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IMF Working Paper

Defining the Government's Debt and Deficit

by Timothy C. Irwin

***IMF Working Papers* describe research in progress by the author(s) and are published to elicit comments and to encourage debate.** The views expressed in IMF Working Papers are those of the author(s) and do not necessarily represent the views of the IMF, its Executive Board, or IMF management.

I N T E R N A T I O N A L M O N E T A R Y F U N D

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Defining the Government's Debt and Deficit

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Abstract

Although the budget deficit and the public debt feature prominently in political debate and economic research, there is no agreement about how they should be measured. They can be defined for different sets of public institutions, including the nested sets corresponding to central government, general government, and the public sector, and, for any definition of government, there are many measures of the debt and deficit, including those generated by four kinds of accounts (cash, financial, full accrual, and comprehensive), which can be derived from four nested sets of assets and liabilities. Each debt and deficit measure says something about public finances, but none tells the whole story. Each is also vulnerable to manipulation, and is likely to be manipulated if it is subject to a binding fiscal rule or target. Narrow definitions of government encourage the shifting of spending to entities outside the defined perimeter of government. Narrow definitions of debt and deficit encourage operations involving off-balance-sheet assets and liabilities, while broad measures are susceptible to the mismeasurement of on-balance-sheet assets and liabilities. Reviewing the literature on these issues, the paper concludes that governments should publish several measures of the debt and deficit in a form that clearly reveals their interrelationships.

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I. INTRODUCTION*

One might think that defining the government's debt and deficit debt was easy, but it turns out to raise difficult questions whose answers matter for the numbers. Canadian government debt in 2010, for instance, could plausibly be said to be as little as 38 percent of GDP and as much as 104 percent, depending on how *government* and *debt* were defined (Dippelsman *et al.*, 2012). The U.S. federal government's deficit in fiscal year 2010/2011 was either 8 percent of GDP or 14 percent depending on whether the source of the estimate was the government's mainly cash-based budget or its accrual-based financial statements (U.S. Treasury, 2011, p. vi), while Kotlikoff and Burns (2012, pp. 37–38) say the “true deficit”—the change in the fiscal gap—was actually 39 percent of GDP.¹

Such uncertainties create problems for policymaking and economic research. Measures of debts and deficits are widely used to estimate the risks of fiscal crises. They also enter into assessments of the sustainability of the government's tax and spending policies and thus judgments about intergenerational equity. Deficits are used to estimate whether the government's fiscal policy is stimulating or constraining the rest of the economy. Debt must be measured to determine whether high levels inhibit economic growth. And estimates of spending and revenue must be made to assess the impact of the size of government on economic growth and other variables. If it is not possible to say how large are debt and deficits even for Canada and the United States, how useful can empirical research on these issues be?

The choices that arise in defining the deficit were reviewed by Blejer and Cheasty (1991a), but since then there has been a revolution in the practice of government accounting. In 1991, almost all central governments measured the deficit on a cash basis. Since then, many have started to publish accrual accounts—that is, accounts that record revenue and spending when economic value is deemed to have been transferred, not when cash changes hands, and that include balance sheets that are arithmetically linked to the measures of revenue and spending. New national and international standards calling for the preparation of such accounts by

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¹ The first two estimates of the U.S. government's deficit are for the year ending September 2011. The third is for the year ending June 2011. The dollar values reported in the sources have been divided by the average of the GDP estimates for 2010 and 2011 in the IMF's April 2014 World Economic Outlook database (\$15.2 trillion).

government have also been published. And a revival of interest in budget transparency and the proliferation of fiscal rules have both put government accounts under a spotlight.

Precisely how many governments now produce accrual accounts depends on how such accounts are defined. In a review that isn't exhaustive, Blondy *et al.* (2013) identify 13 central governments worldwide that produce accrual accounts that meet four relatively demanding criteria: that is, are audited; recognize real as well as financial assets; are for the government as a whole, not just individual ministries and agencies; and include a cash-flow statement as well as a balance sheet and an accrual operating statement. Many other governments produce accounts that do not meet all these criteria, but are still recognizably accrual based, and many more have plans to produce them. Looking at just the European Union, Ernst and Young (2012, p. 21) report that 22 out of 26 central governments say that they use some form of accrual accounting, sometimes alongside cash data.

Early adopters of accrual accounting, including most governments in Australasia, Scandinavia, and North America, followed standards based on those used by local firms. Starting in 2002, however, the International Federation of Accountants began to publish International Public Sector Accounting Standards (Chan and Zhang, 2013; IPSASB, 2014). These standards are derived from International Financial Reporting Standards—the standards used by large companies in much of the world—but have been adapted to some of the special characteristics of governments. Although IPSAS are promulgated by a private body, some governments have adopted them in whole or part (e.g., Government of Switzerland, 2014) and others have referred to them as a source of accounting doctrine (e.g., Government of France, 2014). In the United States, a radical change occurred in 1999, when the Governmental Accounting Standards Board issued a standard requiring all state and local governments to prepare accrual accounts (GASB, 1999). The European Union may create its own standards for accrual accounts (European Commission, 2013), which would be very influential.

The accounts produced by accountants, however, are not the only fiscal data produced by governments. There are also statistics on government finances. These have their origin in national accounts and thus complement data on other sectors of the economy. Whereas accounts are prepared for particular governments or government agencies, statistics may be prepared for collections of governments, like all governments in the United States or the European Union. Yet accounts and statistics may present very similar information, and both may be prepared for the central government of a given country.

The International Monetary Fund's first manual on government-finance statistics (IMF, 1986) recommended that such statistics be prepared on a cash basis. The 2001 manual (IMF, 2001), however, prescribed an accrual basis in which measures of the government's spending and revenue were linked to its opening and closing balance sheets. With IMF (2001), the guidelines for preparing government-finance statistics became more like

accounting standards for businesses and very similar to the manuals for preparing national accounts, which had provided for accrual reporting and balance sheets since United Nations (1968) (see also European Commission *et al.*, 2009). Data presented later in this paper show that at least 57 countries around the world now report fiscal statistics on some kind of accrual basis.

Accompanying these changes in accounting, there have been calls for greater budgetary transparency, by the IMF (Kopits and Craig, 1998; IMF, 2014a), the Organization for Economic Cooperation and Development (OECD, 2002), and the United Nations (2012). The demands include good measurement of the government's debt and deficit, as well as regular publication of budgets and accounts, credible fiscal forecasts, and opportunities for citizens to participate in budget decisions. Various indices of transparency have been developed, including by Alt *et al.* (2002), Hameed (2005), and the International Budget Partnership (IBP, 2012), and these indices have been used by researchers trying to identify the causes of fiscal transparency (e.g., Alt *et al.*, 2006; Khagram *et al.*, 2013) and its consequences (e.g., Alt and Lassen, 2006). All this has drawn attention to the reliability of fiscal data.

Finally, government accounting has taken on a new prominence because of the proliferation of fiscal rules. According to research reported by Budina *et al.* (2013), only five central governments were subject to a fiscal rule in 1991 but, by 2014, 78 were.² Most such rules cap the debt or deficit; some cap spending or revenue. Writing about U.S. municipal accounting, Greene (1980, p. 59) joked that the “basic drives of man are few: to get enough food, to find shelter, and to keep debt off the balance sheet.” Certainly, the spread of debt limits has encouraged governments to look for forms of financing that need not be counted as debt. This in turn has prompted accountants and statisticians to think harder about how to define debt. Deficit rules have done the same for the definitions of revenue and spending. Eurostat, which supervises the measurement of the debts and deficits subject to the European Union's fiscal rules, publishes not only the national-accounts manuals that underpin the measurements (Eurostat, 1996, 2013b), but also an annual volume on problems that arise in measuring debts and deficits specifically (e.g., Eurostat, 2013c).

