WP/15/261

IMF Working Paper

The Whole Elephant: A Proposal for Integrating Cash, Accrual, and Sustainability-Gap Accounts

by Timothy C. Irwin

INTERNATIONAL MONETARY FUND

 WP/15/261

IMF Working Paper

Fiscal Affairs Department

The Whole Elephant: A Proposal for Integrating Cash, Accrual, and Sustainability-Gap Accounts

Prepared by Timothy C. Irwin

Authorized for distribution by Richard Hughes

December 2015

Abstract

Although the budget deficit is much discussed in political debate and economic research, there is no agreement on how it should be measured. There are at least four options, which can be called the cash deficit, the financial deficit, the full-accrual deficit, and the comprehensive deficit. Each is informative, but each has problems of relevance or reliability. Some are more vulnerable to manipulation involving assets and liabilities that are unrecognized in the underlying accounting, others to manipulation involving the mismeasurement of recognized assets and liabilities. Governments should publish all four in a form that reveals their interrelationships.

JEL Classification Numbers: H6, H61, H62

Keywords: Accrual accounts, comprehensive accounts, liabilities, budget deficit

Author's E-Mail Address: TimothyIrwin@hotmail.com

Contents Page

I. INTRODUCTION*

There is an old Indian fable in which a group of blind men are brought to an elephant and asked to describe what they find. Each answers according to the part he can feel. One grasps the trunk and says the object is a snake. Another holds the tail and says it's a rope. A third touches a tusk and says it's a spear. And so on. In a version of the fable told by John Godfrey Saxe, the blind men:

> Disputed loud and long,
> Each in his own opinion
> Exceeding stiff and strong
> Though each was partly in the right
> And all were in the wrong.

There is a dispute about government accounting that resembles this argument. Cash accounting, still the dominant kind in government, is staunchly defended by some and summarily dismissed by others who prefer accrual accounting. Within the accrual-accounting camp, there is a dispute between those who think that investment in real assets should be counted as spending that increases the deficit and those that think that only depreciation should be counted. Finally there are some economists who consider that all conventional government accounts are simply meaningless and that the only useful measure of the government's fiscal position is a comprehensive one that takes account of the net present value of all the government's future payments and receipts under current policy (sometimes called the fiscal gap or sustainability gap).

This paper argues that all four kinds of the accounts—which for convenience can be called cash, financial, full-accrual, and comprehensive—are informative, but that none gives a full picture of the fiscal elephant. It shows, moreover, that each is susceptible to different kinds of manipulation. The solution to the dispute, the paper argues, is for governments—or at least those in advanced economies—to produce four sets of accounts, each with its own set of deficits.

This may seem crazy. Four sets of accounts and four separate deficits? In fact, the proposal is even more extreme than this: it is to present two deficits from each set of accounts, giving eight in total—and this is without thinking about adjustments for inflation or the state of the economic cycle or different measures for different definitions of government.

---

* This paper has also been published in the *OECD Journal on Budgeting*, Vol. 2014, No. 3. It has benefited from comments from or discussions with Marco Cangiano, Adrienne Cheasty, Carlo Cottarelli, Derick Cullen, Vítor Gaspar, Torben Hansen, Richard Hughes, Tom Josephs, Kris Kaufman, Andy King, Abdul Khan, John Merrifield, Delphine Moretti, Jean-Paul Milot, Marvin Phaup, Steve Redburn, Mike Seiferling, Phil Stokoe, and Frans van Schaik.

Yet the idea is mostly unoriginal. Modern accounting standards require governments to produce both an accrual income statement and a cash-flow statement, and more than one surplus measure can be derived from each of these statements. The New Zealand government mentions three deficits in the press releases that accompany the publication of its monthly accounts: a cash deficit, a bottom-line accrual deficit, and an accrual deficit that excludes capital gains and losses. The IMF's *Government Finance Statistics Manual 2014* recommends that governments produce both a cash-flow statement and an accrual-based operating statement that generates a measure of the deficit that treats net investment in real assets as spending and another measure that does not. Although very few countries produce all the information suggested by this manual, the Australian Bureau of Statistics produces government-finance statistics that include three of the four sets of accounts suggested here—each for several different definitions of government. What this paper proposes adding is a set of measures drawn from comprehensive accounts.

Even so, multiple measures of the deficit might sow confusion, allowing governments to claim they had met their fiscal promises by pointing to the measure that happened to prove them right. To avoid such problems, governments setting deficit targets must be required to explain which measure they are talking about. Public debate can then be expected to focus on this measure. Yet the existence of the other measures will still be useful, since, among other things, they will help analysts tell whether success in meeting the target reflects a broader improvement in public finances or only the use of accounting stratagems that improve the targeted measure without fundamentally changing public finances.

II. Accounting Systems

It is useful to start by abstracting from some of the real-world variation in government accounting and isolating the fundamental differences between cash, accrual, and other accounting systems.

To do this, we first define accounting systems according to the assets and liabilities that they recognize, where to recognize an asset or liability means to record it on the face of the balance sheet. Cash accounts, for instance, can be thought of as recognizing only one asset, namely cash, while accrual accounts add other financial assets and liabilities, such as accounts payable and receivable. In one version of accrual accounting, which might be called *full-accrual accounting*, nonfinancial assets such as land and buildings are also recognized.

Each accounting system therefore generates its own measure of the government's net assets, where net assets are the sum of the government's assets less the sum of its liabilities.

The clean *surplus* is defined as the increase in net assets. It follows immediately that each accounting system generates its own clean surplus.

Although dirty surpluses—that is, those that are not equal to the increase in net assets—can be defined in any number of ways, each accounting system also tends to be associated with certain dirty surpluses. In cash accounts, changes in cash are classified according to whether they relate to operations, investments, or financing and the (dirty) cash surplus is taken to be either the sum of operating cash flows or the sum of both operating and investing cash flows. In financial and full-accrual accounts, changes in net assets are sometimes classified according to whether they arise from transactions or whether they arise from other changes such as capital gains and losses, and the dirty surplus on transactions is what gets attention. Because these surpluses are not affected by capital gains and losses, they tend to be less volatile and more easily controlled by the government. Despite the disparaging name, dirty surpluses can be very useful.

