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CONTENTS

Measuring and Analyzing the Cyclically Adjusted Budget

Frank de Leeuw and Thomas M. Holloway*

There is continuing strong interest in partitioning the federal budget into a cyclical component, measuring the automatic responses of receipts and expenditures to economic fluctuations, and a cyclically adjusted or "structural" component, measuring discretionary fiscal policy and other noncyclical factors affecting the budget.[1] Reasons for this interest vary. The current concern of the Office of Management and Budget is that "the prospect of a permanently large structural deficit problem is likely to have a significant adverse impact on capital formation and economic growth during the period ahead."[2] As recently as 1981, however, the Council of Economic Advisers referred to the growth in the high-employment deficit from 1979 to 1980 as an "apparent move toward expansion."[3]

Not only do views about the effects of deficits vary, but measures of the size of cyclically adjusted budgets also vary enormously, as Chart 1 illustrates. BEA's published high-employment budget, which measures what the budget would be at a 4.9 percent unemployment rate, shows a deficit of 1.5 percent of high-employment GNP in calendar year 1983. A high-employment budget based on a 6 percent unemployment rate shows a 1983 deficit of 2.5 percent of the corresponding high-employment GNP. The cyclically adjusted budget we will emphasize in this paper, based on a "mid-expansion trend" GNP, shows a 1983 deficit of 4.0 percent of the corresponding trend GNP. Finally, the actual deficit is 5.6 percent of actual GNP in 1983.[4]

We make no attempt in this paper to choose among the various views about how the federal budget affects the economy. The paper is an example not of measurement without theory but of measurement with several theories of uncertain standing. Our hope is that careful measurement will eventually contribute to choosing among the theories.

*Frank de Leeuw is Chief Statistician and Thomas M. Holloway is an Economist, both at the Bureau of Economic Analysis. A slightly different version of this paper appeared in the *Survey of Current Business* 63(December 1983). The authors have benefited from comments by Darrel Cohen, Edward Gramlich, George Jaszi, Joseph Pechman, and the late William Fellner. The ideas of James Tobin strongly influenced the sections dealing with debt, including Appendix 1. Views expressed in the paper are the authors'.

[1]The Administration used the term "structural" in the *Budget of the United States Government—Fiscal Year 1984*, pp. 2-16 to 2-19. We will use the more descriptive term, "cyclically adjusted" in the remainder of this paper.

[2]*Budget of the United States Government—Fiscal Year 1984*, pp. 2-16 to 2-17.

[3]*Economic Report of the President* (January 1981), p. 156.

[4]All these measures are on a national income and product accounts (NIPAs) basis. Still other cyclically adjusted budgets are presented in Congressional Budget Office, *The Outlook for Economic Recovery—Part I* (February 1983), pp. 67-9.

In the first part of the paper we discuss the measurement of a cyclically adjusted budget, emphasizing the selection of a reference trend for real GNP. We review four uses of cyclically adjusted budgets, and then propose a budget based on a new reference trend drawn through GNP in middle expansion periods, in place of the traditional reliance on potential GNP.

In the second part of the paper we analyze the sources of change in the cyclically adjusted budget based on mid-expansion trend GNP. We also present some results for a high-employment budget based on a 6 percent unemployment rate. We relate the cyclically adjusted budget, using accounting identities, to changes in the ratio of cyclically adjusted federal debt to trend GNP—a ratio that we believe should occupy a central place in current concerns about the budget. Changes in that ratio depend on cyclically adjusted expenditures and receipts, on the growth rate of trend GNP, on an average interest rate, and on federal balance-sheet items such as net lending.

To conclude the paper, we derive the implications of possible combinations of deficits, growth rates, and interest rates for the future ratio of federal debt to GNP.

A four-equation macroeconomic model is shown in Appendix 1 to clarify the logical relation between the expansionary-contractionary effects and the crowding-out effects of fiscal policy, and between the deficit and the debt as measures of fiscal policy.

Some of the paper's highlights are these:

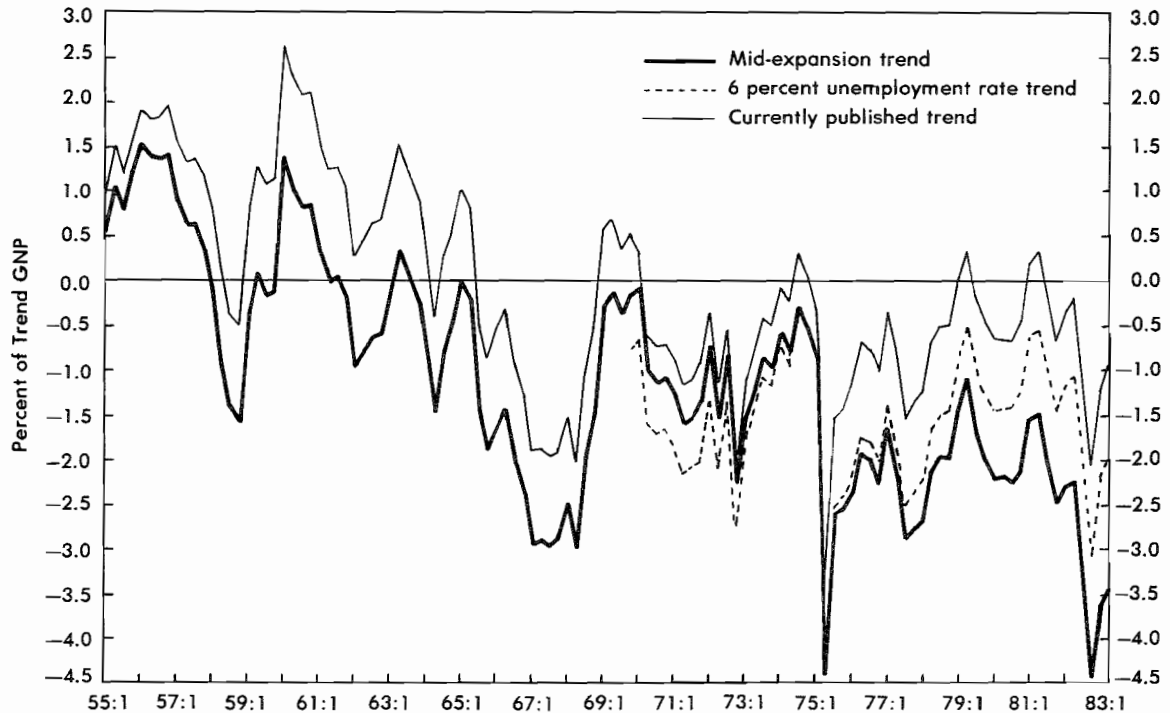
- As we have already seen in Chart 1, our preferred measure of the cyclically adjusted deficit reached 4 percent of trend GNP in 1983, far higher than in any earlier year;
- The ratio of cyclically adjusted debt to trend GNP—a ratio that we believe is more relevant than deficit-to-GNP ratios to current budget concerns about crowding out—rose from 1981 to 1983, in contrast to a continual fall from the end of World War II to the early 1970s;
- The differential between the interest rate on federal debt and the growth rate of GNP contributed as much as explicit decisions about federal receipts and expenditures to the rise in the debt-to-GNP ratio;
- Explicit decisions about federal receipts and expenditures that had the biggest influence on the 1981–83 rise in the debt were cuts in personal income taxes and corporate profits taxes and higher defense spending;
- Under a wide range of assumptions about interest rates, GNP growth rates, and budget decisions, the ratio of cyclically adjusted federal debt to GNP will continue to rise from 1983 to 1988.

I. Measurement of a Cyclically Adjusted Budget

To construct a cyclically adjusted budget, the essential steps are (1) determining the responsiveness (under current legislation) of each category of receipts and expenditures to short-run movements in GNP (e.g., cyclical tax elasticities), (2) choosing a reference trend for GNP free from short-run fluctuations, (3) applying the responses from step 1 to gaps between trend GNP and actual GNP, and (4) adding the expenditures and receipts "gross-ups"

Chart 1

Cyclically Adjusted Federal Surplus/Deficit as a Percent of Trend GNP



from step 3 to the actual budget to obtain a cyclically adjusted budget.[5] The second step, selecting a GNP reference trend, is the most important and controversial. Other things being equal, the higher the reference trend, the smaller the cyclically adjusted deficit.

In the past, the usual procedure has been to construct a high-employment or potential GNP trend based on assumed high-employment levels of the labor force, productivity, and the unemployment rate. An alternative—one that we will end up recommending and using—is to base a reference trend on movements of actual GNP after filtering out cyclical fluctuations. Differences between the two are sometimes large. Since the choice between them should depend on why and how cyclically adjusted budgets are used, we begin this section with a review of four approaches to using cyclically adjusted budgets and their implications for measuring a reference trend.

A. *Uses of a Cyclically Adjusted Budget*

1. *The CED guideline for the surplus/deficit.* —The Committee for Economic Development (CED) first devised the full-employment budget soon after the end of World War II on the theory that a small surplus in that budget would ensure a high level of national saving while permitting built-in stabilizers to damp short-run fluctuations.[6] The CED policy rule in its original form has not attracted attention for many years, but the idea of fiscal guidelines related to a cyclically adjusted budget persists. The latest edition of Brookings' *Setting National Priorities,* for example, states:

> The deficit that would remain if the economy were operating at a high level is called the *structural* or *high-employment* deficit, two terms that are used interchangeably. . . . Reduction or elimination of this deficit as the economy recovers would increase national saving and permit a larger increase in investment, which would in turn help to stimulate productivity.[7]

The GNP trend called for by this use is one that represents highest possible utilization of resources without accelerating inflation—an extraordinarily difficult concept to estimate. Moreover, the exact level of the trend clearly matters. Balancing a cyclically adjusted budget based on a GNP reference trend associated with a 7 percent unemployment rate, for example, would call for an actual current deficit $25 to $30 billion smaller than balancing a cyclically adjusted budget associated with a 6 percent unemployment rate.

[5]For a detailed description, see Frank de Leeuw, Thomas M. Holloway, Darwin G. Johnson, David S. McClain, and Charles A. Waite, "The High-Employment Budget: New Estimates, 1955–80," *Survey of Current Business,* 60 (November 1980), pp. 15–21, 31–43.

[6]*Taxes and the Budget: A Program for Prosperity in a Free Economy* (New York: Committee for Economic Development, 1947).

[7]Joseph A. Pechman, editor, *Setting National Priorities: The 1984 Budget* (Washington, D.C.: The Brookings Institution, 1983), pp. 32–33. Pechman uses an estimate of the high-employment deficit associated with a 6 percent unemployment rate.

2. *A measure of discretionary fiscal policy.* —Probably the most widespread use of a cyclically adjusted budget has been to measure the short-run expansionary or contractionary thrust of fiscal policy. The major reason for using the cyclically adjusted rather than the actual surplus or deficit for this purpose stems from what can be described as a simultaneous-equations problem. One equation—the one of fundamental interest—relates economic activity to the federal budget (and other forces such as monetary policy). The other equation relates the federal budget to economic activity (and other forces such as new legislation). Trying to estimate the first relationship using the actual budget can lead to serious bias, especially in a period when the budget reflects mainly changes in economic activity rather than changes in legislation. A cyclically adjusted budget removes the effect of changing economic activity and eliminates this source of bias in the analysis.[8]

The level of the GNP reference trend called for by this use is not particularly important; two trends that differ only in level will lead to similar analytical conclusions about the impact of fiscal policy. What is important is that movements in the trend should *not* be highly sensitive to GNP movements that may themselves be due to fiscal policy; for if they are then the simultaneous-equations problem remains. If a prolonged boom or a deep recession is caused by fiscal policy, in other words, that boom or recession should not influence the GNP trend.

[8]Using the determination of national income as an example, the two equations noted in the paragraph, omitting time subscripts, are:

$$(1)\quad Y = a_0 + a_1 DF + a_2 O_1 + u_1$$

$$(2)\quad DF = b_0 + b_1 Y + b_2 O_2 + u_2$$

where:

Y = actual GNP;
DF = actual deficit;
O_1 = other factors affecting GNP;
O_2 = other factors affecting the deficit;
u_1, u_2 = error terms.