Notwithstanding the international standards, there are still many differences in how debts and deficits are actually measured. Although many governments now produce some form of accrual data, the great majority of central governments still use cash accounting where it matters most—in the budget (Blöndal, 2004; Kahn, 2013). Among followers of the accrual principle, some prefer to treat the acquisition of real assets as an investment that leaves the deficit unchanged, while others prefer to treat it as deficit-increasing. Some think that governments should concentrate on government-finance statistics (Barton, 2011) while others

² Data provided by Tidiane Kinda.

say that accounts are more useful (Ball and Pflugrath, 2012). Partly because of the disagreements and partly because of enduring historical differences, cross-country fiscal data are not fully standardized, while time series for a single country are muddled by changes in definitions over time. Even in a single country in a single year, different measures are used in different contexts. In the European Union, a government may budget on a cash basis, prepare end-of-year accounts on an accrual basis, and strive to comply with fiscal rules that refer to fiscal statistics prepared on an accrual basis somewhat different from that of the accounts.

This paper surveys developments in practice and research related to government accounting and specifically the measurement of debts and deficits. It concentrates on developments after 1991 and, in keeping with the theme of this volume, on the use of debts and deficits in assessing governments' savings and solvency and the sustainability of their tax and spending policies. It touches on the accounting for several of the things discussed by other papers in this volume, including pensions, Islamic financing, and sovereign wealth funds. It does not address other questions, such as which deficit best shows the effect of fiscal policy on aggregate demand (the best measure might give different weights to different types of spending and revenue), how the deficit should be adjusted for the effects of inflation (which can cause government spending to be overstated since a portion of interest expense is really the repayment of principal), or how the deficit can be adjusted to isolate the effects of changes in government policy from those of the business cycle. (On these questions, see Blejer and Cheasty, 1991a, 1991b; for recent reviews of the political economy of deficits and the differences between forecast and actual deficits, among other things, see Eslava, 2011, and Cimadomo, 2014, respectively).

Although the paper surveys the research of economists, it also pays attention to the work of accountants and political scientists and to that of practitioners whose job it is to define, measure, and analyze debts and deficits. Economists have made major contributions to the theory and practice of government accounting and their empirical analyses of fiscal rules have helped clarify the effects of accounting choices, but the field would benefit from further theoretical clarification and more-convincing empirical evidence of the kind that economists might be able to bring to bear. For example, there is a large literature on the relative merits of cash and accrual measures of the surpluses of firms (e.g., Dechow, 1994; Sloan, 1996; Penman and Yehuda, 2009) but nothing comparable for governments. Part of the reason is no doubt the lack of large databases and natural experiments (Poterba, 1995). Yet the mathematical nature of accounting makes the subject amenable to theorizing, while the increasing number of governments reporting noncash accounts may create opportunities for new research. By setting out some current controversies in the field, the paper may encourage further research along these or other lines. Although it is by no means a guide to fiscal data, it

may also alert researchers to questions they should ask when using estimates of debts and deficits.

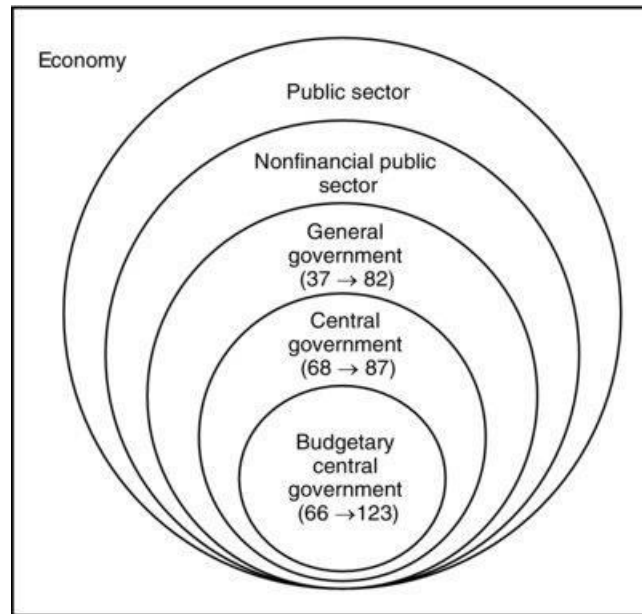
The paper is organized around two aspects of the measurement of government debt and deficit: the definition of government and the definitions of debt and deficit. Some of the literature it reviews explicitly examines the possible choices. Other work sheds light on the choices indirectly by investigating how governments react to fiscal rules. A theme of the paper is that there are narrow and broad ways of defining both government and debt and deficit. Narrow definitions invite what could be called window dressing, or operations that, exploiting a weakness in accounting, reduce the reported debt or deficit without substantially changing public finances. For instance, a government using cash accounting may delay the payment of a bill from the end of one budget year to the beginning of the next. Broader definitions mitigate this problem, but create new ones, including what might be called creative accounting, which need not involve any new operations, just the convenient but misleading measurement of the state of public finances. A government using accrual accounting, for example, might improve its apparent fiscal position by choosing to measure its pension liability at a discount rate that is unreasonably high given the nature of the payments. (This distinction between two kinds of manipulation is made by Tirole (2006), who refers to “operating methods” and “accounting methods.”)

II. DEFINING THE GOVERNMENT

The first issue that arises in measuring government debt and deficit is the definition of government. Although distinctions are sometime drawn between different government funds, the dominant international approach to delimiting government is to specify the entities that lie within its perimeter. Some of the main options can be represented by nested sets (Figure 1). At the narrow end of the spectrum, the government can be defined as the state as a legal entity, and the state’s spending and revenue as the flows shown in its budget. This entity can be called *budgetary central government* (IMF, 2014b, chap. 2). This definition is too narrow for many purposes, however, since governments create legally distinct, but government-controlled, tax-funded agencies to carry out their policies. Including such agencies gives *central government*, while adding subnational governments and their agencies gives *general government*. (About half the above-mentioned difference between the high and low estimates of Canadian debt is the difference between budgetary central government and general government.³) Some definitions of government also include government-owned corporations. Adding the nonfinancial ones gives the *nonfinancial public sector*; adding all of them, including the central bank, the *public sector*.

³ Increasing the perimeter of government from budgetary central government to general government increases the estimate of debt by 74–109 percent, depending on the definition of debt.

Figure 1. Five Definitions of Government



Source: Data are from the IMF's *Government Finance Statistics Yearbooks* 2003 (pp. xix–xxii) and 2013 (pp. xxi–xxv).

Note: The figure shows five increasingly broad sets of public institutions, each of which can be considered a definition of government. The first and second numbers in parentheses in the three smaller sets show how many countries reported data for the relevant definition of government in the 2003 and 2013 *Government Finance Statistics Yearbooks*, respectively. Countries are counted as providing data for a given definition of government if the most recent data reported in the 2003 *Yearbook* are for the year 2001 or later and for the 2013 *Yearbook* if they are for the year 2011 or later.

