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Fiscal Policy, Past and Present

RECENT EVENTS EXPOSE SOME OF the difficulties of making timely and rational fiscal policy choices. The recession that began in early 2001 has likely been over for several quarters, but as of early 2003 the Business Cycle Dating Committee at the National Bureau of Economic Research (NBER) had not yet declared its end, and economic growth has been tepid. The ideal time for countercyclical fiscal measures may have passed, but politicians remain under pressure to act.

Politics aside, the current economic climate has many unusual attributes that may provide support for expansionary fiscal action. First, despite several quarters of positive economic growth, the unemployment rate remains relatively high, in part because of unusually rapid productivity growth during the recent recession. Second, the vigorous use of monetary policy over the last few years has left the federal funds rate at 1 percent, its lowest point in over four decades. With this primary tool of monetary policy so close to its lower bound of zero, there is concern that monetary policy will be helpless should the economy relapse. Third, the recent war in Iraq has contributed to an atmosphere of economic uncertainty. Finally, state governments face large budget deficits, which past practice suggests, and the laws of most states require, be followed by substantial tax increases and expenditure cuts in the coming months, possibly weakening economic activity.

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Apart from the usual problems of timing and uncertain efficacy, potential fiscal expansion in the current environment faces an additional hurdle: it would occur during a period of fiscal stress at the federal level. The federal budget surpluses of recent years have evaporated, and a major crisis of unfunded entitlement programs lies just beyond the moderate deficits projected for the near term. This significant fiscal imbalance lends an air of recklessness to proposed expansionary policies and could make some of these policies less effective, if they are perceived as unsustainable. Thus the long-term fiscal imbalance may have implications for attempts at short-term stabilization policy.

What, then, is to be done? This paper approaches the question by first describing the current circumstances in greater detail and then considering the determinants of past fiscal policy actions. Although this discussion provides a reasonably good sense of how fiscal policy has reacted to the economy in recent decades, a harder question is how policy in turn has affected the economy. Indeed, given the extent to which today's circumstances differ from those in the past, there is reason to be cautious about past evidence on the economic effects of policy, at least as a guide for future policy decisions.

The Fiscal Climate

The NBER dates the most recent recession as having begun in March 2001, and current statistics from the Bureau of Economic Analysis (BEA) indicate that real GDP fell in each of the first three quarters of calendar year 2001, a period that ended just after the September 11 attacks. Growth has been positive for six consecutive quarters since then, but growth in the most recent quarters has been weak, and unemployment remains at or near 6 percent. Fiscal policy has been active during this period, with President Bush's 2001 tax cut followed by a smaller round of tax cuts in the spring of 2002 and large increases in spending on defense and homeland security. The combination of economic weakness, tax cuts, and increased spending has sharply altered the short-term fiscal outlook.

The high-water mark for projected budget surpluses was January 2001, when, in the last in a long series of upward revisions, the Congressional Budget Office (CBO) projected a surplus of $359 billion for the current

fiscal year, 2003, rising to $889 billion in fiscal year 2011.[1] At the time, some saw a novel fiscal challenge looming with the possible disappearance of marketable government debt, but this "problem" now commands less attention. With each successive revision since January 2001, the CBO has reduced its surplus projections; as of last March a deficit of $246 billion was projected for fiscal year 2003, and the 2011 surplus is now projected at only $231 billion.

Where did the money go? The top panel of figure 1 provides a breakdown of the change in the surplus, based on the cumulative changes in CBO projections, into reductions in projected revenue, increases in projected expenditure, and the added debt service associated with these contributions to the national debt. The lion's share of the reduction in the primary surplus (which excludes service on the national debt) is attributable to reductions in revenue rather than increases in spending. For fiscal year 2003, for example, projected revenue has fallen by $451 billion since the January 2001 projection, whereas projected expenditure (excluding debt service) has risen by $112 billion. But only a portion of the fall in projected revenue is directly attributable to tax legislation. The rest is due to changes in the economy.

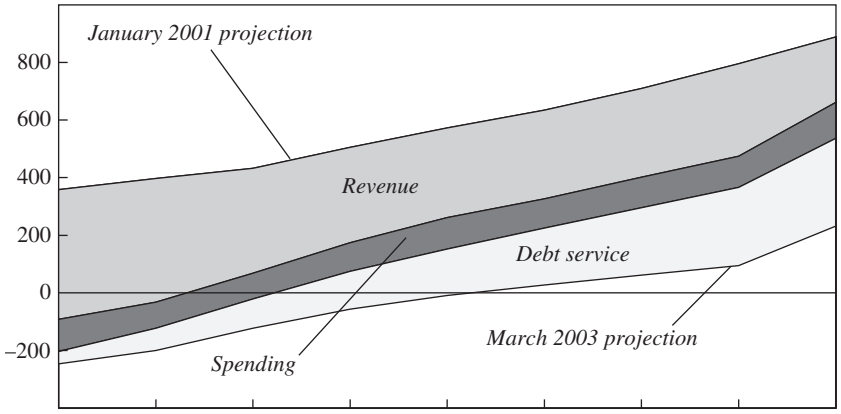
The bottom panel of figure 1 provides a different breakdown, showing the changes in revenue and expenditure since 2001 that the CBO directly attributes to legislation, as well as changes in the primary surplus due to what the agency calls "economic" (that is, cyclical) and "technical" (noncyclical) factors. Of the $451 billion drop in projected 2003 revenue, only $126 billion is directly attributed to legislation; the rest comes from the economic and technical factors. The relative importance of these two components changes over the projection period. The effect of the cyclical factors fades over time, as one would expect, but the technical adjustments remain. These adjustments, mainly on the revenue side, reflect the decline in personal income tax collections since the boom years of the late 1990s, collections that were fueled by stock options, capital gains, and other income flowing mainly to persons at the very high end of the income distribution. As a fraction of GDP, individual income tax receipts rose sharply from around 8 percent in the early 1990s to 10.3 percent in fiscal year 2000, and CBO projections at the end of the 1990s forecast that

1. CBO (2001).

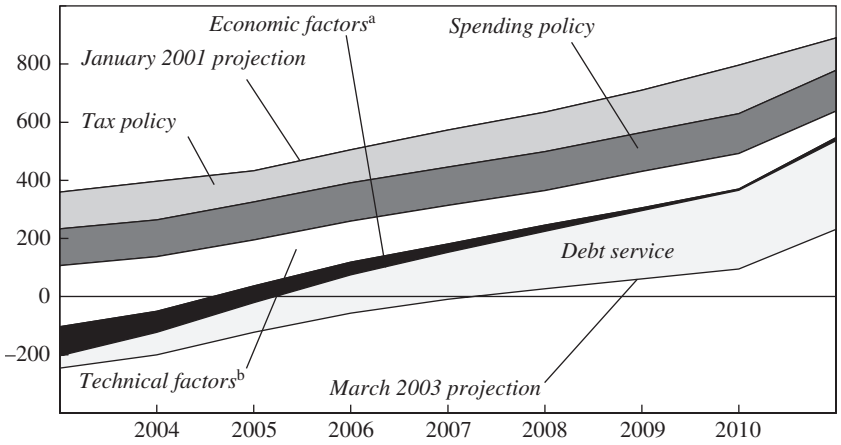
Figure 1. Changes in the Projected Federal Budget Surplus, 2003–11

Breakdown by changes in revenue and spending

Billions of dollars



Breakdown by type of policy change and economic and technical factors



Source: CBO, *The Budget and Economic Outlook*, various issues.
a. Change due to fluctuations in the business cycle.
b. Change in tax revenue collection and spending not due to fluctuations in the business cycle or policy changes.

this increased share would be largely maintained throughout the budget period.[2]

Given the relatively small role that macroeconomic factors appear to have played in the change in projections, it is unsurprising that the decline in actual budget surpluses in recent years largely survives cyclical adjustment. The federal surplus fell from 2.4 percent of GDP in fiscal year 2000 to –1.5 percent in fiscal year 2002, and nearly two-thirds of this swing remains after cyclical adjustment.[3]

In any case, the current ten-year budget outlook at the federal level is far less attractive than it was just over two years ago. Moreover, the situation is considerably more precarious than these projections suggest. The CBO's ten-year budget projections reflect existing tax law, under which a number of tax benefits, including the entire 2001 tax cut, expire during the budget period, and the fraction of taxpayers subject to the alternative minimum tax (AMT) will grow steadily. The CBO projections also assume that discretionary spending will remain constant in real terms, something that has not happened in recent experience. If, instead, the expiring tax provisions are extended, the AMT is adjusted so that the share of taxpayers affected by it remains constant, and discretionary spending remains constant as a share of GDP, then the projected budget balance for fiscal year 2011 drops by $551 billion, to a deficit larger than the surplus currently projected.[4]

Some have noted that, even with such adjustments, the projected deficits are smaller as a fraction of GDP than those of the late 1980s and early 1990s, and therefore should not play a major role in current policy decisions. But an important difference from the earlier period of large deficits is that the baby-boom cohort will retire soon, greatly increasing the urgency of meeting the largely unfunded liabilities associated with Medicare and Social Security.

The unified federal budget surplus includes accumulations in the Social Security and Medicare trust funds; these accumulations have become substantial in recent years. In fiscal year 2002, for example, the Social Security trust fund surplus was $159 billion, and its inclusion effectively halved the reported deficit. The growth in these trust fund surpluses in recent years reflects the coming need to finance entitlement ben-

2. See Auerbach and Gale (1999).
3. See CBO (2003a).
4. See Auerbach and others (forthcoming). The CBO (2002a) reports similar findings.

efits and has led to the debate about the need to place the trust fund balances in a "lockbox" to prevent "raids" on those balances by the rest of government.

But excluding the trust fund surpluses from the estimated overall surplus is only the small first step toward acknowledging that the surpluses projected beyond the end of this decade are not "real" surpluses, because it still ignores the much larger implicit liabilities that are accumulating in the Social Security and Medicare programs. The president's proposed budget for fiscal year 2004 contains a section titled "The Real Fiscal Danger," which estimates the unfunded liabilities of these two programs.[5] At $21.5 trillion, that estimate swamps the publicly held national debt of $3.6 trillion, yet even this calculation still understates the magnitude of the problem, as I will show below.[6] In the face of this enormous fiscal obstacle, highlighted in his own budget presentation, the president has offered a new round of substantial tax cuts, aimed primarily at the long term, and an increase in Medicare benefits. Clearly, there must be some other motive than a wish to stimulate the economy or to close the long-term fiscal gap. Two that have been mentioned are reform of the tax system and control of discretionary government spending, the latter on the theory that sustained large deficits may force spending to grow more slowly.

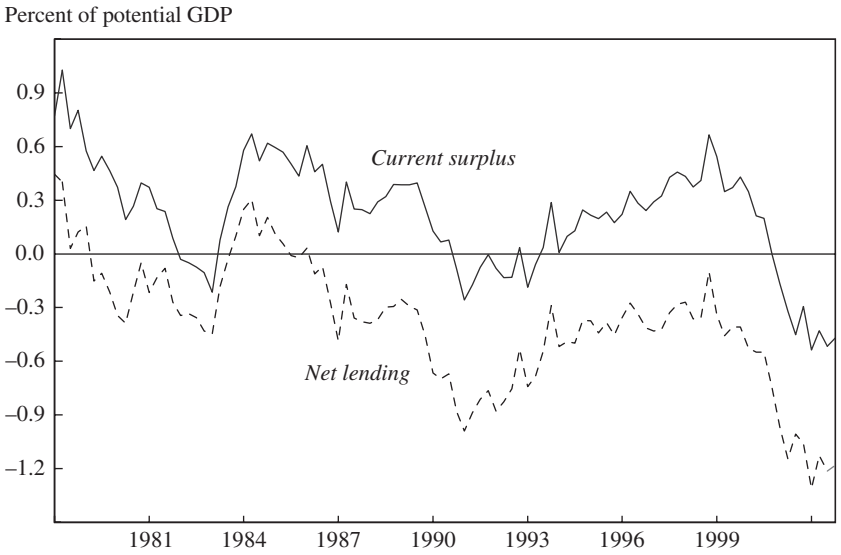
One last important aspect of the current fiscal situation is the position of state and local governments, which in the aggregate face budget deficits of unprecedented size. Figure 2 shows two aggregate measures of state and local budgets, both on a national income and product accounts (NIPA) basis, since 1978. The combined current balance of state and local governments, which treats the flows from capital goods (as measured by depreciation) rather than investment expenditure itself as an expenditure component, hovered in the range of –0.5 percent of potential GDP throughout calendar year 2002—roughly *twice* the size, relative to potential GDP, of the deficits recorded during the recessions of the early 1980s and the early 1990s.[7] A simpler cash-flow measure of net lending tracks

5. Office of Management and Budget (2003a, p. 31).

6. The trust funds also have asset balances of $2.7 trillion, which partly offset these unfunded liabilities, but this amount is itself offset by an equal liability of the general government and hence is irrelevant in calculating the overall government's net liability.

7. The NIPA measure of the current state and local balance excludes interfund transfers that states use to meet balanced-budget requirements.

Figure 2. Alternative Measures of Aggregate State and Local Budget Surplus, 1978–2002



Sources: BEA, National Income and Product Accounts, and CBO, *The Budget and Economic Outlook*, various issues.

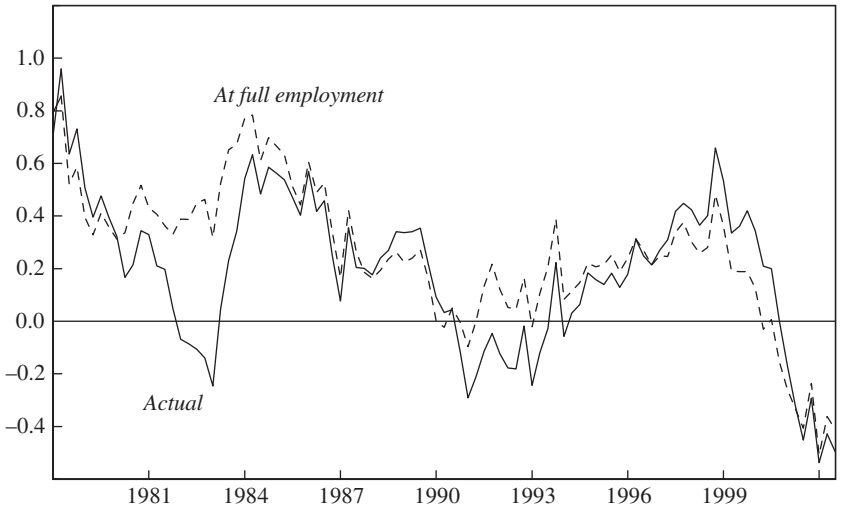
the current balance closely but has been consistently lower over the period shown, because investment spending has exceeded depreciation. In 2002 net lending reached a deficit of about 1.2 percent of potential GDP.