Since b_1 is significantly negative, a_1 will also tend to be negative when O_2 and u_2 vary little. If a cyclically adjusted trend value, Y*, is substituted for Y, the cyclically adjusted deficit, DF*, is:

$$(3)\quad DF^* = b_0 + b_1 Y^* + b_2 O_2 + u_2$$

which implies that:

$$(4)\quad DF = DF^* + b_1 (Y - Y^*).$$

Substituting equation (4) into equation (1),

$$(5)\quad Y = a_0 + a_1 DF^* + a_2 O_1 + a_1 b_1 Y - a_1 b_1 Y^* + u_1$$

Bringing $a_1 b_1 Y$ to the left-hand side, equation (5) can be solved for Y. Reduced-form estimates of equation (5) will not have the bias likely in equation (1). One further point is that Y* remains on the right-hand side of equation (5). Most reduced-form studies do not include this term—an omission, according to the analysis above.

3. *A measure of potential crowding out.* — As noted earlier in the reference from the Administration's 1984 *Budget,* a current concern about large deficits is that they will interfere with long-term domestic growth. A related concern is that the high interest rates they entail will attract foreign saving, reducing growth in other countries rather than domestic growth.[9]

This view of the effects of deficits may be, but is not necessarily, inconsistent with the view that they are expansionary. The view that deficits have short-run expansionary effects is equivalent to the hypothesis that the cyclically adjusted deficit has a positive coefficient in a reduced-form equation for GNP or some other measure of economic activity. The view that deficits curb productivity and growth in the long run is equivalent to the hypothesis that the deficit has a negative coefficient in a reduced-form equation for the long-run rate of growth of the capital stock relative to output. Appendix 1 explores the issue with the aid of a theoretical macroeconomic model.

Analysis of the possible long-run crowding out effects of the federal budget makes more sense in terms of the *stock* of federal debt than the federal surplus or deficit. It is a reduced capital stock that may curtail further growth; and it is the stock of government securities, not current government deficits, that is a substitute for capital stock in the public's asset portfolio. Appendix 1 also analyzes this issue.

The choice between the flow of deficits and the stock of debt makes a big difference. The deficit as a fraction of GNP can be rising while the debt as a fraction of GNP is falling—any combination of increases and decreases in the two ratios is possible. If it is the debt-to-GNP ratio that we suspect may have an eventual impact on productivity and growth, then we should be focusing attention not on the deficit (in dollars or as a fraction of GNP) but on the growth of cyclically adjusted debt relative to cyclically adjusted GNP.[10]

The GNP reference trend called for by this use should remove short-run cyclical fluctuations, but should not alter the *average* level of GNP over any sustained period. One compelling reason for preserving the average level is that a deviation of GNP from trend, while it affects the surplus or deficit only during the quarter of the deviation, affects a cyclically adjusted measure of debt for that quarter *and all future quarters* because of cumulation. Unless positive and negative deviations of GNP from trend are approximately offsetting, therefore, a measure of cyclically adjusted debt can deviate permanently from actual debt because of some long-past fluctuations. For example, if we were to cumulate cyclically adjusted deficits starting in 1970 based on a GNP trend corresponding to a 6 percent unemployment rate, the cyclically adjusted debt would now be more than $100 billion below actual debt even if the economy were to return to a 6 percent unemployment rate immediately and stay there. Such a debt measure would be a poor guide to the portfolio position of the public.

[9]*Economic Report of the President* (February 1983), pp. 62-4, 69-70.

[10]Focusing on changes in the cyclically adjusted debt-to-GNP ratio is similar to adjusting the high-employment surplus/deficit by substituting real interest payments for nominal interest payments to take into account changes in the real value of outstanding public debt. This adjustment was recently examined by Robert Eisner and Paul J. Pieper, "A New View of the Federal Debt and Budget Deficits" (mimeo, 1983).

4. *An atheoretical measure of budget trends.*—The three uses discussed so far are all related to some theoretical view about how fiscal policies influence the economy. A fourth use is not associated with any economic theory; cyclical fluctuations in receipts and expenditures are simply treated as one source of "noise" to be filtered out. For example, a comparison of actual expenditures in a boom year with those in a recession year will often give a misleading indication of budget trends. Comparing cyclically adjusted spending in the two years will give a more accurate picture. Cyclical adjustment, in this view, is analogous to seasonal adjustment. Just as we learn more about what is happening to the economy currently by examining seasonally adjusted numbers than by examining unadjusted numbers, we learn more about what is happening to the budget by examining cyclically adjusted numbers than by examining unadjusted numbers.

The GNP trend appropriate for this use is clearly a path that eliminates cyclical fluctuations but preserves average levels. One such trend, suggested by John Cochrane of the staff of the Council of Economic Advisers, is a weighted moving average of actual GNP, analogous to the initial estimate of the cycle-trend in seasonal adjustment. Another such trend, suggested by William Fellner, is constructed by calculating trough-to-trough or peak-to-peak averages of GNP, placing them at the center of the time-spans they cover, and connecting them by smooth-growth lines. In both cases, positive and negative deviations of GNP from trend will offset over any extended period.

B. *A "Mid-Expansion" Reference Trend to Estimate a New Cyclically Adjusted Budget*

The reference trend proposed in this paper, and used to calculate a new cyclically adjusted budget, is one that smoothly connects real GNP averages in mid-periods of economic expansions. Each quarterly value of real GNP is classified into one of four phases: recession, early expansion (recovery), middle expansion, and late expansion (not every cycle has a late expansion, as we shall see in a moment; in the 1930s, one cycle did not even achieve a middle expansion). The mean level of GNP during each middle expansion, placed at the center of that middle expansion, is one point on the proposed reference trend.[11] Mid-expansion averages are then connected by constant-growth-rate lines to complete the reference trend.

A mid-expansion trend reflects the path of actual GNP, not the path of a hypothetical potential GNP.[12] It does *not* necessarily represent high employment without accelerating inflation; therefore, a budget based on a mid-expansion trend is not suitable for the old CED use of setting budget targets. It is, however, suitable for filtering out cyclical "noise" and for developing a measure of cyclically adjusted debt. Furthermore, by discarding periods of prolonged boom or deep recession, it is unlikely to be heavily

[11]A geometric mean is used in this step.

[12]The CEA potential GNP series is the reference trend for the BEA high-employment budget and is described in *Economic Report of the President* (January 1981) pp. 180–1.

influenced by GNP movements that are themselves due to fiscal policy. It is therefore more suitable for measuring the expansionary/contractionary thrust of fiscal policy than moving averages or entire-cycle averages. Overall, mid-expansion trend GNP provides a useful reference on which to base a cyclically adjusted budget.

Estimating the mid-expansion trend begins with delineation of four cyclical phases. Recessions, the first of the four phases, have been demarcated by the NBER.[13] The second phase, early expansion or recovery, is defined as the period from the beginning of an upturn until real GNP reaches its previous peak. Middle expansion is defined as the 12 quarters beginning when real GNP passes its pre-recession peak — unless a downturn begins during those 12 quarters. If a downturn begins during the 12 quarters, then middle expansion is simply the period after surpassing a pre-recession peak until the next downturn. Late expansion, finally, is the period beginning after middle expansion ends, and ending when the downturn begins. If the downturn begins before middle expansion ends, then the late expansion phase is skipped.

Why 12 quarters rather than, say, 8 or 16? In the six middle expansions since 1953, a 12-quarter choice means that two expansions (1961–63 and 1976–78) have started from levels that most observers would regard as depressed and two (1971–73 and 1976–78) have ended at levels that most observers would regard as associated with accelerating inflation (the middle expansion *averages,* however, are above the depressed levels and below the inflationary ones). A shorter or longer span is less symmetrical in this regard. In any case, however, budget calculations are not sensitive to the exact length of the middle expansion.[14]

Chart 2 applies this four-phase scheme to real GNP since 1953. During the first expansion in the chart, 1954:4-1957:3, the downturn began immediately after the middle expansion period. During the next expansion, the downturn began before the end of the middle expansion period, so that in both cases the late expansion stage was skipped. During the 1961:2-1969:4 expansion, however, the middle expansion period was followed by a 5½ year late expansion. In the 1970s, the 1971:1-1973:4 middle expansion was followed directly by a downturn, but the 1976:1-1978:4 middle expansion was followed by a late expansion lasting until 1980:1. The 1981:1-1981:3 middle expansion lasted only three quarters. Finally, the trend after 1981 is based on a forecast 1983:3-1986:2 middle expansion (not shown in the chart).[15]

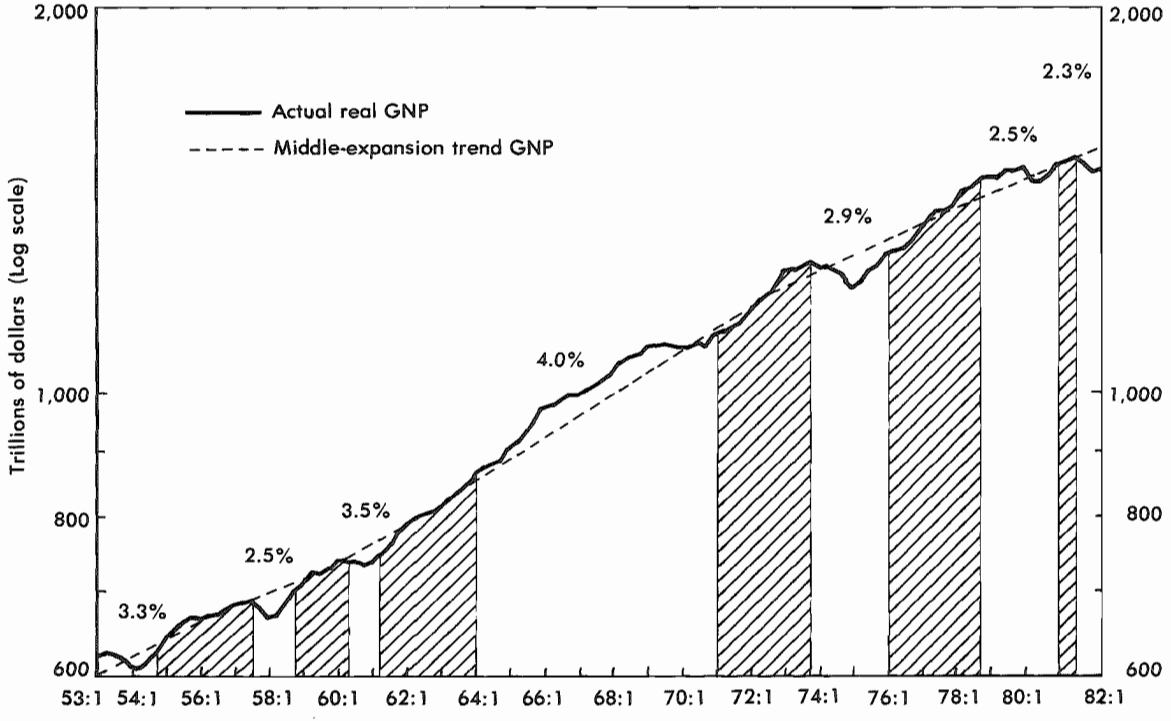
[13]Current cycles are demarcated on preliminary bases by the Statistical Indicators Division at BEA.

[14]Various measures of the cyclical timing of inflation changes suggest that 12 quarters is a reasonable judgmental delineation. Simulations using an eight quarter cutoff, however, had no appreciable effect on the results.

[15]The trend since 1981:3 is based on the Administration's midsession review and underlie the budget estimates shown later in this paper.

Chart 2

Actual and Middle-expansion Trend Real GNP



At the start of a middle expansion period, the mid-expansion approach is generally easy to keep up to date. Forecasts of GNP often fall within a narrow range, so there is broad agreement on the next point to which to anchor the trend line. In contrast, when the middle of an expansion has just been passed, keeping a middle-expansion trend up to date is subject to uncertainty. Probably using two or three alternative rates of extrapolation is wise.

C. *Estimating the Cyclically Adjusted Budget and Cyclically Adjusted Debt*

The methodology for cyclically adjusting receipts and expenditures and estimating the sources of change is described in the *Survey of Current Business.*[16] Exactly the same methodology applies to a budget based on a mid-expansion trend as to a budget based on potential GNP. The only difference is the substitution of the new mid-expansion GNP reference trend and an associated unemployment trend for potential GNP and the high employment unemployment rate.

