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Accrual Accounting for Federal Entitlements -- Issues and Estimates

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1. Introduction and Summary

The weak connection between federal budget totals and the long-term obligations that the Congress regularly incurs raises the question of whether federal accounting rules are in need of fundamental reform. For instance, although forecasters agree that the Social Security system faces a future funding gap amounting to many trillions of dollars in present value terms, under the cash basis accounting rules that govern federal budgeting, Social Security reduced the reported budget deficit by about $52 billion in 2002. The current budgetary treatment of Medicare and Medicaid similarly gives no indication of the multi-trillion dollar projected future shortfalls. The new prescription drug benefit will add significantly to these unfunded liabilities, but only a small fraction of the costs will be reflected in the budget.

A reform that addresses the concern that obligations should be recognized when they are incurred, rather than when they are paid for, is to put more programs in the federal budget on an accrual basis. In this paper I examine what this would entail, both practically and conceptually, and provide rough estimates of how the 2002 budget balance would have changed had Social Security, Medicare, and the retirement programs for federal workers and military personnel, been recorded on a true accrual basis.

It is useful to begin by reviewing some of the history of thought on the use of accrual in the federal budget. Even after more than thirty years, *The Report of the President's Commission on Budget Concepts* (1967) remains the most influential work on federal budget concepts. The Commission, comprised of a respected group of authorities on the budget drawn from government, academia and business, were asked to recommend changes to the federal budget. Their recommendations were wide-ranging, and included a strong endorsement of accounting for expenditures and receipts on an accrual rather than a cash basis. Interestingly, the justification for moving to accrual was not to increase accountability for long-term obligations. At the time long-term obligations were modest, and their treatment received little attention in the Report. Rather, the motivation

for accrual was to improve how the stimulus effect of the federal government on the economy is measured, which at the time was considered by many economists to be the most important use of the budget deficit. For instance, there was concern that the large supply orders for the Vietnam War, which were obligated but not yet paid for, were having a large stimulus effect that was not reflected in cash expenditures. In fact, accruing long-term obligations for retirement programs could make the budget deficit a poorer measure of the stimulus effect of government spending.[1] Economists, however, no longer pay as much attention to measures of fiscal stimulus, so this is of less concern today than at that time.

Although the Commission's recommendation to put the budget on an accrual basis was not immediately adopted, the general direction of budget reform in the U.S. has been towards accrual.[2] Several categories of expenditures for which cash basis accounting quite obviously biases choices are already reported on an accrual basis. The most prominent is for loans and credit guarantees, which are accounted for under the rules laid out in the Credit Reform Act of 1990. Before credit reform, loans and loan guarantees, like other commitments, were recorded on a cash basis. This implies that when a loan is made, a cash outlay equal to the principal amount is recorded, and repayments and interest are recorded as negative outlays (i.e., revenues). Loan guarantees, although economically equivalent in their cost to the government, have a much lower budget cost on a cash basis because there is no initial outlay. On an accrual basis, the cost of a loan or loan guarantee is equal; it is the present value of any subsidies associated with the contract. In fact, the form of accruals adopted under Credit Reform accelerates net cash flow, a practice some refer to as an up-front form of accrual. It correctly recognizes the full capitalized value of expected losses at the point the guarantee is obligated.[3] Capital

[1] This would be true, for instance, if people's consumption plans are largely unaffected by retirement accruals.

[2] Several OECD countries have adopted accrual for retirement obligations, but most remain on a cash basis.

[3] An alternative is to capitalize the loss, but then amortize it over the life of the credit contract, so as to match cost recognition with the accrual of benefits. This alternative is inconsistent, however, with the purpose of accrual in this instance, which is to recognize the present value of all cash flows associated with a commitment up front.

leases are also recorded on an accrual basis. This correctly makes a capital lease equivalent to purchasing an asset, whereas accounting for capital leases on a cash basis frequently understates the value of the payments obligated. Retirement benefits for federal workers and military personnel are also on a partial accrual basis, but as discussed in Section 4, the accruals do not affect budget totals and so have a limited impact.

In contrast, federal retirement entitlement programs such as Social Security, Medicare and Medicaid continue to be reported on a cash basis. This decision is usually justified by the non-contractual nature of social insurance obligations. Benefits are not literally earned as they are by federal employees, and in fact Congress can change the program at any time. Proponents of accruing social insurance benefits counter that the implicit commitment is strong enough to justify treating it on an accrual basis.

How much would the deficit change if major federal retirement programs were recorded in the budget on a true accrual basis? The answer depends crucially on how program obligations and associated assets are defined. In Section 2, I consider in detail several ways accruals could be defined, and work through some stylized examples that reveal the strengths and weaknesses of the candidate accrual measures. The message conveyed by accrual estimates is shown to be very sensitive to the seemingly technical details of the chosen definition. My preferred definition of the net accrual is "current benefits earned net of current taxes paid." This definition is consistent with the idea that accruals should call attention to new obligations incurred. It avoids some of the problems with alternative measures (including the one currently used by the Treasury in its *Financial Report of the U.S. Government*) that include an interest charge on liabilities outstanding. These problems include a type of double counting, and the likelihood of large swings in year-to-year budget totals that are unrelated to policy actions.

Since the trust funds remain prominent in the public's perception of the financial status of social insurance programs, Section 3 briefly explains why accruals contain different, and more relevant, information than do trust fund balances.

Accrual estimates under several alternative definitions are constructed in Sections 4, 5 and 6. In Section 4, estimates of retirement accruals for federal employees and military personnel are developed under several of the candidate accrual definitions. Estimates for Social Security and Medicare are developed in Section 5. Section 6 looks at the net effect of retirement accruals, and considers the sensitivity of the estimates to factors such as the interest rate, the programs included, and the population of beneficiaries.

The result of the calculations is that switching to an accrual basis greatly increases the deficit if interest charges on outstanding liabilities are included in accruals. Under my preferred accrual definition, however, budget totals in 2002 are largely unaffected by switching to an accrual basis for federal retirement programs. This is because the imbalances in these programs are primarily due to past commitments, not to new ones. Had new unfunded obligations been incurred, such as the expansion in military retirement benefits that occurred in 2001, the deficit would have increased significantly under my preferred accrual definition. I conclude that the value of accrual accounting is in accurately portraying the size of new commitments, rather than in focusing attention on existing imbalances. This is not meant to suggest that the carrying cost of past liabilities should be ignored in the budget. These liabilities should be recorded, but not necessarily in a way that affects the bottom line budget balance.

Finally, the anticipated effects on the policy process of putting entitlement programs on an accrual basis differ widely. Many of the arguments that have been advanced for and against accrual are summarized in Section 7, and evaluated in the light of the analysis here.

2. Options for Accruing Social Security and Medicare Obligations

In this section I discuss several ways to define retirement accruals in the federal budget. The analysis leads to the conclusion that no single accrual measure can give a completely satisfactory picture of government commitments. In fact, the message the accrual charge is quite sensitive to the way the accrual measure is defined. Two measures are emphasized -- one because it closely tracks the current practices of the U.S. Treasury in preparing financial statements for the government, and a second because it focuses attention on new commitments, avoids a type of double-counting, and is relatively simple to calculate.

The accrual of liabilities answers the basic question, "How much did the present value of future obligations for this program change this year?" Analogously, the accrual of assets answers, "How much did the present value of assets associated with this program change this year?" The net accrual surplus represents the difference between accrued assets and accrued liabilities.

While the questions seem straightforward, the answers vary depending on how obligations and assets are defined. Consistent with most previous analyses, for the federal social insurance programs that are the main focus of this analysis, the assumed level of benefits and taxes are those specified by current law[4], projected forward using the best available forecasts of economic and demographic trend.[5]

It is far less obvious how to define the scope of the obligations or the relevant assets. Federal accounting standards define a liability as a probable outflow of economic resources due to a past event or transaction. There are widely differing views on what

[4]This is a technical definition. It is not intended as an opinion on whether current law represents a moral or contractual commitment for the future, as discussed in Section 7.

[5] Economic forecasts require assumptions to be made about the effects of future fiscal imbalances on the rest of the economy. One approach is to rely on econometric forecasts that assume normal market outcomes, such as those used by the Social Security Administration. A more speculative approach is to try to incorporate the disruptive effect on the economy of the deficits that would emerge under current law.

constitutes a recognition event for social insurance liabilities. For instance, are Social Security and Medicare benefits earned at birth, at age 15, gradually with years worked or taxes paid, at retirement, or are they always revocable? The definition of an asset -- a probable inflow of economic benefits owned or controlled by the reporting entity, based on a past transaction or event – is similarly open to interpretation. Should assets include only current payroll taxes net of current benefits, or should trust fund balances, and capitalized future tax payments, also be included?

In the analysis that follows, I primarily focus on benefits earned as the recognition event for liabilities. When liabilities are based on benefits earned, the relevant population includes retirees and current workers with earned benefits. The concept is consistent with the idea that current law obligations should be recognized only to the extent that an individual has worked and paid taxes into the program to date. It is also consistent with the accrual treatment of federal and military retirement benefits in the budget now. Broader definitions, for instance including full benefits for everyone over 15, can overstate imbalances since there is no expectation that the status quo will be maintained indefinitely.[6] On the other hand, narrower definitions of liabilities, such as the current practice of denying any future obligation, ignore what is widely perceived to be the social contract – if you work and pay taxes, you are entitled to benefits. It seems unlikely then, that benefits would be cut significantly below current law levels for retirees or for older worker with substantial earned benefits.