A lower bound on the availability of fiscal data for the three smallest sets can be gleaned from *Government Finance Statistics Yearbooks*. The first and second numbers in the parentheses in Figure 1 show how many countries reported data for the relevant definition of government in the 2003 and 2013 *Yearbooks*, respectively. They reveal both an increase in the reporting of fiscal data to the IMF and a large increase in reporting for general government. Only a few countries prepare fiscal data for the nonfinancial public sector or the public sector (IMF, 2012), and such data were not reported in the *Yearbooks*. Perhaps surprisingly, if “public” means the public sector of Figure 1, few governments publish information on public debt.

Definitions used in macroeconomic statistics are influenced by national accounting's division of the domestic economy into five sectors, one of which is general government. The others are households, nonprofit institutions serving households, financial corporations, and nonfinancial corporations (European Commission *et al.*, 2009, chap. 4). A tricky aspect of

delimiting general government is distinguishing public enterprises that operate commercially and are properly considered corporations from those that have the legal form of a company but do not really operate commercially and should be included in general government. The classification of sovereign wealth funds (Megginson and Fotak, forthcoming) can also be difficult (IMF, 2014b).

Definitions used in accounting stress accountability and hence the scope of the government's ownership-like control. A business's accounts typically consolidate all the entities it controls, including majority-owned subsidiaries. In government accounting, the application of the same idea has led to a definition of government that includes not only the government and budget-funded agencies carrying out government policy but also any companies that the government owns or controls, and whose finances the government can thus ultimately be held accountable for. Determining what a government controls is of course tricky, since its coercive powers give it an influence quite unlike that of any company. International Public Sector Accounting Standards define control as "the power to govern the financial and operating policies of another entity so as to benefit from its activities" (IPSASB, 2014, vol. 2, p. 1633). Local governments are consolidated if they are deemed to be controlled by the central government, but not otherwise.

In the United States, narrow definitions of city and state governments can make debt and deficit rules easy to circumvent. Debt rules applying only to the borrowing of the government as a legal entity, for example, can be evaded by establishing a public authority and having it borrow. The revenue used to repay the borrowing may come from user fees, such as tolls on a highway, or from the government itself, in the form of payments for buildings leased from the authority. Kiewiet and Szakaly (1996) explain how state governments can circumvent debt rules in this way, and Sbragia (1996, chap. 7) explains how city governments can do the same thing to circumvent the debt rules imposed on them by states. In addition, most states have balanced-budget rules that apply to the government's general fund, but not to other government funds, such as those for capital projects and employee pensions. The rules thus constrain only a narrow definition of government. Peterson (2003) explains that state governments can eliminate a deficit in the general fund simply by transferring in money from one of the other funds.

Bunch (1991) was one of the first to systematically examine the effects of fiscal rules based on narrow definitions of government and the extent to which they lead to the creation of new public agencies outside government as defined. She considers a cross section of U.S. states in the 1980s, most of which have constitutions that limit state debt. All the rules limit general-obligation debt and some also limit revenue bonds, which are secured by a specified revenue stream and not the "full faith and credit" of the government. Some of the constitutional debt rules were set in nominal terms and have become very restrictive—limiting debt to \$1 million or less. She finds that state governments subject to a constitutional debt rule that limits both general-obligation and revenue debt have on average more than six times as many

public authorities as those subject to no constitutional debt restriction and that their authorities undertake a wider range of functions. These governments are also more likely to create a public building authority (that is, one that borrows money to build facilities that are then leased to the government) and more of their debt is issued by public authorities.

Kiewiet and Szakaly (1996) take a somewhat different approach to the issue. They investigate the effect of debt rules embedded in state constitutions on three kinds of debt: the generally guaranteed state debt that is the subject of the debt rules, the generally unguaranteed state debt that is not restricted by the rule, and the debt of cities and counties within the state. They analyze data on all 50 U.S. states over the 30-year period 1961–90 and exploit both cross-state differences in debt rules and the fact that 12 states changed their debt rules during the period. They find that rules restricting state debt shift debt to cities and counties and do not “meaningfully” reduce the total debt issued by public authorities in the state (p. 91). They find no evidence, however, that restrictions on guaranteed state debt are circumvented by the issuance at the state level of unrestricted unguaranteed state debt. They find this result “more than a bit surprising” (p. 91) and conjecture that there is a (small) effect that they are unable to detect given the data they have, namely that restrictions on guaranteed state debt result in the issuance of lease-revenue bonds by the public building authorities mentioned above, but that these bonds make up a small part of total unguaranteed debt.

These results could of course be affected by the endogeneity of fiscal rules. States with fiscally conservative voters may elect governments that choose both to have little government debt and to enact tough rules. Yet governments could also be more likely to adopt fiscal rules when they know they can circumvent them. So the effect of endogeneity on circumvention is not clear. Kiewiet and Szakaly note that constitutional rules tend to change only slowly and that their data on fiscal rules are not strongly correlated with their data on state ideology or with their other explanatory variables. The investigations discussed in Section III (“Defining the Debt and Deficit”) of the effects of the fiscal rules of the European Union—which though not truly exogenous are accepted by governments as part of a much larger package of rights and obligations—may be less vulnerable to this problem.

A different kind of evidence on circumvention comes from the General Accounting Office (1993), which examined the extent to which U.S. states balanced their budgets with genuine spending cuts and tax increases. Its method was to ask budget officials how they closed gaps in the budget that was most recently completed and the one that was most recently enacted. For the most recently completed budget, 36 percent of the reported deficit gap was said to have been closed by means of actions other than cutting spending or raising revenue. Of this 36 percent, 22 percent came from transfers to the general fund from other government funds. Thus at least 8 percent of the total deficit reduction came from devices that exploited the narrow definition of government underlying the rule (“at least” because the nature of some of the “other” actions is unclear and because officials may have preferred not to disclose dubious measures). For the most recently enacted budget, a similar calculation shows that

10 percent of the total deficit reduction came from transfers from other funds, reduced contributions to pension funds, and the shifting of spending to cities and counties.⁴ As Porterba (1996) notes, the results suggest that most apparent fiscal adjustment is real. Yet they also confirm that narrow definitions of government encourage the shifting of spending and debt to other public entities.

The European Union's debt and deficit rules, based on statistical standards, apply to general government, a broad and less easily manipulated definition of government. This definition also allows fair comparisons despite differences among countries in the way responsibilities for public services are divided between central and subnational governments. It also ensures that the debt and deficit rules affect the core, primarily tax-funded activities of government, without constraining those of the central bank or commercial government-owned companies. Faced with a gross-debt rule applying to even this fairly broad definition of government, however, a government can reduce its debt by selling assets to a public corporation that it owns and controls. To facilitate the operation, the government may even guarantee the corporation's borrowing. Examples of the use of public corporations to circumvent debt and deficit rules have been identified by Blanchard and Giavazzi (2008), Dafflon and Rossi (1999), and Prammer (2009), among others. The empirical research discussed in Section III ("Defining the Debt and Deficit") on differences between deficits and the growth of debt in the European Union also provides indirect evidence of the shifting of spending and debt to public enterprises.