In principle, there are as many kinds of accounts as there are possible combinations of assets and liabilities. Four are worth examining.[1]

- *Cash accounts (C),* which in their pure form recognize cash as an asset (and its negative, an overdraft, as a liability) but recognize no other assets or liabilities.

- *Financial accounts (F),* which recognize all financial assets, as well as the corresponding liabilities.

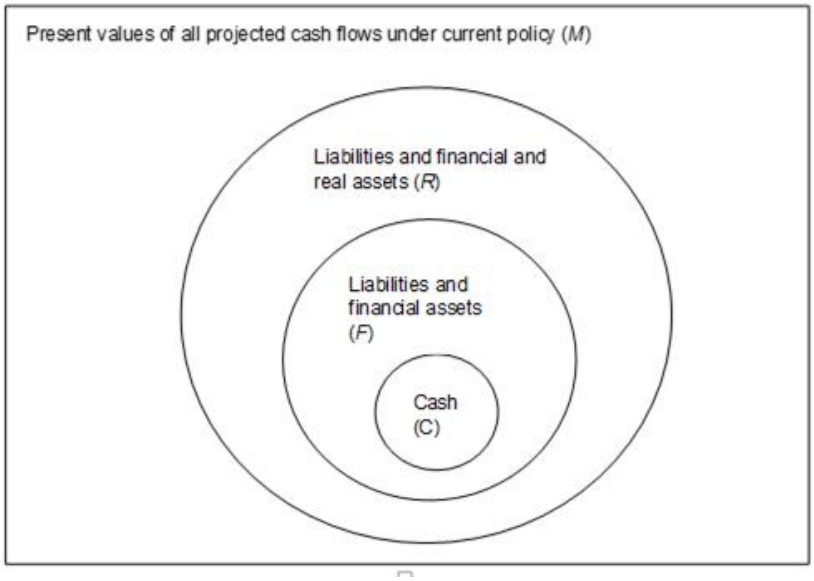
- *Full-accrual accounts (R),* which recognize all the assets and liabilities of financial accounts and also nonfinancial assets.

- *Comprehensive accounts (M),* which recognize all the assets and liabilities of full-accrual accounting and also assets and liabilities associated with the government's projected future spending and revenue.

Figure 1 shows the sets of assets and liabilities associated with each of these systems. What is crucial is that the sets are nested, so that the smaller ones are subsets of the larger ones. This makes reconciling the different accounts simple. Ensuring that the different accounts are based on nested sets of assets and liabilities can, however, be tricky. In particular, in preparing comprehensive accounts, care needs to be taken to avoid double counting assets and liabilities that are already included in smaller sets. For example, if the full-accrual accounts recognize an asset, the long-term projections that underlie the comprehensive accounts should not include the cash flows generated by that asset.

[1] There is no perfectly satisfactory terminology for these deficits. In particular, what is here called the financial deficit could also be called an accrual deficit or a modified-accrual deficit. The term financial is used here because the deficit is derived from what statisticians call financial accounts and to avoid confusion with what is called here the full-accrual deficit, as well as with the term modified accrual as that is used in US local-government accounting (Granof and Khumawala, 2011, p. 41). For a review of the literature on different ways of measuring the deficit, see Irwin (forthcoming).

Figure 1. Assets and Liabilities of Four Accounting Systems



Source: Irwin (2012)

The different accounts provide different kinds of information about public finances. Cash accounts show changes in a crucial asset and by classifying cash flows—for example, as relating to operations, investment, or financing—offer an insight into broader fiscal developments. By recognizing a progressively wider range of assets and liabilities, financial and full-accrual accounting provide clearer evidence of these developments. Finally, comprehensive accounts, by taking accounting of the expected effects of the government's tax and spending policies, offer an even broader perspective.

The different accounts are also subject to different kinds of manipulation. The first kind of manipulation can be analyzed as the substitution of recognized for unrecognized net assets (Irwin, 2012). Delaying the payment of a bill and keeping more cash in the bank reduces the cash deficit, because the government records the cash but not the accounts payable on its balance sheet. Similarly, selling land and using the proceeds to repay debt reduces the financial deficit because the debt but not the land was recorded on the balance sheet.

Preventing this kind of manipulation is a matter of putting more assets and liabilities on the government's balance sheet. If accounts payable are recognized, delaying the payment of bills does not reduce spending. If real assets are recognized, selling them generates no revenue. Because comprehensive accounts recognize all possible assets and liabilities, they are not susceptible to this kind of manipulation.

Assets and liabilities may, however, be mismeasured: that is, they may be recognized on the balance sheet at an incorrect value. This creates new problems.[2] If an asset or a liability is recognized at less than its true (market) value, a lesser version of the problem just discussed arises. For example, if the liabilities related to employee pensions are recognized but measured at less than their true value, the government's deficit will be tend to be underreported. But if an asset or liability is measured at more than its true value, a different kind of manipulation can occur. For instance, the financial deficit can be temporarily reduced by overvaluing accounts receivables and therefore overestimating revenue. Some deficits can also be manipulated by changing the extent of mismeasurement over time. The clean comprehensive deficit, for instance, can be reduced by increasing the discount rate used to value future spending.