Like that at the federal level, the sharp recent deterioration in state and local budget surpluses is not attributable primarily to the cyclical downturn. Figure 3 shows both cyclically adjusted and unadjusted state and local budget deficits since the late 1970s, both as a percentage of potential GDP.[8] Whereas the cyclical adjustment explains essentially all of the budget deficits recorded during the 1990–91 recession—and more than explains the deficits of the 1980s—it accounts for very little of the recent deficits. Indeed, even with the cyclical adjustment, the aggregate state and local budget surplus exhibits a very sharp downward trend in the past few years. From its peak in 1998:4 to 2002:3 (the most recent quarter for

8. I am grateful to Laura Rubin for providing this series, taken from Knight, Kusko, and Rubin (2003), who also provide the corresponding measure of the actual surplus in figure 3, which differs very slightly from that in figure 2 because of data revisions.

Figure 3. Aggregate State and Local Current Budget Surplus, 1978–2002

Percent of potential GDP



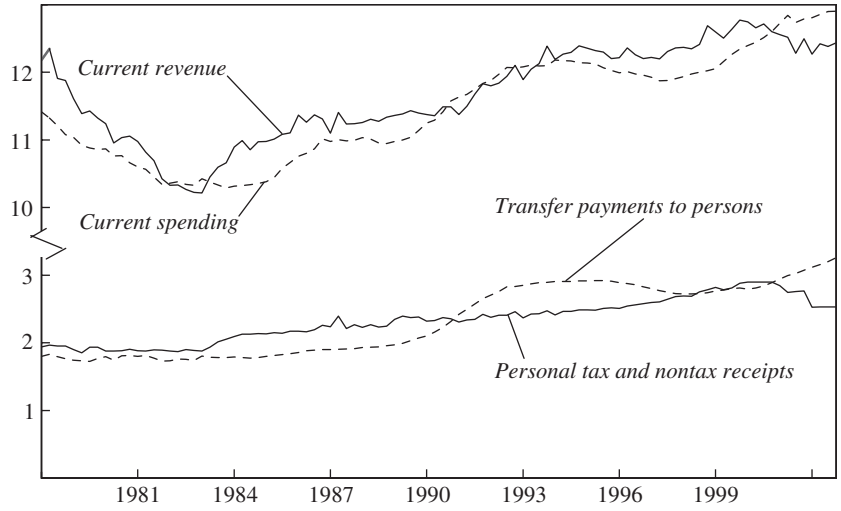
Source: Knight, Kusko, and Rubin (2003).

which adjusted data are available), the full-employment state and local surplus fell by 0.9 percent of potential GDP.

Figure 4 shows separately the revenue and the expenditure of state and local governments since 1978, demonstrating that the recent deficits are associated with sharp expenditure growth since the late 1990s together with a leveling off of revenues. Some have seen this pattern as implicating uncontrolled spending as the root cause of the crisis. But trends in some important components of revenue and spending suggest a more complicated story. Figure 4 also shows personal tax and nontax receipts of state and local governments, as well as their transfer payments to persons. The series for personal tax and nontax receipts shows more clearly than does the aggregate revenue series that a decline in personal income tax revenue (which dominates personal receipts) is an important factor that the state and local fiscal picture shares in common with the recent federal experience. As a fraction of potential GDP, this component of revenue had been rising steadily for decades, and that growth accelerated in the late 1990s. Then, around the end of 2000, the growth ended, and the ratio of this component to GDP began falling more sharply than simple cyclical adjustment can explain. As at the federal level, the drop in tax payments on

Figure 4. Aggregate State and Local Revenue and Spending, 1978–2002

Percent of potential GDP



Sources: BEA, National Income and Product Accounts, and CBO, *The Budget and Economic Outlook*, various issues.

options and capital gains was considerable. In some states the drop was particularly severe. California, for example, estimates that, at their peak in fiscal year 2000–01, taxes on capital gains and options amounted to $17.6 billion, or just under 25 percent of *all* general fund revenue in the state, and that declines in this revenue source alone reduced state revenue by $12.0 billion between that fiscal year and the current one.[9]

An increase in spending has indeed accompanied this decline in revenue, but an important part of this spending increase has been in transfer payments, fueled by autonomous growth in health care costs, rather than discretionary spending. Figure 4 also shows the rapid recent growth in these transfer payments, most of which are for a single program, Medicaid. In 2001 Medicaid payments (which are partly offset by federal grants) accounted for 18 percent of all current spending by state and local governments.

Whatever the cause of the reemergence of state and local deficits, these governments have much less capacity than the federal government to

9. California, State of (2003).

engage in budget smoothing. Most states have balanced-budget requirements, forcing a broad consideration of major tax increases as well as spending cuts, and these policy changes influence the desirability of fiscal action at the federal level.

In summary, there is room for disagreement about the current need for expansionary fiscal action at the federal level and about the form that such action should take. Recent economic growth has been weak, monetary policy may be reaching its limit as normally perceived, and state and local governments face a fiscal crisis of unusual magnitude. All these considerations argue for further fiscal stimulus. On the other hand, the economy appears to be out of recession, and the federal government faces a looming fiscal collapse in its entitlement programs, which further expansion of deficits could worsen. Clearly, in judging whether more stimulus is called for, it would be useful to know how well attempts at fiscal stimulus have succeeded in the past. Before turning to that question, it is helpful to consider first how government has responded in the past to weakness in the economy.

Past as Prologue

Studying the past behavior of governments in making fiscal policy can help clarify the extent to which policy actions at least had the potential to provide countercyclical stimulus, based on their magnitude and timing. It also provides a guide to the current political environment, by helping identify policy actions that would be consistent with past behavior in similar economic circumstances. For example, to what extent are President Bush's recent proposals in line with past fiscal policy actions? What changes in state and local tax and expenditure policies should we anticipate?

Despite all its problems as an aggregate measure that does not account for compositional effects, the quarterly full-employment budget surplus constructed by the CBO is a reasonable place to start in considering the timing of past fiscal policy.[10] The series spans a period of almost fifty

10. These quarterly series obtained from the CBO are unpublished versions of the annual series that the agency regularly publishes. I am grateful to John McMurray of the CBO for supplying the data.

years, and its quarterly frequency is particularly useful in considering the timing of fiscal policy around recessions, given that the typical postwar recession has lasted less than one year.

Table 1 reports regressions relating the change in the CBO full-employment budget surplus to its own value in the preceding quarter and to the gap between full-employment and actual GDP in the preceding quarter, with both measures divided by full-employment GDP.[11] The first column reports results for the full sample period from 1955:2 through 2002:4. The coefficients on both the output gap and the lagged surplus are negative and significant. The coefficient on the output gap indicates that, at this frequency and based on this measure of activity, fiscal policy changes have been countercyclical. The coefficient on the lagged surplus suggests that fiscal policy has also responded independently to the size of the budget surplus. This is not a new finding. Henning Bohn, for example, found that increases in the national debt tended to lead to increases in budget surpluses in subsequent years.[12] In terms of first differences, this implies that an increase in the deficit in the recent past should cause a tightening of fiscal policy.

The next three columns of table 1 present estimates of the same regression equation over three shorter sample periods. Estimated for the period from 1984:3 to the present, the equation shows roughly twice the responsiveness of the full-employment surplus to both the lagged surplus and the output gap, indicating a more active fiscal policy in the past two decades. Indeed, this responsiveness is even more evident if the recent sample period is broken down into two roughly equal subperiods, with the dividing line being 1993, the first year of the Clinton administration. During the final period, covering the Clinton years and the current Bush administration through 2002, the influence of the budget surplus and, especially, the output gap has been high. The coefficient on the output gap predicts that the full-employment surplus falls by nearly half of the previous quarter's output gap.[13]

What might have caused this growing sensitivity? One set of explanations relates to changes in the political climate. One might expect the

11. Some of the regressions in tables 1 through 4 are updates of results first presented in Auerbach (2002a).

12. Bohn (1998).

13. The finding of increasing cyclical responsiveness in recent years is consistent with results for other countries reported by Galí and Perotti (forthcoming).

Table 1. Regressions Explaining Changes in the Full-Employment Federal Budget Surplus[a]

	Sample period				
Independent variable	*1955:2–2002:4*	*1984:3–2002:4*	*1984:3–1993:1*	*1993:2–2002:4*	*1955:2–2002:4*
Constant	–0.105 (0.052)	–0.200 (0.094)	–0.811 (0.368)	–0.349 (0.104)	–0.112 (0.089)
Lagged output gap[b]	–0.070 (0.020)	–0.171 (0.053)	–0.149 (0.067)	–0.404 (0.086)	–0.098 (0.051)
Lagged surplus[c]	–0.078 (0.026)	–0.125 (0.041)	–0.263 (0.111)	–0.332 (0.069)	–0.024 (0.030)
Split government dummy[d]					–0.361 (0.287)
Lagged output gap × split government					–0.304 (0.170)
Lagged surplus × split government					–0.462 (0.224)
Republican president dummy[e]					0.317 (0.288)
Lagged output gap × Republican president					0.304 (0.172)
Lagged surplus × Republican president					0.390 (0.224)
Summary statistics					
Adjusted R^2	0.059	0.112	0.118	0.367	0.078
No. of observations	191	74	35	39	191

Source: Author's regressions using CBO data.

a. The dependent variable is the quarterly change in the full-employment federal budget surplus as a percentage of full-employment GDP. Standard errors are in parentheses.

b. Difference between GDP at full employment and actual GDP in the previous quarter, as a percentage of full-employment GDP in that quarter.

c. Federal budget surplus in the previous quarter, as a percentage of full-employment GDP.

d. Equals 1 when at least one house of Congress is not controlled by the president's party.

e. Equals 1 when the president is a Republican.

major parties to differ in their preferred responses to the business cycle and the budget; a divided government, with the congressional majority being of a different party than the president, could be more susceptible to gridlock and thus to a muted fiscal response. The last column of table 1 therefore considers the effects of presidential party and divided government (defined as the state in which at least one house of Congress is not controlled by the president's party);[14] the specification reported here

14. The second quarter of the current Bush administration is counted as not having a split government because the Democrats regained control of the Senate after the quarter's halfway point.

includes dummy variables for quarters when a Republican was president and when the government was divided, as well as variables interacting these dummies with the lagged output gap and the lagged surplus.

Unfortunately, the results add little information beyond that in the previous columns. The coefficients on the two sets of added variables are large, nearly equal in absolute value, and of opposite sign. They imply that the basic equation roughly holds when the government is split and the president is a Republican, or when the government is not split and the president is a Democrat. Together these conditions characterize 165 of the 191 quarterly observations—all except the last six years of the Clinton administration and the first two quarters of the current Bush administration's first two years. Hence what the equation is saying is that policy during the Clinton administration was much more active than for the sample as a whole, which was already evident from a comparison of the first and fourth columns.

To put the large implied coefficients in the fourth column of table 1 in context, consider the implied effect of an increase of 1 percentage point in the unemployment rate. Based on the recent Okun's Law relationship, this would imply a roughly 2 percent drop in output relative to its full-employment level. The coefficient of –0.404 on the output gap implies a corresponding rise in the full-employment deficit of 0.81 percent of potential GDP in the next quarter—or over $85 billion on an annual basis at the current level of GDP. This seems a large response in just one quarter and leads one to think about what changes in the full-employment surplus represent.

One concern about equating changes in the full-employment surplus with discretionary fiscal policy is that the full-employment surplus can change for any of several reasons, some of which should not be interpreted either as a change in discretionary policy or, for that matter, as a change in an automatic fiscal stabilizer that might have a similar impact on the economy. A salient illustration is the sharp drop in individual income tax revenue in recent years, already discussed, much of which reflects a change in the composition of aggregate income ("Technical changes" in the bottom panel of figure 1). Although it shows up as a drop in the full-employment surplus, this is clearly not the direct result of a policy change, nor is it evident why it should be viewed as an expansionary event.

Another problem in interpreting the change in the CBO surplus as a policy response to current economic conditions is that the surplus may change as a result of policy decisions made several periods before. An example is the phased-in tax cut enacted in 2001. Further, the underlying cyclical responsiveness of the budget might change unpredictably over time, leading to the possibility of over- or undercorrection in construction of the adjusted series, and hence a spurious statistical relationship to the output gap. For example, should one view the decline in incomes and tax payments at the top of the income distribution in recent years as unrelated to the economic cycle? For these reasons, it is useful to rely on an alternative measure based on explicit policy changes.

To construct this measure, I rely on the successive budget forecast updates provided by the CBO, the recent versions of which were used in constructing figure 1. The CBO typically publishes two major revisions of its budget projections during each year, incorporating updated economic forecasts: the first in late January or early February, and the second during the summer. By accumulating changes attributed to legislative action between each of these forecasts (including additional, intermediate revisions, such as the one recently issued in conjunction with the release of the president's budget), one may derive a continuous, roughly semiannual series of forecast changes in revenue and expenditure due to policy, beginning with changes between the winter and summer of 1984. Before 1984 there was a transition period during which observations were produced at different intervals. I will discuss this period below, but I begin by analyzing the period of continuous observation from 1984 to 2003.

For each observation I measure the policy change with respect to revenue, expenditure net of debt service, and their difference—the change in the primary surplus. Because each update includes legislative changes for the current fiscal year and several subsequent years, it is not clear how these projected changes should be combined. This highlights the problem of treating annual changes in revenue or spending as measures of policy changes adopted in that year.

Much of the literature focuses on changes within the current fiscal year, perhaps distinguishing expected changes from unexpected ones. But how should one deal with changes adopted in the current fiscal year that affect the future? Presumably, a permanent change would have a different effect than a temporary one, and therefore the information about future

years is useful and should not be ignored. For the time being, however, I put this question aside and consider only the changes in the surplus adopted for the current fiscal year.[15] To facilitate comparison with the results in table 1, I relate these fiscal policy changes to lagged values of the full-employment output gap from the preceding quarter, and to the previous fiscal year's surplus.[16] The first column of table 2 presents the results of this regression. Over the full sample period, both the output gap and the budget surplus exhibit a significant, negative impact on surplus-enhancing policy actions. The effects are somewhat smaller than for the same period in table 1, but of the same order of magnitude.

As mentioned, however, changes in revenue and spending adopted today for future years should not be ignored if these changes have any credibility. Although a policy change adopted for the future could certainly be reversed or amended before it takes effect, it would be extreme to assume that such changes are irrelevant as indicators of future policy or as determinants of individual behavior. Thus it is worth considering how changes for future fiscal years are affected by current conditions.

But how should present-year and future-year policy shifts adopted in the current period be aggregated? A simple approach is to let the data indicate the appropriate aggregation. I form the discounted sum of policy changes to the primary surplus adopted during the interval for the current and subsequent four fiscal years (relative to each year's corresponding measure of potential GDP), with the five weights normalized to sum to 1, and I vary the discount factor to determine the appropriate specification.[17] Based on a simple goodness-of-fit measure (the regression's adjusted R^2), I choose a discount factor of 0.5, meaning that each succeeding fiscal year's policy change is accorded half the weight of the previous one. The

15. Because policy revisions between winter and summer start to take effect midway through the current fiscal year, I include half of the current year's change and half of the change for the next fiscal year for these observations.