Several definitions of system assets are considered. As the examples below illustrate, to interpret net accruals as net new obligations, it is important to define assets and liabilities fairly symmetrically. This occurs in a private pension plan accounting, where a trustee invests payments made on behalf of employees in dedicated financial assets, which are then used to pay benefits. Payments into the fund generally match the value of current benefits earned. Under-funding can occur if insufficient assets are set aside to begin

[6] While benefits earned are a well-defined quantity for programs such as Social Security, it is harder to define for programs with categorical eligibility such as Medicare and Medicaid, as discussed in Section 6. The *Financial Report of the U.S. Government* (2002) uses a broader measure, including all citizens age 15 and over, but notes that the criterion of benefits earned satisfies the definition of accrual most closely.

with, if demographic projections fail to materialize, or if earnings on assets turn out to be lower than anticipated. For federal programs such as Social Security, when the recognition event is benefits earned, it seems natural to include payroll taxes collected in excess of benefits paid as system assets (the payment of taxes is the symmetric recognition event for assets).

Whether any assets other than current payroll taxes should be attributed to the social insurance system is the subject of some debate. Payroll taxes in excess of current benefit payments are notionally invested in U.S. special Treasury obligations held in a trust fund. In reality, the revenues are used to cover current expenditures, and the special Treasury obligations are essentially accounting entries. The question, then, is to what extent trust fund balances are system assets? The analogy to a private pension fund seems to suggest that they are assets, since they represent an obligation from the Treasury to the pension system. However, budget totals reflect the position of the consolidated federal government including the Treasury and the trust funds, and from that perspective, the trust fund balances are not assets. The current treatment of retirement accruals for federal workers and the military, which do not include their respective trust fund balances as assets, reflects this comprehensive budget perspective.

To examine these issues more concretely, consider the following possible definitions of the net accrual surplus:

1. Current revenues collected, less all benefits earned
2. Current revenues collected and interest on system assets, less all benefits earned
3. Current revenues collected, less current benefits earned
4. Comprehensive new revenues less comprehensive new benefits

As the preceding discussion suggests, each measure is best understood in terms of the implicitly underlying assets and liabilities. All measures of accruing liabilities are based on the general formula:

$$\text{Annual Liability Accrual}(t) = PV[\text{Liabilities}(t)] - PV[\text{Liabilities}(t-1)]. \quad (1)$$

Similarly, accruing assets are based on the general formula:

:

$$\text{Annual Asset Accrual}(t) = PV[\text{Assets}(t)] - PV[\text{Assets}(t-1)] \quad (2)$$

where t is time, in years.

Equation (1) can be rewritten to reflect flows across time:

$$\begin{aligned} &\text{Annual Liability Accrual}(t) = \\ &PV[\text{Liabilites}(t-1)]*\text{Rate} + PV[\text{New Benefits Earned}(t)] \\ &+ PV[\text{Actuarial Adjustments}(t)] - \text{Benefits Paid to Retirees}(t) \end{aligned} \quad (3)$$

Where:

Rate = market interest rate (usually taken to be a one-year Treasury rate)
PV[x] = present value of x
Liabilities = benefits due
Revenues = dedicated taxes and other fees or payments into the system
Actuarial Adjustments = changes in assumptions (e.g., life expectancy, costs)

Equation (3) says that the annual accrual includes interest earned on past liabilities, plus the present value of new benefits earned by current workers, minus benefits paid to current retirees. Adjustments to liabilities, reflecting changes in assumptions about economic or demographic variables, also are included. For instance, an increase in retiree life expectancy would add to expected costs and cause a positive actuarial adjustment. The final subtraction is due to the fact that current benefits paid reduce the present value of future liabilities.

Similarly, it is convenient to rewrite equation (2) in terms of annual flows:

$$\begin{aligned} &\text{Annual Asset Accrual}(t) = \\ &PV[\text{Assets}(t-1)]*\text{Return} + PV[\text{revenues}(t)] - \text{Benefits Paid to Retirees}(t) \end{aligned} \quad (4)$$

"Return" is a rate based on interest earnings, and any realized or unrealized capital gains and losses. Assets increase due to investment gains and associated revenues, and decrease due to benefits paid.

Subtracting equation (3) from equation (4) provides a formula for the net accrual:

$$\text{Net Annual Accrual Surplus}(t) = \tag{5}$$
$$PV[\text{Assets}(t-1)]*\text{Return} + PV[\text{revenues}(t)] - PV[\text{Liabilites}(t-1)]*\text{Rate} -$$
$$PV[\text{New Benefits Earned}(t)] - PV[\text{Actuarial Adjustments}(t)]$$

Notice that benefits paid to retirees cancel out in net accruals, since they are subtracted from both equations (3) and (4).

Using an "all benefits earned" criterion as proposed under the first two candidate accrual definitions, the underlying liabilities equal the present value of all benefits earned to date. This includes the present value of all remaining retirement benefits for current retirees. For an individual retiree, the present value declines over time as benefits are paid. For current workers, the present value of benefits earned includes benefits already earned, but excludes those expected to be earned from future labor force participation. The annual accrual is generally positive, both because retirement benefits begin one year sooner, and also because benefits due (e.g., for Social Security) may increase with years of employment or time.

The first two accrual definitions are distinguished by whether trust fund balances are included in assets. The first is currently used by the U.S. Treasury to calculate accruing civilian and military retirement benefits in the *Financial Report of the United States* (2002). The second is considered because it is more symmetric in its treatment of assets and liabilities. Under both definitions, equation (5) describes the components of the net accrual. It includes current revenues, which are primarily generated by payroll taxes, and a charge for interest on past liabilities. Current taxes, as opposed to the present value of expected future taxes, are recorded because, symmetric to benefits, the accounting makes

no presumption that expected future tax receipts are current obligations. The only difference between the two definitions is that under the first, PV[Assets(t-1)] is reset to zero each year, whereas under the second it is equated to accumulated trust fund balances.

Comparing these first two definitions of net accruals, some would view the first as more realistic because it does not treat the government's obligations to itself, i.e., the special issue Treasury securities, as real assets. Others might object, however, that zeroing out assets each year implies the need to collect taxes twice to cover the same earned benefits. Clearly, the reported budget deficit will be smaller under the second definition because it excludes interest on trust fund balances.

Both of these problems are avoided using the third proposed definition of a net accrual: "Current revenues collected less current benefits earned." This definition effectively ignores both accumulated assets and past liabilities, focusing instead on new obligations. Whereas the first two definitions would result in systematically higher deficits than the current cash deficit because of the large interest charge on accumulated retirement liabilities, this definition would not. In terms of equation (5), it finesses the trust fund debate by assuming that the return on system assets always equals the interest charge on outstanding liabilities. As Appendix 1 shows, it also avoids the systematic double counting of costs that arises under the first definition used by Treasury. It indicates whether a program is stable going forward by reporting current revenues relative to current incremental liabilities including actuarial adjustments.[7] Its value-added, relative to cash basis accounting, is in calling attention to new imbalances in commitments as they arise.[8]

[7] Reporting current revenues as the asset flow is correct for programs where participants are not obligated to any future payments. For programs with longer term contracts, current revenues should be replaced by the present value of newly committed revenues in the calculations.

[8] Actuarial adjustments are based on new information about costs, and so should be included in a measure recognizing new liabilities.

A potential drawback of the third definition is that it does not reveal anything about the magnitude of unfunded or under-funded past liabilities. Therefore to accurately portray the government's financial condition, it is necessary to use this accrual measure in combination with additional information. The information needed is essentially the interest charge on net capitalized liabilities. Net capitalized liabilities always include the present value of all retirement obligations, and may or may not subtract the value of trust fund assets. This capitalized liability, however defined, cannot be directly compared with an accrual number since accruals are flows and capitalized liabilities are stocks. However, it can be converted into an annual dollar payment that has a present value equal to the capitalized liability. The current interest rate times the capitalized liability is an estimate of this cost. This can be thought of as the annual special assessment or tax surcharge needed to pay off the capitalized liability.[9] It would be possible to report this interest cost in the budget under a label like "carrying cost for accumulated social insurance obligations" but not include it in the accrual totals that affect the budget balance.

The fourth candidate, "Comprehensive new taxes less new comprehensive benefits," involves estimating equation (2) taking into account all future payments to retirees and current workers, the young, and even the unborn (this is often called an open system estimate). Similarly, comprehensive revenues include estimating equation (4) using all anticipated payments into the system (interest on the trust fund may or may not be included, as discussed above). If, for new entrants into the workforce, lifetime taxes and benefits roughly offset, the estimates should be similar to those including only earned benefits.[10] This definition, although it is the most inclusive, is problematic in several respects. It requires estimating highly uncertain future wage trends, health status, and life

[9] Such a surcharge, if assessed on retirees, is equivalent to a benefit cut.

The Social Security Administration expresses the shortfall as a percentage of current revenues in calculating the actuarial gap. It is a similar concept, but the gap is not expressed in units that could directly be recorded in the budget.

[10] According to informal Congressional Budget Office estimates, this is approximately the case for Social Security today.

expectancies of generations yet unborn. Because of the long time horizon, it is extremely sensitive to assumptions such as the interest rate and growth rate of the economy. Small imbalances that likely will be addressed in future legislation can create the appearance of catastrophic imbalances when they are assumed to continue to grow into the indefinite future. Although this definition is used in some published estimates of the capitalized value of net liabilities,[11] due to these considerations no original estimates on this basis are included in this paper.

To compare and contrast the first three definitions of accrual with traditional cash based accounting, it is useful to consider the stylized numerical example described in detail in Box 1 (see also Appendix 1 for a simpler example). It has three features that are useful in assessing the different concepts as they would apply to the social security system today. First, it has an overhang of unfunded liabilities to retirees who no longer pay taxes. Second, it has a positive trust fund balance. Third, it assumes an actuarially balanced system for new workers, but with a timing discrepancy between taxes paid and benefits earned. For ease of exposition, it considers only a single generation of workers, and the system shuts down completely at the end of 60 years. Nevertheless, the example reveals the strengths and weaknesses of the alternative measures.

Box 1. A Numerical Example

The three definitions of an accrual and cash surplus/deficit are considered in the context of the follow numerical example:

Time horizon = 60 years
Trust fund initial balance = 30
Annual payment to those already retired at time 0 = $2
Interest rate = 5%
Present value of payments to current retirees = $37.86

[11]See, e.g., Gokhale and Smetters (2003).