The existence of two kinds of manipulation creates a tradeoff. Opportunities for manipulation involving unrecognized assets and liabilities can be reduced by recognizing a wider variety of assets and liabilities. But this means that there are more assets and liabilities that can be mismeasured. Moreover, the newly recognized assets and liabilities tend to be increasingly difficult to measure. The gains from preventing one kind of device must therefore be traded off against the gains from preventing the other. The tradeoff can be reduced by limiting the scope for mismeasurement through the use of accounting standards, independent auditors, independent statistical agencies, independent forecasters, and so on, but it probably cannot be eliminated.[3]

A. Cash Accounts

In pure cash accounts, the net-assets measure is just the cash balance, and the clean deficit is just the reduction in the government's cash balance. When a government is struggling to pay its bills, the clean cash deficit is of great interest, especially if recorded at high frequency. At other times, it is not especially significant. It is never the most prominent measure of the deficit. From an analytical perspective, however, the clean cash deficit is worth examining. Because anything that increases the government's bank balance reduces the deficit, it is especially easy to manipulate.[4] Delaying payments and accelerating receipts both reduce the

[2] The two kinds of problem—nonrecognition and mismeasurement—are related: nonrecognition is an extreme case of mismeasurement in which an asset or liability is wrongly measured at zero value.

[3] In principle, the tradeoff might also be improved by reducing opportunities for the kind of manipulation that involves operations in unrecognized assets or liabilities, but this would mean preventing the government from engaging in certain transactions, not just prescribing how it reports the financial effects of those transactions. Moreover, many transactions that can be used to manipulate narrow deficit measures also have a nonaccounting justification. Thus, the attempt to improve the tradeoff is best focused on reducing the scope for mismeasurement.

[4] The problem is not that the accounting is single-entry: because even cash accounting, as defined here, includes a (primitive) balance sheet, each transaction involves two entries. When the government receives taxes, for instance, it credits revenue and debits cash.

deficit. So does selling any kind of asset (other than cash). And so too does borrowing (except by overdraft), since cash accounting in its pure form makes no distinction between receipts from different sources. Curiously, borrowing reduces some actually used cash deficits (Blejer and Cheasty, 1991a:1645; Granof and Khumawala, 2011:310).

At the same time, the clean cash deficit can be measured with little uncertainty because all it depends on is the amount of cash held by the government. In practice, the definition of cash is not completely straightforward. Accountants typically add together cash and cash equivalents, which are short-term investments convertible to cash with negligible uncertainty. Naturally, there are some problems in identifying and measuring cash equivalents. Yet these problems are nothing like those associated with broader accounting systems.

Because of the limitations of the clean cash deficit, governments that use cash accounting, and analysts who work with cash data, usually monitor dirty deficits. For example, a line is often drawn between financial and other transactions. Financial transactions such as borrowing and the repayment of debt are recorded below the line and do not affect the deficit. The sale of real assets might also be treated as below the line, especially if the amounts are large and unusual. In other cases, operating cash flows are distinguished from investing cash flows, and a deficit that takes account only of operating cash flows is monitored. Such a deficit is sometimes called the *current deficit*.

The effect of these classifications is to bring cash accounting closer to accounting systems that recognize a wider range of assets and liabilities, including in particular financial and full-accrual accounting. The resulting dirty deficits are less vulnerable to manipulation by means of transactions in unrecognized assets and liabilities. The cost, however, is greater vulnerability to measurement problems, because dirty cash deficits depend not only on changes in the government's cash balances but on how these changes are classified.

These adjustments to cash accounting are often less than wholly satisfactory. Large sales of real assets in a privatization program may be put below the line, while acquisitions and smaller sales remain above it. Borrowing by issuing bonds is easily identified and thus put below the line; borrowing by purchasing supplies on credit, accumulating arrears, issuing guarantees, and entering into long-term leases and public-private partnerships is not. Thus even above-the-line cash deficits usually remain very susceptible to fiscal tricks that change the time at which cash is transferred (e.g., Easterly, 1999).

Nevertheless, recording cash flows and classifying them according to whether they relate to operating, investing, or financing activities is surely useful. It makes it possible to track the government's liquidity and therefore its ability to meet its commitments in the short term. Cash accounts also help identify fiscal tricks designed to reduce a financial or full-accrual deficit by mismeasuring the assets and liabilities recognized in those accounting systems. If a government reduces an accrual deficit by overestimating the collectability of taxes, for

instance, a difference between accrued tax revenues and cash tax receipts is likely to arise, which should arouse suspicions if it cannot be explained.

If the use of various dirty cash deficits can be thought of as attempts to approximate financial or full-accrual accounts, another modification of cash accounting moves it in the direction of comprehensive accounts: namely, not only recording past deficits but also forecasting future deficits. Manipulations that reduce the cash deficit in one year will show up in accurate forecasts of future deficits, so if the forecasts have a sufficiently long horizon they reveal everything. (In the long run, all that matters is cash.) Indeed, if the horizon is very long, they essentially generate comprehensive accounting: all that is needed is to produce a comprehensive balance sheet by estimating the present values of the projected classes of spending and revenue.

B. Financial Accounts

An increasingly prominent alternative to cash accounts is a form of accrual accounts (called here financial) in which transactions are generally recorded when value is deemed to be created, consumed, or transferred, but in which nonfinancial assets are not recognized and in which, therefore, real investment counts as spending that increases the deficit. It is the basis of the fiscal statistics that are used to measure compliance with the European Union's fiscal rules and (where the data are available) much of the IMF's fiscal analysis.

The argument for using financial instead of cash accounts turns on the problems of cash accounts. Recording transactions when economic value is created, consumed, or transferred seems more useful than recording them when cash changes hand. Likewise, it seems useful to produce balance sheets that include more than just cash, and to link them arithmetically to the government's operating statements.

The argument for using financial instead of full-accrual accounts turns on the unusual nature of many of the real assets owned by governments (e.g., Icelandic Ministry of Finance, 1995, pp. 21–22). Unlike the machines and factories owned by firms, the roads, parks, museums, and courthouses owned by governments frequently generate no cash. This makes their fiscal value unclear and introduces new problems of measurement: what is the value of an asset that generates no cash? If a government were to get into financial difficulty, it could sell its financial assets, or at least some of them. Would the same be true of its real assets?

In financial accounts, the clean financial deficit is the decline in net financial worth. Useful in itself, this deficit can be decomposed into two components. One is the deficit on transactions, which in fiscal statistics is called *net lending/net borrowing*. This is, roughly speaking, the measure that is used to test compliance with the European Union's deficit rules. The second component of the clean deficit, other changes in net financial worth, arises mainly because of changes in the values of financial assets and liabilities that occur as interest rates, exchange rates, and other market prices fluctuate.