So should the broadest definition of government always be preferred? The United Kingdom tracks the finances of the entire public sector in both its accounts and its statistics (HM Treasury, 2014; ONS, 2014), thus minimizing the problem that arises with narrower definitions of government. Yet its experience suggests that the broadest measure is not always the most useful. When the government nationalized several banks during the financial crisis of 2008, its balance sheet grew enormously. In June 2009, the debt of the public sector including the banks (but excluding the Bank of England) was 198 percent of GDP, while the debt of general government was 58 percent (ONS, 2014, table PSA8B).⁵ To have reported only the finances of the entire public sector would have frustrated attempts to monitor the government's core operations, and government statisticians chose to report measures of public finances that excluded the banks as well as measures that included them. Nor does defining the government as the public sector prevent all shifting of deficits or debts. There

⁴ Nineteen percent of the reduction comes from "other actions" (p. 27), of which 20 percent comes from "inter-fund transfers" and 25 percent from an action by the state of California, which reduced the forecast gap in its enacted budget by shifting educational costs to cities and counties.

⁵ Percentages of GDP are obtained using the estimate of UK GDP in 2009 in the IMF's April 2014 World Economic Outlook database (£1.417 trillion).

has been a long-running controversy over whether Network Rail, a company without shareholders, is part of the public sector or the private sector (Eurostat, 2013a; Joloza, 2013). And more generally governments can often achieve spending goals by means of regulation—that is, by requiring private firms to supply or subsidize services like electricity and health insurance and allowing the costs to be recouped from implicit taxes on the firms’ employees, customers, or shareholders. Drawing a sharp line between fiscal and economic analysis may never be possible.

III. DEFINING THE DEBT AND DEFICIT

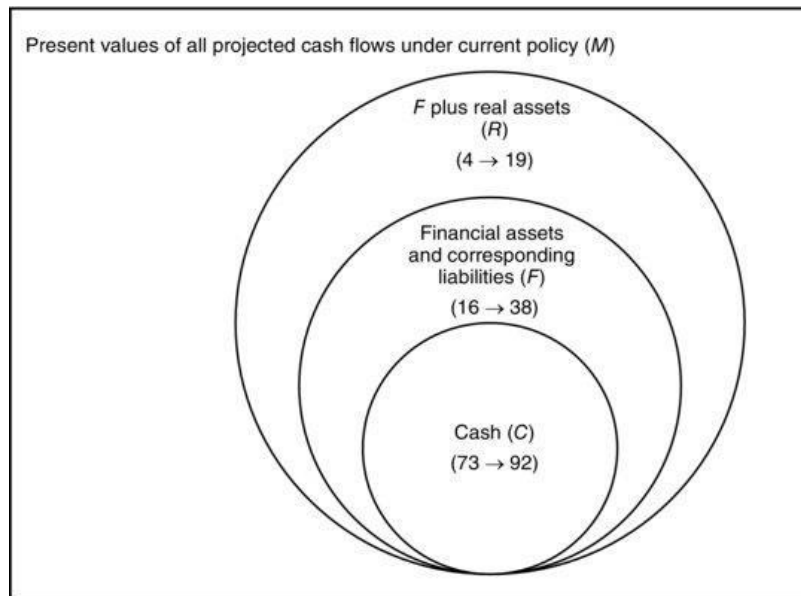
Given a definition of *government*, the next issue is defining *debt* and *deficit*. There are a myriad of ways of doing so. Practice varies from country to country and, within a given country, central and local governments may follow different rules. To make analytical progress, it is necessary to abstract from much of this variation.

We can start with the deficit. It is natural to think of it as the difference between spending and revenue, without reference to the government's balance sheet. Yet it can also be defined in terms of changes in the balance sheet, and it often is because spending and revenue are themselves defined in this way (e.g., IMF, 2014b; IPSAB, 2014). The simplest measure of the deficit is the decline in the value of the government's net assets. Such a deficit is said to be clean, while one that excludes certain changes is said to be dirty (Nobes, 2006, pp. 66, 111). Although dirty deficits can be used to exclude losses for purely cosmetic reasons, certain dirty deficits are important. In particular, excluding capital gains and losses caused by changes in market prices generates a deficit that is more stable and more easily controlled by the government than the clean deficit. In government-finance statistics, the clean deficit is usefully split into a part arising from transactions and a part related to “other economic flows,” and it is the deficit on transactions that gets most attention.

Different measures of the clean deficit arise from differences in the assets and liabilities that are recognized in the government's accounting. (To recognize an asset or liability is to record it on the balance sheet.) Four nested sets of assets and liabilities can be highlighted (Figure 2), each of which generates its own measure of net assets and hence its own clean deficit. Each set also tends to be associated with certain dirty deficits, as well as certain measures of the debt. The smallest set, *C*, contains cash and nothing else. The clean cash deficit is just the change in the government's cash balance, which is crucial when the government's liquidity is in doubt, but not very informative otherwise. When cash accounting is used, attention is paid to a dirty deficit that is derived by classifying transactions into groups. Often, financing cash flows are distinguished from operating and investing cash flows, and the deficit is taken to be the sum of operating and investing cash flows. The next set, *F*, contains cash and other financial assets, like loans, shares, and accounts receivable, as well as the liabilities that correspond to these assets. This set generates what could be called *financial accounting* and a clean deficit equal to the decline in the government's net financial

worth. The part of this decline that arises from transactions is the deficit subject to the European Union's fiscal rule. The third set, R , also includes real assets, like land and buildings, and generates the kind of accounting that is used by businesses and required by IPSASB (2014). For convenience, R -based accounts can be called *full-accrual* (recognizing that financial accounting as defined above is also a form of accrual accounting). The clean deficit of full-accrual accounting is the decline in the government's *net worth*, and the change in net worth arising from transactions is the *net operating* balance (IMF, 2014b, chap. 4). The universal set, M , in Figure 2 includes assets and liabilities in respect of all the government's projected spending and revenue under current policy. It generates what can be called comprehensive accounting (Buiter, 1983) and a measure of the deficit equal to the decline in the government's comprehensive net worth, including the net present value of its projected spending and revenue under current policy.

Figure 2. Four Sets of Assets and Liabilities



Source: Data are from the IMF's *Government Finance Statistics Yearbooks* 2003 and 2013.

Note: The figure shows four increasingly broad sets of assets and liabilities, each of which is associated with a type of accounts. The first and second numbers in parentheses in the three smaller sets show how many countries reported accounts of a given type in the 2003 and 2013 *Government Finance Statistics Yearbooks*, respectively. Countries are classified as reporting cash-based accounts if they present a statement of sources and uses of cash, financial accounts if they report a financial balance sheet and net lending/borrowing, and full-accrual accounts if they report a full balance sheet and the net operating balance. Some countries report two or three kinds of accounts; other are not counted as producing any, even though they report some fiscal data. Countries are counted as providing data for a given definition of government if the most recent data reported in the 2003 *Yearbook* are for the year 2001 or later and for the 2013 *Yearbook* if they are for the year 2011 or later.