A new generation of workers enters the system at time 0. This generation works for 40 years and spends 20 years in retirement. For this new generation:

Earnings per year = $50
Payroll tax rate on earnings = 6.19%
Maximum annual benefit = $30
1/20 of maximum benefit is earned with each year of work.

Under these assumptions, the present value of taxes from new workers equals the present value of benefits that they earn ($53.11), although there is a timing mismatch because taxes do not equal accruing benefits in any year. There is an overhang of costs from retirees, who pay no additional taxes. The trust fund is credited with taxes and interest, and reduced by benefits paid. It holds only government obligations, and so only represents a claim on resources to the extent that additional taxes are assessed in the future.

The economic reality of the system is that it is not in balance because the present value of future taxes falls short of the present value of promised benefits. The system is, however, in balance going forward if only current workers are considered. As is true of the federal budget today, under cash basis accounting the funding shortfall is not recognized for many years. In fact, a significant surplus is recorded as long as young people are paying taxes and not collecting benefits, since tax collections exceed the benefits to retirees. In this stylized example, large deficits arise only after 40 years, when the large cohort of workers enters retirement.

Cash basis accounting does not reflect this economic reality. There is a surplus equal to tax revenues net of benefits paid to retirees for the first 40 years, followed by large deficits equal to total benefit payments thereafter.

The pattern of surpluses and deficits varies considerably across the three definitions of accrual, as shown in Figure 1. Each graph is generated using equation (5) with the restrictions imposed by the particular definition under consideration. The spreadsheet used for the calculations is in Appendix 3. None of the accrual measures transparently portrays the system's financial status. The first two may be considered improvements over cash basis accounting in that they suggest early on that the system is in deficit rather than in surplus, but the source of the problem (old liabilities rather than new commitments) is not apparent, and the magnitudes are difficult to interpret. The third definition correctly shows incremental accruals but does not reflect any costs from past shortfalls.

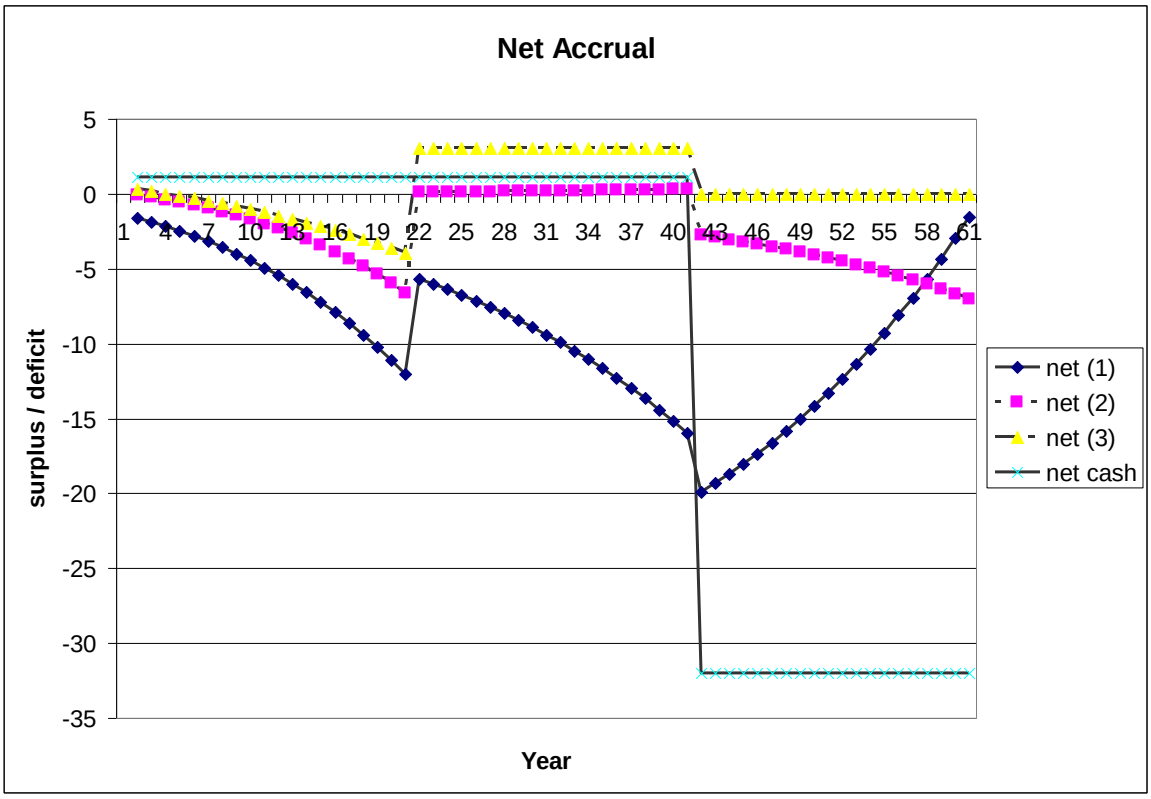

Figure 1

Under the first definition, deficits increase exponentially over the first 20 years due to the compounding interest on outstanding liabilities to retirees. Adding to these liabilities are small net accruals for current workers, who earn more in benefits in their early working years than they pay in taxes. The deficit is still positive but smaller in the 21st year, when workers simultaneously stop accruing additional benefits. The deficit again grows

rapidly through the 40th year, as interest on liabilities continues to compound. Deficits start to shrink in the 41st year, as remaining liabilities shrink with benefits paid. To see that this pattern of accruals does not reflect the economic situation, consider the last 10 years, when annual deficits are declining. Without new taxes or a reduction in benefits, by the 50th year the additional public debt to finance the accumulated shortfalls would total $187. By the 60th year it would total $707. Yet the reported deficit declines over the period because the definition of the liability only reflects remaining benefits to be paid, not new debt accumulated to finance shortfalls over the life of the program.

The second definition adds accrued interest on the trust fund to assets, resulting in smaller reported deficits in almost all years. The pattern over the first 20 years is similar to that under the first definition. Deficits are negligible between years 21 and 40 because the pattern of taxes paid plus interest earned on trust fund assets happens to offset most of the interest cost on accumulated liabilities. After workers cease paying taxes in the 40th year, deficits again increase since the shrinking trust fund ceases to produce enough income to offset interest on liabilities. As with the first definition, deficits in later years do not reflect the large stock of accumulated debt needed to pay promised benefits.

The third definition is entirely forward looking, comparing current taxes with the current accruals of new benefits. The current accrual is measured as the present value of any new benefits earned in the current year. It differs from the first two definitions by assuming that the interest due on past accumulated liabilities equals the interest earned on assets. The accrual pattern in this case reveals a small but growing deficit over the first 20 years, followed by 20 years of surpluses, and then a zero deficit for the last 20 years. The initial deficits are due to the fact that workers accumulate benefits at a faster rate than they pay taxes initially; it only takes 20 years to reach the maximum benefit, whereas taxes of equal present value are paid over all 40 working years. The surpluses arise starting in year 20 because no new benefits accrue, but workers continue to pay taxes. At retirement there are no further accruals because there are no additional taxes and no newly granted benefits. While this accurately reflects the accruals for current workers, it does not reveal the under-funding problem for the system as a whole.

To get a complete picture of system finances, additional information on the cost of unfunded past obligations incurred must be added to this measure of accrual. In our example that amount on a capitalized basis is $37.86, the present value of total liabilities to retirees. As discussed earlier, some might argue that trust fund balances represent federal assets earmarked for retirees.[12] In that case there is still a system shortfall not reflected in the trust fund of $7.86 (the present value of promised benefits minus the trust fund balance).[13] The $30 in the trust fund also must be financed with future taxes, so the $37.86 does represent the total funding requirement for the overhang. In any case, multiplying the capitalized net liability by the interest rate provides an estimate of the annual cost of maintaining the outstanding balance in perpetuity. In this example, it amounts to .05($37.86) or $1.89 per year if the entire liability is taken to be relevant, or .05($7.86) = $0.39 if the trust fund balance is treated as an offset.

While the interest on past liabilities is clearly a cost that must be paid (either through future tax increases or benefit cuts), it is not obvious from an economic perspective that it should be included in a true accrual-based measure of the budget surplus or deficit. Consider a new retirement program. In the first year that a benefit is earned, under any of the accrual definitions the accruing liability is the present value of the promised benefit. If that present value were paid out immediately in cash to beneficiaries, it would have no further implications for future receipts or expenditures. When instead the benefit payment is deferred to a future date, the government has the advantage (in opportunity cost terms) of earning interest on the money saved over the deferral period. It is as if the government, like a private employer, made an investment that could be used to fund the eventual benefit. If in fact the government spends the money rather than invests it, the deferral still reduces the government's interest costs because it need borrow less than it otherwise would have. The net effect is that the benefit to the government of the time

[12] Notice that the initial trust fund balance is positive, and, like cash basis budgeting, does not reveal the substantial under-funding in the system going forward. The balance is positive because past taxes exceeded past benefits paid.

[13] Shoven (2003) makes essentially this argument.

value of the money exactly equals the increased cost of the benefit (assuming a single interest rate is appropriate for assets and liabilities). Recording a net accrual charge for the interest neglects the fact that the government has offsetting interest receipts on the money they avoided paying out. Recording the interest as a budgetary cost is a form of double counting the benefits.[14]

These considerations suggest that "current revenues collected less current benefits earned" is the correct definition of accruals that affect the bottom line of the budget. The first definition, however, corresponds more closely to estimates appearing in the *Financial Report of the United States Government*. The estimates developed below are presented using all three concepts, but with an emphasis on the first and the third.

3. Comparing the Information in Trust Funds with Accruals

Some analysts look to the trust funds and projections of their future balances as measures of the long-term fiscal pressures arising from federal entitlements. This might lead one to ask: to what extent do the trust funds substitute for, or add to, the information that accrual accounting would provide? The short answer is that by their nature current trust fund balances are backwards looking. Therefore they cannot be viewed as substitutes for forward looking accrual estimates. Projections of future trust fund balances are suggestive of trends, but still are backward looking. On a fundamental level it makes no sense to compare accruals with trust fund balances, since the former represents the annual *change* in asset or liability value, while the latter is an asset value.