16. I use the annual surplus measure rather than the quarterly NIPA surplus used in table 1, to maintain consistency with the surplus, revenue, and expenditure policy measures here, which are based on the actual federal budget.

17. Projections for a ten-year budget period have been provided in recent years, but not for a long enough period for statistical analysis to be practical. As in the simpler case, I reduce the weight on the current fiscal year by one-half, and increase weights on subsequent years correspondingly, for winter-to-summer revisions. That is, if β is the discount factor, the weights applied to revisions between summer and winter are x, $x\beta$, … , $x\beta^4$, and the weights applied to revisions between winter and summer are $0.5y$, $0.5(y + y\beta)$, … , $0.5(y\beta^3 + y\beta^4)$, where x and y are determined so that the weights for the five fiscal years sum to 1.

Table 2. Regressions Explaining Legislated Changes in the Primary Federal Budget Surplus and in Revenue and Spending[a]

	Dependent variable							
Independent variable	*Surplus*[b]	*Surplus*[c]	*Surplus*	*Surplus*	*Surplus*[d]	*Surplus*	*Revenue*	*Spending*
Constant	–0.002	–0.002	–0.002	–0.002	–0.003	–0.002	–0.001	0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.000)	(0.000)
Lagged output gap[e]	–0.090	–0.092	–0.113	–0.115	–0.147	–0.115	–0.039	0.076
	(0.033)	(0.036)	(0.038)	(0.038)	(0.034)	(0.038)	(0.022)	(0.027)
Lagged surplus[e]	–0.104	–0.121	–0.034					
	(0.023)	(0.025)	(0.065)					
Projected surplus[f]			–0.106	–0.141	–0.163	–0.141	–0.055	0.086
			(0.073)	(0.027)	(0.025)	(0.027)	(0.016)	(0.020)
Dummy for 1981:2 observation[g]						–0.005	–0.018	–0.014
						(0.003)	(0.002)	(0.002)
Summary statistics								
Adjusted R^2	0.354	0.402	0.421	0.433	0.529	0.553	0.857	0.565
No. of observations	38	38	38	38	39	39	39	39

Source: Author's regressions using CBO data.

a. Regressions are based on semiannual data for the period 1984–2003. Standard errors are in parentheses.

b. The dependent variable is the legislated change in the primary federal budget surplus adopted for the current fiscal year only (decay rate = 1).

c. In this and subsequent columns, the dependent variable is the discounted sum of legislated changes in the primary surplus (or revenue, or spending) in the current and subsequent four years, with each succeeding year's change given half the weight of the previous year (decay rate = 0.5; weights normalized to sum to 1).

d. Sample includes observation covering the summer of 1981 to the winter of 1982; in other specifications, if the dummy variable for this observation is not reported, data for this observation are excluded from the sample.

e. Defined as in table 1.

f. Projected primary surplus for the current and next four years, aggregated as described in note c.

g. Equals 1 for the observation covering the summer of 1981 to the winter of 1982.

second column of table 2 presents estimates corresponding to this decay rate, which is used for all subsequent specifications.

Once one takes into account that policy changes affect future years as well as current ones, it becomes obvious that current fiscal conditions should not be the only ones considered relevant for policy decisions. As discussed above, the looming federal fiscal crisis should affect both current policy decisions and the economy's reactions to those decisions. A summary measure of future fiscal conditions, such as the unfunded implicit entitlement liabilities mentioned above, might be appropriately included in the regression equation, but there is no single, commonly used measure of these liabilities comparable to the official annual budget balance. As a modest first step, one can consider the surpluses projected over the budget period, rather than simply the most recent budget surplus, as a determinant of policy changes. To be consistent with the aggregate policy measure just developed, I aggregate the projected surplus for the current and next four fiscal years, as of the beginning of the period of observation, using the same discount factor used in constructing the policy measure. The third column of table 2 shows the result of adding this surplus projection to the regression. Both surplus coefficients are negative, but collinearity between the variables leads to an increase in the standard errors. Given that the projected surplus has a much stronger effect, I exclude the lagged surplus from the regression in the fourth and subsequent columns.

As indicated earlier, some data are available on CBO forecast revisions before August 1984, but not at regular intervals. Using a combination of published and unpublished data, it is possible to construct annual observations of policy changes for the periods February 1983 to February 1984, and for February 1982 to February 1983, plus one semiannual observation for August 1981 to February 1982. Although it is two years removed from the original sample, this additional semiannual observation is a very significant one: it covers the passage of the Economic Recovery Tax Act and the initial spending changes effected by the Reagan administration.

Inclusion of this observation leads to a strengthening of the effects of the model, as a comparison of the fourth and fifth columns of table 2 shows.[18] The sixth column shows the effect of including a dummy variable

18. Although it is not obvious how to include the two annual observations for 1983 and 1984, one approach—dividing each change by 2 (to reflect the period being twice as long)

for this observation, in order to measure its residual from the model estimated using the rest of the sample. The coefficient on the dummy variable indicates that the "Reagan Revolution" produced a surplus policy residual of –0.5 percent of GDP—the expected sign, although of a smaller magnitude than one might have expected. But the last two columns of table 2, which break the policy response down into revenue and expenditure excluding debt service, show that this overall surplus residual is the consequence of enormous and largely offsetting residuals in the revenue and spending equations. Reagan cut taxes a lot, but he also cut spending a lot. These equations indicate that both taxes and spending play a role in the response of the current fiscal surplus to the lagged surplus and the lagged output gap, with spending playing a more important role over the whole sample period.

The magnitude of these initial-period residuals is evident in figure 5, which plots them along with all the within-sample residuals. For the surplus as a whole, the initial observation's residual of –0.5 percent of GDP is large in absolute value, but there are others of about the same magnitude during the period. But for spending and, especially, revenue, the magnitudes are much greater than for any other observation in the sample, even though one can see evidence of other major policy changes over the sample period. Significant residuals are associated, for example, with the Clinton tax increase of 1993, the Bush tax cut of 2001, the 1990 budget summit of the first Bush administration (which raised taxes and cut spending), and the large spending cuts adopted in 1985–86 and 1987–88, when the Gramm-Rudman-Hollings Act was in force. Given how atypical the first observation is, I omit it from further consideration. There is clearly more to what happened in 1981 than the simple model used here can explain.

Table 3 considers fiscal policy behavior in more detail, for different components of policy and different sample periods. The first column repeats the baseline model for the surplus from table 2, and the second and third columns present the same model for two subperiods, with the break at the beginning of the Clinton administration. In contrast to the behavior of changes in the full-employment surplus considered in table 1, there is no obvious increase in responsiveness since 1993. In fact, the

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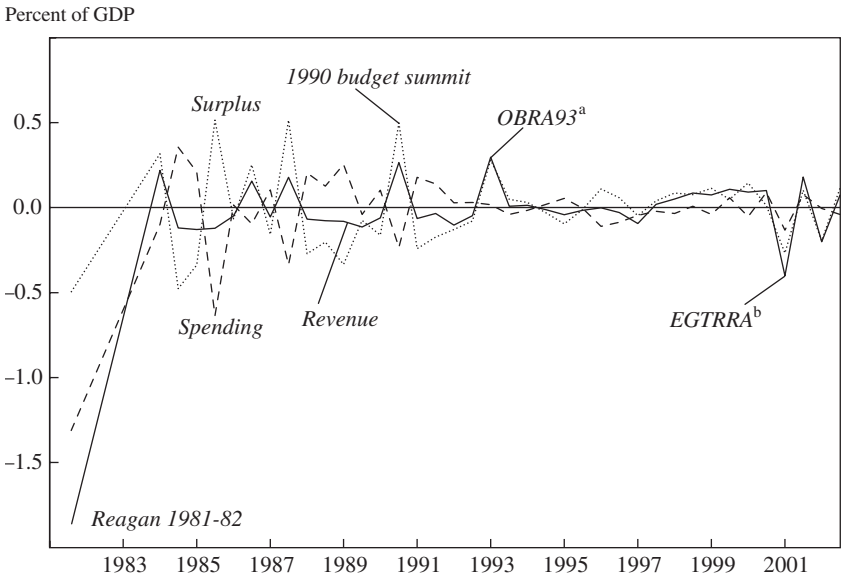
and using the beginning-of-period values of the explanatory variables—leads to estimates closer to the results in the table's fourth column.

Figure 5. Residuals from Regressions Explaining Legislated Changes in the Federal Budget Surplus, 1982–2002



Source: Author's calculations.
a. Omnibus Budget Reconciliation Act of 1993.
b. Economic Growth and Tax Relief Reconciliation Act.

coefficients are slightly larger for the earlier sample period, although not significantly so. Note, too, that the standard errors are much larger, and the adjusted R^2 is much lower, for the earlier sample period. As can be seen in figure 5, policy actions were much more volatile prior to 1993. One final cut of the data is between Democratic and Republican presidential administrations.[19] The last six columns of table 3 present results for the surplus and its components for Republican and Democratic presidential administrations. What is striking about these results is how similar they are. There are no differences of any importance for any of the coefficients. Although this may be merely a fluke of the sample period considered, it does suggest that, except perhaps for the occasional "revolution,"

19. For this sample there are only five observations for which a majority in Congress and the president were of the same party, so the table does not present results for this additional sample split.

Table 3. Regressions Explaining Legislated Changes in the Primary Federal Budget Surplus and in Revenue and Spending, by Subperiod[a]

	Sample period and dependent variable								
	1984:2–2003:1	*1984:2–1993:1*	*1993:2–2003:1*	*Republican president 1984:2–1993:1, 2001:2–2003:1*			*Democratic president 1993:2–2001:1*		
Independent variable		*Surplus*		*Surplus*	*Revenue*	*Spending*	*Surplus*	*Revenue*	*Spending*
Constant	–0.002	–0.007	–0.002	–0.003	–0.002	0.002	–0.002	–0.0004	0.001
	(0.001)	(0.005)	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.000)
Lagged output gap[b]	–0.115	–0.170	–0.150	–0.104	–0.025	0.078	–0.117	–0.036	0.081
	(0.038)	(0.097)	(0.031)	(0.055)	(0.028)	(0.041)	(0.049)	(0.049)	(0.029)
Projected surplus[c]	–0.141	–0.278	–0.176	–0.156	–0.069	0.087	–0.141	–0.045	0.096
	(0.027)	(0.161)	(0.023)	(0.038)	(0.020)	(0.029)	(0.039)	(0.039)	(0.023)
Summary statistics									
Adjusted R^2	0.433	0.069	0.769	0.414	0.372	0.253	0.638	0.072	0.697
No. of observations	38	18	20	22	22	22	16	16	16

Source: Author's regressions using CBO data.

a. The dependent variable is the legislated change in the federal surplus, revenue, or spending on a semiannual basis, as a percentage of full-employment GDP. Standard errors are in parentheses.

b. Defined as in table 1.

c. Defined as in table 2.

relatively stable behavioral rules apply across superficially different budget regimes and different ideologies.

Given that these policy changes are organized in the form that proposed legislation typically is, in terms of annual changes in revenue and expenditure during a multiyear budget period, it is simple to calculate what the estimates in table 3 would predict for current policy, that is, the legislative actions that one would expect to be taken between the winter and summer of 2003. Using estimates for the period since 1993:2, and assuming that any expenditure or revenue changes adopted would be permanent, constant as a fraction of GDP beginning in 2004, and half that large this year (because the change occurs at approximately midyear), the predicted undiscounted net budget cost of policy changes during the budget period 2004–13 (the common way of reporting these changes in the press) would be $368 billion, composed of a tax cut of $148 billion and a spending increase of $220 billion over the full period. The first full year would have a tax cut of $12 billion and an expenditure increase of $17 billion. These relatively small changes reflect the fact that the estimated output gap is not large, whereas the budget is already in deficit and projected to be so for the next few years, at least. By contrast, the president's recent budget would involve a ten-year reduction in tax revenue of $1,455 billion and an expenditure increase of $725 billion net of interest.[20] Of course, proposal is not enactment, and so one would expect the coefficients to imply a smaller change in expected value.[21]

One potential problem with the results based on changes in baseline expenditure is that it is not always clear when actual policy changes. Throughout the 1990s, Congress adopted successive expenditure caps, and CBO projections reflected each update. But extending existing caps should not be treated as a change in policy, if such an extension was expected. In the other direction, the breaching of the spending caps in

20. CBO (2003b, table 8). The expenditure number equals the CBO's ten-year total of $1,255 billion less $530 billion in interest. Treating all of the interest as added debt service (for which there is no separate entry) probably overstates the appropriate adjustment, as some of the increased interest expenses may result from an induced increase in interest rates.

21. On the other hand, the most recent CBO forecast (CBO, 2003b) lists increased discretionary and mandatory spending of $22 billion for fiscal year 2004 and $248 billion for the ten-year budget period 2004–13, based on policy changes already adopted since the January forecast. As this volume goes to press, the president has signed into law the Jobs and Growth Tax Relief and Reconciliation Act, with tax cuts officially estimated at $350 billion over ten years.

recent years, leading to continual upward revisions of projected spending, may not have been true policy changes, either.

To address this ambiguity, I consider yet another measure of policy: the actual behavior of discretionary spending over the years, starting in 1963.[22] Table 4 relates actual year-to-year changes in discretionary spending to the preceding year's output gap and budget surplus, all relative to full-employment GDP. Although this exercise has the advantage of considering actual spending changes, a disadvantage is that it necessarily uses data at an annual frequency, which is even less appropriate for consideration of cyclical timing than the semiannual frequency of the data analyzed above.[23]

The left half of the table presents estimates for all discretionary spending. For the full sample and the period starting in 1984 (first two columns), the coefficients on the output gap and the budget surplus both have the predicted sign but are small and estimated imprecisely. For the period from 1984 to 1992 (third column), there is no discernable relationship at all. For the period starting in 1993, however, there is a sharp increase in both coefficients (which are also both significant), indicating a much more reactive policy stance. The right half of the table presents estimates for nondefense discretionary spending alone, for which the simple model used here might be more applicable. Indeed, the results are more stable over time for this measure of spending, although there is still a stronger response in recent years. One should be cautious given the small number of observations, but the findings in this table are generally consistent with those in table 1, indicating that policy has been more responsive since 1984 and, with respect to the budget gap, particularly so since 1993. Table 3, on the other hand, shows no increase in the responsiveness of actual policy changes to the budget gap since 1993, but differences in the methodologies make it difficult to identify the reason.

Overall, then, various pieces of evidence indicate that fiscal policy has been responsive to both fiscal and macroeconomic conditions, and possibly more responsive in recent decades than previously. Whatever the intellectual developments regarding the efficacy of countercyclical policy, policymakers are still Keynesians, and spending and revenue do

22. The CBO publishes data starting in 1962, which makes 1963 the earliest possible starting date that can take lags into account.