The financial deficit (clean or dirty) is immune to many devices that affect the cash deficit. Delaying the payment of a bill has no effect on it. But because the financial deficit does not recognize real assets, it can be reduced by selling land and buildings. It can also be affected by seemingly insignificant changes in the packaging of transactions. Purchasing land increases the deficit; purchasing all the shares in a company that owns the land, and nothing else, does not.

Unlike cash accounts, financial accounts require estimates of the value of the government's equity stakes, derivative positions, tax receivables, and so on. It is therefore vulnerable to manipulation by mismeasurement. For example, a government might understate its deficit by treating a transfer to a state-owned enterprise as the purchase of shares in the enterprise that are worth as much as the government has paid for them. The equity injections constitute the purchase of a financial asset, so do not increase the government's financial deficit. Yet the state-owned enterprise might be losing money and the government's investment made at an expected loss. If the government's investment were properly valued, its net financial worth would have declined, but the investment may not be properly valued. Accounting rules can mitigate, but probably not eliminate, these problems.

C. Full-Accrual Accounts

Many governments in advanced economies now also produce full-accrual measures of the deficit, at least in their end-of-year financial statements. The argument for recognizing nonfinancial as well as financial assets is that even when they do not generate cash inflows the government's nonfinancial assets tend to have lasting fiscal value. In particular, they reduce the required future cash outflows of providing government services. For instance, if governments that provide schooling did not own schools, they would have to build, buy, or lease them, increasing their future cash outflows.[5]

The clean full-accrual deficit is the decline in net worth. This deficit can be broken down in different ways. In fiscal statistics, it is split into a part (the *net operating balance*) that reflects changes in net worth resulting from transactions and a part equal to other changes, such as those arising from holding gains and losses.

Because full-accrual accounting recognizes real as well as financial assets, its deficit cannot be reduced by the sale of those assets. Nor is it affected by whether the purchase of the assets happens directly or through the veil of a company owning the assets. Yet even full-accrual accounting as practiced does not recognize all the assets and liabilities that might be

[5] The value of such assets is thus equal to the increase in the net present value of the government's cash flows that they are expected to cause, conditional on current government policy. The same approach is used in long-term fiscal projections and comprehensive accounts, which project cash flows conditional on current government policy. On the assumption that government policy is to repay its debt, valuation conditional on government policy also avoids the seemingly paradoxical result that an indebted government's net worth improves when it becomes less creditworthy.

recognized, and it is vulnerable to accounting devices involving these assets and liabilities. Finance (capital) leases create assets and liabilities for the lessee, but operating leases, which differ from finance leases only in degree, may not. Similarly, rights and obligations that generate payments only in certain circumstances are sometimes recognized, but often not. As a result, governments can sometimes reduce their reported deficits and debts by issuing guarantees instead of subsidizing loans; they may also charge guarantee fees, further reducing the reported deficit.

At the same time, real assets are hard to value, so full-accrual accounting creates new opportunities for mismeasurement. In practice, non-cash-generating real government assets are often valued at an estimate of their depreciated historic or replacement cost, with a possible adjustment for gold-plating. The adjustment (impairment in accounting jargon) takes into account that real assets may be over-dimensioned, capable of producing a higher volume or quality of service that the government plans to provide. This means that real investments are not necessarily deficit neutral (even apart from ordinary depreciation), but the complexities of estimating replacement cost, depreciation, and impairment certainly create additional uncertainties in the estimation of the deficit.

D. Comprehensive Accounts

Over time, the rules for accrual accounting may be revised so that they require recognition of more assets and liabilities. Operating leases and a wider range of guarantees, for instance, may be put on the government's balance sheet. Yet it will probably never be possible to draw a satisfactory line between the rights and obligations that are, and are not, firm enough to constitute assets and liabilities under definitions roughly similar to the ones used in modern standards. For example, governments may always be able to reduce this year's deficit by increasing taxes while simultaneously promising to increase future social spending.

These concerns have led to the claim that traditional measures of the deficit are meaningless (Kotlikoff, 1986). The criticism has been leveled at the mainly cash-based US budget deficit, but it also applies to the financial and full-accrual deficits described here. The idea is that there is no economically meaningful way to differentiate taxes, say, from the proceeds of borrowing and, likewise, no way to differentiate the repayment of borrowing from the payment of social-security benefits or even defense spending. There are just payments made and received at different dates. The labels given to the payments and receipts make no difference. As a result, it is claimed, conventional measures of the deficit and debt, and many other fiscal indicators besides, are entirely arbitrary.

This seems an exaggeration. The argument is most persuasive when applied to social security in the United States, where employees pay earmarked social-security taxes during their working lives and later receive social-security benefits whose amount depends on the prior contributions. As a result, it is easy to see the similarity between borrowing and collecting social-security taxes and between repaying borrowing and paying social-security benefits.

Less persuasive, however, is the claim that there is no economically meaningful distinction between the repayment of debt and ordinary, discretionary spending (Irwin, 2015).

Nevertheless, accounting that ignores projected future spending and taxes misses a great deal. In such systems, a government may have positive net assets, yet be in serious financial trouble, unable to sustain its current policies. Likewise, a government with negative net assets may be financially strong and have no difficulty sustaining its policies. Further, some of the distinctions made in narrower systems between assets and other rights and between liabilities and other obligations are rather fine. Pensions for government employees may create liabilities, for instance, while public pensions for ordinary citizens do not. True, there is usually a difference between the two cases. Where employee pensions create liabilities, there is typically an employment contract that imposes a binding legal obligation on the government. Public pensions, on the other hand, are usually provided for by a law that may create an expectation of payment, but which may be amended. Yet if the law has strong political support, its repeal or amendment may be extremely unlikely and the obligation may, for practical purposes, be as binding as a contract.