The federal budget includes more than a dozen trust funds, with "assets" totaling over $2.5 trillion in 2002.[15] The largest of these, and the ones of interest here, are for Social Security and Medicare. These account for $1.6 trillion of the total.

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[14] This statement can be verified algebraically. For a program where the present value of taxes and benefits are equal, the present value of net accruals equals zero when accruals are defined under the third definition. Under definitions that track accruing interest, even though the system is in balance the net accruals do not have a discounted value of zero.

[15] *Financial Report of the U.S. Government* (2002), Note 19. Dedicated Collections

Why were the trust funds created? Before the budget was consolidated in 1969, some trust funds appear to have been created primarily to hide federal obligations outside the more closely scrutinized administrative budget.[16] A more positive view of trust funds is that they were designed to ensure that certain programs are funded with earmarked revenues, and shielded from the rest of the budget process. The money paid into the fund is intended to fund a particular set of services or investments, and expenditures on these programs are limited by the balances of the trust fund, absent further congressional action. There is little in practice, however, to support the idealized view of trust funds as segregated programs. The government has the discretion to redirect the monies or change program parameters independent of trust fund balances, and it frequently has done so in the past.[17]

For instance, there is minimal legal linkage between the Social Security and Medicare trust funds, payroll taxes, and expenditures. The Social Security trust fund represents the accumulated difference between dedicated payroll taxes and benefits paid, plus interest on the fund's holdings of U.S. Treasury obligations. The level of Social Security payroll taxes is independent of the trust fund balance, and there is no legal commitment to workers that having paid taxes, they will receive any future benefit. A separate law determines benefits as a function of years worked and wages earned, but it does not link benefits directly to taxes paid.[18] The trust fund only affects benefits in the event that the trust fund runs out of money, at which time benefits paid cannot exceed current tax revenues without further legislative action.

As critics of trust fund accounting are quick to point out, the government securities held in the trust fund represent a claim on real resources only insofar as they force the Congress to raise tax revenue or induce the Treasury to borrow to refinance its debt. That

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[16] President's Commission on Budget Concepts (1969) commentary in supporting documents.

[17] See the Congressional Budget Office report: "Social Security: A Primer."

[18] See Herman (1988) for an interesting account of the history of the legal structure.

is, trust fund "assets" are claims held by the government upon itself. Payments to beneficiaries ultimately must come from the real economy, independent of the size of the trust funds. They maintain that the trust funds are at best irrelevant, and it worst misleading. Other commentators are more sympathetic to the idea that the trust funds result in more saving than would have accumulated in a completely unfunded system, and that trust fund balances represent a firmer commitment to pay benefits than if the program were financed out of general revenues.

The question here is not whether trust funds have resulted in higher savings levels than would otherwise have been realized. Rather, it is to what extent are they informative about the state of government finances going forward? Arguably, trust fund balances are for the most part uninformative about this question. In contrast to accruals, current trust fund balances give no indication of the future fiscal pressures that will result from today's policy decisions. Rather, trust funds by construction are entirely backwards-looking. They report the present value of the difference between taxes already paid and benefits already received. Projecting trust fund balances forward provides more information about the future, but not in a form that can be readily compared to other budget entries. Accruals, on the other hand, are entirely forward looking. They answer the question, how much this year did my future obligations increase or decrease, relative to current receipts? As discussed above, accruals do not give a full picture either because the stock of past liabilities is difficult to accurately portray on an accrual basis.

Although I have argued that trust funds provide little useful information about the pressures from long-term obligations, the logic of an accrual based system does not allow them to be put aside entirely. As discussed at length in the last section, an account akin to a trust fund is necessary to track assets generated by the deferred payments associated with accruing liabilities. They continue to arise, but only in that context, throughout the paper.

4. Accruals for Federal Employee and Military Retirement Programs

The federal budget reports some federal retirement programs on what can be described as a partial accrual basis. Federal agencies record all pension costs that accrue for employees covered by the Federal Employees' Retirement System (FERS), and about 40 percent for employees covered by the older Civil Service Retirement System (CSRS).[19] The President's 2003 budget proposed that federal agencies record the full cost of employees' pension and health benefits in retirement as those benefits are earned, starting in 2003. The motivation for putting these expenses on an accrual basis is to make agencies aware of the full cost of hiring workers, and to allow more accurate comparisons with the cost of outside contractors where these costs are reflected in bid prices. As discussed in Section 7, budget officials defend the practice of accruing these liabilities, but not Social Security and Medicare, on the grounds that only the former represent firm contractual commitments.

The reason these programs are on a partial rather than full accrual basis is that accounts are deliberately structured so as not to affect the unified budget surplus or deficit. This preserves the interpretation of the unified budget balance as approximately the net cash transaction with the public, while providing agencies with better incentives in hiring decisions. This is implemented by charging agencies for their accruing retirement liabilities, but at the same time increasing their budget authority by an equivalent amount. The accruals are recorded as payments to a dedicated trust fund, financed by charges to an agency's budget authority and notionally invested in interest-earning Treasury securities. Payments to retirees are debited from the trust fund, and interest accrues to the trust fund. Since there is no change in net transactions with the public, there is no change in the budget balance.

To demonstrate what the budget would look like if these obligations were treated as true accruals, it is necessary to replace cash charges for these expenses with accrual charges in

[19] The President's Proposal to Accrue Retirement Costs for Federal Employees, Congressional Budget Office, 2003.

the budget totals. This task is simplified by the fact that the Treasury does a similar calculation to estimate net operating costs in the *Financial Report of the United States Government* (2002). However for our purposes the Treasury numbers require adjustment, and there are some questions of interpretation. In addition to federal retirement programs, the Treasury estimates accrual charges for environmental liabilities and veterans' disability and insurance payments. These are also included in some of the Tables, but not in the net retirement program accrual estimates. As shown in Table 4.3 and explained below, under the Treasury's accrual definition (which is the first definition described in Section 2) these federal obligations would add considerably to the deficit, adding $194.8 billion in 2002 and $601.9 in 2001.[20]

The estimates rely on two useful sets of statistics for estimating alternative accrual estimates, reproduced in Table 4.1 and 4.2 from the Treasury's *Financial Report*. They track the components of the annual change in liabilities for federal employee and military pension and retirement benefits.

[20] These calculations are based on information appearing in the table on page 56 of the *Financial Report of the U.S. Government* (2002). The figures used for interest adjustments are from the tables on pages 108 and 109. Not all items in the original tables are included. For instance, adjustments to capital costs, included there to get to a net operating cost, are omitted here. Other relatively small adjustments, such as those for the timing of other payments, are neglected for simplicity.

Table 4.1: CHANGE IN ACCRUED PENSION LIABILITIES
($ billions) *Source: Financial Report of the U.S. Government (2002), page 108*

	Civilian	Military	Total
Pension Liability as of September 30, 2001	1,112.9	708.3	1,821.2
Pension Expense			
Normal Costs	23.2	18.5	41.7
Interest on Liability	73.9	43.0	116.9
Actuarial (Gain)/Loss	(31.2)	(4.9)	(36.1)
Total Expense	65.9	56.6	122.5
Less Benefits Paid	-49.0	-34.9	-83.9
Pension Liability as of Sept. 30, 2002	1,129.8	730.0	1,859.8
Change	**16.9**	**21.7**	**38.6**

Table 4.2: CHANGE IN ACCRUED POST-RETIREMENT HEALTH BENEFITS
($ billions) *Source: Financial Report of the U.S. Government (2002), page 109*

	Civilian	Military	Total
Health Liability as of September 30, 2001	205.2	580.9	786.1
Health Expense			
Normal Costs	8.7	13.1	21.8
Interest on Liability	13.9	34.7	48.6
Actuarial (Gain)/Loss	1.8	(26.2)	(24.4)
Total Expense	24.4	21.6	46.0
Less Benefits Paid	8.2	10.5	18.7
Health Liability as of Sept. 30, 2002	221.4	592.0	813.4
Change	**16.2**	**11.1**	**27.3**

The information in Tables 4.1 and 4.2 enters into the more comprehensive estimates shown in Table 4.3. Table 4.3 is also based on information in the Treasury's *Financial*

Report of the U.S. Government (2002). It reports what happens to the unified budget balance as a result of putting these programs on an accrual basis.