23. Given that the focus is on discretionary spending, one would not expect the changes in spending to include automatic responses to cyclical factors.

Table 4. Regressions Explaining Changes in Federal Discretionary Spending[a]

	Dependent variable and sample period							
	All discretionary spending				*Nondefense discretionary spending*			
Independent variable	*1963–2002*	*1984–2002*	*1984–1992*	*1993–2002*	*1963–2002*	*1984–2002*	*1984–1992*	*1993–2002*
Constant	0.000	0.000	–0.003	0.002	0.001	0.001	0.005	0.001
	(0.001)	(0.001)	(0.005)	(0.001)	(0.001)	(0.000)	(0.002)	(0.001)
Lagged output gap[b]	0.017	0.046	0.026	0.364	0.025	0.023	0.046	0.160
	(0.039)	(0.044)	(0.060)	(0.083)	(0.018)	(0.019)	(0.020)	(0.067)
Projected surplus[c]	0.051	0.067	–0.032	0.357	0.053	0.033	0.139	0.137
	(0.050)	(0.037)	(0.141)	(0.064)	(0.023)	(0.017)	(0.046)	(0.051)
Summary statistics								
Adjusted R^2	–0.023	0.073	–0.165	0.825	0.074	0.112	0.467	0.380
No. of observations	40	19	9	10	40	19	9	10

Source: Author's regressions using CBO data.

a. The dependent variable is the annual change in discretionary spending, including or excluding defense spending, as a percentage of full-employment GDP. Standard errors are in parentheses.

b. Defined as in table 1.

c. Defined as in table 2.

react to the budget situation, as measured by current and projected surpluses.

Tax Policy and Investment

Thus far I have considered changes in fiscal policy as measured by expenditure and overall tax revenue. Although this aggregation of revenue is common in the literature, one would not expect all current changes in tax revenue to have the same effect on output. The impact would depend on the type of tax being changed, as well as on the inferences private agents make from the change about future tax policy. Perhaps the most important illustration of these differences in tax policy effects concerns investment incentives. For forward-looking investors, changes in tax revenue—even those to corporate tax revenue—due to changes in legislation may be a very poor measure of changes in the incentive to invest. Different provisions that impose the same tax burden on new investment, in present value, may yield very different patterns of tax revenue over time and very different first-year revenue effects. Indeed, different provisions that have the same impact on new investment need not raise the same amount of revenue in present value, after taking into account the taxes on existing assets. Further, *expected* changes in tax provisions can themselves exert a powerful impact on the incentive to invest. Whereas standard models of consumption lead us to expect that temporary provisions will have muted effects, the opposite is true of investment incentives. A temporary reduction in the effective price of a durable investment good can have large incentive effects, and policies may seek to take advantage of this.

A good illustration of this distinction is the stimulus bill passed in early 2002. The primary change was the introduction, for a period of three years, of expensing (instead of regular depreciation) for 30 percent of purchases of investment goods with tax lifetimes of twenty years or less. As a form of accelerated depreciation, this policy would have a larger revenue effect in the short run than in the long run, even if it were enacted permanently. The additional deductions for investment made several years from now would be offset by smaller deductions in those years on earlier investment that had already been partly expensed. Thus

the annual revenue losses would not provide an accurate picture of the tax incentives for capital investment, which would remain constant after enactment. As enacted, however, the provision encourages a shift in the timing of investment to occur within the three-year window. Clearly, neither the policy change itself nor its potential impact on investment is adequately summarized by a one-year change in revenue. This is particularly important given the volatility of investment relative to other components of GDP.[24]

Figure 6 graphs net nonresidential investment in structures and in equipment since 1954 as shares of nominal GDP. The pattern of equipment investment since the early 1990s is particularly noteworthy: this component rose sharply from a trough during the 1990–91 recession to a historical high, then fell precipitously in 2001. The motivation for the 2002 legislation is evident. But measuring the effect of this and other policy changes requires a model of investment behavior.

To begin, consider the standard Hall-Jorgenson user cost of capital, which provides a measure of the required gross, before-tax return to capital, and hence a measure of the incentive to use capital in production, under the assumption of instantaneous adjustment. For a constant-tax system, the user cost is

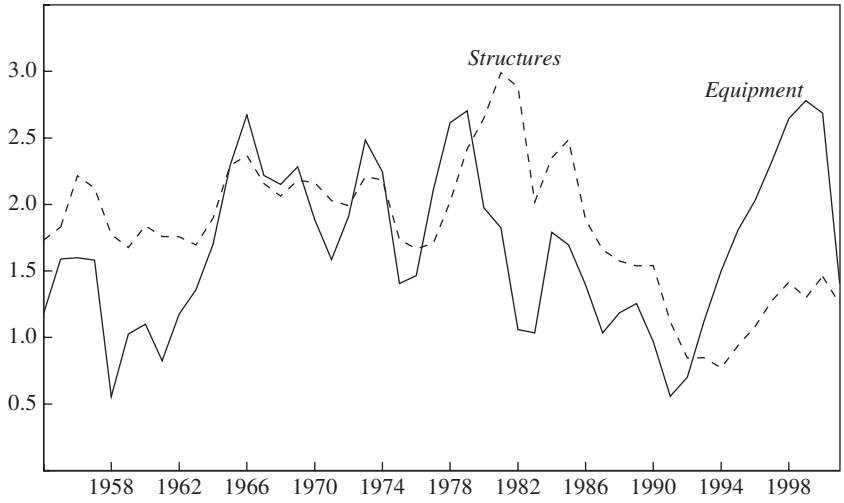
$$c = \frac{q}{p}\left(\rho + \delta - \frac{\Delta q}{q}\right)\frac{1 - k - \tau z}{1 - \tau}, \tag{1}$$

where p is the price of output, q is the price of new capital goods, ρ is the nominal discount rate, δ is the exponential rate at which capital actually depreciates, k is the investment tax credit, τ is the corporate tax rate, and z is the present value of depreciation allowances per dollar of capital purchased. If one modifies the assumptions to incorporate changes in tax policy, the user cost of capital becomes

$$c = \frac{q}{p}\left(\rho + \delta - \frac{\Delta q}{q}\right)\frac{1 - \Gamma}{1 - \tau} + \frac{q}{p}\frac{\Delta \Gamma}{1 - \tau}, \tag{2}$$

24. Blanchard and Perotti (2002) and Alesina and others (2002) have found, using vector autoregression models, that aggregate tax shocks influence investment, but it is unclear to what extent these shocks act through changes in the incentive to invest, rather than through other channels.

Figure 6. Net Nonresidential Investment, 1954–2001



Source: BEA, National Income and Product Accounts.

where Γ equals the sum of the investment tax credit and the present value of tax savings from depreciation deductions.[25] The presence of the additional term on the right-hand side of equation 2 means that there is now a second way in which tax policy may affect investment, namely, through expected changes in policy, as well as through current policy. For example, the expected elimination of an investment tax credit has a powerful effect on the user cost of capital as computed from equation 2, because it induces a huge capital gain at the time of the credit's elimination. Thus the introduction of an investment tax credit that is expected to be temporary has two effects that encourage investment—through the tax credit itself as well as through its expected elimination—which together can be thought of as corresponding to changes in the desired level of capital as well as changes in the desired timing of capital purchases.

25. See Auerbach (1983a). This sum equals $k + \tau z$ if τ is constant over time. If τ is expected to change over time, then the present value of tax savings from depreciation deductions is not the simple product of the current value of τ and the present value of depreciation deductions z.

As noted, equation 2 applies only under the assumption of instantaneous capital stock adjustment. Optimal investment behavior in the presence of convex adjustment costs may be characterized by a partial-adjustment investment process in which the desired capital stock at date t varies inversely with the weighted average of the current and expected future user costs of capital based on equation 2:[26]

$$c_t^* = E_t \sum_{s \geq t} w_{s-t} c_s, \tag{3}$$

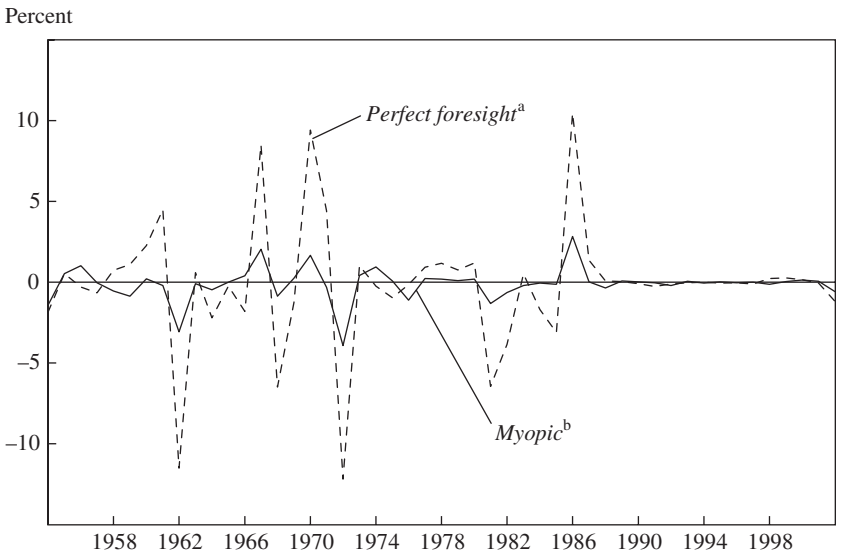
where the weights w_i sum to unity and decline exponentially, at a rate that is inversely related to the size of adjustment costs; the more sluggish the investment response, the more the future matters. Estimates by Auerbach and Kevin Hassett indicate that it is reasonable to assume an annual decay rate of 0.5 in calculating the weights.[27]

Figure 7 traces estimated changes since 1954 in the user cost of capital for equipment investment under two alternative assumptions about expected tax law changes: under one assumption, investors myopically expect the tax law to remain constant (equation 1); under the second, investors have perfect foresight with respect to future tax law changes (equations 2 and 3). These estimates, whose construction is described in appendix A, take into account the changing composition of the capital stock over time and assume a constant required real rate of return $\rho - \Delta q/q$. Therefore they do not incorporate the effects on the required return of changes in individual taxes or in interest rates. However, the most important tax provisions affecting investment have been investment tax credits and depreciation provisions, not changes in corporate or individual tax rates; the level of interest rates is part of the macroeconomic environment to which one might expect tax policy to respond, and this calls for constructing a measure of policy that is not a function of the interest rate.

A number of patterns in figure 7 are worth mentioning. First, the fluctuations in the perfect-foresight user cost are substantially larger, even though they are smoothed by averaging. Second, policy has been quiet since the Tax Reform Act of 1986 eliminated the investment tax credit and adjusted depreciation allowances. Third, the distribution of policy shocks by this measure is poorly approximated by a normal distribution.

26. As shown in Auerbach (1989).
27. Auerbach and Hassett (1992).

Figure 7. Changes in the User Cost of Capital for Equipment under Alternative Expectations Assumptions, 1954–2002



Source: Author's calculations.
a. Calculated from equations 2 and 3 as described in appendix A.
b. Calculated from equation 1 as described in appendix A.

Thus the standard linear regression model is not appropriate to explain the determinants of these policy changes. Instead I estimate an ordered probit, with the three states being a substantial reduction in the user cost, no substantial change in the user cost, and a substantial increase in the user cost. For the myopic user cost of capital, I set the cutoffs at 0.005, so that changes in the user cost with an absolute value of less than 0.5 percentage point are treated as no change in policy. This counts all important legislation as a tax change but leaves out minor changes in law and changes in the present value of depreciation deductions due to changes in the annual inflation rate.[28]

28. An alternative approach to estimating the effects of the economy on policy is found in Auerbach and Hines (1988), who assumed that the decision to effect a policy change was independent of economic conditions. For the period 1953–85 they estimated a linear model based only on the years in which major changes occurred, with the key variable in the user cost expression, $\Gamma/(1-\tau)$, as the dependent variable.

Table 5 reports the results for this case of myopic user costs.[29] Independent variables include, as above, the lagged annual budget surplus and the lagged output gap, both relative to potential GDP, plus, for each type of investment, its own lagged value and the lagged change in that value, both as percentages of GDP. The estimates suggest that investment incentives have responded to both the output gap and the budget surplus: the coefficients on the output gap are significant in all specifications, whereas those on the surplus are less precisely estimated but still, in general, at least marginally significant. For equipment investment, investment conditions also play a role, when specified as the lagged change in investment.

The modest investment incentives introduced into the tax code in 2002 were consistent with the model in column 5-2 of table 5, which, because of the very large drop in net equipment investment, put the probability of a tax reduction in that year at close to 1. For the current year, given the continuing drop in net equipment investment from 2001 to 2002,[30] the model assigns a further cut in the myopic user cost a probability of just over 0.5 and assigns an increase a probability close to zero.

Thus the myopic user cost of capital appears to respond to the same basic determinants as simple changes in revenue and expenditure and, for equipment investment, to particular investment conditions as well. But this does not necessarily imply that the *incentive* to invest behaves this way. Recall that forward-looking investors should also be concerned with future values of the user cost, and thus with possible changes in tax rules. If accelerated depreciation incentives are made more generous again in 2003, investors' anticipation of this could have undercut the effects of the 2002 provisions.

If, in the extreme, investors had perfect foresight, the volatile, forward-looking user costs shown in figure 7 would characterize the incentive to invest. An ordered probit model for changes in this concept of the user cost yields quite different results from those in table 5. None of the coefficients are significant in any specification, for a broad range of

29. The coefficient μ is an estimate of the cutoff between the second category (no change) and the third category (cost-of-capital increase), with the cutoff between the first two categories normalized to zero and the indicators ranging between 1 (decrease) and 3 (increase).

30. As the BEA has not yet released an estimate for *net* investment for calendar year 2002, I impute a value by assuming that the difference between net and gross equipment investment, as a percentage of GDP, is the same for 2002 as for 2001.

Table 5. Ordered Probit Analysis of Changes in Tax Policy Affecting Investment Incentives[a]

	Dependent variable					
	Myopic user cost of capital for equipment		*Myopic user cost of capital for structures*		*Myopic user cost of capital for both*	
Independent variable	*5-1*	*5-2*	*5-3*	*5-4*	*5-5*	*5-6*
Constant	–0.068	0.890	1.818	1.488	0.640	1.212
	(0.942)	(0.410)	(1.205)	(0.588)	(1.123)	(0.434)
Lagged surplus[b]	–29.145	–26.681	–39.994	–37.675	–31.623	–35.500
	(14.240)	(15.889)	(26.475)	(27.721)	(16.856)	(18.022)
Lagged output gap[b]	–24.678	–24.658	–51.819	–61.212	–41.952	–46.225
	(12.096)	(11.342)	(20.597)	(24.496)	(14.544)	(15.025)
Lagged net investment[c]	35.942		–25.363		13.969	
	(47.331)		(59.014)		(29.309)	
Lagged change in investment[d]		198.373		–133.759		0.637
		(66.597)		(137.007)		(0.393)
μ[e]	2.650	3.248	4.996	5.558	3.500	3.789
	(0.412)	(0.559)	(1.197)	(1.526)	(0.613)	(0.713)
Summary statistics						
Scaled R^2	0.203	0.441	0.264	0.286	0.300	0.358
No. of observations	42	42	42	42	42	42

Source: Author's regressions using CBO data.

a. The dependent variable is the annual change in the myopic user cost of capital for the indicated type of investment. Standard errors are in parentheses.

b. Defined as in table 1 except that the data are annual.

c. Value of the indicated type of investment, net of depreciation, in the previous year.

d. Change in value of the indicated type of investment in the previous year.

e. Estimate of the cutoff between the second category (no change) and the third category (cost-of-capital increase), with the cutoff between the first two categories normalized to zero and the indicators ranging between 1 (decrease) and 3 (increase).

assumed cutoff values (results not shown).[31] This suggests that policy actions, as they have been taken, may not have influenced the incentive to invest in a countercyclical manner, even if the changes were timed to be countercyclical.