The unemployment rate trend is calculated by averaging unemployment rates during each middle expansion, placing the average at the center of the middle expansion, and linearly connecting these averages.[17] The middle-expansion GNP and unemployment rate reference trends and gaps are show in Table 1.

Cyclical adjustment of the debt raises a few additional complications. Basically, the debt is the cumulative deficit, and cyclically adjusted debt is actual debt less the cumulative differences between the actual deficit and the cyclically adjusted deficit. However, our measure of the debt, the market value of outstanding Treasury obligations held by the public (including the Federal Reserve), differs from cumulative deficits in the national income and product accounts (NIPAs) because of a number of reconciliation items. Appendix 2 shows these items in detail.

One important source of difference is federal lending, which in the NIPAs does not constitute an expenditure but which does require additional Treasury borrowing to finance. We could consolidate loans and borrowing and get rid of this reconciliation item. However, much federal lending is for special borrowers, such as rural electrical systems or subsidized housing projects—borrowers that might well not be in the capital markets at all in the absence of federal programs. We therefore prefer to keep track of

[16]de Leeuw, et al., "High-Employment Budget: New Estimates," and Frank de Leeuw and Thomas M. Holloway, "The High-Employment Budget: Revised Estimates and Automatic Inflation Effects," *Survey of Current Business,* 62 (April 1982), pp. 21–33.

[17]The middle-expansion period is modified in calculating the unemployment rate average by omitting the first quarter of each middle expansion. The reason for the amendment is that unemployment typically lags behind output at the beginning of a middle expansion, but not at the end; unemployment is classified by the BEA Statistical Indicators Division as a lagging indicator at troughs, but a leading indicator at peaks. The unemployment averages derived in this way for the six middle expansions since 1953 are: 1955–57 (4.2%); 1959–60 (5.4%); 1961–63 (5.7%); 1971–73 (5.4%); 1976–78 (6.9%); 1981 (7.4%).

Table 1
Cyclically Adjusted[1] and Actual Unemployment Rate and GNP

Year	Unemployment rate			GNP		
	Cyclically adjusted	Actual	Gap: col. (1) less col. (2)	Cyclically adjusted	Actual	Gap: col. (4) less col. (5) / col. (4)
	(1)	(2)	(3)	(4)	(5)	(6)
1955	4.1	4.4	−0.3	396.0	400.0	−1.0
1956	4.3	4.1	0.1	421.0	421.7	−0.2
1957	4.6	4.3	0.3	446.2	444.0	0.5
1958	4.9	6.8	−1.9	464.9	449.7	3.3
1959	5.3	5.5	−0.2	488.2	487.9	0.1
1960	5.5	5.6	−0.1	512.6	506.5	1.2
1961	5.6	6.7	−1.1	535.4	524.6	2.0
1962	5.7	5.5	0.2	564.5	565.0	−0.1
1963	5.7	5.6	0.1	595.4	596.7	−0.2
1964	5.7	5.2	0.5	628.9	637.7	−1.4
1965	5.7	4.5	1.2	668.6	691.1	−3.4
1966	5.6	3.8	1.8	718.1	756.0	−5.3
1967	5.6	3.8	1.8	769.4	799.6	−3.9
1968	5.6	3.6	2.0	835.7	873.4	−4.5
1969	5.5	3.5	2.0	914.5	944.0	−3.3
1970	5.5	5.0	0.5	1002.3	992.7	0.9
1971	5.5	6.0	−0.5	1094.8	1077.6	1.6
1972	5.5	5.6	−0.1	1184.5	1185.9	−0.1
1973	5.7	4.9	0.8	1290.8	1326.4	−2.8
1974	6.0	5.6	0.3	1445.7	1434.2	0.7
1975	6.3	8.5	−2.2	1624.8	1549.2	4.7
1976	6.5	7.7	−1.2	1759.0	1718.0	2.3
1977	6.8	7.1	−0.2	1914.6	1918.3	−0.2
1978	7.0	6.1	0.9	2112.0	2163.9	−2.4
1979	7.1	5.8	1.3	2357.2	2417.8	−2.6
1980	7.2	7.1	0.1	2643.7	2631.7	0.4
1981	7.4	7.6	−0.2	2966.5	2954.1	0.4
1982	7.7	9.7	−2.0	3217.0	3073.0	4.5
1983[2]	8.1	10.0	−1.9	3442.6	3304.0	4.0

[1]Based on mid-expansion trend.
[2]Partly based on the Administration forecast of June 29, 1983.

federal lending separately rather than net it against borrowing. Other differences between Treasury obligations and the cumulative deficit are all combined into a single discrepancy item which we also keep track of separately.

We focus on Treasury obligations held by the public because they compete directly with private securities. It is important to bear in mind, however, that every component of federal net worth presumably has some economic impact, even though we have chosen to focus on the component most relevant to current concerns about the budget.

The basic identity relating the debt to its components is:

$$(1) \qquad \Delta D_t = \sum_{j=1}^{n} E^j{}_t - \sum_{j=1}^{m} T^j{}_t + \Delta L_t + Z_t$$

where:

D_t = cyclically adjusted market value of Treasury debt held by the public at the end of period t;

ΔD_t = change in D during period t;

E^j_t = cyclically adjusted expenditure on category j (e.g., defense purchases, transfer payments) during period t;

T^j_t = cyclically adjusted tax receipts from category j (e.g., personal income taxes, indirect business taxes) during period t;

L_t = Government direct loans at the end of period t;

ΔL_t = Government net lending (lending minus loan repayments) during period t;

Z_t = other factors affecting ΔD_t.

Over any lengthy time-span it is better to examine these components as ratios to trend GNP (in current dollars) than as dollar amounts. Symbolizing trend GNP by Y^*_t, we write:

$$(2) \qquad \frac{\Delta D_t}{Y^*_t} = \frac{\sum_{j=1}^{n} E^j{}_t}{Y^*_t} - \frac{\sum_{j=1}^{m} T^j{}_t}{Y^*_t} + \frac{\Delta L_t}{Y^*_t} + \frac{Z_t}{Y^*_t}$$

These ratios of expenditures, taxes, net lending, and the residual Z to trend GNP will be presented and analyzed below.

The left-hand variable in equation (2), the ratio of the cyclically adjusted deficit to GNP, is not the same as the change in the debt-to-GNP ratio. The latter, in which we are especially interested, depends not only on the deficit-to-GNP ratio, but also on the rate of growth of trend GNP.

Specifically,

$$(3) \qquad \Delta\left(\frac{D_t}{Y^*_t}\right) = \left(\frac{\Delta D_t}{Y^*_t}\right) - \left(\frac{D_{t-1}}{Y^*_t}\right)\left(\frac{\Delta Y^*_t}{Y^*_{t-1}}\right)$$

For analyzing changes in the debt-to-GNP ratio, furthermore, it is instructive to treat one category of expenditures, net interest payments, separately from other expenditures. Unlike other expenditures, net interest payments are not discretionary even in the long run. Net interest payments equal the initial stock of net debt, $(D_{t-1} - L_{t-1})$, times an effective interest rate, r_t.[18] Combining this expression for net interest payments with equation (3), we can write:

$$(4) \qquad \Delta\left(\frac{D_t}{Y^*_t}\right) = \frac{\Delta D_t - E^I_t}{Y^*_t} + r_t\left(\frac{D_{t-1} - L_{t-1}}{Y^*_t}\right) - \left(\frac{D_{t-1}}{Y^*_t}\right)\left(\frac{\Delta Y^*_t}{Y^*_{t-1}}\right)$$

where E^I_t is the net interest component of expenditures.

Letting g_t represent $\Delta Y^*_t/Y^*_{t-1}$, the growth rate of Y^*_t, and noting that $Y^*_t = Y^*_{t-1}(1 + g_t)$, we can rewrite (4) as:

$$(5) \qquad \Delta\left(\frac{D_t}{Y^*_t}\right) = \frac{\Delta D_t - E^I_t}{Y^*_t} + \left(\frac{D_{t-1}}{Y^*_{t-1}}\right)\left(\frac{(r_t - g_t)}{(1 + g_t)}\right) - \left(\frac{L_{t-1}}{Y^*_{t-1}}\right)\left(\frac{r_t}{(1 + g_t)}\right)$$

This is the expression for the change in the ratio of debt to trend GNP that we will analyze later. The first term on the right-hand side covers all the items, except net interest, covered in the analysis of the deficit-to-GNP ratio (equation (2) above). There are two additional terms. One depends critically on the difference between the effective interest rate on the debt and the growth rate of trend GNP. The other measures interest receipts from loans outstanding.

[18]To a minor extent, interest payments depend on debt and loans contracted for during period t; but the dependence is small enough to ignore.

II. Analysis of the Cyclically Adjusted Budget and Debt

A. *The Tables*

Measures of the cyclically adjusted budget and cyclically adjusted debt are shown in Tables 2 through 8 and Charts 3 through 5. These tables and charts are all based on middle-expansion trend GNP. Table 9 and Chart 6 compare these results with results based on a 6-percent-unemployment-rate trend GNP. We have aimed to provide enough detail in the tables so that readers can make their own comparisons and draw their own conclusions rather than simply follow our analysis.

Table 2 shows annual and quarterly estimates of cyclically adjusted receipts, expenditures, and the surplus/deficit, both in billions of dollars and as a percent of cyclically adjusted GNP. The table also divides *changes* in receipts, expenditures, and the surplus/deficit into two components — the automatic effects of inflation and the combined effects of discretionary policy changes and other factors (such as demographic trends).[19] On balance, as the table shows, the automatic effects of inflation push the budget toward surplus. The acceleration of inflation during the 1970s and the deceleration since 1981 have affected the magnitude of this force.

Tables 3 through 6 provide detail underlying Table 2. Tables 3 and 4 show major receipt and expenditure categories as percentages of cyclically adjusted GNP. Tables 5 and 6 divide changes in major categories of receipts and expenditures into the automatic effects of inflation and the effects of discretionary policy changes and other factors.

B. *The Growth in the Deficit*

We will use these tables to analyze the growth in the cyclically adjusted deficit from 1981 to 1983, from 1.9 percent to 4.0 percent of trend GNP. We first show which categories of receipts and expenditures account for the growth. Then we compare the 1981–83 growth of the deficit with the much smaller 1973–81 growth and show which categories are responsible for the acceleration of growth between the two periods.

From Tables 3 and 4, it appears that four major categories more than accounted for the 2.1 percentage point rise in the deficit-to-GNP ratio from 1981 to 1983 (their percentage-point changes are in parentheses);

- increase in defense spending (0.8)
- reduction in personal taxes (0.6)
- increase in interest payments (0.6)
- reduction in corporate taxes (0.5)

Slightly offsetting these four factors were an increase in contributions for social insurance of 0.3 percentage points and a reduction in nondefense purchases of 0.3 percentage points.

[19]See de Leeuw and Holloway, "The High-Employment Budget: Revised Estimates and Automatic Inflation Effects."