TABLE 4.3: **The Effect of Accruing Federal and Military Retirement Programs and Environmental Liabilities**

($ BILLIONS)

Panel A: Inclusive of interest charges (accrual definition 1)		
	2002	2001
Cash surplus (deficit)	(157.5)	127.0
Increase in liability for military employee benefits		
Pension liabilities	21.7	17.8
Health liabilities	11.1	388.6
Other liabilities	(0.4)	0.4
Total military	32.4	406.8
Increase in liability for veterans		
Liability for veterans	147.7	115.2
Liability for survivors	9.0	24.1
Liabilities for burial benefits	0.6	0.0
Total veterans	157.3	139.3
Increase in liability for civilian employee benefits		
Pension liabilities	16.9	41.0
Health liabilities	16.2	7.2
Other liabilities	5.8	1.9
Total civilian	38.9	50.1
Decrease in environmental liabilities		
Energy's liabilities	(28.7)	4.1
All others' liabilities	(5.1)	1.6
Total environmental	(33.8)	5.7
Accrual surplus (deficit)	(352.3)	(474.9)
Change in surplus (accrual definition1)	(194.8)	(601.9)

TABLE 4.3 (CONTINUED): The Effect of Accruing Federal and Military Retirement Programs and Environmental Liabilities	
Panel B: Exclusive of interest charges (accrual definition 2)	
	2002
Cash surplus (deficit)	(157.5)
Increase in liability for military employee benefits	
Pension	(21.3)
Health	(23.6)
Other	(0.4)
Total military	(45.3)
Increase in liability for veterans	
For veterans	147.7
For survivors	9
For burial benefits	0.6
Total veterans	157.3
Increase in liability for civilian employee benefits	
Pension	(57)
Health	2.3
Other	5.8
Total civilian	(48.9)
Decrease in environmental liabilities	
Energy's liabilities	(28.7)
All others' liabilities	(5.1)
Total environmental	(33.8)
Accrual surplus (deficit)	(186.8)
Change in surplus (accrual definition 3)	(29.3)
Interest on liabilities (1)	(165.5)
Interest on trust funds (2)	NA
Notes: (1) Sum of interest charges in Tables 4.1 and 4.2. No estimate is available for interest on liabilities to veterans or environmental liabilities. (2) I have not tracked down the trust fund totals associated with these programs	

The difference between the numbers reported in panels A and B of Table 4.3 is the interest on outstanding liabilities (and also in the case of definition 2, the interest on assets). Panel A includes the interest charge in the current accrual, and Panel B excludes it. The two panels are reconciled in the final line of Panel B, which reports the interest cost on a separate line, but not as part of the accrual. As discussed in Section 2, the inclusion of interest in the current accrual is a form of double counting in an accrual-based system. Under the third accrual definition that avoids double-counting, "current revenues collected, less current benefits earned," the change in the deficit is more modest – the increase in 2002 is only $29.3 billion, and this is due primarily to actuarial adjustments in veteran's disability and insurance benefits.

The reason accruing liabilities are much lower under the third definition can be seen by looking at the components of the accruing pension liabilities in Table 4.1. The normal cost plus the actuarial loss corresponds to my definition of current benefits earned plus actuarial adjustments. To convert from cash to an accrual basis, "current benefits earned" replaces "current benefits paid" as an outlay. Since pension benefits earned are smaller than pension benefits paid, the accrual totals for pension benefits are actually smaller than the cash basis totals. Again, the difference between this estimate and the one based on the first accrual definition is "interest on liability," which adds considerably to the total because of the significant accumulated liabilities to retired federal workers and military personnel.[21]

The first panel of Table 4.3 includes estimates for 2001 as well as 2002. The $388 billion accrual for military health liabilities in 2001 is a particularly good illustration of when cash and accrual budgeting provide very different messages. The charge is the result of the sharp increase in military health benefits that was enacted that year. Had these costs been recorded on an accrual basis (under any of the alternative definitions), the unified budget surplus would flipped to a deficit. The benefit increase, since it primarily affected

[21] These calculations assume that interest payments from the trust funds are not included in these estimates, but this has not been verified.

future benefits, had only a small impact on the cash budget. It is a striking example of where true accrual budgeting could have changed the perception of the affordability of expanding benefits.

5. Accrual Estimates for Federal Entitlement Programs

Social Security

Estimating net accruals for Social Security requires the following building blocks: currently accruing benefits to workers and actuarial adjustments to past liabilities; current retirement benefits; current payroll taxes; the size of the Social Security trust fund; the appropriate interest rates; and total liabilities. Most of these statistics can be found in the federal budget or obtained from publications of the Social Security Administration (SSA), for instance their annual Trustee's Report. Several of these quantities, however, are not immediately available. Estimating "currently accruing benefits and actuarial adjustments" from scratch is a formidable task. It requires modeling the life expectancies of current workers and retirees, the path of future wages and inflation, and other economic and demographic variables. To my knowledge, an estimate of this quantity is not published, although the SSA and CBO have the capacity to estimate it. Calculations done at the CBO suggest that current workers' taxes approximately equal their accruing benefits. I use this approximation in the accrual calculations reported below. Another elusive number is the overhang of liabilities from benefits owed to retirees and already earned by current workers. SSA's estimate of the present value of resources needed over the 75-year projection period of $4,562 billion in January 2002 serves as an upper bound, since it also includes benefits that have not yet been earned. I will use 2/3^{rds} of this amount for the estimates below, adjusting it down to account for the unearned benefits it includes.[22]

[22] SSA and CBO also have models that can easily generate precise estimates of accrued liabilities, so it is feasible for the government to estimate this accurately.

How Social Security is currently accounted for in the federal budget is shown in Table 5.1. The Table is excerpted from the President' Budget (2004). The largest contribution to outlays is current benefits paid, which include Old-age, Survivors, and Disability Insurance (OASDI), and Supplementary Security Income (SSI). Administrative and miscellaneous costs also add to outlays. Other accruals in the federal budget, e.g., for credit programs, leave associated administrative costs on a cash basis, a practice followed here. I also leave SSI on a cash basis for two reasons: to simplify the calculations, and because it is a categorical entitlement rather than an earned benefit. Similarly, disability insurance eligibility is categorical and remains on a cash basis in the calculations. (Some of these assumptions are reconsidered in the sensitivity analysis below.) On the revenue side, conceptually inflows include payroll taxes, taxes on benefit payments to high-income elderly, and other collections. The latter two are recorded as negative outlays, but the effect on the consolidated budget balance is the same as if they were recorded as revenues. Notice that some items are classified as mandatory and others are discretionary, but the distinction does not affect the current budget totals nor does it affect the adjustments needed to convert the budget to an accrual basis.

Table 5.1: CURRENT BUDGET TREATMENT OF THE SOCIAL SECURITY ADMINISTRATION ($ millions)	2002 Actual
Spending	
Discretionary Budget Authority:	
Limitation on Administrative Expenses (LAE)1	7,570
Office of the Inspector General	75
Research and Development	30
Total, Discretionary budget authority	7,675
Mandatory Outlays:	
Old-age, Survivors, and Disability Insurance (OASDI)	452,154
Supplemental Security Income (SSI)	31,411
Special Benefits for Certain World War II Veterans	7
Offsetting Collections	-1,707
Undistributed Offsetting Receipts	-9,292
Total, Mandatory outlays	472,573
Total discretionary budget authority and mandatory outlays	480,248
Payroll taxes	
OASI	455,200
DI	77,300
Total payroll taxes	532,500
Contribution of system to the unified deficit (surplus)	**(52,252)**

To convert the cash surplus to an accrual surplus, the main change under any of the accrual definitions is to add benefits paid back into the surplus, and to subtract out current benefits accruing to workers including actuarial adjustments. The relevant taxes and benefits are those associated with the old-age insurance (OASI) program. Current taxes, which are taken as a proxy for accruing benefits, equal $455.2 billion.[23] Current benefit payments equal $388.1 billion. The net effect of switching this program to an accrual basis is a decrease in the surplus of $67.1 billion, the difference between the two

[23] These numbers are taken from Table II.B.I from the 2003 Trustee's Report of the Social Security Administration.

amounts. An interest charge on the overhang from past liabilities incurred also can be computed. The charge equals the total interest incurred on liabilities, or the interest on liabilities net of interest on the associated trust fund (whether to include trust fund interest earnings is discussed in Section 2). The interest rate on assets and liabilities is taken to be the return on trust fund assets in 2002 inferred from interest earnings reported by the SSA, of 6.64 percent. These calculations are summarized in Table 5.2.

Table 5.2: THE EFFECT OF ACCRUING SOCIAL SECURITY ON THE BUDGET ($ billions)	**Fiscal Year 2002**
Unified Budget Surplus (cash basis)	(157.5)
Adjustment for benefits paid	388.1
Adjustment for currently accruing benefits	(455.2)
Accrual Surplus (third definition)	**(224.6)**
Trust Fund Balance	1,071
Interest earned on trust fund	71
Liabilities	3,041
Interest cost on liabilities	(202)
Accrual Surplus (first definition)	**(426.6)**
Accrual Surplus (second definition)	**(355.6)**

Medicare and Medicaid

Accruing liabilities for Medicare or Medicaid is complicated by both conceptual and practical difficulties.[24] The programs fundamentally differ from Social Security's OASI program (and from the health benefits earned by federal employees and the military) in that they are a categorical entitlement. U.S. citizens reaching the age of eligibility or satisfying other criteria are entitled to full hospital insurance (HI) benefits, and are

[24] Similar considerations apply to Medicaid. Analysis of that program is further complicated because payment is shared with state governments.

eligible to participate in the heavily subsidized supplementary medical insurance (SMI) program. Income is the primary determinant of Medicaid eligibility. Hence, full lifetime benefits accrue to all newborns and new citizens. Accruals for Medicare booked from the time of birth would be based on highly speculative estimates of health care costs 60 to 100 years into the future. Furthermore, the lifetime pattern of accruals -- a large accrual deficit at birth that grows rapidly over time until several decades later when entry into the workforce triggers tax payments – is not particularly informative about the pressures from the aging of the baby boom generation that confronts the system in the near future.

For these reasons, it does not seem sensible to try to accrue Medicare or Medicaid benefits in the budget in the way that programs for federal workers and the military, or even Social Security OASI, might be accounted for. If an adjustment for Medicare's projected imbalances is to be made, ideally it would be based on a full projection of costs net of revenues over the lifetime of the current population.[25] The annual interest cost for the net liability is a measure of the imbalance on a flow basis that can be added to the net accrual estimate for other programs, or listed separately. As for Social Security, estimates already regularly made by federal agencies can be used to do this calculation, although published numbers have to be manipulated to approximate the relevant quantities. An approximation is made here for the HI program that is similar to the approach taken for Social Security. The SMI program is neglected in these calculations for the practical reason is that the SSA does not provide much information for it. SSA justifies this omission on the grounds that adequate financing is guaranteed in current law, and that the program is not financed through payroll taxes.[26] SMI is considered, however, in the sensitivity analysis in the next section. Since the entire HI accrual occurs at birth and 75 years covers the remaining lifespan of most citizens alive today, the 75-

[25] Notice that expected future revenues are subtracted from liabilities for Medicare, but not for Social Security. This is due to the difference is in the nature of the accruals. For Social Security neither unearned benefits nor future taxes are capitalized. This is a symmetric assumption about the future. For Medicare, since the lifetime accrual is at birth, lifetime benefits are immediately recognized. Neglecting lifetime taxes and premiums paid would greatly overstate the unfunded liability.