State and Local Responses to Economic and Fiscal Conditions

As discussed above, state and local governments are facing unprecedented fiscal imbalances. Although it is customary to focus primarily on

31. Values of 0.005, 0.01, 0.015, and 0.02 were considered.

the federal budget when contemplating the interaction of fiscal policy and the economic cycle, the magnitude of the problem facing state and local governments today and the large responses that this problem may induce call for a closer look.

One would expect changes in policy at the state and local level not to be heavily influenced by cyclical factors. The reason is that most states face restrictions on the deficits they can run,[32] apart from whether individual states would wish to attempt countercyclical measures if they could. Indeed, a regression of the change in the aggregate state and local full-employment surplus (depicted in figure 3) on the lagged output gap and the lagged surplus (all divided by full-employment GDP),

$$\begin{aligned}\Delta\text{SURPLUSFE} &= \underset{(0.015)}{0.002} + \underset{(0.005)}{0.007}*\text{GAP}(-1) - \underset{(0.042)}{0.100}*\text{SURPLUS}(-1)\\ \text{Adjusted } R^2 &= 0.105; \quad N = 98,\end{aligned}$$

indicates that, as at the federal level, the lagged budget surplus has a negative impact on changes in the current surplus. Unlike at the federal level, however, the output gap has no negative effect.

Because, as previously argued, the change in the full-employment surplus has many problems as a measure of policy, I consider again a measure based on explicit policy actions. The measure comes from the National Association of State Budget Officers, which each year publishes *The Fiscal Survey of the States*. James Poterba has previously used these data to analyze state responses to fiscal shocks during 1988–92, and I follow a related approach for the period 1988–2002.[33] For each state in each budget year, the survey reports actual general fund revenue and expenditure, and hence the actual surplus and the associated change in the general fund balance. It also reports projected revenue, projected expenditure, and the projected surplus for the coming year and, after the fiscal year has ended, changes in outlays adopted and implemented during the year and the revenue effects of tax legislation enacted during the year for the *next* fiscal year. That is, for year t, we have the revenue and expenditure projected at the end of the previous year, which I will call ${}_{t-1}R_t$ and ${}_{t-1}E_t$,

32. See the discussion in Poterba (1994).

33. Poterba (1994). I am grateful to Kim Rueben and James Poterba for providing an updated version of their data. Another potential data source for state fiscal actions is the National Conference of State Legislatures.

respectively; the legislated change in outlays in year t that takes effect in year t, ${}_t\Delta E_{Lt}$; and the legislated change in revenue in year t that takes effect in year $t + 1$, ${}_t\Delta R_{Lt+1}$. Following Poterba, I impute revenue changes enacted and implemented in year t, ${}_t\Delta R_{Lt}$, by scaling the value of ${}_t\Delta R_{Lt+1}$ by the fraction of the year remaining in year t when each provision was enacted.

To review, for each fiscal year and each state, data exist for a measure of the projected surplus, the actual surplus, expenditure changes adopted and implemented during the year, and revenue changes adopted during the year and implemented the following year, which can also be used to impute revenue changes adopted and implemented during the year. Although there may be useful independent variation across states in different fiscal circumstances, I focus primarily on the aggregate data, to make the analysis comparable to that for the federal government.

The first three columns of table 6 report regressions explaining aggregate state policy changes in revenue during the current year, changes in revenue during the next year, and changes in expenditure during the current year, as a function of three explanatory variables: the lagged value of the national output gap (the same measure used in the previous tables), the change in the aggregate general fund balance over the course of the previous year (roughly equal to that year's aggregate state budget surplus),[34] and the projected surplus for the current year, made at the beginning of the year. All variables are expressed as fractions of potential GDP. The specification is similar to that in the third column of table 2 except that, for federal changes, the projected surplus incorporates forecasts not only for the current fiscal year, but also for several future years. As expected, the lagged output gap has a very small and insignificant impact; its omission from the estimates in the middle three columns produces higher values of the adjusted R^2 but little other effect. Fiscal conditions, on the other hand, have a powerful impact, particularly if one focuses on taxes next

34. The general fund budget surplus is not exactly equal to the change in the general fund balance, because states use budget stabilization funds to make transfers in and out of the general fund. It is not clear which measure of the change in the budget situation is more relevant. If states have substantial funds available to cover declines in the general fund, it may be appropriate for the measure used here to reflect this, because the actual change in the general fund balance does. In any event, the two measures have a correlation coefficient of 0.9 over the period considered. Using the actual lagged surplus instead of the change in the general fund balance changes the relative magnitudes of the coefficients on the lagged and the projected surplus (the projected surplus has a bigger impact, and the lagged surplus a smaller one) but has little impact on the overall picture.

Table 6. Regressions Explaining Changes in State Revenue and Spending, 1988–2002[a]

	Dependent variable								
	Regressions including lagged output gap, excluding surplus shock			*Regressions excluding lagged output gap and surplus shock*			*Regressions excluding lagged output gap, including surplus shock*		
Independent variable	*Revenue*	*Next year's revenue*	*Spending*	*Revenue*	*Next year's revenue*	*Spending*	*Revenue*	*Next year's revenue*	*Spending*
Constant	0.037	0.471	–0.478	0.033	0.426	–0.501	–0.037	0.154	–0.381
	(0.076)	(0.280)	(0.112)	(0.067)	(0.248)	(0.100)	(0.055)	(0.194)	(0.069)
Lagged output gap[b]	–0.007	–0.071	–0.036						
	(0.048)	(0.175)	(0.070)						
Lagged budget surplus[c]	–0.190	–0.786	0.741	–0.187	–0.759	0.755	0.087	0.306	0.285
	(0.094)	(0.346)	(0.139)	(0.089)	(0.328)	(0.132)	(0.109)	(0.384)	(0.136)
Projected surplus[d]	0.006	–0.086	0.475	–0.007	–0.220	0.405	0.042	–0.031	0.322
	(0.146)	(0.539)	(0.216)	(0.110)	(0.408)	(0.164)	(0.084)	(0.298)	(0.106)
Surplus shock[e]							–0.147	–0.573	0.253
							(0.046)	(0.163)	(0.058)
Summary statistics									
Adjusted R^2	0.077	0.137	0.690	0.152	0.197	0.708	0.519	0.587	0.884
No. of observations	15	15	15	15	15	15	15	15	15

Source: Author's regressions using data from the National Association of State Budget Officers.

a. The dependent variable is the legislated change in state revenue or spending aggregated across all fifty states as a percentage of national full-employment GDP. Data are annual data for 1988–2002. Standard errors are in parentheses.

b. Defined as in table 1.

c. Change in the aggregate state general fund balance during the previous year, as a percentage of full-employment GDP.

d. Projection of the current-year change in the aggregate general fund balance, made at the beginning of the year, as a percentage of full-employment GDP.

e. Current-year revision in revenue minus expenditure, excluding that due to policy change.

year and outlays in the current year. The lagged budget surplus has an enormous implied effect on revenue and outlays: the combined effect of its point estimates is above 1. The projected surplus for the current year has an additional impact in the same direction, although the impact for revenue is not significant.[35]

Finally, one may consider the effects of contemporaneous budget shocks on fiscal decisions. Again following the approach taken by Poterba, I define shocks to the surplus during the current year as the total change in the surplus minus the policy change in the surplus already measured. This approach is analogous to decomposing federal budget forecast revisions into legislative and nonlegislative (economic and technical) changes, as done above, and then considering the impact of nonlegislative changes on concurrent legislative ones. In general, an issue of simultaneity must be considered: causality can run in both directions. Indeed, at the federal level, there is evidence that policy shocks have an impact on output within the same quarter,[36] so that policy changes during a given period would also influence the change in the surplus attributable to cyclical factors. In this case, regressing policy changes on nonpolicy changes in the surplus would not identify the impact of shocks on the policy process. I am not aware of similar evidence regarding the timing of the impact of state policy shocks on the aggregate economy, and so it is difficult to know how serious a problem this is. However, for the sake of comparison with the earlier use of these data, the last three columns of table 6 add the concurrent shock to the aggregate state surplus as an explanatory variable. The estimated coefficients are all significant and quite consistent with those reported by Poterba, despite differences in the other explanatory variables, in the sample period, and in the method of estimation (panel data versus aggregate time series).[37] But the impact of this additional variable is offset by weaker estimated effects of the others, so that the overall picture does not change appreciably.[38]

35. The effect on outlays is particularly striking, given that the variable as reported includes only outlay *reductions*. This should attenuate the estimated relationship between the variable and the surplus. See Poterba (1994, footnote 10) for further discussion.

36. Blanchard and Perotti (2002).

37. Reestimates of the equations in table 6 using panel data give results that are generally consistent with the time series results, although the coefficients are typically smaller in absolute value.

38. The fact that coefficients on the other variables change indicates that the budget shocks are not true shocks, in the sense of being unpredictable from prior information.

In summary, state governments appear even more responsive to their own budget conditions than the federal government does to its. This is consistent with the tighter restrictions on the typical state's budget process. The estimates in table 6 imply that enormous fiscal changes are to be expected at the state level in the current fiscal year: the results in the middle three columns of the table imply tax increases of $4 billion this year and $22 billion next year, and current-year spending cuts of $24 billion. The full-year response of spending cuts and tax increases is actually larger than the federal tax cuts and spending increases implied by the model presented above, indicating that the state fiscal situation, indeed, is more than a sideshow for macroeconomic policy in the current fiscal environment.

"The Real Fiscal Danger"

Tables 2 and 3 showed that policy actions are forward looking to some extent: projected future surpluses affect current policy decisions. But discounted near-term surpluses are an inadequate measure of long-run fiscal balance, and this is particularly true at present. As already discussed, the United States faces huge implicit liabilities due to growth in old-age entitlement programs and a changing population age structure. The true fiscal imbalance may be expressed in terms of the implicit liabilities cited above or as a fraction of GDP. One recent calculation puts the annual fiscal gap at between 4.4 and 7.8 percent of GDP, depending on how "current policy" is defined.[39] Another arrives at a gap of 6.5 percent of GDP in 2003.[40]

Some object to the use of such comprehensive measures, which require making tax and spending projections far into the future. But virtually the entire measured long-term fiscal imbalance is attributable to age- and health-related entitlement programs for which long-term planning is already institutionalized.[41] If one wishes to use the standard seventy-five-year horizon for which projections are made for Social Security and

39. See Auerbach and others (forthcoming).

40. See Gokhale and Smetters (2003).

41. Gokhale and Smetters (2003) report that less than $1 trillion of an infinite-horizon fiscal liability of over $40 trillion is attributable to the rest of government. This may overstate the problem somewhat, and understate the surplus from the rest of government, to the extent that there may be a surge in future tax payments as the result of fully taxable distributions from tax-deferred retirement savings vehicles. Boskin (2003) has estimated that the

Medicare, it is more accurate to concentrate on the "closed group" liabilities of these programs, that is, the present value of future benefits net of future contributions of existing age cohorts already participating in the programs, rather than include all taxes and benefits over the period as in the budget calculations cited above. The truncation at seventy-five years has little impact when only current participants are considered, but it leads to an understatement of the liabilities to future participants, because it truncates their benefits—which come later in life—more than it does their taxes.

The change in the closed-group liability from one year to the next equals the sum of two terms: increases in liabilities to those remaining in the system plus the difference between liabilities to those entering the system and liabilities to those leaving the system. Changes in the closed-group liability give us a clear measure of the change in the implicit entitlement debt from one year to the next—the implicit deficit.[42] The column labeled "Implicit debt" in table 7 provides a short time series of the closed-group liability for Social Security's OASDI (Old-Age, Survivors, and Disability Insurance) system since 1997.[43] The table also shows that the annual implicit deficits, measured as the change in the implicit debt, have been substantially larger than the accumulating off-budget surpluses in the OASDI trust fund. One can learn more by breaking down these annual deficits into changes in the implicit debt attributable to updated assumptions (about interest rates, productivity growth, and the like) and those attributable to the incremental change in the base year for which the calculation is done. The component attributable to changes in assumptions shows no clear pattern, although it is large in absolute value in some years. For example, between the 1998 and 1999 reports, favor-

present value of such deferred taxes was nearly $3 trillion at the end of 2002—a large number in absolute terms, but not relative to the size of the implicit entitlement liabilities being considered here.

42. This implicit deficit measure is consistent with the nominal basis on which deficit accounting is currently done, although it could be expressed in real terms by subtracting the increase in the implicit debt that is due to inflation.

43. The liabilities reported here track reasonably well those reported by the U.S. Treasury (2003, p. 65, calculated as the difference between future benefits and future taxes for current participants reported there) for the last three years: $9.6 trillion, $10.5 trillion, and $11.2 trillion. The 2003 OASDI trustees' report, issued on March 17, 2003, puts the current closed-group liability even higher, at $11.9 trillion (U.S. Social Security Administration, 2003, p. 63).

Table 7. Implicit Debt and Deficits of the OASDI System, 1997–2003
Billions of dollars

Year	*Implicit debt at start of year*	*Change in implicit debt in current year due to change in*		*Implicit deficit*
		Base year	*Projection assumptions*	
1997	7,724	523	–97	426
1998	8,151	581	–408	173
1999	8,324	604	161	765
2000	9,089	677	201	878
2001	9,967	731	–27	704
2002	10,671	731	–328	403
2003	11,074			

Source: Author's calculations, described in appendix B.

able changes in assumptions regarding productivity growth, employment, and fertility sharply reduced growth in the implicit liability. The improvement between 2002 and 2003 appears to be due in part to an increase in the projected population in the 2000 census. The component attributable to the annual advance in the base year, on the other hand, is always positive and very large. By itself, this component would cause the implicit debt to grow much faster than GDP, reflecting the fact that, as the baby-boom cohort nears retirement and the collection of benefits, the present value of this bulge in benefits is becoming larger and larger.