Table 2
Cyclically Adjusted Federal Receipts and Expenditures
(Billions of dollars; quarters at seasonally adjusted annual rates)

Year and quarter	Receipts					Expenditures					Surplus or deficit (−)				
			Change from preceding period					Change from preceding period					Change from preceding period		
	Level	Percentage of cyclically adjusted GNP	Total	Due to automatic inflation effects	Due to discretionary policy and other factors	Level	Percentage of cyclically adjusted GNP	Total	Due to automatic inflation effects	Due to discretionary policy and other factors	Level	Percentage of cyclically adjusted GNP	Total	Due to automatic inflation effects	Due to discretionary policy and other factors
1955	71.6	18.1	—	—	—	68.0	17.2	—	—	—	3.6	0.9	—	—	—
1956	78.0	18.5	6.4	3.1	3.4	72.1	17.1	4.1	0	4.1	6.0	1.4	2.4	3.0	−0.6
1957	82.7	18.5	4.7	3.1	1.6	79.9	17.9	7.8	0	7.8	2.9	0.6	−3.1	3.0	−6.2
1958	83.0	17.8	0.3	0.5	−0.2	87.7	18.9	7.8	0	7.8	−4.8	−1.0	−7.7	0.5	−8.1
1959	90.1	18.5	7.1	2.2	5.0	90.8	18.6	3.1	0	3.0	−0.7	−0.1	4.1	2.2	1.9
1960	98.3	19.2	8.2	0.9	7.2	93.1	18.2	2.3	0	2.3	5.2	1.0	5.9	0.8	5.0
1961	101.3	18.9	3.0	0.4	2.7	101.1	18.9	8.0	0	8.1	0.2	0	−5.0	0.3	−5.3
1962	106.3	18.8	5.0	2.3	2.7	110.5	19.6	9.4	0	9.4	−4.3	−0.8	−4.5	2.3	−6.7
1963	114.3	19.2	8.0	1.6	6.5	114.2	19.2	3.7	0	3.7	0	0	4.3	1.6	2.8
1964	112.9	18.0	−1.4	1.8	−3.2	118.7	18.9	4.5	0.1	4.3	−5.8	−0.9	−5.8	1.7	−7.5
1965	118.8	17.8	5.9	3.0	2.9	125.0	18.7	6.3	0	6.3	−6.1	−0.9	−0.3	2.9	−3.3
1966	132.3	18.4	13.5	5.1	8.5	145.7	20.3	20.7	0.3	20.4	−13.4	−1.9	−7.3	4.7	−11.9
1967	143.2	18.6	10.9	4.3	6.7	165.9	21.6	20.2	0.5	19.7	−22.6	−2.9	−9.2	3.6	−12.9
1968	164.7	19.7	21.5	8.1	13.3	183.3	21.9	17.4	0.7	16.7	−18.6	−2.2	4.0	7.5	−3.4
1969	189.3	20.7	24.6	10.6	14.0	191.6	21.0	8.3	1.1	7.3	−2.3	−0.3	16.3	9.6	6.7
1970	196.2	19.6	6.9	11.2	−4.4	204.8	20.4	13.2	1.3	11.8	−8.6	−0.9	−6.3	9.8	−16.1
1971	204.4	18.7	8.2	10.0	−1.7	220.4	20.1	15.6	3.7	11.9	−15.9	−1.5	−7.3	6.2	−13.5
1972	228.3	19.3	23.9	8.0	15.9	244.4	20.6	24.0	4.2	19.8	−16.1	−1.4	−0.2	3.7	−3.9
1973	250.0	19.4	21.7	16.4	5.3	265.0	20.5	20.6	3.8	16.8	−15.0	−1.2	1.1	12.6	−11.4
1974	291.8	20.2	41.8	29.5	12.3	300.0	20.7	35.0	7.5	27.5	−8.1	−0.6	6.9	21.9	−15.1
1975	308.6	19.0	16.8	32.5	−15.7	351.3	21.6	51.3	11.4	40.0	−42.8	−2.6	−34.7	21.0	−55.7
1976	344.6	19.6	36.0	14.0	22.0	382.4	21.7	31.1	10.8	20.3	−37.9	−2.2	4.9	3.2	1.7
1977	375.5	19.6	30.9	23.7	7.2	421.1	22.0	38.7	12.2	26.5	−45.7	−2.4	−7.8	11.5	−19.3
1978	417.5	19.8	42.0	36.2	5.8	463.9	22.0	42.8	15.2	27.6	−46.4	−2.2	−0.7	20.9	−21.6
1979	476.7	20.2	59.2	47.8	11.4	513.8	21.8	49.9	20.8	29.1	−37.1	−1.6	9.3	27.0	−17.7
1980	544.7	20.6	68.0	54.5	13.5	603.2	22.8	89.4	28.5	60.9	−58.5	−2.2	−21.4	26.0	−47.4
1981	632.6	21.3	87.9	61.5	26.4	689.4	23.2	86.2	36.8	49.5	−56.8	−1.9	1.7	24.7	−23.0
1982	658.4	20.5	25.8	36.9	−11.1	758.4	23.6	69.0	29.5	39.5	−100.0	−3.1	−43.2	7.4	−50.6
1983[1]	694.2	20.2	35.8	30.1	5.6	832.9	24.2	74.5	14.7	59.8	−138.7	−4.0	−38.7	15.4	−54.2

Table 2 (Continued)
Cyclically Adjusted Federal Receipts and Expenditures
(Billions of dollars; quarters at seasonally adjusted annual rates)

Year and quarter	Receipts					Expenditures					Surplus or deficit (−)				
			Change from preceding period					Change from preceding period					Change from preceding period		
	Level	Percentage of cyclically adjusted GNP	Total	Due to automatic inflation effects	Due to discretionary policy and other factors	Level	Percentage of cyclically adjusted GNP	Total	Due to automatic inflation effects	Due to discretionary policy and other factors	Level	Percentage of cyclically adjusted GNP	Total	Due to automatic inflation effects	Due to discretionary policy and other factors
1955:I	69.7	18.0	—	—	—	67.5	17.4	—	—	—	2.2	0.6	—	—	—
II	70.7	18.0	1.0	0.7	0.3	66.5	16.9	−1.0	0	−1.0	4.2	1.1	2.0	0.7	1.3
III	72.0	18.1	1.3	0.6	0.7	68.9	17.3	2.4	0	2.4	3.1	0.8	−1.1	0.6	−1.7
IV	73.8	18.3	1.8	0.5	1.3	68.9	17.0	0	0	0	4.9	1.2	1.8	0.5	1.3
1956:I	75.8	18.4	2.0	0.8	1.2	69.5	16.9	0.6	0	0.6	6.3	1.5	1.4	0.7	0.7
II	77.6	18.6	1.8	0.8	1.0	71.8	17.2	2.3	0	2.3	5.8	1.4	−0.5	0.8	−1.3
III	78.2	18.4	0.6	1.3	−0.7	72.5	17.1	0.7	0	0.7	5.8	1.4	0	1.2	−1.2
IV	80.5	18.7	2.3	0.9	1.4	74.4	17.3	1.9	0	1.9	6.1	1.4	0.3	0.9	−0.6
1957:I	82.4	18.8	1.9	1.2	0.7	78.4	17.9	4.0	0	4.0	4.0	0.9	−2.1	1.2	−3.3
II	82.9	18.7	0.5	0	0.5	80.1	18.1	1.7	0	1.7	2.8	0.6	−1.2	0	−1.2
III	83.0	18.4	0.1	0.9	−0.8	80.1	17.8	0	0	0	2.9	0.6	0.1	0.9	−0.8
IV	82.5	18.2	−0.5	−0.4	−0.1	80.9	17.8	0.8	0	0.8	1.7	0.4	−1.2	−0.4	−0.8
1958:I	82.2	17.9	−0.3	0.1	−0.4	82.6	18.0	1.7	0	1.7	−0.4	−0.1	−2.1	0.1	−2.2
II	81.9	17.7	−0.3	−0.2	−0.1	86.2	18.7	3.6	0	3.6	−4.3	−0.9	−3.9	−0.2	−3.7
III	83.3	17.8	1.4	0.6	0.8	90.0	19.3	3.8	0	3.8	−6.7	−1.4	−2.4	0.6	−3.0
IV	84.4	17.9	1.1	0.3	0.8	92.0	19.5	2.0	0	2.0	−7.6	−1.6	−0.9	0.3	−1.2
1959:I	88.2	18.4	3.8	1.0	2.8	89.9	18.8	−2.1	0	−2.1	−1.7	−0.4	5.9	1.0	4.9
II	90.4	18.6	2.2	0.8	1.4	89.9	18.5	0	0	0	0.5	0.1	2.2	0.8	1.4
III	90.6	18.5	0.2	0.2	0	91.5	18.6	1.6	0	1.6	−0.9	−0.2	−1.4	0.2	−1.6
IV	91.1	18.3	0.5	−0.1	0.6	91.7	18.5	0.2	0	0.2	−0.6	−0.1	0.3	−0.1	0.4
1960:I	97.4	19.3	6.3	0.6	5.7	90.4	17.9	−1.3	0	−1.3	7.0	1.4	7.6	0.5	7.1
II	97.7	19.2	0.3	−0.1	0.4	92.5	18.2	2.1	0	2.1	5.2	1.0	−1.8	−0.1	−1.7
III	98.3	19.1	0.6	0.4	0.2	94.1	18.2	1.6	0	1.6	4.2	0.8	−1.0	0.4	−1.4
IV	99.6	19.1	1.3	−0.1	1.4	95.2	18.3	1.1	0	1.1	4.4	0.8	0.2	−0.1	0.3

1961:I	99.6	19.0	0	−0.5	0.5	98.0	18.7	2.8	0	2.8	1.6	0.3	−2.8	−0.5	−2.3
II	100.5	18.9	0.9	0.5	0.4	100.6	18.9	2.6	0	2.6	−0.1	0	−1.7	0.5	−2.2
III	102.2	18.9	1.7	0.7	1.0	101.9	18.9	1.3	0	1.3	0.3	0.1	0.4	0.6	−0.2
IV	102.9	18.9	0.7	0.1	0.6	103.9	19.1	2.0	0	2.0	−1.0	−0.2	−1.3	0.1	−1.4
1962:I	103.4	18.7	0.5	1.2	−0.7	108.9	19.6	5.0	0	5.0	−5.5	−1.0	−4.5	1.2	−5.7
II	104.8	18.7	1.4	0.4	1.0	109.3	19.5	0.4	0	0.4	−4.5	−0.8	1.0	0.4	0.6
III	107.2	18.9	2.4	0.1	2.3	110.8	19.5	1.5	0	1.5	−3.6	−0.6	0.9	0.1	0.8
IV	109.6	19.0	2.4	0.8	1.6	113.0	19.6	2.2	0	2.2	−3.4	−0.6	0.2	0.8	−0.6
1963:I	112.6	19.3	3.0	0.6	2.4	113.5	19.4	0.5	0	0.5	−0.9	−0.2	2.5	0.6	1.9
II	114.4	19.4	1.8	−0.2	2.0	112.2	19.0	−1.3	0	−1.3	2.1	0.4	3.0	−0.2	3.2
III	114.5	19.1	0.1	0.2	−0.1	114.3	19.1	2.1	0	2.1	0.2	0	−1.9	0.2	−2.1
IV	115.7	19.0	1.2	1.1	0.1	116.9	19.2	2.6	0.1	2.5	−1.2	−0.2	−1.4	1.0	−2.4
1964:I	113.1	18.4	−2.6	0.3	−2.9	118.5	19.2	1.6	0	1.6	−5.4	−0.9	−4.2	0.3	−4.5
II	109.8	17.6	−3.3	0.3	−3.6	119.2	19.1	0.7	0	0.7	−9.4	−1.5	−4.0	0.3	−4.3
III	113.2	17.9	3.4	0.7	2.7	118.2	18.7	−1.0	0	−1.0	−5.1	−0.8	4.3	0.7	3.6
IV	115.5	18.0	2.3	0.2	2.1	118.7	18.5	0.5	0	0.5	−3.1	−0.5	2.0	0.2	1.8
1965:I	118.9	18.2	3.4	1.3	2.1	119.0	18.2	0.3	0	0.3	0	0	3.1	1.3	1.8
II	119.8	18.1	0.9	0.7	0.2	121.4	18.3	2.4	0	2.4	−1.6	−0.2	−1.6	0.7	−2.3
III	117.6	17.5	−2.2	0.9	−3.1	127.4	18.9	6.0	0	6.0	−9.8	−1.5	−8.2	0.8	−9.0
IV	118.9	17.4	1.3	0.6	0.7	132.1	19.3	4.7	0.1	4.6	−13.1	−1.9	−3.3	0.5	−3.8
1966:I	126.2	18.1	7.3	1.7	5.6	137.6	19.7	5.4	0.1	5.4	−11.5	−1.6	1.6	1.5	0.1
I	131.9	18.5	5.7	2.0	3.7	142.0	19.9	4.4	0	4.4	−10.1	−1.4	1.4	2.0	−0.6
III	134.5	18.6	2.6	0.8	1.8	149.0	20.6	7.0	0.1	6.9	−14.5	−2.0	−4.4	0.8	−5.2
IV	136.7	18.5	2.2	1.6	0.6	154.0	20.9	5.0	0.1	4.9	−17.3	−2.3	−2.8	1.4	−4.2
1967:I	139.6	18.6	2.9	0.8	2.1	162.0	21.6	8.0	0.2	7.8	−22.4	−3.0	−5.1	0.5	−5.6
II	140.9	18.5	1.3	0.2	1.1	163.1	21.4	1.1	0.1	1.0	−22.1	−2.9	0.3	0.1	0.2
III	144.2	18.6	3.3	1.4	1.9	167.3	21.6	4.2	0.1	4.1	−23.1	−3.0	−1.0	1.3	−2.3
IV	148.2	18.7	4.0	2.0	2.0	171.1	21.6	3.8	0.1	3.7	−22.8	−2.9	0.3	1.9	−1.6
1968:I	155.8	19.2	7.6	2.6	5.0	175.8	21.7	4.7	0.2	4.5	−20.1	−2.5	2.7	2.4	0.3
II	158.7	19.2	2.9	2.5	0.4	183.6	22.2	7.8	0.3	7.5	−24.9	−3.0	−4.8	2.2	−7.0
III	168.7	20.0	10.0	1.4	8.6	185.4	22.0	1.8	0.2	1.6	−16.7	−2.0	8.2	1.3	6.9
IV	175.5	20.3	6.8	2.8	4.0	188.2	21.8	2.8	0.2	2.6	−12.6	−1.5	4.1	2.6	1.5
1969:I	184.5	20.9	9.0	2.3	6.7	187.2	21.2	−1.0	0.3	−1.3	−2.6	−0.3	10.0	2.0	8.0
II	189.1	21.0	4.6	3.0	1.6	190.3	21.1	3.1	0.4	2.7	−1.2	−0.1	1.4	2.6	−1.2
III	189.0	20.4	−0.1	3.8	−3.9	192.9	20.8	2.6	0.2	2.4	−3.8	−0.4	−2.6	3.6	−6.2
IV	194.5	20.5	5.5	3.0	2.5	196.1	20.7	3.2	0.2	3.0	−1.6	−0.2	2.2	2.7	−0.5
1970:I	193.8	20.0	−0.7	3.1	−3.8	194.8	20.1	−1.3	0.4	−1.7	−0.9	−0.1	0.7	2.7	−2.0
II	197.9	19.9	4.1	2.7	1.4	208.1	21.0	13.3	0.4	12.9	−10.2	−1.0	−9.3	2.3	−11.6
III	194.3	19.2	−3.6	1.1	−4.7	206.1	20.4	−2.0	0.5	−2.5	−11.8	−1.2	−1.6	0.6	−2.2
IV	198.6	19.2	4.3	2.6	1.7	210.0	20.3	3.9	0.1	3.8	−11.4	−1.1	0.4	2.4	−2.0