This creates a strong case for accounting in which the net-assets measure is comprehensive net worth, which includes the net present value of all future payments and receipts under current policy (Buiter, 1983). The corresponding clean deficit is the decline in comprehensive net worth. Under narrower accounting standards, all assets and liabilities are associated with expected future cash flows,[6] and those assets and liabilities can be valued at the present value of the associated cash flows. But in narrower accounting systems, not all future cash flows are associated with assets and liabilities. The characteristic feature of comprehensive accounting is that all future cash flows are associated with assets and liabilities. Thus its set of assets and liabilities is the universal set *M* in Figure 1 (above). As in other accounting systems, this deficit can be split into parts. A natural option is to distinguish the part related to transactions and policy changes from the part related to changes in discount rates and assumptions about demographics and economic growth.

Moreover, following FASAB (2009), the US government now includes in its annual financial statements estimates of the present values of future taxes and spending, as Table 1 illustrates. It shows the net present values of the government's projected receipts and primary spending over the next 75 years as percentages of the present values of GDP over the same time period. The numbers are large: in 2013, the present value of projected receipts was more than USD 200 trillion, but the present value of projected GDP was USD 1 quadrillion. The top row of the table shows the gap between projected receipts and primary spending: it shows the amount by which taxes have to be permanently raised or spending permanently cut to keep

[6] For the case of company accounting, see Stickney and Weil (2010, p. 108). As noted above, some government assets do not directly generate future cash inflows but rather reduce the future cash costs of carrying out current policies.

the government's debt constant. The changes from year to year reflect changes in policy and other assumptions. For example, the decline from −0.7 to −1.7 percent of 75-year GDP was

> . . . primarily due to the changes in model technical assumptions, such as (i) the inclusion of cost or health insurance exchange subsidies, (ii) the assumption in this year's Report that all of the 2001/2003 tax cuts will be extended indefinitely, rather than being allowed to expire for high income taxpayers, and (iii) an improved methodology for projecting Medicare costs (US Treasury, 2012, p. 157).

By contrast, the improvement between 2012 and 2013 came partly from a reassessment of the effects of the Affordable Care Act: the 2013 projections assume that the Act will slow the growth of spending on Medicare and Medicaid by more than had been assumed in the previous year's projections. In addition, the Treasury estimates that the American Taxpayer Relief Act 2013 will increase tax revenue relative to the previous year's projections, partly because it established that the abovementioned tax cuts will expire for high-income taxpayers (US Treasury, 2013).

Table 1. Summary of Long-Term Fiscal Projections of US Government
(Present value of 75-year GDP)

	2010	2011	2012	2013
Receipts less primary spending	−1.9	−0.7	−1.7	−0.4
Receipts	20.2	20.3	19.7	19.8
Social Security payroll taxes	4.4	4.4	4.3	4.2
Medicare payroll taxes	1.4	1.5	1.5	1.4
Individual income taxes	10.5	10.5	10.0	10.4
Other receipts	4.0	3.9	3.9	3.8
Primary spending	22.1	21.0	21.4	20.2
Defense discretionary	3.6	3.2	3.1	2.1
Nondefense discretionary	3.5	1.7	1.7	2.5
Social Security	5.7	5.8	5.9	5.7
Medicare Part A	2.0	2.0	2.2	2.2
Medicare Parts B and D	2.4	2.4	2.4	2.2
Medicaid	2.8	2.7	2.7	2.3
Other mandatory	2.2	3.2	3.4	3.1

Source: US Treasury (2011, 2012, 2013).

Comprehensive accounts are of course extremely vulnerable to manipulation by mismeasurement. Calculating the present value of future taxes and spending under current policy requires specifying current policy, forecasting demographic and economic variables over the very long term, projecting the payments and receipts that will occur given these

projections, and finally choosing discount rates[7] for converting the projected payments into present values. At each of these steps, opportunities arise for small adjustments that have large effects on the results. Even in the absence of manipulation, the results are likely to be extremely imprecise.

The idea behind comprehensive accounts, however, is that having a very imprecise estimate is better than having no estimate at all. It is the idea behind the maxim about being approximately right instead of precisely wrong and the joke about the drunk who looked for his keys under the lamppost because that was where the light was best. While there is a risk that comprehensive accounts will mislead, there is a similar risk in not presenting them. If a government produces only the balance sheet of financial or full-accrual accounting, it may overestimate the importance of that balance sheet, while paying too little attention to more important fiscal issues.

Moreover, the scope for manipulation can be reduced by producing comprehensive accounts according to standards (see FASAB, 2009; NZICA, 2005). The models that are used to produce them can be made public, so that others can replicate and, if they wish, modify the accounts.[8] And the forecasts can be checked or produced by official agencies that are independent of the government (see UK Office for Budget Responsibility, 2013).

III. THE WHOLE ELEPHANT

Sometimes a single measure of the government's deficit needs to be selected, as for example in the design of a simple fiscal rule. If the government sets itself a target for the deficit, it must specify in advance a particular measure of the deficit. There is no reason, however, not to present all four deficits, along with corresponding balance sheets and other tables for each of the four accounting systems. They can be presented, moreover, in a way that makes clear their relationships. These four-part accounts, as they might be called, would not prevent the manipulation of a single deficit measure, but they would help reveal such devices and give an overview of public finances in the round.

Table 2 shows a possible summary of four-part accounts. It reveals opening and closing balances for each of four versions of net assets—cash, net financial worth, net worth, and comprehensive net worth—the main dirty surplus associated with each of these indicators and the other changes that make up the clean surplus.

[7] Although a single discount rate can be used for simplicity, the conceptually appropriate discount rate varies according to the timing and risk of the cash flow. Adjusting for the timing requires starting with a risk-free yield curve, rather than a single risk-free rate. Adjusting for risk requires adding or subtracting an appropriate risk premium.

[8] The New Zealand Treasury's long-term fiscal model is available at www.treasury.govt.nz/government/longterm/fiscalmodel.