The government's implicit long-term liabilities are more than twice as large if one considers the Medicare system as well (not shown).[44] These enormous liabilities have implications for both policy decisions and policy evaluation. Private agents taking these liabilities into account are likely to respond differently to short-run policy actions than they would otherwise. For example, as discussed below, tax cuts might have weak or even negative demand effects if they are viewed as unsustainable. If private agents can be expected to behave differently in the face of long-term imbalances, optimal government policy should adapt as well; it may be pointless, for example, to enact a tax cut in an attempt to stimulate the

44. The U.S. Treasury (2003, p. 65) estimates the combined closed-group liability of Medicare parts A (hospital insurance) and B (supplementary medical insurance) at $12.5 trillion at the end of 2001 and $12.9 trillion at the end of 2002. This gives a combined closed-group liability for OASDI and Medicare of $24.1 trillion at the end of 2002.

economy. Even if private agents have short horizons, the implicit liabilities still restrict the scope of available policy choices and could influence government actions. If they do, estimated equations based on official surplus projections for an earlier period when such implicit liabilities were smaller will not perform well. On the other hand, recent actions by policymakers offer little compelling evidence of this type of prudence.

A quite relevant question is whether the method of calculating the deficit for official purposes affects policy decisions. It is a reasonable conjecture that a much larger "official" deficit would restrain government behavior, even though the information such a statement would provide is already available. Another question is whether current private asset values, which should be influenced by expectations about future policy, rationally reflect the fiscal and monetary policy paths that will be needed to deal with the current fiscal imbalance. Should the stock market be as high as it is, or long-term interest rates as low as they are, given the probability of much higher taxes or inflation?

Measuring the Impact of Fiscal Policy

Armed with this knowledge about how fiscal policy has reacted to the economic and fiscal situation in the past, what can we say about the effectiveness of policy, in the past and potentially in the future, at stabilizing the economy? The answer is far from obvious and is difficult to pin down. The reasons for this difficulty are not new and have been extensively discussed in the literature,[45] but they deserve a quick summary review, particularly in light of renewed enthusiasm about "dynamic scoring" of tax and expenditure proposals, which incorporates the induced macroeconomic effects of policy changes on revenue and spending in the estimated budget costs of such proposals.[46] The CBO has recently taken a step in this direction: its evaluation of the president's fiscal year 2004 budget proposals includes a range of estimates of the feedback effects on the budget.[47] Further efforts in this direction are likely and should be informed by the empirical difficulties.

45. See Cochrane (1994), for example, for a citation of important early contributions and a discussion of many of the points raised here.

46. For further discussion and evaluation, see Auerbach (1996).

47. CBO (2003b).

Starting with some very basic points, the infrequency with which the relevant observations are generated limits what we can learn. The most convincing evidence presented above is based on data at annual or semi-annual frequencies. A policy that reacts to the previous year's output gap might not be well timed to smooth output fluctuations, whereas a policy reaction to the previous quarter's gap might. Also, one needs to know how fiscal policy has interacted with monetary policy. But perhaps the most challenging problem is determining how policy changes affect the economy.

The various challenges to modeling fiscal policy's impact can be illustrated with reference to a simple vector autoregression model of output Y and a fiscal policy aggregate F:

$$\mathbf{X}_t = \mathbf{G}(\mathbf{X}_{t-1}) + \varepsilon_t, \tag{4}$$

where $\mathbf{X} = [Y, F]$ and ε_t is the vector of shocks to the two variables at date t. Such models, typically including some measure of monetary policy as well, are common in the literature.[48] What can estimates of such a system tell us about the effects of fiscal policy?

Dealing with Contemporaneous Shocks

The regression results presented above relate policy changes to beginning-of-period information. As already emphasized, the ability to act more quickly to news as it develops during the period could be crucial to stabilization attempts. But because economic and policy shocks are contemporaneous elements of the vector ε_t, it is difficult to determine the extent to which policy is reacting to economic news, or economic news is reacting to policy, or both.

With additional information, one can make reasonable assumptions about the relationship between the two variables. For example, discretionary policy changes of the kind reported in CBO revisions might not be influenced by economic changes within the period;[49] the budget surplus, purged of an automatic cyclical component that is commonly estimated, might be independent of current economic shocks.[50] In each case one can

48. See, for example, Romer and Romer (1994) or Blanchard and Perotti (2002).
49. This restriction is suggested by Hayashi (2002).
50. This is the approach taken by Blanchard and Perotti (2002).

then estimate the effects of these policy changes on contemporaneous economic outcomes. But the data may not come at a high enough frequency for such assumptions to make sense, and the assumptions are questionable for other reasons. As discussed above, the CBO's estimates of changes due to policy, particularly on the spending side, might not represent policy changes actually occurring in that period—an example is an extension of the budget caps. Moreover, the full-employment deficit, even conditional on its own past values and those of output, can change for reasons that have nothing to do with policy, such as a shift in the income distribution.

How Does Fiscal Policy Affect Output?

An equation that simply relates output to lagged values of output and fiscal policy is inadequate for identifying how different components of policy affect output. For example, how does one distinguish the impact of automatic fiscal stabilizers from that of policy surprises that could not be predicted using contemporaneous income? One might think that a predictable tax reduction would have a smaller impact on consumption than an unpredictable one, if consumption smoothing begins when the reduction is first anticipated. The coefficient on lagged policy can only be identified by the existence of policy shocks; if income could predict all policy changes, the effect of policy could not be estimated independently. Thus one cannot know how much of the coefficient on lagged income is attributable to automatic stabilizers and other predictable elements of policy (such as the decision rules estimated above) unless one makes assumptions about the relationship between the effects of predictable and those of unpredictable policy changes, or finds instruments for the predictable policy changes that do not belong in the equation explaining output. This makes it difficult to say whether past policy actions have stabilized output, because we likely do not have a model that is invariant to changes in policy rules.

What Is the Right Measure of Fiscal Policy?

Parsimonious models of the impact of government policy on output use aggregate measures of fiscal policy, such as the budget surplus, revenue, and expenditure. Using aggregate revenue as a measure of the impact of taxes might make sense if the world corresponded closely to a

representative-agent model with lump-sum taxes. But this approach does not allow us to determine whether tax cuts will have a different impact if they go to the rich rather than the poor, for example, nor does it tell us how the economic incentives to invest, save, and engage in other activities have changed. In principle, several measures of fiscal policy need to be included simultaneously, but the individual effects would likely prove difficult to estimate precisely. This is particularly so because some of the measures, such as the incentive to invest, would depend critically on expectations about future tax parameters.

How Can We Measure the Impact of Expectations?

Perhaps the most difficult problem in estimating the impact of fiscal policy is the role of expectations. Will a tax cut be permanent? Will new investment incentives be temporary? Will the government have to raise taxes in the future? The answers to all these questions should affect current behavior, but expectations typically are difficult to assess. Models that omit expectations may be very unstable, as has been clearly understood since the work of Robert Lucas.[51] Estimated effects of policy "shocks," measured as unpredictable changes in current fiscal variables, can vary depending on how these current shocks influence expectations. One can attempt to deal with this by including additional variables in the regression that might proxy for expectations,[52] but these proxies will be imperfect; one can estimate relationships for different sample periods based on prior beliefs about within-period stability,[53] but such divisions will be arbitrary and leave much uncertainty about which "regime" prevails at present.

Fiscal policy in the 1990s offers a good illustration of the difficulty of incorporating the effects of expectations. In mid-1993 the Clinton administration pushed through a modest increase in federal taxes,[54] and Congress extended the discretionary spending caps that had been introduced

51. Lucas (1976).

52. For example, Canzoneri, Cumby, and Diba (2002) include the CBO budget surplus projections in equations to explain the long-term interest rate.

53. For example, Perotti (1999) suggests that increases in the current surplus should have more expansionary effects on expectations during periods of fiscal stress, and he therefore divides his sample period according to this criterion.

54. According to the CBO (1993), the impact of the tax legislation in its first full fiscal year of implementation, 1995, was $44 billion, or 0.6 percent of GDP.

in 1990. This began a prolonged period of falling federal deficits, declining long-term interest rates, and expanding output. The decline in long-term interest rates and the vibrant economic expansion are often attributed to the Clinton policy program.[55] Long-term interest rates did indeed trend downward throughout the Clinton administration.

The literature has made quite clear that the apparently paradoxical idea of an expansionary budget contraction rests on expectations.[56] If agents believe that current fiscal actions presage significant *future* fiscal tightening, in a situation where the current fiscal path is unsustainable, this belief may stimulate current demand while at the same time reducing long-term interest rates. One can rationalize the magnitude of the observed interest rate decline and output growth during the early Clinton years by saying that the tax increase and spending cuts not only changed the levels of taxes and spending but also had important effects on their expected trajectories; one could explain the timing of the process, which continued after 1993, by saying that the Clinton administration's commitment to budget discipline became more credible over time. After all, the budget caps were extended again, in 1997. But this scenario's complexity and its reliance on changes in expectations help illustrate why rigorous empirical validation is so difficult and why some economists remain skeptical.

Evaluating Policy Proposals

The challenges of predicting the impact of possible fiscal policy changes are evident in the revenue proposals in the president's budget for fiscal year 2004. These proposals and their estimated revenue effects for the period 2003–13 are presented in table 8.

Consider the various questions one must address. First, what is the change in policy? The tax cut appears much larger in fiscal years 2011–13, because the president proposes extending those provisions in the Economic Growth and Tax Relief Reconciliation Act of 2001 that are set to expire in 2011. But did private agents believe the original tax cut actually would expire in 2011? This cannot be determined from the CBO projection, nor does the change in the current year's revenue or full-employment

55. For example, Blinder and Yellen (2001, chapter 4, p. 18) point to important dates when declines in long-term interest rates were associated with milestones in the implementation of the Clinton program.

56. Auerbach (2002a) reviews some of the recent literature on this subject.

Table 8. Contribution to Federal Budget Balance of Proposals in the President's 2004 Budget, 2003–13

Billions of dollars

Item	*2003*	*2004*	*2005*	*2006*	*2007*	*2008*	*2009*	*2010*	*2011*	*2012*	*2013*
Baseline balance as projected by CBO in March 2003	–246	–200	–123	–57	–9	27	61	96	231	405	459
Proposal											
Extend EGTRRA provisions expiring in 2011	0	–1	–1	–1	–1	–2	–2	–2	–134	–224	–234
Provide dividend exclusion	–8	–23	–26	–29	–32	–36	–39	–44	–48	–52	–59
Accelerate cuts in individual income tax rates	–25	–78	–51	–27	–19	–15	–12	–8	–1	0	0
Extend experimentation credit	0	–1	–3	–4	–5	–6	–7	–7	–7	–8	–8
Increase AMT exemption	–1	–9	–14	–13	0	0	0	0	0	0	0
Increase expensing for small businesses	–1	–3	–3	–3	–3	–3	–3	–2	–2	–2	–2
Provide deduction for long-term care insurance	0	0	0	–1	–1	–2	–2	–2	–3	–3	–3
Provide charitable contribution deduction for nonitemizers	0	–1	–1	–1	–1	–1	–2	–2	–2	–2	–2
Provide tax credit for affordable single-family housing	0	0	0	0	–1	–1	–2	–2	–3	–3	–3
Provide refundable health insurance credit	0	0	–1	–1	–1	–1	–1	–1	–2	–2	–2
Expand tax-free savings accounts	2	3	3	3	1	0	–2	–3	–4	–4	–5
Extend AMT treatment of nonrefundable personal credits	0	0	0	0	0	0	0	0	0	0	0
Other proposals	–1	–5	–7	–7	–7	–7	–7	–7	–7	–6	–6
Total effect of revenue proposals	–35	–117	–105	–87	–71	–74	–78	–81	–212	–307	–324

Source: CBO (2003b, table 8).

surplus provide any information. A similar problem applies to the provision to temporarily increase the alternative minimum tax exemption through 2005. As already discussed, the AMT will affect more and more taxpayers over time, and the reduction in ordinary tax liability under the 2001 legislation will accelerate this. It is reasonable to believe, however, that the share of taxpayers subject to the AMT would not have been allowed to rise much above its current level in any case; if so, the temporary, partial adjustment of the AMT proposed by the president does not represent a tax cut relative to "current" policy. The same evaluation applies to the extension of the AMT treatment of nonrefundable personal credits and the extension of the experimentation credit.

Second, what is the change in incentives? Several of the president's proposals are targeted at saving and investment. For these proposals, the change in current tax payments provides a poor measure of the incentive effects. One reason is timing. For example, as with the 2002 partial investment expensing provisions already discussed, the provision to increase investment expensing for small business has a larger revenue cost in the short run than in the long run, even though the proposal calls for a permanent change. The reason is that expensing entails an acceleration of depreciation deductions, so that the current tax reduction for new investment overstates the present value of the tax benefit. The proposal to expand tax-free savings accounts is actually expected to produce a revenue *gain* in the short run, even though it is in effect a substantial tax cut, because it encourages taxpayers to shift the timing of their tax payments, withdrawing funds from accounts that have substantial deferred tax liabilities in order to place them in the new accounts, which require smaller (in present value) tax payments up front. Another reason why tax payments offer a poor measure of incentive effects stems from the distinction between tax payments and marginal tax rates. The small business expensing provision would expand covered investment from $25,000 to $75,000 annually; for companies already investing more than $75,000 in a given year, the provision would have no impact on the marginal tax rate on investment. The dividend exclusion proposal might have little impact on the cost of capital for firms that finance investment through the retention of earnings.[57]

57. See Auerbach (2002b).

Except perhaps for the accelerated reduction in individual tax rates, then, the change in fiscal policy under the president's proposals may bear little relation to any typical summary measure. Even to estimate the net effects of these rate reductions, however, one would need good estimates of the marginal propensities to consume across different tax brackets. One would also need to apply such a disaggregated model to assess the consumption impact of the proposed dividend tax exclusion, after first figuring out the impact of the exclusion on the stock market and whether consumers treat assets within pension and sheltered savings plans as if they were held directly. Only after one has dealt with the problems of measuring the legislation's impact on consumption and investment could the further macroeconomic feedback effects of the proposals be evaluated.

It is instructive to consider the types of models that the CBO actually used to predict the macroeconomic effects of the president's proposals. In all, six models were used: a "textbook" growth model, an infinite-horizon growth model, a closed-economy life-cycle growth model, an open-economy life-cycle growth model, and two traditional macroeconomic forecasting models. Only the life-cycle and infinite-horizon models were forward looking, and projections for these models were based on alternative scenarios rather than on formal estimates of expectations. Only the traditional forecasting models incorporated Keynesian demand-side effects. In short, the importance of several channels (including expectations, international flows, demand-side effects, and intergenerational linkages) varied sharply across the models, by assumption rather than by estimation. On the other hand, reflecting the complexity of the proposals being studied, the models typically were specified at a level of detail that allowed different tax and expenditure changes to have different types of effects, in contrast to the simple vector autoregressive models common in the recent literature on estimating policy effects.