A lower bound on the availability of fiscal accounts derived from the three smallest sets can be gleaned from *Government Finance Statistics Yearbooks*. The first and second numbers in the parentheses in Figure 2 show how many countries reported the corresponding accounts in the 2003 and 2013 *Yearbooks*, respectively. As well as revealing an increase in the reporting of fiscal data to the IMF, the numbers show that cash accounting remains by far the most common kind, but that financial and full-accrual accounting are becoming much more common. Many countries report just one kind of data, but some report two or three. Australia, for instance, reports cash, financial, and full-accrual accounts—and each for several definitions of government.⁶

Each set can be associated with a measure of debt. In a pure system of cash accounting, the natural measure of debt is the government's overdraft. In practice, governments that use cash-based accounting also record the loans they have taken out and the bonds they have issued, even if this measure is not produced by the accounting system that measures the deficit. In financial and full-accrual accounting, the range of possible liabilities is larger. The difference between the high and low estimates of Canadian government debt not explained by differing definitions of government comes from adding accounts payable, employee pensions, and other liabilities. Even when these measures are available, however, they are not always included in the most salient measures of debt. Finally, comprehensive accounting generates a measure of liabilities that includes the present value of all projected payments under current policy.

Debt may also be defined in net terms by deducting certain assets from gross debt. Taking account of a government's assets clearly provides a fuller picture of government finances than does considering only its liabilities. In assessing the risk that the government will fail to repay its debt, however, analysts may attach little weight to some assets. A strong case can be made for taking account of creditworthy government bonds denominated in the same currencies and with the same maturities as the government's debt. Indeed, if the assets and liabilities are identical—with one part of the government holding notes and bonds issued by another part—they are eliminated in the measurement of the government's gross debt. But assets like roads or shares in state-owned enterprises might be hard to sell, especially when the government was most in danger of not being able to repay its debt. And bonds denominated in different currencies from the government's debt might have depreciated when the government needed to sell them.

Narrow and broad definitions of deficits and debts have their own advantages and disadvantages. Narrow ones can be measured more reliably than broad ones and provide useful information on certain changes of public finances, such as in the government's ability

⁶ See the pages for Australia in the IMF's *Government Finance Statistics Yearbooks* and the data published by the Australian Bureau of Statistics at <http://www.abs.gov.au/ausstats/abs@.nsf/PrimaryMainFeatures/5512.0?OpenDocument>.

to meet its obligations in the short term. Yet narrow definitions are poor indicators of the government's savings and of the sustainability of its policies, and they can be window-dressed by operations in off-balance-sheet assets and liabilities (Irwin, 2012). For instance, because cash accounting does not recognize accounts payable as a liability, a cash deficit can be reduced simply by deferring the payment of bills. Broad definitions are better indicators of the government's savings and the sustainability of its policies, and the corresponding deficits are less vulnerable to manipulation involving off-balance-sheet assets and liabilities. But the assets and liabilities on broader balance sheets can be hard to measure reliably—it is said that everything on a modern balance sheet is an estimate, with the possible exception of the date. The corresponding deficit measures are thus vulnerable to manipulation by mismeasurement (creative accounting). The comprehensive deficit, for instance, can be varied enormously by altering the rate at which tax revenues are forecast to grow or at which future cash flows are discounted.

A. Cash and Accrual

Because cash accounting is the traditional form of government accounting, its defense often takes the form of a rejection of a proposal to adopt business-like accrual accounting. Writing in about 1830, Bentham (1993) objected to a proposal that the U.K. government adopt the kind of accounting then used by merchants, on the grounds that its obscure terminology would prevent the public from understanding the government's finances. More recently, Ward (2004) questions the suitability of business-like accrual statistics and worries about their political implications. IMF (1986), the manual prescribing cash accounting, advances both practical and conceptual arguments against accrual accounts. It contends that a government cannot actually keep them because it is not a party to the transactions that give rise to its assets and liabilities. For instance, a sale may generate a sales-tax receivable, but the government isn't a party to the sale and therefore doesn't know when the receivable arises. Moreover, it argues, net worth is not even “meaningful” for government (p. 34). Levin (1991) acknowledges that other deficit measures may have their uses, but contends that the cash deficit is “probably the best single measure of the impact of government finances on the behavior of the rest of the economy” (p. 107). Even among those who accept the usefulness of accrual data, there are doubts about whether budgets in particular should be formulated on such a basis (Schick, 2007; see also Blöndal, 2004). Finally, the benefits of fuller information need to be weighed against the costs of collecting it (e.g., Blondy *et al.*, 2013; European Commission, 2013).

The arguments against cash accounting usually involve the desirability of recording transactions not when cash changes hands, but when value is “created, transformed, exchanged, transferred, or extinguished” (IMF, 2014b, p. 50). This reduces window-dressing and leads naturally to preparation of a balance sheet that includes accounts payable and receivable, among other items. IMF (2001) argues that accrual accounting for governments is both possible and desirable. It allows that governments may not know when tax-generating

events like sales occur, but says that they can record a tax receivable when they have enough information to be reasonably confident of receiving payment (IMF, 2001, chap. 3). It also argues that accrual data are the most relevant for economic analysis, as do manuals for national accounts (e.g., European Commission *et al.*, 2009; see also Efford, 1996). A recent and influential defense of accrual accounting has been made by the European Commission (2013), which says it is “the only generally accepted information system that provides a complete and reliable picture of the financial and economic position and performance of a government” (p. 3).

Research on the effects of fiscal rules and targets has cast some light on the effects of different kinds of accounting, even if it cannot settle the debate about which is best. One line of research has shown how cash-deficit rules are partly circumvented by transactions in off-balance-sheet assets, though the size of the effect remains unclear. The survey of U.S. state budget officials referred to in Section II (“Defining the Government”) found that states defer payments to fill 13–16 percent of the budget gap not filled by genuine spending cuts or revenue increases (GAO, 1993). In a systematic empirical examination of U.S. states, Costello *et al.* (2012) find indirect evidence that governments meet stringent cash-based balanced-budget rules by deferring payments and direct evidence that they do so by selling assets (see also Block, 2008, and Bifulco *et al.*, 2012). Examining governments subject to IMF- and World Bank-supported adjustment programs in the 1980s and 1990s (which set targets for cash deficits) Easterly (1999) finds suggestive evidence of the deferral of deficits rather than sustained reductions.

Evidence on the effects of the European Union's gross-debt and financial-deficit rules also reveals partial circumvention by operations involving assets and liabilities not recognized in the financial accounts underlying the respective rules. Easterly (1999) shows that European governments wanting to join the euro privatized public enterprises after the signing of the Maastricht treaty—and also that three EU members not seeking to adopt the euro did not behave in this way. Similarly, Milesi-Ferretti and Moriyama (2006) find that reductions in the gross debt of EU members were strongly and positively correlated with reductions in their assets in the period 1992–97, when governments were trying to meet the Maastricht debt criterion, but much less so in the period 1997–2002. They also show that the 1992–97 reductions in assets were greater in countries with higher initial levels of debt and higher in member of the European Union than in other OECD countries. Looking at the period 1993–2003, Koen and van den Noord (2005) identify many transactions involving off-balance-sheet assets that reduced the reported deficit but did not improve public finances in a broader sense. In three countries, the dubious transactions they identify (they do not attempt to specify which involve off-balance-sheet assets and liabilities) averaged more than half a percent of GDP. The transactions were more likely to occur when the deficit rule was in danger of being breached. There is also some suggestive evidence of a different kind of problem. Auditors looking for made-up numbers in company accounts assess the extent to which the numbers in the accounts deviate from Benford's law—a distribution that describes

the frequency of digits in many naturally generated data sets. Rauch *et al.* (2011) examine the extent to which fiscal data reported by 27 EU countries in the period 1999–2009 conform to Benford’s law and find the largest deviations in Greece’s numbers. Eurostat (2004) finds that Greece simply did not report some spending.