Table 2 (Continued)
Cyclically Adjusted Federal Receipts and Expenditures
(Billions of dollars; quarters at seasonally adjusted annual rates)

Year and quarter	Receipts					Expenditures					Surplus or deficit (−)				
			Change from preceding period					Change from preceding period					Change from preceding period		
	Level	Percentage of cyclically adjusted GNP	Total	Due to automatic inflation effects	Due to discretionary policy and other factors	Level	Percentage of cyclically adjusted GNP	Total	Due to automatic inflation effects	Due to discretionary policy and other factors	Level	Percentage of cyclically adjusted GNP	Total	Due to automatic inflation effects	Due to discretionary policy and other factors
1971:I	199.3	18.8	0.7	3.4	−2.7	213.2	20.1	3.2	2.6	0.6	−13.8	−1.3	−2.4	0.8	−3.2
II	203.0	18.7	3.7	3.2	0.5	220.5	20.3	7.3	0.3	7.0	−17.5	−1.6	−3.7	2.9	−6.6
III	204.9	18.5	1.9	1.3	0.6	222.0	20.1	1.5	0.5	1.0	−17.0	−1.5	0.5	0.8	−0.3
IV	210.5	18.7	5.6	1.4	4.2	225.7	20.0	3.7	0.9	2.8	−15.2	−1.3	1.8	0.5	1.3
1972:I	227.4	19.7	16.9	3.0	13.9	235.7	20.4	10.0	2.4	7.6	−8.4	−0.7	6.8	0.5	6.3
II	225.9	19.3	−1.5	1.2	−2.7	244.0	20.8	8.3	0.1	8.2	−18.1	−1.5	−9.7	1.1	−10.8
III	228.0	19.1	2.1	1.6	0.5	238.0	19.9	−6.0	0.3	−6.3	−10.1	−0.8	8.0	1.3	6.7
IV	232.0	19.1	4.0	3.3	0.7	259.7	21.3	21.7	2.4	19.3	−27.7	−2.3	−17.6	0.9	−18.5
1973:I	242.0	19.5	10.0	4.2	5.8	261.4	21.0	1.7	0.4	1.3	−19.3	−1.6	8.4	3.8	4.6
II	247.5	19.4	5.5	5.5	0	263.2	20.7	1.8	0.1	1.7	−15.7	−1.2	3.6	5.4	−1.8
III	251.8	19.3	4.3	5.5	−1.2	263.0	20.2	−0.2	1.3	−1.5	−11.2	−0.9	4.5	4.2	0.3
IV	258.6	19.3	6.8	7.0	−0.2	272.2	20.3	9.2	2.9	6.3	−13.6	−1.0	−2.4	4.1	−6.5
1974:I	272.3	19.8	13.7	5.8	7.9	280.3	20.4	8.1	1.9	6.2	−8.0	−0.6	5.6	3.9	1.7
II	284.4	20.0	12.1	8.8	3.3	296.4	20.9	16.1	1.1	15.0	−12.0	−0.8	−4.0	7.6	−11.6
III	301.7	20.6	17.3	9.7	7.6	306.0	20.9	9.6	1.9	7.7	−4.3	−0.3	7.7	7.7	0
IV	308.8	20.3	7.1	11.4	−4.3	317.1	20.9	11.1	3.8	7.3	−8.2	−0.5	−3.9	7.6	−11.5
1975:I	314.0	20.0	5.2	10.3	−5.1	328.4	20.9	11.3	2.2	9.1	−14.4	−0.9	−6.2	8.1	−14.3
II	276.2	17.2	−37.8	3.8	−41.6	347.4	21.7	19.0	1.4	17.6	−71.1	−4.4	−56.7	2.4	−59.1
III	317.5	19.3	41.3	4.5	36.8	360.2	21.9	12.8	6.8	6.0	−42.7	−2.6	28.4	−2.3	30.7
IV	326.5	19.4	9.0	5.9	3.1	369.3	21.9	9.1	2.7	6.4	−42.9	−2.5	−0.2	3.2	−3.4
1976:I	332.6	19.4	6.1	1.7	4.4	373.4	21.8	4.1	0.9	3.2	−40.9	−2.4	2.0	0.8	1.2
II	340.2	19.6	7.6	1.6	6.0	373.6	21.5	0.2	0.7	−0.5	−33.4	−1.9	7.5	0.9	6.6
III	349.3	19.7	9.1	3.8	5.3	385.0	21.7	11.4	6.0	5.4	−35.7	−2.0	−2.3	−2.2	−0.1
IV	356.2	19.6	6.9	6.5	0.4	397.7	21.9	12.7	2.5	10.2	−41.5	−2.3	−5.8	4.0	−9.8

1977:I	370.0	20.0	13.8	5.7	8.1	400.4	21.6	2.7	0.8	1.9	−30.5	−1.6	11.0	4.9	6.1
II	371.6	19.6	1.6	7.7	−6.1	412.2	21.8	11.8	2.2	9.6	−40.6	−2.1	−10.1	5.5	−15.6
III	373.5	19.3	1.9	6.5	−4.6	430.0	22.2	17.8	6.9	10.9	−56.5	−2.9	−15.9	−0.5	−15.4
IV	386.7	19.5	13.2	7.1	6.1	441.8	22.3	11.8	4.8	7.0	−55.1	−2.8	1.4	2.3	−0.9
1978:I	393.4	19.5	6.7	5.6	1.1	447.8	22.2	6.0	1.3	4.7	−54.4	−2.7	0.7	4.3	−3.6
II	409.7	19.7	16.3	14.3	2.0	454.2	21.8	6.4	1.4	5.0	−44.5	−2.1	9.9	12.9	−3.0
III	425.8	19.9	16.1	12.1	4.0	468.3	21.9	14.1	7.9	6.2	−42.5	−2.0	2.0	4.2	−2.2
IV	441.2	20.0	15.4	13.4	2.0	485.4	22.0	17.1	5.4	11.7	−44.2	−2.0	−1.7	8.0	−9.7
1979:I	458.2	20.2	17.0	11.4	5.6	491.1	21.7	5.7	2.6	3.1	−32.8	−1.4	11.4	8.8	2.6
II	472.1	20.3	13.9	11.7	2.2	497.6	21.4	6.5	2.9	3.6	−25.5	−1.1	7.3	8.8	−1.5
III	481.7	20.2	9.6	11.0	−1.4	522.4	21.9	24.8	12.0	12.8	−40.7	−1.7	−15.2	−1.0	−14.2
IV	494.7	20.2	13.0	9.8	3.2	544.1	22.2	21.7	6.6	15.1	−49.4	−2.0	−6.7	3.2	−11.9
1980:I	512.2	20.3	17.5	13.9	3.6	568.2	22.5	24.1	2.3	21.8	−56.0	−2.2	−6.6	11.6	−18.2
II	530.6	20.4	18.4	17.2	1.2	587.9	22.6	19.7	3.0	16.7	−57.3	−2.2	−1.3	14.2	−15.5
III	554.5	20.7	23.9	14.3	9.6	615.7	23.0	27.8	19.2	8.6	−61.1	−2.3	−3.8	−4.9	1.1
IV	581.5	21.0	27.0	19.0	8.0	640.9	23.1	25.2	10.5	14.7	−59.4	−2.1	1.7	8.5	−6.8
1981:I	617.5	21.6	36.0	18.1	17.9	661.9	23.2	21.0	4.6	16.4	−44.3	−1.5	15.1	13.5	1.6
II	627.2	21.5	9.7	8.3	1.4	670.7	23.0	8.8	3.5	5.3	−43.5	−1.5	0.8	4.8	−4.0
III	640.6	21.3	13.4	15.1	−1.7	702.2	23.4	31.5	18.1	13.4	−61.6	−2.1	−18.1	−3.0	−15.1
IV	645.2	20.9	4.6	15.6	−11.0	722.9	23.4	20.7	9.2	11.5	−77.6	−2.5	−16.0	6.4	−22.4
1982:I	651.9	20.8	6.7	5.8	0.9	724.6	23.1	1.7	2.1	−0.4	−72.7	−2.3	4.9	3.7	1.2
II	658.4	20.6	6.5	8.3	−1.8	730.5	22.9	5.9	3.2	2.7	−72.1	−2.3	0.6	5.1	−4.5
III	658.7	20.3	0.3	4.7	−4.4	766.8	23.6	36.3	14.1	22.2	−108.1	−3.3	−36.0	−9.4	−26.6
IV	664.6	20.2	5.9	4.8	1.1	811.5	24.6	44.7	4.3	40.4	−146.9	−4.5	−38.8	0.5	−39.3
1983:I	678.3	20.2	13.7	9.2	4.5	800.1	23.8	−11.4	0.5	−11.9	−121.8	−3.6	25.1	8.7	16.4
II	693.6	20.3	15.3	8.3	7.0	811.6	23.8	11.5	2.7	8.8	−118.0	−3.5	3.8	5.6	−1.8
III[1]	692.9	20.0	−0.7	9.2	−9.9	863.6	24.9	52.0	1.2	50.8	−170.8	−4.9	−52.8	8.0	−60.8
IV[1]	711.9	20.2	19.0	8.4	10.6	856.1	24.2	−7.5	2.1	−9.6	−144.2	−4.1	26.6	6.3	20.3

[1]Data for the third and fourth quarters of 1983 are based on the Administration forecast of June 29, 1983.