[26] This is a nice example of how laws can be written to avoid the appearance of imbalances (and hence of any accrual charge), even though its rapidly growing costs suggests major reforms will ultimately be needed.

year SSA estimates appear to be a reasonable starting point. The net liabilities are approximated using data from SSA's 2003 Trustee's Report, Table VI.F10. It presents estimates of dollar costs and income excluding interest for the 2003 to 2080 period.[27] Using these numbers and the same 6.64 percent discount rate gives a present value of net liabilities of $3,756 billion. The HI Trust Fund balance is reported to be $197 billion at year-end 2001. Under these assumptions, estimates are shown for the Medicare HI program in Table 5.3.

Table 5.3: THE EFFECT OF ACCRUING MEDICARE ON THE BUDGET ($ billions)	**Fiscal year 2002**
Unified Budget Surplus (cash basis)	(157.5)
Adjustment for benefits paid	0
Adjustment for currently accruing benefits	0
Accrual Surplus (third definition)	**(157.5)**
Trust Fund Balance HI	197.4
Interest earned on trust funds	13.1
HI Liabilities	3,756
Interest cost on liabilities	(249.4)
Accrual Surplus (definition 1)	**(406.9)**
Accrual Surplus (definition 2)	**(393.8)**

[27] Some years must be interpolated.

6. Net Effect of Retirement Accruals, and Sensitivity Analysis

Table 6.1 shows the effect on the budget balance of putting all major federal retirement programs in the budget on a true accrual basis in 2002.[28] These summary statistics suggest a number of interesting conclusions.[29] The first is that replacing current benefits with accruing benefits has a relatively small effect on budget totals in 2002, at least under my preferred accrual definition 3. The reduction in the surplus from putting Social Security on an accrual basis is more than offset by putting the programs for federal workers and military personnel on an accrual basis. More generally, only big changes are likely to create a large wedge between accrual and cash estimates, and there was no large permanent change to any retirement program in 2002. As discussed earlier, the spike in accruals due to the expansion of health benefits for military retirees in 2001 is an illustration where the two estimates will diverge in a way that is informative.

The difference between cash and accrual is more dramatic when interest costs are included in accruals. The budget deficit increases by more than $600 billion under either the first or second definitions of accrual. Including interest charges in the budget underscores the fact that the liabilities are increasing in value and that real resources will be needed to meet them, but it introduces new difficulties. The first, which has already been discussed at length, is that it creates a type of double counting. The second, as demonstrated in the sensitivity analysis presented here, is that the charge is very sensitive to underlying assumptions that will change over time, creating potentially large swings in the budget that are unrelated to Congressional actions.

Accrual estimates that are inclusive of an interest charge are particularly sensitive to the choice of interest rate(s). The interest rate clearly will change over time with market

[28] Environmental and Veterans benefits are omitted, to focus on retirements benefits.

[29] These estimates should not be taken as definitive. There are doubtlessly errors in my interpretation of reported numbers and omissions are likely.

conditions, and also may be affected by other factors.[30] The previous calculations assumed an interest rate of 6.64 percent, based on the earnings reported on trust fund investments by the SSA. If average interest rates were 2 percent lower (and therefore closer to 2003 Treasury rates), all else equal, the reported deficit would decrease by $189.5 billion under the first accrual definition. Such a change would dwarf the effects of even very large changes in other spending programs, complicating year to year comparisons.

The interest costs are also very sensitive to which programs are included in total liabilities, and the population for whom a liability is recognized. In the base case I omitted charges for Medicare Part B (SMI), the cost of supplementary security income (SSI), etc. The *Financial Report of the U.S. Government* reports liabilities for SMI approximately equal to those for Part A. Under the original interest rate assumption, including a SMI liability would increase the deficit by $249.4 billion.[31] The *Financial Report of the U.S. Government* reports much higher liabilities for all programs. This is in part because it includes a larger population: all participants over the age of 15 for 75 years, including unearned benefits. It also presumably includes expenditures on programs with categorical entitlement (e.g., SSI) that I did not include. Treasury's estimate of commitments to Social Security, Medicare, and federal post-retirement liabilities exceeds $27 trillion, which is three times greater than the basis for the estimates in Table 6.1. This would add over $1 trillion to the reported 2002 deficit. Of course, the accrual totals are also sensitive to modeling assumptions under my preferred accrual definition, but the year to year swings in the total would be much smaller.

[30] How the interest rates for discounting future liabilities and valuing assets are chosen will have a large effect on accrual estimates. The right rules for discounting are not completely agreed upon, and private pension accounting standards are still evolving on these questions.

[31] These statistics are from page 6 of the *Financial Repor of the U.S. Government (2002)t*.

Table 6.1: THE EFFECT OF COMPREHENSIVE RETIREMENT ACCRUALS ON THE BUDGET BALANCE (2002) ($ billions)				
	Federal and military employees	**Social Security**	**Medicare**	**Total**
Unified Budget Surplus (cash basis)				**(157.5)**
Benefits paid	102.6	388.1	0	490.7
Currently accruing benefits including actuarial adjustments	3	(455.2)	0	(452.2)
Accrual Surplus (definition 3)				**(119.0)**
Trust Fund Balance	760.2	1,071	197.4	2,028.6
Interest earned on trust funds @ 6.64%	50.5	71	13.1	134.6
Beginning Liabilities	2,673	3,041	3,756	9,470
Interest cost on liabilities	(177.5)	(202)	(249.4)	(628.9)
Accrual Surplus (definition 1)				**(747.9)**
Accrual Surplus (definition 2)				**(613.3)**
Notes: (1) Civil Service Retirement plus Disability and Medical Retirement Funds				

7. Evaluating the Pros and Cons of Accruing Entitlements

The most direct consequence of accounting for federal entitlement programs on an accrual basis would be to make the reported budget deficit significantly larger in any year where a benefit expansion or tax cut was enacted, and conversely to make it smaller were benefits to be cut or payroll taxes increased. Exactly how much it would affect the deficit in any year depends on how accrual is defined. Based on the estimates in the previous section, the reported $157.5 billion cash deficit in 2002 would range from $119 billion to $748 billion, depending on whether interest charges assessed on outstanding liabilities is treated as part of the accrual, and whether interest on trust funds is treated as revenue.

The indirect consequences of accruing all federal retirement programs are far harder to assess. Whether adopting accrual would improve transparency and lead to better public policy is a difficult question, and there are valid arguments on both sides. Budget reform is unlikely to take place without consensus on the major issues, so it is worthwhile to examine the conflicting points of view in some detail. The intent is to present the case for and against accrual accounting as neutrally as possible, so that readers can judge for themselves the strengths and weaknesses of the various arguments.

Proponents of accrual accounting view it as a more honest representation of the government's fiscal position than the cash basis accounting it would replace. While acknowledging that the laws governing retirement programs could change, they argue that people make plans based on the expectation that taxes and benefits will be largely as they are now for the foreseeable future. Accrual accounting makes clear that such expectations are unrealistic. Either government spending must be cut or taxes increased. Additional borrowing by the government can postpone, but not change these stark choices. Some proponents believe that the greater recognition of fiscal pressures under accrual accounting would put a damper on current spending increases or tax cuts. For instance, accrual accounting would have converted the surplus of 2001 into a significant deficit, which might have made tax cuts less palatable, limited the expansion of military

retirement health benefits, or created more doubt about the advisability of adding a stand-alone prescription drug benefit to Medicare. At very least, it is expected that by focusing attention on problems earlier they would be addressed in a more timely fashion, both in public debate and by legislative action. Smaller reported deficits make deferring action politically easier. Delay, however, can lead to much higher social costs. Reforms precipitated by crisis are unlikely to be well designed. People nearing retirement that had not planned for program cuts might experience financial hardship or restricted access to medical services. Sharply higher taxes would put a disproportionate burden on future workers, discouraging work effort and slowing economic growth.

Many, if not most, opponents of putting the budget on a full accrual basis concur with the assessment that the looming fiscal imbalance caused by the aging of the baby boom is one of the most serious challenges facing policymakers, and that addressing the problem earlier rather than later is essential.[32] Some question, however, whether the goals of reform would be furthered rather than hindered by accruing program costs in the budget. Others worry that while it might draw more attention to future fiscal problems, it would diminish the usefulness of the budget for its fundamental purpose of controlling and tracking cash commitments and expenditures.

Opponents of accrual point out that a large body of credible information is already available to policymakers and to the interested public, with detailed analyses available from a variety of governmental, academic, and private entities. The federal government publishes comprehensive estimates of future funding shortfalls, many of which were drawn on for the estimates in this paper. The 2004 President's Budget has a prominent chapter devoted to highlighting long-run budget imbalances, and the "Analytical Perspectives Supplement" has a chapter on stewardship that includes a balance sheet

[32] An alternate but perhaps less widely held view is that early action is not called for, and could lead to inferior outcomes. Advances in medicine and medical delivery systems, immigration, etc., may change the best response to an aging population in ways that cannot be foreseen. The U.S. economy is flexible and adaptable, and the best thing to do is to let people prepare for their own futures. Raising taxes in anticipation of future shortfalls would immediately discourage work effort, slowing the growth that will make meeting future liabilities less painful and likely resulting in the money being spent by the government rather than saved.

analysis. The Congressional Budget Office regularly publishes a long-term budget outlook that emphasizes imbalances in entitlement programs. Various measures of the 75-year imbalance in the social security system can be found in the Social Security Administration's annual Trustee's Report. The actuarial division of the Department of Health and Human Services (HHS), CMS, analyzes Medicare's long-term finances. The *Green Book*, published by the U.S. House of Representatives Committee on Ways and Means, includes projections of other major entitlements including Medicaid. The Treasury prepares annual audited financial statements for the government, prepared on an accrual basis, that have an even broader scope than what is reported in the budget. Arguably then, legislators and other policymakers have no excuse for ignorance. This information is also readily available to the interested public, and reported by the press. Evidence that the message has reached the public is reflected in polls finding that the majority of young people expect to receive little in government retirement benefits when they retire. It is plausible to conclude that reforms are put off not because of a lack of information, but because of reluctance to vote for unpopular program cuts or tax increases, or because of the lack of agreement on the best course of action.