B. Debt-Deficit Residuals and the Importance of Reconciling Stocks and Flows

Evidence of the value of linking stocks and flows in the style of accrual accounts comes from research on the differences between deficits and the growth of debt. In simple models of public finance, the increase in the government’s debt from one period to the next equals the deficit for that period:

$$debt_t - debt_{t-1} = deficit_t$$

If the deficit were clean and debt were net liabilities, this equation would hold as an identity. Usually, however, the deficit is dirty and debt is gross, so the equation does not hold. The difference between the deficit and the increase in debt is often called the “stock-flow adjustment,” but it could more precisely be called the *debt-deficit residual*. In any case, the relevant equation is

$$debt_t - debt_{t-1} = deficit_t + residual_t$$

The existence of even a large residual is not necessarily a sign of a problem in the government’s accounting. Large and consistently *negative* residuals, however, could suggest an attempt to contain debt without reducing spending. Likewise, large and consistently *positive* residuals might hint at efforts to hide spending. For instance, a government may choose to borrow in a low-interest-rate foreign currency to reduce a dirty deficit that excludes local-currency appreciation of foreign-currency debt. If interest-rate parity holds, the lower interest rate implies an expected appreciation of the foreign currency against the local currency, so borrowing in the foreign currency is not cheaper. Yet increases in the local-currency value of the debt show up only in the residual, and the reported deficit is misleading.

Several studies have found large positive residuals that raise suspicions. Kharas and Mishra (2005) examine the difference between reported deficits and increases in debt in 29 countries during the period 1980–97. They find that on average debt increases more rapidly than can be explained by cumulative deficits. In the seven developed countries in their sample, however, reported deficits give “a fairly accurate picture” of the evolution of public debt (p. 160), while in the developing countries reported deficits are on average much less than the increases in debt. They argue that the unexplained increase is likely to have been caused by currency depreciations and bank rescues in which a government assumes liabilities without this affecting the deficit. They conclude with an appeal for better government accounting.

Campos *et al.* (2006) find similar results in an investigation of 117 countries in the period 1972–2003, with 1900 country-year observations in all. In their sample, the average annual residual is 5 percent of GDP. It is less than 1 percent of GDP in high-income countries, however, and as much as 9 percent in sub-Saharan Africa. Weber (2012), examining 163 countries in the period 1980–2010, also finds large residuals, but in a new twist discovers that the component of the residual that cannot be explained by her data on inflation, exchange rates, banking crises, and debt forgiveness is greater in countries that score less well on an index of fiscal transparency, lending some support to the view that debt-deficit residuals may reflect attempts to hide spending.

A limitation of these large-sample studies is that for many of the country-year observations little or no accounting information is available. Campos *et al.* and Weber therefore have to explain the residual by regression. For a smaller sample of mainly developed countries in recent years, it is possible to see how the residual arises simply by examining the accounts. Seiferling (2013) explains how the debt-deficit residual that arises from common statistical measures of the debt and the deficit is made up of (i) transactions in financial assets, (ii) transactions in liabilities that don't count as debt (e.g., liabilities from financial derivatives); and (iii) changes in the value of debt not caused by transactions (e.g., changes in the local-currency value of foreign-currency debt). Using data for 22 countries in the period 1996–2011, he shows that the part of the residual not explained by accounting data on items (i), (ii), and (iii) is very small. In principle, it should be zero, but small statistical discrepancies arise.

C. Debt-Deficit Residuals and the Valuation of Assets and Liabilities

Nevertheless, even a fully explained residual may reflect an attempt to hide a deficit, and studies of debt-deficit residuals can tell us something about the measurement problems that arise in financial accounting. For example, when the relevant deficit excludes both the spending of public enterprises and the government's acquisition of financial assets, a government can shift spending into the residual by transferring funds to public enterprises and having them spend the money, as long as it can describe the transfer to the enterprise as a loan or equity investment. The potential problem here is the mismeasurement of financial assets. If the public enterprise is profitable and the government can expect a market rate of return on its loan or investment, there is nothing amiss. But public enterprises often lose money, and the government's loan or equity investment may be made at an expected loss. Then some or all of the transfer is spending, not genuine investment. In principle, the part that is spending should be recorded as such. In practice, given the difficulty of estimating expected returns, the government may have some leeway to shift spending into the residual. To take a second example, if the deficit is measured on an accrual basis, spending includes increases in accounts payable and revenue includes increases in accounts receivable. If debt is gross and excludes accounts payable (as in the European Union), these components of the deficit do not affect the debt and are therefore part of the debt-deficit residual. Though not

inherently suspicious, the components can arise from creative accounting that underestimates increases in payables or overestimates increases in receivables.

While European fiscal rules limit both debts and deficits, von Hagen and Wolff (2006) point out that breaches of the deficit rule have often created more political problems than breaches of the debt rule. Governments are often well under or well over the debt limit of 60 percent of GDP, and in the short term nothing they can reasonably do is likely to change this. By contrast, whether or not the deficit target will be met is often an open question. Von Hagen and Wolff therefore argue that governments in danger of breaching the deficit rule will seek to shift increases in debt from the deficit to the residual, and point to the possibility of doing this by shifting spending to public enterprises. To test their hypothesis, they examine debt and deficit data for EU member states in the period 1980–2003. They find first that debt-deficit residuals tend to be positive, though they fall in the period leading up to the adoption of the euro (when the debt rule was more salient and governments sold financial assets to reduce gross debt) and increase thereafter. Second, they find that, after the Stability and Growth Pact came into force, the debt-deficit residual tends to increase when deficits are higher, especially when the 3 percent deficit rule is in danger of being breached, and especially during cyclical downturns when genuine spending reductions are likely to be more difficult.

Buti *et al.* (2007) find further evidence by analyzing not just the whole residual but also certain of its components. They first consider changes in accounts payable and receivable. Looking at 25 EU countries in the period 1994–2004 (with shorter periods for some countries), they find that this component of the residual increases with the deficit and increases by about 0.5 percent of GDP after the Stability and Growth Pact comes into force. They also find evidence that it increases during cyclical downturns and in election years. Next, they add the part of the residual most likely to be associated with the shifting of spending to public enterprises. They point out that the purchase of securities by a social-security institution that is investing surpluses may be commercially motivated even if other government investments are not. Given the available data, they single out as most likely to be suspicious lending and the purchase of securities by government entities other than social-security organizations. Examining a slightly smaller sample of observations for which these data are available, they find evidence that the sum of the two above components of the residual increases significantly after the introduction of the Stability and Growth Pact.

Alt *et al.* (2014) get similar results, but also show that the effects are smaller in countries that have greater budgetary transparency. Their primary source of data on transparency is the Open Budget Index (IBP, 2012), which they supplement, for countries not included in the OBI, with data from the IMF and Alt and Lassen (2006). Following the same logic as Buti *et al.* (2007), they look especially closely at the parts of the debt-deficit residual related to the acquisition of shares and other equities and decreases in accounts payable. Motivated by theoretical work on fiscal rules, accounting, and transparency by Milesi-Ferretti (2004) and Alt and Lassen (2006), they examine 14 EU countries in the period 1990–2007 and find that

debt-deficit residuals increase (i) after the EU's fiscal rules came into force, (ii) as elections draw near, and (iii) when the economy goes into a slump. Most interesting, however, they find that the effect of fiscal rules, elections, and slumps on the residual is lower in countries where budgetary transparency is higher. They argue that governments with greater budgetary transparency are less likely to engage in budgetary gimmicks because such gimmicks are more likely to be discovered and publicized.