Table 3
Cyclically Adjusted Federal Receipts, Percent of Trend GNP

Calendar year	Total receipts	Personal taxes	Corporate profits taxes	Contributions for social insurance	Indirect business taxes
1955	18.1	7.8	5.3	2.4	2.7
1956	18.5	8.2	5.1	2.5	2.7
1957	18.5	8.4	4.8	2.7	2.7
1958	17.8	8.2	4.3	2.7	2.5
1959	18.5	8.2	4.6	3.1	2.6
1960	19.2	8.6	4.5	3.4	2.7
1961	18.9	8.6	4.3	3.4	2.6
1962	18.8	8.6	4.0	3.6	2.6
1963	19.2	8.6	4.2	3.9	2.6
1964	18.0	7.5	4.1	3.8	2.5
1965	17.8	7.7	4.1	3.7	2.4
1966	18.4	7.9	4.0	4.4	2.1
1967	18.6	8.2	3.8	4.6	2.0
1968	19.7	8.9	4.1	4.7	2.1
1969	20.7	9.8	3.9	5.0	2.0
1970	19.6	9.3	3.5	4.9	1.9
1971	18.7	8.4	3.3	5.0	1.9
1972	19.3	9.2	3.1	5.3	1.7
1973	19.4	8.5	3.2	6.0	1.6
1974	20.2	9.1	3.4	6.2	1.5
1975	19.0	8.3	3.2	6.0	1.5
1976	19.6	8.7	3.3	6.2	1.4
1977	19.6	8.9	3.2	6.2	1.3
1978	19.8	8.9	3.2	6.4	1.3
1979	20.2	9.3	3.1	6.6	1.2
1980	20.6	9.7	2.9	6.5	1.5
1981	21.3	10.1	2.4	6.9	1.9
1982	20.5	10.1	1.8	7.0	1.5
1983[1]	20.2	9.5	1.9	7.2	1.6

[1]Partly based on the Administration forecast of June 29, 1983.

Table 4
Cyclically Adjusted Federal Expenditures, Percent of Trend GNP

Calendar year	Total expenditures	Defense purchases	Nondefense purchases	Transfer payments	Net interest	All other[1]
1955	17.2	9.7	1.5	3.6	1.2	1.2
1956	17.1	9.5	1.4	3.6	1.2	1.4
1957	17.9	9.9	1.3	4.0	1.2	1.5
1958	18.9	9.8	1.8	4.3	1.1	1.8
1959	18.6	9.3	1.7	4.5	1.3	1.8
1960	18.2	8.7	1.8	4.6	1.3	1.8
1961	18.9	8.8	1.9	4.9	1.2	2.1
1962	19.6	9.0	2.2	4.9	1.2	2.1
1963	19.2	8.4	2.4	4.9	1.2	2.2
1964	18.9	7.8	2.6	4.9	1.3	2.4
1965	18.7	7.4	2.7	5.0	1.3	2.3
1966	20.3	8.4	2.6	5.3	1.3	2.8
1967	21.6	9.3	2.5	5.8	1.3	2.7
1968	21.9	9.2	2.5	6.1	1.4	2.8
1969	21.0	8.3	2.3	6.1	1.4	2.8
1970	20.4	7.3	2.2	6.4	1.3	3.1
1971	20.1	6.4	2.4	6.8	1.3	3.2
1972	20.6	6.2	2.4	7.0	1.3	3.8
1973	20.5	5.6	2.3	7.6	1.3	3.7
1974	20.7	5.3	2.3	8.2	1.4	3.5
1975	21.6	5.1	2.4	8.7	1.6	3.8
1976	21.7	4.9	2.5	8.9	1.7	3.8
1977	22.0	4.8	2.6	9.0	1.6	3.9
1978	22.0	4.7	2.5	8.9	1.6	4.1
1979	21.8	4.7	2.4	9.1	1.7	3.8
1980	22.8	5.0	2.5	9.5	2.0	3.8
1981	23.2	5.2	2.5	9.6	2.5	3.4
1982	23.6	5.6	2.5	9.7	2.8	3.1
1983[2]	24.2	6.0	2.2	9.7	3.1	3.3

[1]Consists of grants-in-aid, subsidies less current surplus of government enterprises, and wage accruals less disbursements.
[2]Partly based on the Administration forecast of June 29, 1983.

Table 5
Sources of Change in Cyclically Adjusted Federal Receipts

	Total change					Change due to automatic inflation effects					Change due to discretionary policy and other factors				
	Total receipts	Personal taxes	Corporate profits taxes	Contributions for social insurance	Indirect business taxes	Total receipts	Personal taxes	Corporate profits taxes	Contributions for social insurance	Indirect business taxes	Total receipts	Personal taxes	Corporate profits taxes	Contributions for social insurance	Indirect business taxes
1956	6.4	3.7	0.9	1.2	0.7	3.1	1.6	1.2	0.1	0.2	3.4	2.2	−0.3	1.1	0.6
1957	4.7	2.7	−0.3	1.8	0.6	3.1	1.9	0.8	0.2	0.3	1.6	0.7	−1.1	1.5	0.3
1958	0.3	1.0	−1.2	0.3	0	0.5	1.1	−0.8	0.1	0	−0.2	−0.1	−0.4	0.3	0
1959	7.1	1.6	2.5	2.4	0.6	2.2	1.3	0.6	0.1	0.1	5.0	0.3	1.9	2.3	0.6
1960	8.2	4.0	0.4	2.6	1.1	0.9	1.0	−0.4	0	0	7.2	3.0	0.8	2.6	1.1
1961	3.0	1.9	0	0.9	0.3	0.4	0.7	−0.4	0	0	2.7	1.2	0.5	0.8	0.3
1962	5.0	2.7	−0.3	2.0	0.7	2.3	1.3	0.8	0.1	0.1	2.7	1.4	−1.2	1.9	0.6
1963	8.0	2.6	2.3	2.5	0.6	1.6	1.3	0.2	0.1	0	6.5	1.3	2.2	2.4	0.6
1964	−1.4	−3.7	0.8	0.7	0.8	1.8	1.1	0.3	0.1	0.1	−3.2	−4.8	0.5	0.6	0.7
1965	5.9	3.9	1.3	0.8	0	3.0	1.7	0.9	0.3	0.1	2.9	2.2	0.4	0.5	−0.1
1966	13.5	5.4	1.8	7.3	−1.1	5.1	2.6	1.9	0.5	0.2	8.5	2.8	−0.2	6.9	−1.3
1967	10.9	6.3	0.1	3.7	0.8	4.3	2.8	0.8	0.6	0.2	6.7	3.5	−0.6	3.1	0.7
1968	21.5	11.1	4.9	3.8	1.6	8.1	4.3	2.7	0.9	0.4	13.3	6.9	2.2	2.9	1.2
1969	24.6	15.6	1.9	6.0	1.1	10.6	6.1	2.8	1.2	0.4	14.0	9.5	−0.9	4.8	0.7
1970	6.9	3.1	−1.1	3.9	1.0	11.2	7.1	2.3	1.2	0.4	−4.4	−4.0	−3.4	2.7	0.6
1971	8.2	−0.4	1.8	5.7	1.2	10.0	6.8	1.4	1.2	0.4	−1.7	−7.3	0.4	4.5	0.8
1972	23.9	16.2	0.4	7.9	−0.7	8.0	6.3	0.1	1.2	0.4	15.9	10.0	0.3	6.7	−1.1
1973	21.7	1.7	4.1	14.9	0.9	16.4	9.1	4.7	2.1	0.4	5.3	−7.4	−0.6	12.8	0.4
1974	41.8	20.8	8.5	11.6	1.0	29.5	15.2	9.2	4.2	0.7	12.3	5.6	−0.7	7.4	0.3
1975	16.8	3.4	2.0	8.4	3.0	32.5	19.3	5.8	6.5	0.8	−15.7	−15.9	−3.8	1.8	2.2
1976	36.0	19.2	6.2	11.6	−1.0	14.0	12.5	−3.9	4.9	0.6	22.0	6.8	10.1	6.8	−1.6
1977	30.9	16.9	3.3	9.5	1.2	23.7	15.2	2.3	5.5	0.6	7.2	1.6	1.0	4.0	0.7
1978	42.0	17.4	6.6	15.4	2.7	36.2	21.0	6.8	7.7	0.8	5.8	−3.6	−0.2	7.7	1.8
1979	59.2	32.1	4.9	21.0	1.1	47.8	28.1	9.4	9.3	1.2	11.4	4.0	−4.5	11.7	0
1980	68.0	36.6	3.3	17.8	10.3	54.5	34.0	9.1	10.4	1.1	13.5	2.6	−5.8	7.4	9.2
1981	87.9	44.3	−5.9	32.2	17.4	61.5	40.4	7.5	12.2	1.3	26.4	3.9	−13.4	20.0	16.2
1982	25.8	24.1	−12.4	21.0	−6.9	36.9	29.9	−5.0	11.0	1.1	−11.1	−5.7	−7.5	9.9	−8.0
1983	35.8	0.6	7.9	22.1	5.2	30.1	23.2	−3.8	9.8	0.8	5.6	−22.6	11.7	12.2	4.4

Table 6
Sources of Change in Cyclically Adjusted Federal Expenditures

	Total change						Change due to automatic inflation effects						Change due to discretionary policy and other factors					
	Total expenditures	Defense purchases	Nondefense purchases	Transfer payments	Net interest	Other[1]	Total expenditures	Defense purchases	Nondefense purchases	Transfer payments	Net interest	Other[1]	Total expenditures	Defense purchases	Nondefense purchases	Transfer payments	Net interest	Other[1]
1956	4.1	1.8	−0.3	1.0	0.5	1.1	0	0	0	0	0	0	4.1	1.7	−0.3	1.1	0.5	1.1
1957	7.8	3.8	0.2	2.4	0.5	0.9	0	0	0	0	0	0	7.8	3.9	0.2	2.4	0.5	0.9
1958	7.8	1.6	2.4	2.4	−0.4	1.9	0	0	0	0	0	0	7.8	1.5	2.4	2.4	−0.4	1.9
1959	3.1	0	0	1.7	1.0	0.5	0	0	0	0	0	0	3.0	0	−0.1	1.7	1.0	0.5
1960	2.3	−1.1	1.0	1.6	0.6	0.2	0	0	0	0	0	0	2.3	−1.1	1.0	1.6	0.6	0.2
1961	8.0	2.5	1.1	2.8	−0.5	2.1	0	0	0	0	0	0	8.1	2.5	1.1	2.8	−0.5	2.1
1962	9.4	4.1	2.3	1.6	0.5	0.9	0	0	0	0	0	0	9.4	4.1	2.3	1.6	0.5	0.9
1963	3.7	−0.8	1.6	1.5	0.5	0.8	0	0	0	0	0	0	3.7	−0.8	1.6	1.4	0.6	0.8
1964	4.5	−1.3	1.9	1.2	0.7	2.0	0.1	0	0	0.1	0	0	4.3	−1.3	1.8	1.1	0.7	2.0
1965	6.3	0.4	1.6	3.1	0.4	0.8	0	0	0	0	0	0	6.3	0.4	1.7	3.0	0.4	0.8
1966	20.7	10.9	0.7	4.1	0.8	4.3	0.3	0	0	0.2	0	0.1	20.4	10.8	0.7	3.9	0.8	4.2
1967	20.2	11.2	1.0	6.7	0.7	0.7	0.5	0	0	0.4	0	0.1	19.7	11.1	1.0	6.2	0.7	0.7
1968	17.4	5.4	1.7	6.3	1.4	2.5	0.7	0	0	0.6	0	0.2	16.7	5.4	1.7	5.7	1.4	2.4
1969	8.3	−0.6	0	4.9	1.4	2.6	1.1	0	0	0.9	0	0.1	7.3	−0.5	0.1	3.9	1.4	2.5
1970	13.2	−2.7	1.0	9.0	0.6	5.3	1.3	0	0	1.0	0.1	0.2	11.8	−2.7	0.9	8.0	0.6	5.0
1971	15.6	−3.4	3.8	9.8	1.1	4.2	3.7	1.9	0.6	1.1	−0.1	0.2	11.9	−5.2	3.2	8.7	1.2	4.0
1972	24.0	2.9	2.5	8.4	0.6	9.6	4.2	2.9	0.5	0.9	−0.2	0.2	19.8	0.1	2.1	7.5	0.8	9.4
1973	20.6	−0.3	0.6	14.8	2.0	3.5	3.8	1.5	0.4	1.3	0.4	0.2	16.8	−1.9	0.2	13.5	1.6	3.3
1974	35.0	4.2	4.8	21.3	3.0	1.7	7.5	1.5	0.4	3.6	1.5	0.4	27.5	2.7	4.4	17.6	1.5	1.3
1975	51.3	6.0	5.8	22.8	5.7	11.0	11.4	1.9	0.4	7.2	1.3	0.6	40.0	4.1	5.4	15.7	4.4	10.4
1976	31.1	3.0	3.5	15.3	4.1	5.2	10.8	1.7	0.7	8.7	−1.2	0.9	20.3	1.3	2.8	6.5	5.3	4.4
1977	38.7	6.8	7.4	14.5	0.9	9.1	12.2	1.7	0.9	8.7	0.1	0.8	26.5	5.1	6.5	5.8	0.8	8.3
1978	42.8	7.5	2.7	17.4	4.0	11.3	15.2	2.2	1.0	10.3	1.1	0.8	27.6	5.2	1.8	7.1	2.9	10.6
1979	49.9	11.5	3.2	25.6	6.0	3.4	20.8	2.2	1.0	14.7	1.9	1.1	29.1	9.4	2.2	11.0	4.1	2.4
1980	89.4	19.4	9.4	37.7	12.7	10.2	28.5	3.2	1.4	22.5	0	1.4	60.9	16.2	8.0	15.2	12.7	8.8
1981	86.2	22.8	9.3	33.4	21.0	−0.3	36.8	5.0	1.7	26.4	2.3	1.5	49.5	17.8	7.7	7.0	18.7	−1.8
1982	69.0	25.4	4.1	25.0	15.3	−0.9	29.5	4.4	1.3	23.1	−1.1	1.8	39.5	21.0	2.8	2.0	16.4	−2.7
1983[2]	74.5	26.9	−3.3	21.8	15.8	13.3	14.7	1.8	0.4	13.3	−2.2	1.4	59.8	25.1	−3.8	8.4	18.0	11.9

[1]Consists of grants-in-aid, subsidies less current surplus of government enterprises, and wage accruals less disbursements.
[2]Partly based on the Administration forecast of June 29, 1983.