Table 2. Four-Part Accounts

	Opening Value		Components of Clean Surplus				Closing Value
C	Opening cash	+	Net cash inflows from operating and investing activities	+	Net cash inflows from financing activities and valuation changes	=	Closing cash
F	Opening net financial worth	+	Net lending/borrowing	+	Other changes in net financial worth	=	Closing net financial worth
R	Opening net worth	+	Net operating balance	+	Other changes in net worth	=	Closing net worth
M	Opening comprehensive net worth	+	Change in comprehensive net worth caused by transactions and policy changes	+	Other changes in comprehensive net worth	=	Closing comprehensive net worth

Source: Author

Underlying this table would be more detailed tables for each set of accounts, such as:

- A cash-flow statement of the kind familiar to accountants and recommended in IMF (2014, Table 4.2).
- Statements that provided underlying financial and full-accrual data, such as the statement of operations and the statement of other economic flows, the balance sheet, and detailed tables of revenue and spending (e.g., IMF, 2014, Tables 4.1, 4.3-4.5, 5.1, and 6.1).
- A summary of the present values of the lines of long-term fiscal projections such as in Table 1 above, as well as the projections themselves, or a finite subset of them if they have an infinite horizon.

A. Reconciling the Accounts

Other tables would clarify the interrelationships between different lines of the summary accounts. Some such clarifications are given in existing statistics and accounting disclosures. In statistics, the statement of operations shows how the net operating balance relates to net lending/net borrowing (IMF, 2014, Table 4.1). In accounting, net cash flows from operations (the current cash surplus) are reconciled with a full-accrual balance (e.g., Government of New Zealand, 2013).

In four-part accounts, two relatively simple tables could show the major links between the different deficits. One would show how each clean surplus was made up of components related to accounts based on narrower sets of assets of liabilities. The other would link the four dirty deficits of Table 2.

Because the clean surpluses arise from increasingly broad sets of assets and liabilities, it is easy to show how the clean financial, full-accrual, and comprehensive surpluses are made up of components from the narrower accounts. The clean full-accrual surplus, for instance, is equal to the clean financial surplus plus the increase in the government's real assets. Table 3 shows how each of the clean surpluses other than the first (cash) can be decomposed into contributions from accounts based on subsets, in a triangular pattern.

Table 3. Composition of Clean Surpluses

Clean Surplus			**Incremental contributions from narrower accounts**							
			C		*F*		*R*		*M*	
C	Cash	=	Increase in cash							
F	Financial	=	Increase in cash	+	Increase in noncash net financial worth					
R	Full Accrual	=	Increase in cash	+	Increase in noncash net financial worth	+	Increase in real assets			
M	Comprehensive	=	Increase in cash	+	Increase in noncash net financial worth	+	Increase in real assets	+	Increase in comprehensive net worth excluded from net worth.	

Source: Author

The dirty surpluses of Table 2 could be reconciled with each other in various ways. Box 1 gives an example.

B. Illustrations

No government produces all the fiscal information needed to illustrate internally consistent four-part accounts, but it is possible to present three of the four parts for at least two governments. First, the Australian Bureau of Statistics produces comprehensive government-finance statistics that can be rearranged to present accounts for rows *C*, *F*, and *R*, and the associated reconciliations. Second, the US federal government's financial reports present information that allows approximations of rows *C*, *R*, and *M*.

Table 4 presents summary three-part accounts for general government in Australia for the 2012/13 fiscal year. The meanings of the numbers in Table 4 are those given by the first three rows of Table 2.

Box 1. Reconciling Dirty Surpluses

The following is one recipe for reconciling the four dirty surpluses of Table 2.

Start with the dirty cash surplus.

Add the differences between accrual and cash measures of revenue and spending:

Add the difference between (accrual) revenue and (cash) receipts from operations

Subtract the difference between (accrual) expense and (cash) payments for operations Subtract the difference between accrual acquisitions of real assets net of disposals and net cash flows used in investment

To get net lending/net borrowing.

Then take out transactions in real assets that affect net lending/net borrowing, but not the net operating balance:

Add acquisitions less disposals of real assets

Subtract the depreciation of real assets

To get the net operating balance.

Finally, add the effects of changes in tax and spending policies:

Add the net present value of changes in future receipts and payments that are caused by policy changes and are not already incorporated in recognized assets and liabilities

To get the dirty comprehensive surplus.

Table 4. Summary Three-Part Accounts for Australian General Government, 2012/13
(Percent of 2012/13 GDP)

	Values June 30, 2012		Dirty Surplus 2012/13		Other Changes 2012/13		Values June 30, 2013
C	2.0	+	−2.4	+	2.5	=	2.1
F	−18.8	+	−2.5	+	7.1	=	−14.2
R	47.4	+	−1.4	+	8.7	=	54.8

Source: Australian Bureau of Statistics (2014) and other information available at http://www.abs.gov.au/ausstats/abs@.nsf/mf/5512.0 and, for GDP, the IMF's *World Economic Outlook* database for April 2014.
Note: GDP is average for 2012 and 2013.

To see what Table 4 tells us, we can look first at each line individually.

- The cash accounts (row *C*) show first that general government held cash amounting to roughly 2 percent of GDP at the beginning and end of the year. The clean cash surplus was thus close to zero. The dirty cash surplus, however, defined here as the sum of net operating and investing cash flows, was −2.4 percent of GDP. Examination of the cash-

flow statement reveals that this deficit came entirely from investment: net cash flows from operations were slightly positive. Thus, general government's operations would have complied with a cash-based version of the golden rule, which says that governments should borrow only to invest.

- The financial accounts (row *F*) show that general government began the year with net financial worth of about −19 percent of GDP. During the year, the dirty financial surplus (net lending/net borrowing) was −2.5 percent of GDP. Net financial worth actually increased, however, by 4.6 percent of GDP, because the decline caused by transactions was outweighed by holding gains and losses in general government's assets and liabilities. The largest of these was a reduction in the estimated unfunded liability for government-employee pensions.