D. Real Assets and Full-Accrual Accounting

The assumption that debt-deficit residuals reflect attempts to hide the true deficit can be questioned when the issue is public investment in infrastructure and other real assets. Such investments increase the financial deficit, the one used in the European Union, even if the government gets a durable asset that, through user fees or growth-induced increases in tax revenue, ultimately pays for itself. If a government funds such an investment by borrowing, its financial net worth declines, but its net worth does not. By lending money to an enterprise outside the perimeter of government and having the enterprise invest, the government ensures that the investment takes place without any arguably misleading deterioration in its accounts.

Several studies have drawn attention to declines in net public investment encouraged by rules for gross debt and cash or financial deficits. Easterly (1999) finds that European governments cut back public investment in the run-up to the adoption of the euro. Easterly and Serven (2003) and Perry *et al.* (2008) collect papers that provide evidence that fiscal discipline in Latin America has an anti-investment bias and discuss accounting changes that would reduce this bias. (In Latin America, the constraints created by gross-debt targets and cash- or financial-deficit targets may be greater than elsewhere because government is more likely to be defined broadly to include public corporations). Also relevant is Poterba's (1995) finding that U.S. states that have separate capital budgets have higher capital spending than do other states.

These concerns have led to proposals that governments emphasize full-accrual measures of the deficit, counting depreciation but not investment as a cost. Blanchard and Giavazzi (2008) argue that the Stability and Growth Pact errs in treating public investment as spending that increases the deficit and that it is the full-accrual deficit that should be subject to the fiscal rule. Many others have argued in favor of full-accrual accounting on similar grounds (e.g., Eisner, 1984; Stiglitz, 1989; Bohn, 1992; Easterly *et al.*, 2008). But proposals to stress the full-accrual deficit have not been widely adopted, at least by central governments, perhaps partly because full-accrual accounts are relatively new, but also because governments' real investments do not necessarily pay for themselves and even a balanced accrual deficit can allow an excessive build-up of debt (Balassone and Franco, 2000).

E. Off-Balance-Sheet Financing

There are also debates about whether particular rights and obligations should be recognized as assets and liabilities. In the framework of this paper, these can be viewed as debates not about the relative merits of accounts based on sets C , F , and R , but about the boundaries of F and R . For instance, should these sets include liabilities related to government guarantees or employee pensions? Should R include assets and liabilities related to leases and public-private partnerships? The sometimes uncertain or contingent nature of such rights and obligations makes them fit uneasily on a balance sheet otherwise made up of clear-cut assets and hard-and-fast liabilities, but not putting them there invites window-dressing. In the United States, some subnational governments can circumvent debt rules, even without taking advantage of a narrow definition of government, by issuing revenue bonds—because such bonds are not recognized on the implicit balance sheet underlying the fiscal rule. Examining the effect of U.S. states’ debt and deficit rules in the period 1975–85, Von Hagen (1991) finds that the rules (along with narrow definitions of government) lead governments to “substitute nonrestricted for restricted debt instruments, thereby reducing the relevance and informativeness of data on government debt” (p. 209). Sbragia (2006, chap. 6) explains that one of the ways that cities respond to debt rules imposed on them by state governments is issuing revenue bonds. One might expect Islamic financing (Abedifar *et al.*, forthcoming) to create the same opportunities, though so far the governments that have issued Islamic bonds have treated them as debt in their accounts.⁷

Governments seldom have to recognize a liability when they issue a guarantee. By charging a guarantee fee, they may actually reduce their debt and deficit (Brixi and Mody, 2002). A few governments, however, follow debt rules that count guaranteed as well as direct debt. In the United States, the Federal Credit Reform Act of 1990 requires the government to recognize the estimated net present cost of certain guarantees in the budget in the year of issuance (Phaup, 1993). International accounting and statistical standards also require governments to recognize liabilities in relation to certain guarantees and similar instruments, like derivatives, financial guarantees, or groups of standardized guarantees (IMF, 2014b, chap. 7; IPSASB, 2014; see also Heald and Hodges, 2014). Yet guarantees are hard to value and most remain off balance sheet.

Likewise, governments can often acquire assets by means of leases and public-private partnerships without recording any debt. Greene's (1980) quip about the “basic drives of man” was made in a piece entitled “the joys of leasing.” Nowadays, government accounting often treats a long-term lease as a liability, but assets can be acquired without recognizing debt by entering into a public-private partnership, in which a company builds and maintains an asset that provides a service that the government agrees to pay for over the life of a long-term contract. The government's obligations are not identical to those of debt; what it pays

⁷ Personal communication from Yasemin Hurcan.

depends on whether the service is provided. But the expected fiscal effects are typically similar. The case for recognizing assets and liabilities related to public-private partnerships on the government's balance sheet has been made by Quiggin (2004) and Heald and Georgiou (2011)—and is reflected in IPSAB (2014, §32).

To take a final example, although some standards require the recognition of liabilities for employee pensions (e.g., IMF, 2014b; IPSASB, 2014), only a few governments recognize such liabilities. Except in these countries, budget deficits therefore include the cost of paying current retirees, rather than the cost associated with current employees' increasing entitlements. This is one reason that the U.S. federal government's accrual-based accounts, which recognize employee pensions as a liability, have generally shown a higher deficit than the budget has (CBO, 2006). Similarly, the post-employment costs of war veterans' health care and disability compensation are one of the reasons that Stiglitz and Bilmes (2008, chap. 2) conclude that the federal budget greatly understated the true fiscal costs of the war in Iraq. When employee-pension liabilities are estimated, they can turn out to be about as large as ordinary debt (e.g., U.S. Treasury, 2011; HM Treasury, 2014). The problem of not recognizing liabilities for employee pensions is starkly illustrated by transactions in the European Union in which governments have assumed the pension liabilities of public enterprises in return for cash or other financial assets. If the price is fair, the transaction leaves the government's true net worth unchanged, but, because employee pensions are not recognized as liabilities in the accounts, the transactions reduce the reported debt and deficit (Savage, 2005, chap. 4; Koen and van den Noord, 2005).

Even if employee-pension liabilities are recognized, their amount may be understated. Noting that the relevant accounting rules allow employers to discount future pension payments at the expected rate of return on pension-fund *assets*, rather than at a rate that reflects the low-risk nature of pension *payments*, Novy-Marx and Rauh (2011) show that U.S. state pension obligations are actually worth at least \$3.2 trillion, an amount “clearly higher” than the liabilities reported in the states' accounts (p. 1246) and much higher than the states' ordinary debt of \$1.0 trillion (see also Novy-Marx and Rauh, 2009; Munnell, 2012, chap. 3). Chaney *et al.* (2002) find that U.S. states subject to stringent balanced-budget rules make more optimistic assumptions about the discount rate when they are under fiscal stress, and Mohan and Zhang (2014) find that U.S. subnational governments' pension plans choose to invest in risky assets in order to exploit the accounting rule.