Proponents of accrual might respond that although estimates of future fiscal imbalances are available, none have the weight of the budget totals. The deficit is a singularly powerful number that is taken seriously by the public, the press, and politicians, and so is a focal point for policy action. Including the accruing costs of entitlement programs would force policymakers to pay more attention to them.

Both sides of the accrual debate agree on the importance of the deficit in the policy debate. In fact, some oppose applying accrual to entitlement programs because they fear the budget will lose its credibility. In large part, current budget numbers correspond to measurable and verifiable cash flows. Accrual estimates, particularly those involving revenues and expenditures projected many decades into the future, require numerous assumptions about quantities that are highly uncertain. Three distinct problems emerge: hidden biases, legislation that games the rules, and the volatility of estimates based on long-term projections. To elaborate briefly, it is difficult to evaluate whether

the assumptions underlying the accrual estimates are biased, and the assumptions might themselves become targets of partisan debate. Secondly, the forward looking nature of accruals opens the door to legislative fixes that reduce the reported deficit without seriously addressing the underlying problem. For instance, legislation could require sharp payroll tax increases starting in 20 years that would erase future funding gaps in Social Security. Like the sunset provisions of the recent tax bill, it is doubtful that this policy would ever be put into practice. Its purpose is only to manipulate accounting numbers. Third, some worry that estimates will be highly sensitive to model inputs such as the discount rate and health cost estimates, generating volatility that is largely unrelated to policy actions. This undermines the usefulness of the deficit as a gauge of current policy actions.

Some opponents of accruing entitlements emphasize that it would change the interpretation of the deficit, making it less useful for certain other purposes. It would not longer correspond closely to cash flows, and so cease to track the current year borrowing needs of the Treasury. More fundamentally, it could no longer be interpreted as a measure of the federal government's net fiscal stimulus on the economy. As discussed in the Introduction, accurately measuring fiscal stimulus or drag was one of the articulated goals of the President's 1967 Commission on Budget Concepts, where it was agreed that an essential purpose of the budget is to be able to understand the impact of fiscal policy on the overall economy.

As has been a recurring theme of this paper, no single measure of the deficit is ideal for all purposes. Even now, because the budget is not on a pure cash basis and because of other anomalies, the deficit does not perfectly measure the Treasury's borrowing needs. Nor is it thought to be the best measure of fiscal stimulus.[33] Mechanically, it is easy to add up the components of the budget that are relevant to answering a particular question. The debate is really over which purpose should be the headliner for public discourse. The idea that measuring fiscal stimulus is the premier

[33] For instance, the Congressional Budget Office publishes an adjusted deficit measure that they offer as a better estimate of the fiscal stance of the budget.

purpose of the budget arguably has much less currency than in 1967. At the time, economic thought was dominated by the Keynesians, who viewed the ability of the government to affect aggregate demand as a potent policy tool. The failure of those policies in the next decade caused economists to reevaluate, and fine-tuning the economy with fiscal policy fell out of vogue. Attention moved to the supply side, with its greater emphasis on the effect of government saving on capital formation. Whether Keynesian or supply-sider, economists today generally place less emphasis on fiscal policy as a short-term management tool than 30 years ago.

Some have argued that accruing entitlement costs would actually make it more difficult to cut program spending down the road. The idea is that recognizing future costs in the budget creates an implicit commitment that is stronger than under current law. At present Congress can change program rules at will since there is no contractual obligation to continue collecting payroll taxes or paying benefits at current statutory levels. In fact, a conscious decision was made at the inception of Social Security not to link benefits to tax collections.[34] History provides many examples of significant program changes that used this latitude.[35] Some people who oppose accruing Social Security and Medicare obligations are comfortable with the current practice of accruing federal and military pension and health obligations. Similarly, they agree with the accrual treatment of loans and loan guarantees. They draw a distinction between the relatively firm commitments to federal and military retirees or to credit obligations (which more closely resemble private sector contracts), and the weaker obligation to continue social insurance programs at current funding levels.

It is a legitimate worry that accruing future obligations will increase the perception that they are irrevocable, although it is difficult to assess the importance of this effect. It is questionable, however, that a clean line can be drawn between irrevocable and other government obligations, or even that this principal governs current

[34] See Herman (1988) for an interesting account of the debates surrounding the legislation.

[35] See, for instance, Social Security – A Primer.

budget rules. First of all, Congress can legally revoke contracts, including those for military and federal retirement benefits, in a way that private entities cannot. No federal obligation is absolutely irrevocable, so deciding what to treat on an accrual basis will always require judgment. Furthermore, budget rules require that in preparing the 10-year budget baseline, discretionary spending is projected at current levels whenever explicit legislation does not pin down future spending levels. This effectively, if crudely, accrues uncommitted expenditures. The logic for doing this is the same as for accruing entitlement spending -- to give policymakers a measure of the surplus or deficit that will result from maintaining expenditures and taxes at current law levels.

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Appendix 1

A Simple Example of Why Including Interest Charges in Current Accruals Double-Counts Costs

In this example, a worker pays taxes in the current year (time 0) of $50, entitling him to one year of retirement payments in the amount of $115.76 three years later. At an interest rate of 5 percent. The benefit has a present value of $100 initially. The current tax payment and benefit payment made in three years are the only cash flows.

Table A1: ACCOUNTING FOR PENSION OBLIGATIONS UNDER ACCRUAL DEFINITION 3

	Assets	Liabilities (debt and equity)		accrual liability	accrual asset	accrual net	Cash Surplus	Accrual Surplus
	0.00	0.00						
0	100.00	50.00	debt	100	50	-50	50	-50
		50.00	Tax					
1	105.00	52.50	debt	5.00	5.00	0	0	0
		52.50	Tax					
2	110.25	55.13	Debt	5.25	5.25	0	0	0
		55.13	Tax					
3	115.76	57.88	Debt	5.51	5.51	0	-115.76	0
		57.88	tax					
end 3	0.00	0.00	debt					
		0.00	tax					

Table A1 gives a stylized version of how a private company would account for this retirement obligation on an accrual basis (in the absence of any uncertainty about life expectancy, interest rates, etc.). It is also how accruals would be accounted for under the third definition in the text. The assets and liabilities columns track the aggregate value of fund assets and their financing. The components of accruals are also shown. The obligation of $100 present value of pension liabilities accrues in year 0, when the full benefit is earned. The tax payment of $50 accrues to assets (in the case of a private company this is the employee's contribution to the plan). The remaining $50 must be contributed by the company, and is a charge against its equity. If it fails to pay, the plan is under-funded. Equivalently, $50 of debt must be incurred to fully fund the plan, and the debt is an obligation of the company. This is reported in Table A1 as an accrual of

$50 in debt liabilities. The net accrual, or accrual surplus is -$50. The accruals are also reflected in the reported assets and liabilities. A security (purchased with tax revenues and debt financing) appears as the asset of $100. There is a liability to the worker of $100, which here is broken down as $50 in debt and $50 in equity. Going forward to year 1, the asset earns 5 percent, generating interest accruals of $5. The debt can be thought of as being refinanced, with enough borrowed to cover the 5 percent interest payment of $2.50. The remaining $2.50 accrues to equity. Notice that the $5 accrual on the asset equals the $5 accrual on debt and equity (and on the liability to the worker), so that the net accrual is zero. There is no effect on the accrual surplus. Year 2 is just like year 1, with the interest on the asset (now $5.25 including compound interest) accruing, and used to cover accruing interest on the debt, with the balance going to equity. Again the net accrual is zero. In the third year the final interest payment accrues to assets, and is distributed evenly to debt and equity. At the end of the year the $115.76 in assets is liquidated, with the proceeds used to make the pension payment. Notice that the present value of accrual surpluses of -$50 exactly equals the present value of the final debt payment the company must make to cover the initial funding shortfall.

When the pension is funded by the government, it also incurs a $100 pension obligation, and an implicit $50 debt obligation. Notice that trust fund accounting completely obscures this fact. The trust fund records the $50 in taxes as an asset but reports no liabilities for the accruing benefit, and so would show a $50 surplus instead of a $50 deficit.

Table A2 shows what happens to accruals over time when interest on past liabilities incurred are included in annual accrual charges, and when asset accruals are ignored. This corresponds to the procedure used by the Treasury to compute the accruals used as inputs into net operating costs in the *Financial Report of the U.S. Government*, and also corresponds to the first definition of an accrual in the text.

Table A2: ACCOUNTING FOR PENSION LIABILITIES UNDER DEFINITION 1

	Assets	Liabs		accrual liability	normal costs	Int. on liab	benefits paid	accrual asset	accrual net	cash surplus	accrual surplus
0	100.0	50.0	debt	100	100	0	0	0	-100	50	-50
		50.0	tax								
1	105.0	52.5	debt.	5	0.00	5.00	0.00	0.00	-5	0	-5
		52.5	tax.								
2	110.25	55.13	debt	5.25	0.00	5.25	0.00	0.00	-5.25	0	-5.25
		55.13	tax								
3	115.76	57.88	debt	-110.25	0.00	5.51	115.76	0.00	110.25	-115.76	-5.51
		57.88	tax								
end 3	0	0			0.00	0.00	0.00	0.00	0		

To convert the cash deficit to an accrual deficit, Treasury takes the sum of normal costs (i.e., accruing liabilities and actuarial adjustments) and interest on the liability, subtracts out benefits paid, and adds the total to the cash deficit. Since the cash deficit includes benefits paid, the net effect is to cancel out benefits paid. Starting with the cash deficit also implies that current taxes are subtracted, but that no adjustment is made for interest payments on trust fund assets. Because interest charges on the liability are not offset by interest earnings on assets, there is a small accrual deficit in years 1 to 3. Notice that unlike definition 3, where the present value of accumulated accrual deficits equals the present value of the system deficit, here the present value of accrual deficits exceeds the present value of the system deficit.