Table 7
Relationship of the Cyclically Adjusted Surplus/Deficit to Changes in Cyclically Adjusted Market Debt, Percent of Trend GNP

	Surplus(−) or deficit(+)	Plus: change in loans	Plus: debt-deficit discrepancy	Equals: change in debt
1956	−1.4	0.3	−0.9	−2.0
1957	−0.6	0.3	0.5	0.1
1958	1.0	0.7	−2.0	−0.3
1959	0.1	0.7	−0.5	0.3
1960	−1.0	0.2	1.7	0.9
1961	0	0.6	−0.6	0
1962	0.8	0.5	0.6	1.9
1963	0	0.3	−0.1	0.1
1964	0.9	0.3	0.1	1.4
1965	0.9	0.3	−0.1	1.1
1966	1.9	0.4	−0.4	1.8
1967	2.9	1.4	−1.3	2.9
1968	2.2	−0.1	−0.1	2.0
1969	0.3	−0.5	0.1	−0.2
1970	0.9	0.5	0.6	2.0
1971	1.5	0.2	0.7	2.4
1972	1.4	0.2	−0.5	1.0
1973	1.2	0.1	−0.3	1.0
1974	0.6	0.6	−0.7	0.5
1975	2.6	0.8	0.5	4.0
1976	2.2	0.7	0.9	3.7
1977	2.4	0.7	−0.8	2.3
1978	2.2	1.0	−0.7	2.4
1979	1.6	0.9	−0.7	1.7
1980	2.2	0.9	−0.9	2.2
1981	1.9	0.7	0.3	2.9
1982	3.1	0.8	1.9	5.8
1983	4.0	0.3	−0.7	3.6

Table 8
Sources of Change in the Ratio of Cyclically Adjusted Debt to Trend GNP (Percentages)

	"Budget decisions" factor	Minus: loan interest factor	Plus: interest-rate-less-growth rate factor	Equals: change in debt/GNP ratio	Debt/GNP ratio	Trend GNP growth rate (current dollars)	Interest rate (nominal)
1956	−3.2	0.1	−2.1	−5.4	52.3	6.3	2.4
1957	−1.2	0.1	−1.6	−2.9	49.4	6.0	2.7
1958	−1.4	0.1	−0.8	−2.3	47.1	4.2	2.6
1959	−1.0	0.2	−0.8	−1.9	45.2	5.0	3.2
1960	−0.4	0.2	−0.6	−1.2	44.0	5.0	3.5
1961	−1.2	0.2	−0.5	−1.9	42.1	4.4	3.1
1962	0.7	0.2	−0.8	−0.3	41.8	5.4	3.5
1963	−1.1	0.2	−0.7	−2.0	39.8	5.5	3.6
1964	0.1	0.2	−0.6	−0.7	39.1	5.6	4.0
1965	−0.1	0.2	−0.8	−1.2	37.9	6.3	4.0
1966	0.5	0.2	−1.1	−0.8	37.1	7.4	4.3
1967	1.7	0.2	−1.0	0.5	37.6	7.1	4.4
1968	0.7	0.3	−1.3	−1.0	36.6	8.6	4.8
1969	−1.6	0.3	−1.5	−3.4	33.3	9.4	5.0
1970	0.6	0.2	−1.3	−0.9	32.3	9.6	5.2
1971	1.1	0.3	−1.2	−0.3	32.0	9.2	5.3
1972	−0.2	0.2	−0.9	−1.4	30.6	8.2	5.1
1973	−0.3	0.2	−1.0	−1.5	29.1	9.0	5.5
1974	−0.9	0.3	−1.5	−2.6	26.5	12.0	6.3
1975	2.4	0.3	−1.0	1.1	27.5	12.4	8.2
1976	2.0	0.4	0	1.6	29.1	8.3	8.1
1977	0.7	0.4	−0.4	−0.1	29.1	8.8	7.3
1978	0.8	0.4	−0.7	−0.3	28.8	10.3	7.7
1979	0	0.4	−0.8	−1.2	27.5	11.6	8.4
1980	0.2	0.6	−0.4	−0.8	26.8	12.2	10.6
1981	0.4	0.8	0.4	0	26.8	12.2	13.8
1982	3.0	0.9	1.6	3.7	30.5	8.4	14.8
1983	0.5	0.9	1.9	1.6	32.1	7.0	13.8

Note: For a description of the three factors contributing to the change in the debt/GNP ratio, see text.

Chart 3

Cyclically Adjusted Federal Receipts and Expenditures as a Percent of Trend GNP

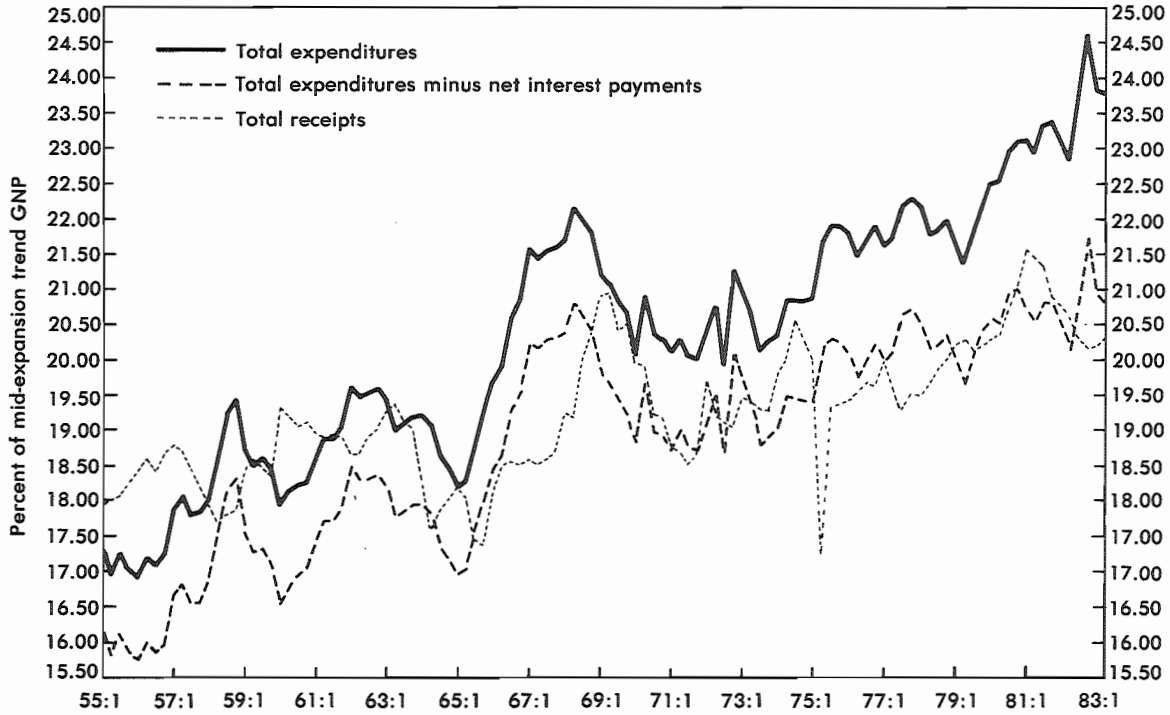


Chart 4

Treasury Debt Held by the Public as a Percent of GNP

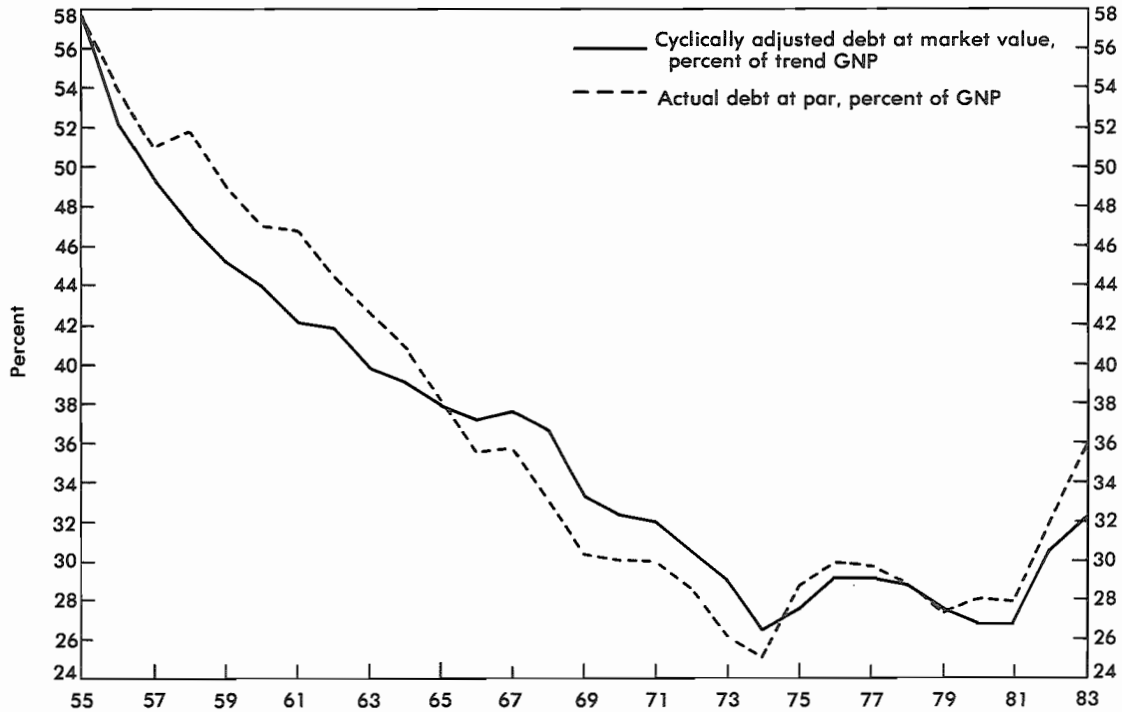
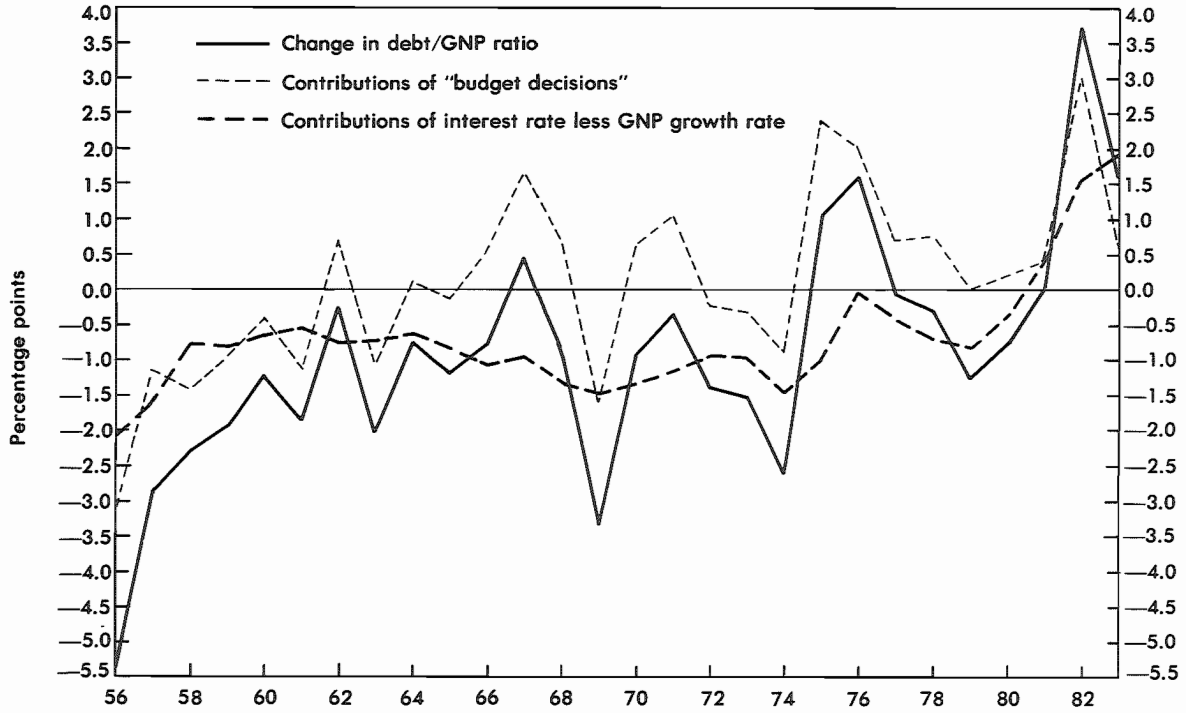