F. Comprehensive Accounting

For some, questions about guarantees, public-private partnerships, and employee pensions are details. While employee pensions may be costly, much more costly are the pensions governments provide to all retired employees or to all citizens above a certain age. The future cost of such pensions is not recognized as a liability on any conventional balance sheet, so a government can reduce this year's deficit by increasing taxes now and promising higher pensions (or lower taxes) in the future (Gokhale and Smetters, 2003). Preventing such effects

requires comprehensive accounts that recognize assets and liabilities for all projected future revenue and spending. Buiter (1983) proposes the estimation of a comprehensive balance sheet and shows how it is related to the government's intertemporal budget constraint and also how macroeconomic stabilization can be viewed as a restructuring of the comprehensive balance sheet (e.g., more debt, but a higher present value of future primary surpluses). He recognizes the value of conventional accounts, but wants to supplement them with comprehensive accounts to ensure the government also keeps the long term in view. Kotlikoff (1986, 1998), by contrast, argues that conventional accounts are meaningless. His target is cash accounting, but his argument applies to financial and full-accrual accounting as well, irrespective of the treatment of guarantees, employee pensions, and the like. There is no difference in economic theory, he argues, between different kinds of cash inflow (e.g., taxes and the proceeds of borrowing) or between different kinds of cash outflow (e.g., payment of social security and repayment of debt). Or, to couch the claim in the framework of this paper, the boundaries of sets C , F , and R in Figure 2 are arbitrary.

The claim that conventional accounting is meaningless has not gained widespread acceptance. No government has replaced accounts based on C , F , or R with accounts based on M . Nor have international organizations and credit-rating agencies rejected conventional measures in their analyses. Gokhale and Smetters (2007) note that financial markets pay more attention to conventional than to comprehensive measures of debt—while arguing that they are mistaken to do so. The argument against distinguishing types of cash flows is quite persuasive when applied to the treatment of social security in the budget of the federal government of the United States, where people pay earmarked social-security taxes during their working lives and later receive social-security benefits whose amount depends on their prior contributions: it is easy to see the similarity between borrowing and collecting social-security taxes and between paying social-security benefits and repaying money previously borrowed. Less persuasive is the claim that there is no economically meaningful distinction between the repayment of debt and spending, say, to improve a road. The one extinguishes an economically meaningful legal obligation; the other at most fulfills a plan. Likewise, there is an economic difference for a developing country between receiving a grant and borrowing on commercial terms.

The value of comprehensive accounts has, however, been recognized by many, including Easterly (1999), Bradbury *et al.* (1999), Boskin (2008), Jackson (2008), and Blondy *et al.* (2013). Comprehensive measures of public finances have been estimated for New Zealand (Huther, 1998), for the countries of the European Union (Velculescu, 2010), and for the U.S. federal government on many occasions (Auerbach, 1994; Gokhale and Smetters, 2003, 2006; Kotlikoff and Burns, 2012, chap. 3; and Auerbach and Gale, 2014). The upshot of all these estimates is that aging and the rising cost of health care pose fiscal problems that are hidden by conventional measures of the debt and deficit. Moreover, governments in most developed countries produce long-term fiscal projections, which allow the calculation of a comprehensive balance sheet, even if the present values of the projections are not calculated.

The U.S. federal government, following FASAB (2009), is an exception in that its accounts include a kind of comprehensive balance sheet (e.g., U.S. Treasury, 2011). Generational accounts (Auerbach *et al.*, 1991, 1994), a relative of comprehensive accounts, have also been prepared for several countries (Kotlikoff and Raffelhüschen, 1999). These look through the government, as it were, and show for each age cohort the present values of its expected payments to and receipts from the government.

Of course, comprehensive accounts are enormously uncertain. They are not vulnerable to the kind of manipulation that works by trading in off-balance-sheet assets and liabilities, because all possible assets and liabilities are on balance sheet, but they are extremely sensitive to assumptions about growth rates and discount rates. Reasonable people can disagree about which assumptions are best, so there is much room for creative accounting (see Haveman, 1994, in relation to generational accounts). Comprehensive accounts also require current government policy to be specified (see, e.g., FASAB, 2009). For some items, this might seem straightforward: tax revenue, for instance, can be projected using the tax rates in the current tax code. But what is current policy regarding future spending on roads or defense? And what if the government passes a law that says that tax rates will rise in twenty years, simply in order to reduce the comprehensive deficit? Such questions leave room for much uncertainty about comprehensive accounts. While Kotlikoff and Burns (2012) conclude that the U.S. federal government ran a large comprehensive deficit in the year to June 2011, the U.S. Treasury reports a large surplus in the year to September 2011 (U.S. Treasury, 2011, p. 148).

IV. CONCLUSION

Twenty-five years ago, when Blejer and Cheasty reviewed the measurement of deficits, there had been many proposals that governments adopt some form of accrual accounting or, more radically, measure the net present values of all their projected cash flows. In the following years, many governments did publish accrual accounts or statistics of some form. In a few countries, comprehensive accounts were also prepared by researchers or the government itself; in others, governments produced the long-term fiscal projections that underlie these accounts, even if they didn't calculate present values. There has been no comparably radical change in the definitions of government that have been employed, but data are now available for broader definitions of government in many countries. In the European Union, in particular, the new fiscal rules have ensured that financial accounts are available for the whole of general government.

Research since 1991 has confirmed that accounting matters—that it is not a veil that is pierced by decision makers (Poterba and von Hagen, 1999)—at least if it underlies a fiscal rule or salient budget target. There is little doubt that stringent rules succeed in constraining government debts or deficits as defined (see also Bohn and Inman, 1996; Poterba, 1994). Some of the effect, however, is achieved by window-dressing and creative accounting. Debt and deficits may be transferred to public entities that lie outside the defined perimeter of government. Depending on the accounting rules, governments may defer payments, sell real

assets and acquire new ones by means of leases or public-private partnerships, issue guarantees instead of granting subsidies, and increase taxes this year while promising to reduce them next year. Such window-dressing can be eliminated by recognizing more assets and liabilities on the balance sheet, but only at the cost of requiring accountants and statisticians to make difficult judgments about the values of those assets and liabilities, which creates opportunities for creative accounting. Although the research surveyed here does not show that rule-governed debts and deficits lose their informative value, it is consistent with Campbell's (1976) law: “[t]he more any quantitative social indicator is used for social decision-making, the more subject it will be to corruption pressures and the more apt it will be to distort and corrupt the social processes it is intended to monitor” (p. 49).

What are the lessons for accountants, statisticians, and budget officials? One is that debt and deficit measures need protection from manipulation, such as independent measurement, independent auditing, the use of standards set by independent bodies, and the publication of the assumptions underlying the measurements so that calculations can be checked. Such measures are especially important for the particular measures of the debt and deficit that are subject to fiscal targets. A second lesson is that several measures of the deficit and debt should be produced, and reconciled, not only to paint a full picture of public finances but also to help reveal manipulation in targeted measures (Balassone *et al.*, 2006). To some extent, this is already happening. In the European Union, the United States, and other developed countries, several measures of the government's debt and deficit are available. In some cases, as in the Australian statistics mentioned above, many different measures are available in a single framework that makes them relatively easy to reconcile. Often, however, the many measures come from different systems and cannot easily be reconciled. It's good to have several maps of the terrain; it would be better to know more about why the maps differ.

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