Appendix 2

Are Private Accounting Measures Relevant for the Federal Budget?

Accrual is a well-established principle in private sector accounting that has been applied to some areas of government accounting. Some look to private sector accounting standards more broadly as a model for budget reform. In this Appendix I briefly review some of the differences between the federal budget and private sector accounting statements, and discuss why moving to an accrual basis is a relatively small step towards private sector disclosure standards. Some of the difficulties in broadly applying private sector accounting standards to the government are also discussed.

Private sector standards aim to provide investors with the information they need to evaluate the financial performance and value of companies. Publicly owned firms file three main accounting statements -- a balance sheet, an income statement and a statement of cash flows – which together provide an overview of current performance and indicators of future prospects. The balance sheet records the value and composition of assets and liabilities. It is forward looking in that it capitalizes information about future cash flows. The second two statements record current year flows summarizing operating, investment, and financing outcomes. The federal budget is not a direct analogue of any of these statements. In its current form it corresponds most closely to a statement of cash flows. A key difference between the federal budget and a corporate statement of cash flows, however, is that the federal budget projects cash flows 10 years forward, while corporate cash flow statements present current and sometimes historical numbers. The out-year projections in the federal budget to a limited extent substitute for balance sheet information, in that they give an indication of future obligations and costs.

A statement of cash flows alone clearly cannot be expected to provide enough information to assess the current and prospective financial condition of either a private company or the government. For instance, many financially viable corporations have multiple years in which cash outflows for net investment and expenses exceeds cash inflows from operations. This does not speak to financial viability, which is determined

primarily by whether the market value of assets (broadly defined) exceeds that of liabilities. Similarly, long-term government programs such as Social Security and Medicare may report current cash surpluses due to a relatively high current ratio of workers to retirees, but may be out of balance in the long run due to declining revenues or growing obligations.

Moving from cash basis to accrual basis accounting would in some ways make the budget closer to a statement of earnings than to a statement of cash flows. This would not solve the problem, however, that no single financial statement can provide a complete picture of the financial position of the government. In particular, accrual would not substitute for the important information about obligations and assets reflected in a balance sheet. [36] Nevertheless, as previously discussed, it could make Congress more sensitive to the consequences of making new long-term commitments.

More fundamentally, private sector cash flows or earnings can be interpreted as measures of whether there is value added, whereas government cash flows or net accruals cannot. If the goods and services a firm produces are worth less than the production costs, net cash flows are negative and the firm eventually goes out of business or improves its products. The government does not charge for most services directly, instead relying on tax revenues or borrowing to finance operations. There is no market price for most government services, and therefore no way to tell from the cash surplus or deficit whether value is being created. The government could run a very large deficit, yet be producing services of value far in excess of taxes paid. It could also run large surpluses while

[36] The lack of a meaningful federal balance sheet may be an equally serious impediment to public understanding of government finances as the practice of not accruing liabilities. For instance, its absence arguably is what allows the government to record a gain rather than a loss when resources such as land and mineral rights are sold at less than its fair market value. (Currently such sales generate positive cash flows in the budget, although they represent a loss in terms of opportunity cost to citizens.) While some believe that the difficulties in assigning values to federal assets makes constructing a credible balance sheet prohibitively difficult, ignoring balance sheet information can lead to serious misallocations of resources. The *Financial Report of the U.S. Government*, prepared by the Treasury, contains a stylized balance sheet, but limited resources are devoted to its construction, and it receives very little attention from policymakers or the public. How it might be improved is an important issue, but one that is beyond the scope of this paper.

creating little value. This fundamental difference will always make direct comparisons between government and private sector accounting statements potentially misleading.

Appendix 3

Accrual Calculations for Box 1 Example, Selected Years

year	income	tax received new worker	benefit paid new worker	benefits paid retirees	accrued benefits (1)	yr-end trust fund balance
-1		$53.11	$53.11	$37.86	37.9	30
0	50	3.09	0.00	2.00	40.5	32.59
1	50	3.09	0.00	2.00	43.5	35.32
2	50	3.09	0.00	2.00	46.7	38.18
3	50	3.09	0.00	2.00	50.3	41.18
15	50	3.09	0.00	2.00	128.1	91.39
16	50	3.09	0.00	2.00	138.6	97.05
17	50	3.09	0.00	2.00	149.9	103.00
18	50	3.09	0.00	2.00	162.1	109.25
19	50	3.09	0.00	2.00	175.2	115.80
20	50	3.09	0.00	2.00	182.0	122.69
21	50	3.09	0.00	2.00	189.1	129.92
22	50	3.09	0.00	2.00	196.5	137.51
23	50	3.09	0.00	2.00	204.4	145.48
24	50	3.09	0.00	2.00	212.6	153.85
25	50	3.09	0.00	2.00	221.2	162.64
26	50	3.09	0.00	2.00	230.3	171.86
27	50	3.09	0.00	2.00	239.8	181.55
28	50	3.09	0.00	2.00	249.8	191.72
29	50	3.09	0.00	2.00	260.3	202.40
30	50	3.09	0.00	2.00	271.3	213.62
31	50	3.09	0.00	2.00	282.8	225.39
32	50	3.09	0.00	2.00	295.0	237.76
33	50	3.09	0.00	2.00	307.7	250.74
34	50	3.09	0.00	2.00	321.1	264.37
35	50	3.09	0.00	2.00	335.2	278.69
36	50	3.09	0.00	2.00	349.9	293.72
37	50	3.09	0.00	2.00	365.4	309.50
56	30	0.00	30.00	2.00	87.1	-39.66
57	30	0.00	30.00	2.00	59.5	-73.64
58	30	0.00	30.00	2.00	30.5	-109.33
59	30	0.00	30.00	2.00	0.0	-146.79

year	PV incremental benefits new worker	current accrual assets (1)	current accrual liab (1)	current accrual assets (2)	current accrual liab (2)	current accrual assets (3)	current accrual liabs (3)
-1							
0	2.79	1.09	2.7	2.59	2.7	3.09	2.79
1	2.93	1.09	3.0	2.72	3.0	3.09	2.93
2	3.07	1.09	3.2	2.86	3.2	3.09	3.07
3	3.23	1.09	3.6	3.00	3.6	3.09	3.23
15	5.80	1.09	9.7	5.39	9.7	3.09	5.80
16	6.09	1.09	10.5	5.66	10.5	3.09	6.09
17	6.39	1.09	11.3	5.95	11.3	3.09	6.39
18	6.71	1.09	12.2	6.24	12.2	3.09	6.71
19	7.05	1.09	13.1	6.56	13.1	3.09	7.05
20		1.09	6.8	6.89	6.8	3.09	0.00
21		1.09	7.1	7.23	7.1	3.09	0.00
22		1.09	7.5	7.59	7.5	3.09	0.00
23		1.09	7.8	7.97	7.8	3.09	0.00
24		1.09	8.2	8.37	8.2	3.09	0.00
25		1.09	8.6	8.79	8.6	3.09	0.00
26		1.09	9.1	9.23	9.1	3.09	0.00
27		1.09	9.5	9.69	9.5	3.09	0.00
28		1.09	10.0	10.17	10.0	3.09	0.00
29		1.09	10.5	10.68	10.5	3.09	0.00
30		1.09	11.0	11.22	11.0	3.09	0.00
31		1.09	11.6	11.78	11.6	3.09	0.00
32		1.09	12.1	12.36	12.1	3.09	0.00
33		1.09	12.7	12.98	12.7	3.09	0.00
34		1.09	13.4	13.63	13.4	3.09	0.00
35		1.09	14.1	14.31	14.1	3.09	0.00
36		1.09	14.8	15.03	14.8	3.09	0.00
37		1.09	15.5	15.78	15.5	3.09	0.00
56		-32.00	(26.3)	-32.36	(26.3)	0.00	0.00
57		-32.00	(27.6)	-33.98	(27.6)	0.00	0.00
58		-32.00	(29.0)	-35.68	(29.0)	0.00	0.00
59		-32.00	(30.5)	-37.47	(30.5)	0.00	0.00

year	net (1)	net (2)	net (3)	net cash
-1				
0	-1.59	-0.09	0.31	1.09
1	-1.86	-0.23	0.17	1.09
2	-2.15	-0.39	0.02	1.09
3	-2.47	-0.56	-0.13	1.09
15	-8.62	-4.32	-2.70	1.09
16	-9.39	-4.82	-2.99	1.09
17	-10.22	-5.37	-3.30	1.09
18	-11.11	-5.96	-3.61	1.09
19	-12.05	-6.59	-3.95	1.09
20	-5.67	0.12	3.09	1.09
21	-6.00	0.13	3.09	1.09
22	-6.36	0.14	3.09	1.09
23	-6.73	0.14	3.09	1.09
24	-7.12	0.15	3.09	1.09
25	-7.53	0.16	3.09	1.09
26	-7.97	0.17	3.09	1.09
27	-8.42	0.17	3.09	1.09
28	-8.89	0.18	3.09	1.09
29	-9.39	0.19	3.09	1.09
30	-9.92	0.20	3.09	1.09
31	-10.47	0.21	3.09	1.09
32	-11.05	0.22	3.09	1.09
33	-11.65	0.23	3.09	1.09
34	-12.29	0.25	3.09	1.09
35	-12.96	0.26	3.09	1.09
36	-13.66	0.27	3.09	1.09
37	-14.40	0.28	3.09	1.09
56	-5.67	-6.04	0.00	-32.00
57	-4.36	-6.34	0.00	-32.00
58	-2.98	-6.66	0.00	-32.00
59	-1.52	-6.99	0.00	-32.00