- The full-accrual accounts (row *R*) show that general government's net worth, including real assets was 47 percent of GDP at the beginning of the year. Transactions caused net worth to decline by 1.4 percent of GDP, but net worth increased during the year, mainly because of the abovementioned increase in net financial worth, but also because of upward revaluations of some real assets.

Table 5 shows how the clean full-accrual surplus is made up of components from narrower accounts. The total increase in net worth of 7.4 percent of GDP was made up of a minor increase in cash (0.1 percent of GDP) and large increases in both financial net worth other than cash (4.5 percent of GDP) and the value of net worth other than financial net worth—that is, the value of real assets (2.8 percent of GDP).

Table 5. Components of the Clean Full-Accrual Surpluses of Table 4
(Percent of 2012/13 GDP)

	Clean Surplus			Incremental contributions				
				C		*F*		*R*
R	Full-Accrual Surplus	7.4	=	0.1	+	4.5	+	2.8

Source: Australian Bureau of Statistics (2014) and other information available at www.abs.gov.au/ausstats/abs@.nsf/mf/ 5512.0 and, for GDP, the IMF's World Economic Outlook database for April 2014.

Table 6 reconciles the three dirty surpluses following the recipe of Box 1. The first step in the reconciliation shows that although the dirty cash and financial deficits differ by only 0.1 percent of GDP this is not because their components are almost identical. The respective measures of revenue differ by 0.7 percent of GDP, but this is offset by differences in the respective measures of operating and investment spending. The second step shows that the difference of 1.1 percent of GDP between net lending/net borrowing and the net operating balance was made up of 2.8 percent of GDP in investment in real assets (net of disposals) less 1.7 percent of GDP in depreciation.

Table 6. Reconciliation of the Dirty Surpluses of Table 4
(Percent of 2012/13 GDP)

Start with the cash surplus		**−2.4**
Make cash-to-accrual adjustments		
Add revenue less receipts from operations	+	0.7
Subtract expense less cash payments for operations	−	0.7
Add acquisitions net of disposals less net cash flows for investment	−	0.2
To get net lending/net borrowing	=	**−2.5**
Then take account of transactions in real assets		
Add acquisitions of real assets minus disposals thereof	+	2.8
Subtract depreciation of real assets	−	1.7
To get the net operating balance	=	**−1.4**

The three-part accounts of tables 4, 5, and 6—and the underlying tables produced by the Australian Bureau of Statistics—provide a much richer picture of the finances of Australian general government than would be available from a single measure of the deficit. Indeed, the ABS actually produces at least 24 measures of the government deficit: the three clean and three dirty surpluses can be calculated for four different definitions of the government: central government, general government, the nonfinancial public sector, and the public sector. Because they come from a single coherent accounting framework, however, this profusion of deficits is not confusing: it is reasonably easy to work out how the deficits relate to each other.

We are still missing information on the expected sustainability of tax and spending policies. The Australian government does publish long-term fiscal projections, but it does not update them annually, so we cannot use them to calculate comprehensive accounts on an annual basis.

To get annual comprehensive accounts, we can turn to the financial report of the US federal government. With the help of some simplifying assumptions, this allows us to produce summary comprehensive accounts, as well as near-cash and full-accrual accounts. (The US government's financial reports follow their own accounting standards, not the concepts of government-finance statistics, so the definitions of the cash and full-accrual deficits are not exactly the same as those set out above.)

Table 7 shows the accounts. In contrast to Table 4, it gives three balance dates and two intervening years. The cash deficit is proxied by the US budget deficit, which is customarily described as being mainly cash based, but which includes some noncash items. The full-accrual deficit is a measure called in the accounts the net operating cost, which is essentially clean: there are no other significant changes in net worth. Finally, the comprehensive

accounts are derived by adding to net worth the net present value of the projections shown in Table 1.[9] For comparability, they are presented as percentages of 2012 GDP. The dirty comprehensive surplus is the negative of the net operating cost plus the change in the net present value of future revenue and spending that arises from changes in law.

Table 7. Summary Accounts for the US Federal Government, 2011–2013
(Percent of 2012 GDP)

	Values September 2011		Dirty deficit 2011/12		Other changes 2011/12		Values September 2012		Dirty deficit 2012/13		Other changes 2012/13		Values September 2013
C	1.1	+	−6.7	+	6.9	=	1.3	+	−4.2	+	4.2	=	1.3
R	−91.0	+	−8.1	+	0.0	=	−99.1	+	−5.0	+	0.0	=	−104.1
M	−130.4	+	−8.1	+	−62.2	=	−200.7	+	25.2	+	46.8	=	−128.7

Source: US Treasury (2012, 2013) and, for GDP, the IMF's *World Economic Outlook* database for April 2014.

Note: Cash is taken from the balance sheet, while the cash deficit is taken to be the unified budget deficit. Net worth is the "total net position" on the balance sheet, and the full-accrual deficit is taken to be the net operating cost. Comprehensive net worth is taken to be the sum of net worth and the net present value of the 75-year projections of primary spending and revenue shown in unaudited supplementary information in the report. The comprehensive deficit is the sum of net operating cost and the change in the net present value of the projections due to enacted legislation. GDP is for 2012.

What do these accounts show?

- The mainly cash accounts (row *C*) show that the budget deficit declined from about 7 percent of GDP in 2011/12 to 4 percent of GDP in 2012/13. These deficits were financed by borrowing, so the government's cash balance was about 1 percent of GDP at all three balance dates.

- The full-accrual accounts (row *R*) show deficits roughly 1 percent of GDP larger than the budget deficits. These deficits caused the government's net worth to decline over the two years from −91 to −104 percent of 2012 GDP. Although the differences between the budget deficit and net operating cost have many causes, the main one is the cost of pensions and veterans' benefits (US Treasury, 2013, p. 7). Although the differences between cash and accrual deficits are essentially differences of timing that will eventually cancel out, they can persist for many years: the accrual deficit has exceeded the cash deficit in 17 of the last 19 years.[10]

[9] An assumption underlying this addition is that it doesn't involve significant double counting.