Thus the requirements of dynamic scoring or more general policy evaluation go far beyond what estimation alone has provided. A continuing challenge is to expand the reach of empirical estimation in the derivation of usable forecasting models, but this is no simple task—economists have been at this for a long time, and many of the problems laid out above have no obvious solution. In the meantime, current policy practice addresses the wide gaps in our knowledge with assumptions and simplifications that may be reasonable, but nonetheless may have sizable impacts on the

resulting estimates. The methods by which these models have been constructed make the presentation of formal standard errors difficult, but future policy evaluations should include some measure of the degree of uncertainty, lest uninformed readers think that the range of estimates obtained from different models covers the range of possible outcomes.

Uncharted Waters?

What are the implications of this analysis for the current policy environment? It appears that government policy at the federal level responds to fiscal and economic conditions. At the state level, the response to economic conditions is weaker and possibly procyclical, and the response to fiscal conditions stronger. But it is very difficult to assess the impact of policy on the economy, in part because it is difficult to measure what the relevant policy *is* for any year or quarter. To measure policy for the purpose of evaluating its impact, one must account for timing, expectations, and the complex effects that different policy provisions might have, through a process that is subject to severe empirical limitations. In the end, economists rely on a variety of assumptions and modeling strategies that might work well in explaining past behavior. If there has been a regime shift, our predictions may be poor.

The present fiscal and economic situation offers a new combination of characteristics. Although, in relation to GDP, the projected short-term annual budget deficits and explicit national debt are well within the historical distribution, the implicit liabilities and associated annual deficits of the major federal entitlement programs are not. The United States finds itself in a period of severe fiscal stress, but conventional budget measures fail to show this. Policy reaction models predict a modest further expansion of the federal deficit, and the president proposes a much larger one, but no agreed-upon model tells us what effects these changes in policies might have. State and local governments face unprecedented budget deficits, which will occasion much larger cuts in their budgets than the economy has experienced, at least within living memory. How will these cuts affect the economy? Interest rates, particularly short-term rates, are today very low. What impact will these low interest rates have on expectations about monetary policy, and how much will they reduce the efficacy of fiscal policies that depend on the timing of tax payments, such as

investment incentives? Alternative theories allow us to predict a broad range of possible outcomes, but empirical evidence has done relatively little to narrow that range.

APPENDIX A

Constructing the User Cost of Capital

THE BASIC METHODOLOGY for constructing the user cost of capital closely follows that in Auerbach (1983b). I take asset-specific tax provisions, including the investment tax credit and depreciation allowances, for each year from 1953 to 2002 for each of the thirty-four asset classes listed in table 3 of that paper. To combine these asset-specific provisions into a single annual measure, I use capital stock weights for each of the asset classes, based on capital stocks at the end of the previous year as reported by the Bureau of Economic Analysis. Because the BEA's categories have expanded since my earlier study, I combine some of the current BEA categories to obtain capital stock weights for the thirty-four original classes. One current category, software, has only recently been treated as fixed investment in the national income and product accounts, so I omit this category in order to maintain comparability with earlier work.

I assume a relative capital goods price of 1 and a required real rate of return of 0.04, and I add the rate of change in the GDP deflator to this rate of return to obtain the nominal discount rate applicable to depreciation deductions. In calculating the change in the user cost from one year to the next, I hold constant the capital stock weights at the preceding year's value. The myopic user cost is based on equation 1 in the text, and the perfect-foresight user cost on equation 2, summed over the current and next three years with weights decaying at a geometric rate of 0.5. After 2002, inflation rates are assumed to equal the 2002 rate, and the tax law is assumed not to change, meaning that the partial expensing provisions enacted in 2002 expire after 2004. Thus the estimated perfect-foresight cost of capital in 2002 incorporates this announced expiration.

In forming the user cost of capital, I use the statutory corporate tax rate for the relevant year, making no allowance for complications due to tax law asymmetries such as the AMT or limits on the deduction of net operating losses.

APPENDIX B

Calculating the OASDI Closed-Group Liability

THIS APPENDIX BRIEFLY describes the data and methodology used to derive the implicit OASDI liability estimates reported in table 7. For each year from 1997 through 2003, annual flows in and out of the OASDI system over a roughly seventy-five-year projection period are taken from that year's OASDI trustees' report. (For the small components needed for years beyond the projection period, smooth growth of prices and productivity is assumed.) Projections of the male and female populations at each age in each of these future years are taken from contemporaneous population projections provided by Social Security from unpublished data.[58] Projected taxes and benefits in each future year are allocated among cohorts using the tax and benefit profiles by age and sex from Gokhale, Page, and Sturrock (1999).[59] Then, to obtain an estimate of the OASDI system's closed-group liability—the amount the system owes to those already participating—only the taxes and benefits in each future year that have been allocated by this procedure to individuals who are at least fifteen years old in the base year are counted. Finally, all of these included tax and benefit flows are discounted back to the base year using the long-term discount factors in that year's trustees' report.

The deficit for each year from 1997 through 2002 equals the next year's estimated liability minus that of the current year. The part of this deficit that is attributable to the change in the base year is obtained by reestimating the following year's debt using current-year projections of flows and population.

58. I am grateful to Seung An and Felicitie Bell at the Social Security Administration for providing these data.

59. If a_i is the relative benefit (or tax) profile element for each cohort i (where i ranges over age and sex), and p_{it} is cohort i's population in year t, then the fraction of benefits (or taxes) in year t allocated to a particular cohort j is $a_j p_{jt}/(\Sigma_i a_i p_{it})$.

Comments and Discussion

William G. Gale: Alan Auerbach's paper provides a comprehensive review of issues and significant new evidence relating to the conduct of fiscal policy. The paper finds that standard measures of fiscal policy have been responsive to the state of the economy and the budget outlook in the past. For a variety of technical reasons, however, it is difficult to pin down the impact of fiscal policy on the economy. It is even more difficult to determine appropriate fiscal policy in the current environment because of several unusual features of the short-term economic picture and the long-term budget outlook.

The most intriguing of Auerbach's results are the regressions that relate federal and state fiscal policy changes to the state of the economy and the budget. The paper shows that states' fiscal responses, in the aggregate, are sensitive to the lagged aggregate state budget surplus but not to the business cycle. These results are sensible, given that almost all states have balanced-budget rules and are unlikely to be able to engage in countercyclical policy. Given the magnitude of the states' current budget problems, the results imply that the states' responses to those problems could produce a significant drag on the national economy in the near term. On the other hand, the regressions showing massive responses at the federal level on a quarterly basis require some explanation. It is difficult to believe that these equations are picking up true policy responses, given the lags in information, the delays with which Congress acts, and the infrequency of major fiscal actions.

The most interesting regressions for federal policy dynamics are in Auerbach's tables 2 and 3. The main regressions show that an increase of 1 percent of GDP in a five-year budget deficit projection (with smaller

weights given to the more distant projections) generates policy changes in the current six-month period that reduce the same weighted deficit projection by 0.14 percent of GDP, including spending reductions of 0.086 percent of GDP and tax increases of 0.055 percent of GDP. Taken at face value, these coefficients imply that the average policy response to an earlier change in policy, or to a shock, that has created a permanent increase in the deficit eliminates 26 percent of that initial increase in the first year, 45 percent after two years, 60 percent after three years, and 78 percent after five years. Although judgments may differ, this strikes me as a fairly rapid response, much more rapid than one might have guessed given the casual observation that nagging deficits persisted from the early 1980s to the middle of the 1990s.

The regressions also imply that spending cuts have historically represented about 60 percent of the policy response. This finding matters because how tax cuts are financed influences their effects on economic growth. Tax cuts financed by future spending cuts can raise future national income, even when the same tax cuts financed by future tax increases have the opposite effect.[1]

It is hard to know how much weight to put on these regressions, however, especially for predictive purposes. First, the sample size is small by necessity. Second, factors omitted from the analysis are likely to affect fiscal policy choices. Budget rules, such as Gramm-Rudman-Hollings, are likely to have influenced fiscal outcomes, but including them in the regression is difficult both because of the small sample size and because the rules themselves are endogenous. Likewise, the source of the change in the budget outlook may matter; policymakers may respond differently to exogenous shifts in the outlook than to changes that their own tax and spending policies created. Ideology also plays a role. President George W. Bush, for example, proposed a tax cut in 1999, pushed it through as legislation in 2001, and then proposed that it be accelerated and made permanent in 2003, despite the fact that the budget and economic situations in those three years varied dramatically.

A third concern is that major tax increases and tax cuts are discrete and sporadic events. That is, there may be discontinuities between events and processes that generate no tax change and those that generate small tax

1. See Auerbach (2002c), Congressional Budget Office (2002b), Elmendorf and Reifschneider (2002), and Gale and Potter (2002).

changes. In addition, the factors generating tax increases may be quite different from those generating tax cuts. Yet the paper's regressions model tax changes as a continuous and symmetric process. Fourth, the definition of policy changes may be suspect. The regressions equate changes in current policy with legislated changes in outlays or taxes. In contrast, the discussion later in the paper on why it is difficult to show how fiscal policy affects the economy emphasizes the difficulty of defining current policy and therefore of identifying the change in policy. How the change in current policy is defined in the regressions may have an important impact on the results. At the very least, however, it should be clear that the regressions use a definition of current policy whose problems are clearly explained later in the paper.

Fifth, the results are somewhat sensitive to relatively minor specification changes. Auerbach's table 3 shows that the results in table 2 are robust to sample splits based on which party holds the White House, but may not be robust to splits based on decades, even though the classification of data points in the two sample splits is almost the same. His table 4 shows that the response of annual discretionary spending to the budget situation is unstable over the period, but that is probably because defense spending responds largely to other factors. Nondefense discretionary spending responds to the budget outlook in a somewhat more stable manner. Even so, the implied response to a 1-percent-of-GDP increase in the weighted deficit projection is an offset of 0.13 percent of GDP for nondefense discretionary spending in 1984–92 and 1993–2002 separately, but an offset of just 0.03 percent of GDP over the combined period. A minor quibble is that the discretionary spending equations might have been improved by looking at changes in budget authority rather than actual outlays. Authority is what Congress most closely controls; outlays typically follow authority changes with variable lags, depending on the type of spending.

For all of these reasons, it is not clear that the regression provides reliable predictions for likely policy responses in the future. Besides the regressions, the paper raises a wide variety of other issues. I will comment on four of them.

The first is whether it is important to think about long-run issues when considering short-run fiscal stimulus. Some would argue that the long run is just a series of short runs, implying that there is no distinction between the two. But the paper is correct to explore the two issues simultaneously,

because long-run considerations impose constraints and raise issues that do not exist in the short run. The most obvious is that a sustainable budget can be wildly out of balance in the short run, but it cannot be wildly out of balance in the long run. In addition, policies that stimulate the economy in the short run can hurt economic growth in the long run. In the short run, in an economy operating with excess capacity, increases in aggregate demand can raise output and income even without increasing the capital stock. In the long run, economic growth reflects expansions in the capacity to produce goods and services. Such expansions, in turn, require increases in the amounts of labor and capital, improvements in their allocation, or technological advances. As a result, policies that raise consumer spending can raise short-term output in a slack economy, but if they continue to raise aggregate demand after the economy has reached full employment, they will reduce future national income by reducing the saving that can finance future capital accumulation. Another key link between the short and the long run is that expectations of future fiscal policy actions help determine the short-run impact of a policy, and those expectations in turn can depend on the future budget outlook.

A second broad issue is the difficulty in determining what constitutes current policy, as noted above.[2] The Congressional Budget Office's baseline projection is useful—indeed, necessary—because Congress needs a benchmark against which to measure the costs of proposals that change the tax law, spending rules, or spending amounts. But the baseline is only a mechanical projection that is intended to serve as a "neutral benchmark . . . according to rules [that are] set forth in law and long-standing practices. . . ."[3] It is not intended to be a realistic or substantive projection of current policy, and indeed it falls short of that in several ways.

The first area where the CBO's baseline assumptions do not appear to be a good reflection of current policy involves discretionary spending, which represents slightly more than a third of total outlays. Discretionary spending typically requires new appropriations by Congress every year. That is, current laws generally do not determine what discretionary spending will be in future years, and this raises the issue of what levels the

2. For citations and supporting details for the discussion in the remainder of these comments, see Burman, Gale, and Rohaly (2002) and Gale and Orszag (2003a, 2003b, 2003c, 2003d).

3. Congressional Budget Office (2002b).

budget projections should assume for such spending. The CBO routinely assumes that real discretionary spending will remain constant at the level prevailing in the first year of the ten-year budget period. Because population, the price level, and income grow over time, applying this assumption to the current budget implies that, by 2012, discretionary spending will have fallen by about 9 percent in real per capita terms and by more than 20 percent relative to GDP. Although judgments may reasonably differ about future spending choices, the CBO's assumption is unrealistic both as a measure that holds current policy constant and as a prediction of likely spending outcomes. I believe that a more appropriate assumption would be that real discretionary spending will grow at the same rate as the population—incidentally the same criterion endorsed by then-Governor George W. Bush in the 2000 presidential campaign.

The CBO baseline also makes unrealistic assumptions about expiring tax provisions. The CBO assumes that Congress will extend expiring spending programs but that all temporary tax provisions (other than excise taxes dedicated to trust funds) will expire as scheduled. The assumption regarding spending is reasonable, since spending programs with expiration dates are normally renewed. But the assumption regarding taxes is not reasonable in most cases. The Internal Revenue Code currently contains several sorts of expiring tax provisions. The first includes the provisions of the Economic Growth and Tax Relief Reconciliation Act (EGTRRA, the 2001 tax cut). All of these provisions end automatically (sunset) by 2010, and some end sooner than that. The second category includes the elements of the 2002 economic stimulus package. The third involves the provisions of the Jobs and Growth Tax Relief Reconciliation Act (JGTRRA, the 2003 tax cut). The fourth is the alternative minimum tax (AMT), discussed below. The fifth includes a variety of other tax provisions that have statutory expiration dates but are routinely extended for a few years at a time as their expiration date approaches. To understand the full implications of recent and current fiscal policy choices, the most accurate assumption, on balance, would be that all these provisions will be extended. This is not a statement of desired or optimal policy, but simply a conjecture about the current stance of policy.

The AMT offers a dramatic example of how the baseline projections generate outcomes that are inconsistent with any but the most mechanistic view of current policy. The AMT was designed in the late 1960s, and then

strengthened in 1986, to curb excessive use of tax shelters and other forms of tax avoidance.[4] The AMT runs parallel to the regular income tax system. It uses a somewhat different measure of income, permits fewer deductions, and applies a flatter schedule of marginal tax rates than does the regular income tax. In theory, all taxpayers must compute their tax liability under both the conventional income tax and the AMT and pay the greater of the two. In practice, the AMT currently generates a larger liability for so few taxpayers—about 3 million—that few filers, other than the tiny minority who might be affected, bother with it. But because the AMT is not adjusted for inflation, whereas the ordinary income tax is, the AMT applies to ever more taxpayers as prices rise. In addition, EGTRRA, which cut the ordinary income tax but not the AMT, will greatly increase the number of people subject to the AMT. All told, by 2010 an estimated 33 million filers will have become subject to the AMT under current law. This result is troubling in large part because the AMT is significantly more complex than the regular tax. Policymakers will therefore be under powerful pressure to modify it. Although specifying current policy toward the AMT is difficult, I assume for illustrative purposes that provisions of the AMT that are slated to expire before the end of the budget window are granted a continuance and that the AMT becomes indexed for inflation and allows dependent exemptions, which it currently does not.

These adjustments for alternative measures of current policy are important because they are huge. Over the ten-year budget horizon, they would reduce revenue by almost $2.2 trillion; counting interest payments, they would reduce the ten-year undiscounted sum of budget surpluses by more than $2.5 trillion. Perhaps a clearer way of portraying the long-term magnitude is to note that, by 2013, extending the expiring provisions in current law and fixing the AMT as I have assumed would reduce revenue on a permanent basis by 3.0 percent of GDP.[5]

A third broad issue raised in the paper is how our current fiscal problems and tax choices compare with those in the past. The good news is that, under the current ten-year budget outlook, projected deficits and debt held by the public, as percentages of GDP, would be well within the range experienced during the past forty years. The bad news is that these comparisons are not particularly relevant or informative, for several reasons

4. Burman, Gale, and Rohaly (2002).
5. Gale and Orszag (2003b, table 3, and 2003d, table 1).

besides the technical issues already mentioned. Most obviously, the official debt and deficit figures ignore the looming problems in Social Security and Medicare. The liabilities of these programs represent a form of implicit federal debt. Even the administration in its fiscal year 2004 budget proposal points out that current "long-run budget projections show clearly that the budget is on an unsustainable path."[6]

Comparisons with the 1981 tax cut are particularly germane. Against a comparable baseline, the administration's proposed tax cuts would roughly equal the net size of the Reagan tax cuts as a share of the economy. But the situation today is far different from what it was in the early 1980s. The nation was much better prepared in the 1980s and early 1990s to deal with the fiscal deficits stemming from large tax cuts than it is now. National saving was significantly higher in the early 1980s than in recent years. The United States was an international creditor in the early 1980s but is a substantial debtor today. And in the early 1980s the retirement of the baby-boom generation was still more than twenty-five years away, giving the nation time to recover before facing the intense fiscal pressures of that demographic tidal wave. The economic benefits of cuts in marginal tax rates were also higher in 1980, because marginal tax rates were significantly higher then.

In addition, the adverse fiscal effects of the 1980s tax cuts were attenuated by several policy responses and fortuitous, exogenous events that soon followed but seem unlikely to be repeated. The policy responses include the raising of taxes in 1982, 1983, 1984, 1990, and 1993 and the institution of budget rules that helped keep spending constant or declining as a share of GDP. The fortuitous events include the breakup of the Soviet Union in the 1980s, which generated a substantial peace dividend: of the 2.5-percentage-point decline in noninterest spending as a share of GDP from 1990 to 2000, 2.2 percentage points came from defense. In the 1990s a surge in productivity helped boost revenue.

Today, in contrast, defense spending is slated to rise. Mandatory entitlement spending is also expected to rise markedly: unlike in the 1980s, the retirement of the baby-boomers is now imminent. Rather than attempting to close the budget shortfall, the administration is pursuing still more tax cuts. Under the administration's budget proposals, projected federal revenue in 2004 would fall to 16.9 percent of GDP, its lowest

6. Office of Management and Budget (2003a, page 31) and (2003b, page 40).

share since 1959. Even if nondefense discretionary spending were cut to zero, the savings would not come close to offsetting the increases in mandatory and defense spending and the proposed reduction in taxes. As a result, along many dimensions, the fiscal situation is much more troubling now than it was in the early 1980s.

The fourth issue raised by the paper is identifying "the real fiscal danger." It is now well understood that Social Security and Medicare face substantial long-term shortfalls. As noted, extending all of the administration's tax cuts, the other expiring provisions, and fixing the AMT would reduce long-term revenue by 3.0 percent of GDP over the next seventy-five years. That is more than three times the actuarial deficit in Social Security, and significantly larger than the combined actuarial deficits in Social Security and Medicare's Hospital Insurance program over the same period. Examining only the value of the future cash flows does not change the fundamental conclusions. Even with a horizon that extends beyond seventy-five years to examine permanent changes, the cost of the tax cuts still exceeds the Social Security shortfall. By these measures, the administration's tax-cutting agenda deserves at least equal billing with the entitlement shortfalls on the list of policies accounting for "the real fiscal danger."

Auerbach's paper is constructive in bringing a wide variety of interesting evidence and perspective to bear on all of these issues. The paper represents an important contribution to our understanding of what we know about fiscal policy—and what we still have to learn.

William D. Nordhaus: Alan Auerbach has written a useful paper reviewing the fiscal troops as the United States emerges from war with Iraq and continues its war on terrorism. There is much in the paper to compliment and little to complain about. Especially interesting are the estimates of fiscal reactions of federal and lower-level governments to economic conditions. But in the venerable tradition of discussants I will concentrate on complaints—primarily about the core of the paper, which discusses the history of fiscal policy over the last two decades.

The major contribution of Auerbach's paper is its review of the relationship between the federal budget and the economy, concentrating on the effects of the economy on policy. He correctly notes that changes in the budget can have sources other than policy changes. The Congressional Budget Office breaks down changes in the budget into legislative,

economic, and technical sources, on both the revenue and the expenditure side. Only the legislative sources of fiscal changes are under the direct control of fiscal policymakers, but Auerbach notes that nonlegislative changes often give rise to quite large changes in the budget. For example, in the January 2003 CBO projection, the ten-year budget moved toward deficit by $385 billion, but only $64 billion of that was due to legislative decisions. Most of the revisions were "technical." Indeed, technical revisions, at $388 billion, more than accounted for the total change; $140 billion came from revisions to revenue projections. Auerbach therefore turns to a new and very revealing way of gauging changes in policy, focusing only on the legislative changes in the budget between consecutive CBO reports. To do this, he collates CBO estimates of the changes in revenue and expenditure from each of the biannual reports starting in 1981.

CBO scorekeeping raises certain issues. Many supply-side and other proto-economists argue that the CBO should engage in "dynamic scoring" to take into account the higher investment and growth in hours worked that come from lowering marginal tax rates. In March of this year the CBO issued a first report on dynamic scoring, which found that dynamic scoring made only a small difference to the budget projections and, more interesting, that four of the seven models it tested showed larger rather than smaller deficits under dynamic scoring.

Others argue that the CBO's expenditure assumptions are generally biased downward, particularly in the health care area. The CBO's scoring methodology results in frequent upward "technical" corrections in spending on health or foreseeable "legislative" extensions of temporary tax provisions. But the CBO numbers have the great virtue of being put together by people who know how to count on more than one hand and with a set of rules that has changed little over the last two decades. I applaud Auerbach's introduction of these numbers into the analysis.

Having introduced the data, however, Auerbach then posts with excessive speed to the econometric analysis. I would have preferred a pause to look at the data more closely. So, relying on the kindness of authors, I obtained the raw CBO data from Auerbach and did the scrutinizing myself.

There appear to have been three distinct regimes for expenditure over the last two decades. The first is from the early 1980s until 1992. During this period the deficit-to-GDP ratio was high, perceived to be high, and felt to be a major concern by both administrations and Congresses. There

were major cuts in expenditure during this period, but the cuts were sporadic: the CBO reports identify them as occurring in early 1986, 1988, 1990, and 1991. (Recall that budget caps and the "pay as you go" rules, which required that any additional spending or tax cuts be offset by tax increases or spending reductions elsewhere, were in effect from 1990 until they expired in September 2002.) From 1993 until 1997, by contrast, the budget was on a favorable trajectory, the budget caps were effective, and there were essentially no legislative changes in expenditure.

The final period occurred when the budget deficit moved toward surplus in 1998, at which point discipline over expenditure collapsed: every CBO report since the summer of 1998 has recorded legislative increases in expenditure. The time series is relatively short, but the two striking features of the expenditure history are that budget caps appear to have been effective on the expenditure side during the early 1990s and that, with or without budget caps, Congress abhors a surplus.

As an aside, it is worth noting that Congress appears to behave much like the private sector in its accounting. Auerbach's table 7 shows how flawed the standard fiscal accounting is as a measure of change in net financial obligations. According to Auerbach's numbers, the standard measure of the OASDI budget was off by $878 billion in 2000. Yet the budget process does not appear to care, or for that matter even to know, about these numbers. Behavioral economics is clearly at work here: the budget system looks only at the bottom line of the measured surplus or deficit and ignores lockboxes and generational accounting, much as the stock market ignores the footnotes in corporate financial statements.

On the revenue side, the striking fact about the legislative changes is how infrequent they are and how little they seem to be explainable by economic conditions. The two major tax cuts of the last roughly forty years, in 1981 and 2001, occurred under diametrically opposite budgetary conditions and quite different economic conditions: with the budget in deficit in the first case, and in surplus in the second; and with an economy mired in stagflation in the first case, and growing robustly in the second. In contrast, the four tax increases that came between these two large tax cuts are plausibly related to the large (measured) fiscal deficits of the time. I suspect that a careful reckoning would indeed show that all the major tax increases of the last century (excepting increases in social insurance taxes) were triggered by deficits or, in wartime, the prospect of deficits. This history also shows that any politicometric treatment of taxes

should treat increases and decreases asymmetrically. Santa Claus is welcome every day of the year, whereas the IRS auditor is treated like ants at a picnic.

One of my worries about the paper is that the results do not appear robust to specification changes. Looking at tables 2 and 3, we see that coefficients differ by factors of four among different specifications. I tried some additional specifications using Auerbach's data and found even larger differences, depending upon the sample period and timing. Adding the Reagan tax cuts of 1981 made a big difference in the equations I estimated, and even changed the signs in some instances. I am not terribly surprised that Auerbach's results are not robust, particularly for revenue. Work on the political business cycle has shown that the determinants of fiscal policy vary greatly across time and across countries. Faced with a stagnant economy, President Kennedy proposed tax cuts, whereas President Clinton in the same circumstances proposed deficit reduction. Faced with a reelection campaign, President Nixon imposed wage and price controls, whereas President Carter decontrolled. Faced with surging budget deficits and escalating military spending in a first term, President Reagan worked to curb the deficit, whereas the current President Bush is moving to widen it. It is hard to find any pattern of behavior here, and I suspect this is why fiscal equations are so fragile.

Finally, there is an interesting and depressing lesson here for responsible political leaders who choose to run a budgetary surplus. In March 2000, then-Secretary of the Treasury Lawrence Summers eloquently provided the rationale for running a budget surplus:

> By continuing to pay down debt within a framework that helps us meet our future commitments to Social Security and Medicare, we can help to maintain the virtuous cycle we have worked so hard to achieve. And we can re-load the fiscal cannon, preparing the government to respond to future contingencies such as recessions or threats from overseas.[1]

One has to wonder whether Summers' policy advice—and President Clinton's acceptance of it—would have been different had they known that their hard-earned surpluses would soon be spent on abolishing the inheritance tax, repealing the tax on dividends, reducing the top income tax rates, and shooting off the remaining rounds of the fiscal cannon in the deserts of Iraq. I suspect that, had they foreseen these events, they would

1. Summers (2000).

have devised quite a different fiscal policy. In any case the lesson can hardly be lost on future administrations: I would guess that the next Democratic administration will be quick to use any fiscal resources left to it for what it believes to be major current priorities, rather than save them for some future administration to fritter away.

General discussion: Eric Leeper questioned the usefulness of the concept of unfunded liabilities. The term suggests that the current situation does not represent an equilibrium, and it raises puzzling questions about why long-term interest rates today are not higher than they are. But one *can* think of this situation as an equilibrium in the sense that individuals making decisions today form expectations about likely future policy actions to fund these liabilities. These actions lie on a continuum, and one can ask what set of unobserved beliefs about future policies might be consistent with the budget situation we observe today. Rather than remain puzzled about why long-term interest rates have not risen as we think they should have, given the unfunded liabilities, one could use this approach to indicate that the public expects future policy adjustments, and so correctly perceives these liabilities as funded in the long run. Auerbach granted that, as Leeper suggested, financial markets might be responding with confidence that the unfunded liabilities will be financed. Or they may simply not understand the true situation. As a parallel, he noted that corporations that do not want to value options more transparently are fighting with reformers and investors who want them to. Since the information about options already exists, the fact that this fight goes on suggests that agents would respond differently if the information were presented more clearly.

George Perry also questioned the usefulness of the unfunded liabilities concept. The paper suggests that the incorporation of unfunded liabilities into official budget projections would both help bestir policymakers and meaningfully inform the decisions of private agents. On the first point, although it would be desirable to address the future of entitlements programs sooner rather than later, Perry reasoned that the failure to do so reflected politicians' unwillingness to make unpopular changes rather than a misunderstanding about the size of the problem. On the second, he suspected that changes in the reporting of unfunded liabilities would have a negligible effect on the current behavior of private agents, in part because when and how politicians would respond is unknown, and in part

because, for a variety of reasons, agents do not react to possible shocks at distant horizons. He concluded that including unfunded liabilities in the presentation of current fiscal policy is likely to confuse rather than clarify how fiscal policy affects the economy.

Thomas Sargent suggested that the views of fiscal policy expressed by Leeper and Perry could be thought of as polar versions of possible equilibrium situations. If perfect commitment of the fiscal authority were possible, one could compute Ramsey policies—a sequence of efficient actions. By construction, such policies are feasible and the debt paths associated with them are sustainable. The analysis forces the government to think about the future when designing its policies. The resulting policies are credible because the government is assumed to abide by a commitment technology. Another possibility is that governments do not worry about the future, except to predict the actions of their successors. Each administration does the best it can given its predictions about future behavior. The policy outcomes of this kind of equilibrium are often improvable. Sargent noted that Marco Bassetto has recently analyzed these two polar cases and clarified their implications for the fiscal theory of the price level. Sargent also cited a half-serious proposal by Alan Blinder to establish an independent fiscal authority, as a way to overcome time inconsistency problems in the same way that independent central banks are thought to do.

Remarking on the present economic situation, Benjamin Friedman emphasized that the recent recession had been very mild, with unemployment rates staying at or below 6 percent, and GDP growing except in three quarters during 2001. Thus, although the recovery seems to be a jobless one, like that of 1992-93, the episode still ranks as only a mild downturn. Hence it is not surprising that the automatic fiscal stabilizers have not changed the budget by much, and, compared with many much more severe downturns in the past, the need for discretionary fiscal stimulus is not pressing. Friedman also remarked that since the data on state and local budgets go back only to the late 1970s, it is unclear to what extent recent budgetary changes in the state-local sector have been unusual, given the mildness of the downturn, and to what extent they simply continue a long trend toward more borrowing by states and localities.

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