[10] See CBO (2006, Table 1), Chan and Xu (2012, Table 4), and US Treasury (2013, Chart 1, p. ii).

- The comprehensive accounts (row *M*) show that comprehensive net worth was volatile, beginning and ending the two-year period at about −130 percent of GDP, but falling to roughly −200 percent in between—mainly for the reasons discussed above in relation to Table 1.

The three-part accounts for the US federal government again paint a richer picture of the changes in public finances than a single deficit could. On the one hand, the full-accrual surplus reveals the significant costs of civil-service pensions and veterans benefits that are not reflected in budget numbers. On the other, the comprehensive accounts shows that legislation that may have no immediate effect on either the cash or full-accrual surplus can have large effects on public finances.

IV. CONCLUSION

To sum up, different deficit measures provide different kinds of information. They are also vulnerable to different kinds of manipulation. One kind of manipulation increases recognized net assets at the expense of unrecognized net assets. This can be combated by recognizing a broader range of assets and liabilities, for example by moving from cash accounting to financial accounting to full-accrual accounting. Preventing all such devices, however, requires an accounting system that recognizes assets and liabilities in relation to all projected future cash flows. Yet this progression creates more and more opportunities for a second kind of manipulation that works by mismeasuring assets or liabilities. Thus there is a tradeoff, and no accounting system can simultaneously prevent both kinds of manipulation.

Part of the appropriate response to this problem is to limit mismeasurement by making use of carefully designed accounting standards; independent auditors, statistical agencies, and fiscal councils; and the publication of detailed data that allow outsiders to check estimates and calculations. A complementary response, explored in this paper, is to present a broad range of fiscal indicators, in part because a problem suppressed in one indicator is likely to show up in others, in part because each indicator provides a different sort of information. In particular, this paper has proposed presenting four interlinked deficits and associated accounts (cash, financial, full-accrual, and comprehensive) that would together present a picture of public finances in the round: one that makes use of the information in each of four deficits without relying on any single measure to tell the whole truth; one that integrates long-term fiscal projections with standard budget and accounting information; and one that helps reveal the use of accounting devices—one that, in short, allows the whole elephant to be seen.

References

Australian Bureau of Statistics, 2014, 5512.0 - Government Finance Statistics, Australia, 2012–13, May 28. Available at http://www.abs.gov.au/ausstats/abs@.nsf/mf/5512.0.

Blejer, Mario I., and Adrienne Cheasty, 1991, "The Measurement of Fiscal Deficits: Analytical and Methodological Issues," *Journal of Economic Literature*, Vol. 29, No. 4, pp. 1644–78.

Buiter, Willem H., 1983, "Measurement of the Public Sector Deficit and Its Implications for Policy Evaluation and Design," *IMF Staff Papers*, Vol. 30, No. 2, pp. 306–49.

Congressional Budget Office, 2006, Comparing Budget and Accounting Measures of the Federal Government's Fiscal Condition, Congress of the United States, www.cbo.gov/sites/default/files/12-07-fiscalmeasures.pdf.

Chan, James L., and Yunxiao Xu, 2012, "How Much Red Ink: Comparing Economic and Accounting Approaches to Measuring Government Deficit and Debt," *World Economics*, Vol. 13, No. 1, pp. 65–74.

Easterly, William, 1999, "When Is Fiscal Adjustment an Illusion?" *Economic Policy*, Vol. 14, No. 28, pp. 55–86.

FASAB (US Federal Accounting Standards Advisory Board), 2009, *Reporting Extended Long-Term Fiscal Projections for the US Government: Statement of Federal Financial Accounting Standards 36*, September 28, www.fasab.gov/pdffiles/sffas_36_.pdf.

Government of New Zealand, 2013, Financial Statements for the Government of New Zealand for the Year Ended 30 June 2013, www.treasury.govt.nz/government/financialstatements/yearend/jun13.

Granof, Michael H. and Saleha B., Khumawala, 2011, *Government and Not-for-Profit Accounting*, 5th edition (John Wiley).

Icelandic Ministry of Finance,1995, *Financial Reporting Reform: The Report of the Financial Reporting Commission*, February.

International Monetary Fund, 2014, *Government Finance Statistics Manual 2014*, (Washington) www.imf.org/external/np/sta/gfsm/.

International Public Sector Accounting Standards Board, 2014, *International Public Sector Accounting Standards*, International Federation of Accountants.

Irwin, Timothy C., 2012, "Some Algebra of Fiscal Transparency: How Accounting Devices Work and How to Reveal Them," IMF Working Paper WP/12/228, (Washington, DC: International Monetary Fund).

Irwin, Timothy C., 2015, "Defining the Government's Debt and Deficit," *Journal of Economic Surveys*, Vol. 29, No. 4, pp. 711–32.

Kotlikoff, Laurence J., 1986, "Deficit Delusion," *The Public Interest*, Vol. 84, Summer, pp. 53–56.

NZICA (New Zealand Institute of Chartered Accountants), 2005, *Financial Reporting Standard 42: Prospective Financial Statements*.

Stickney, Clyde P., Roman L. Weil, Katherine Schipper, and Jennifer Francis, 2010, *Financial Accounting: An Introduction to Concepts, Methods, and Uses*, 13th edition, (Mason, OH: South-Western).

UK Office for Budgetary Responsibility, 2013, *Fiscal Sustainability Report July 2013*, http://budgetresponsibility.org.uk/fiscal-sustainability-report-july-2013/.

US Treasury, 2011, *2011 Financial Report of the United States Government*, www.fiscal.treasury.gov/fsreports/rpt/finrep/fr/backissues.htm.

US Treasury, 2012, *2012 Financial Report of the United States Government*, www.fiscal.treasury.gov/fsreports/rpt/finrep/fr/12frusg.htm.

US Treasury, 2013, *2013 Financial Report of the United States Government*, www.fiscal.treasury.gov/fsreports/pt/finrep/fr/13frusg.htm.