Chart 5

Sources of Change in the Ratio of Cyclically Adjusted Debt to Trend GNP



From Table 5, it appears that the automatic effects of inflation moderated one of these four factors significantly; namely, the reduction in personal taxes. Had the personal income tax been indexed during 1981–83, the reduction in personal taxes as a percent of GNP would have been appreciably larger, even though the rate of inflation fell during 1981–83. In contrast, the automatic effects of inflation contributed to the corporate tax reduction. The reason is that corporate taxes responded to changes in the rate of inflation as well as to the average rate of inflation, while personal taxes responded only to the average rate.[20]

The rise in the deficit from 1981–83 represents a marked acceleration from the rise in the deficit from 1973–81. The factors accounting for this acceleration differ somewhat from those accounting for the 1981–83 rise. For 1973 to 1981 the deficit as a percent of GNP rose by 0.7 percentage points, 1.4 percentage points less than the 2.1 percentage-point rise from 1981 to 1983. Tables 3 and 4 indicate that two factors alone more than accounted for this acceleration. Personal taxes as a percent of GNP rose by 1.6 percentage points in the former interval and fell by 0.6 percentage points in the latter interval, a swing of 2.2 percentage points. Defense spending fell by 0.4 percentage points during the earlier period and rose by 0.8 percentage points during the latter period, a swing of 1.2 percentage points. The swing in these two categories together was thus 3.4 percentage points, far more than the swing in the deficit.

The other two categories important in the 1981–83 change, corporate profits taxes and net interest payments, are much less important in the acceleration from 1973–81 to 1981–83. The reduction in corporate taxes and the increase in net interest payments during 1981–83 were both continuations of earlier trends, whereas the rise in defense spending and the reduction in personal taxes were reversals of earlier trends.

One other category had a major influence on the 1973–81 to 1981–83 comparisons—an influence that partly offset the reversals in defense spending and personal taxes. That category is transfer payments (as a percent of trend GNP), which rose by 2.0 percentage points from 1973 to 1981 and was virtually unchanged from 1981 to 1983. Thus, the 1.4 percentage point acceleration of the growth in the deficit from 1973–81 to 1981–83 is essentially accounted for by three factors (percentage point contribution in parentheses):

- a shift from increase to decrease in personal taxes (2.2)
- a shift from decrease to increase in defense spending (1.2)

partly offset by

- a shift from increase to no change in transfer payments (1.9)

Tables 5 and 6 indicate that the automatic effects of inflation did not greatly influence this acceleration. The reason is that while the average rate of inflation from 1981 to 1983 was below the average rate from 1979 to 1981, it was not so different from the average rate from 1973 to 1981. Automatic inflation effects on the budget were at a peak in 1979–81 (see Table 2, next-to-last column), and were far below that peak not only in 1981–83 but also in 1973–79.

[20]Ibid., pp. 30–1.

C. *The Growth in Debt*

Tables 7 and 8 and Charts 4 and 5 show the relationship between the cyclically adjusted budget and the ratio of debt to GNP. Table 7 goes from the cyclically adjusted surplus/deficit to the change in the cyclically adjusted market value of debt. Over the entire period shown, the change in market debt as a percent of trend GNP averages about 0.3 percentage points higher than the surplus/deficit as a percent of trend GNP. Changes in loans as a percent of trend GNP account for most of this difference. The other item in the table, a discrepancy item that includes the reconciliation items between the NIPA and unified budgets, the par-to-market conversion, and other statistical factors, averages about zero, but has sizable effects in individual years.

The change in market debt less net interest payments—the "budget decisions" factor—is one major source of change in the ratio of market debt to trend GNP. The others (corresponding to equation (5) above) are a term that depends on the difference between the effective interest rate on net debt and the growth of GNP, and a term measuring interest receipts from loans. These are shown in Table 8.[21] The Table and Chart 4 show that the debt-GNP ratio fell between 1955 and 1974, moved up until 1977, then down until 1980, and up since then. The rise is projected to continue, at least for the near future (see section III below). The importance of the interest-less-growth rate factor, shown in Table 8 and in Chart 5, is noteworthy. Over the full period, this factor has contributed more than the "budget decisions" factor to the change in slope of the debt/GNP ratio. The contribution of the interest-less-growth factor remains important in 1980–83, contributing approximately the same as the "budget decisions" factor to the recent rise in the debt-to-GNP ratio.

D. *Comparison with a Cyclically Adjusted Budget Based on a 6 Percent Unemployment Rate*

The results presented so far are all based on mid-expansion trend GNP. Comparison of these results with a cyclically adjusted budget based on a 6-percent unemployment rate reveals some important differences (Table 9 and Chart 6). During 1970–83, the surplus/deficit as a percent of trend GNP shows a strong trend toward deficit in the mid-expansion series and a more moderate trend in the 6-percent-unemployment rate series. The difference is due mainly to expenditures as a percent of trend GNP. The two expenditure numerators are similar, but the trend-GNP denominators diverge steadily. Expenditures as a percent of trend GNP rise by an average of 0.29 percentage points per year during 1970–83 based on the mid-expansion trend, but only by 0.18 percentage points per year based on the 6 percent unemployment rate trend.

[21]The "budget decisions" factor includes not only expenditures (except for net interest) less receipts, but also net lending and the debt-deficit discrepancy items shown in equation (2).

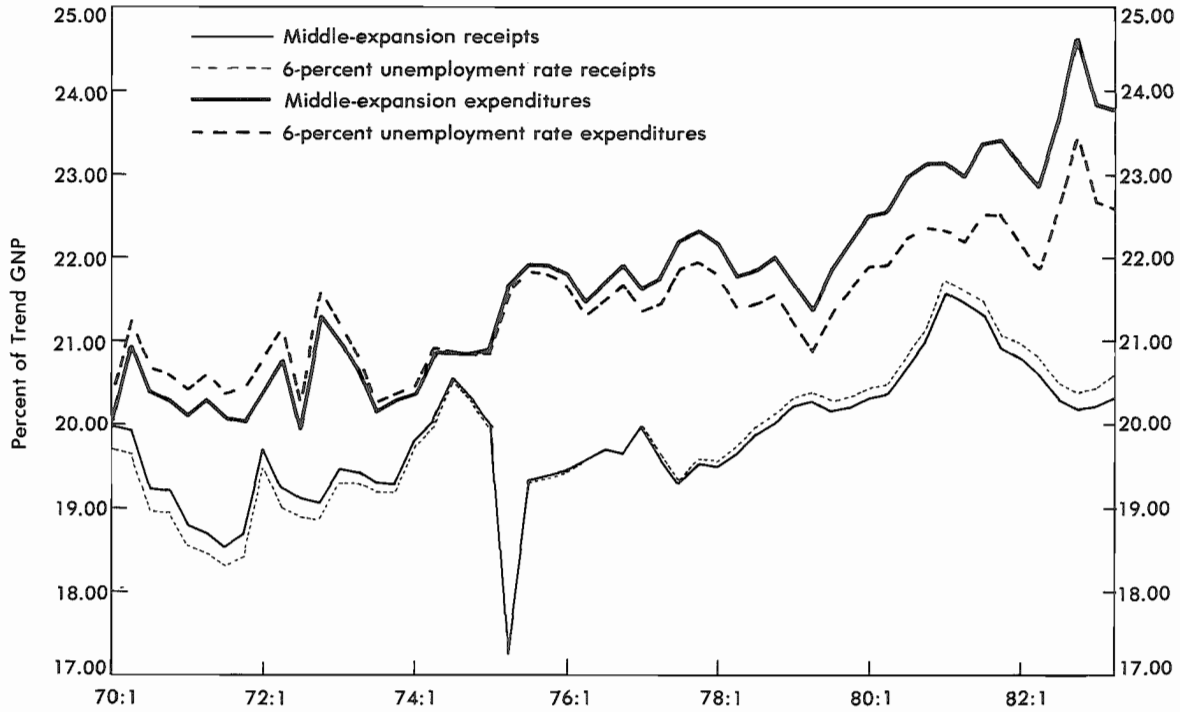
Table 9
Comparison of Cyclically Adjusted Budgets Based on Middle-Expansion Trend GNP and Based on a 6 Percent Unemployment Rate Trend GNP, Percent of Trend GNP

	Total receipts		Total expenditures		Surplus or deficit(−)	
	Mid-expansion trend	6 percent unemployment rate trend	Mid-expansion trend	6 percent unemployment rate trend	Mid-expansion trend	6 percent unemployment rate trend
1970	19.6	19.3	20.4	20.7	−0.9	−1.4
1971	18.7	18.4	20.1	20.5	−1.5	−2.0
1972	19.3	19.1	20.6	21.0	−1.4	−1.9
1973	19.4	19.2	20.5	20.7	−1.2	−1.4
1974	20.2	20.1	20.7	20.8	−0.6	−0.7
1975	19.0	19.0	21.6	21.5	−2.6	−2.6
1976	19.6	19.6	21.7	21.5	−2.2	−2.0
1977	19.6	19.6	22.0	21.7	−2.4	−2.0
1978	19.8	19.9	22.0	21.6	−2.2	−1.7
1979	20.2	20.3	21.8	21.3	−1.6	−0.9
1980	20.6	20.7	22.8	22.1	−2.2	−1.4
1981	21.3	21.5	23.2	22.4	−1.9	−0.9
1982	20.5	20.7	23.6	22.5	−3.1	−1.9
1983[1]	20.2	20.4	24.2	23.0	−4.0	−2.5

[1]Partly based on the Administration forecast of June 29, 1983.

Chart 6

Cyclically Adjusted Federal Receipts and Expenditures Based on Middle-Expansion Trend GNP and Based on 6-Percent Unemployment Rate Trend GNP, Percent of Trend GNP



There can be little doubt that it is the series utilizing the mid-expansion trend that represents more realistically the trend of expenditures in relation to GNP, after correcting for temporary cyclical swings. The series utilizing the 6 percent unemployment rate trend is based on a GNP level to which no one expects the economy to return for several years at the earliest. Its usefulness is as a tool for analyzing and planning the budget in a hypothetical 6 percent unemployment rate economy.

III. The Ratio of Federal Debt to GNP, 1984–88

To conclude the paper, we examine the effects of alternative assumptions about federal taxes and expenditures, interest rates, and nominal trend GNP growth rates on the cyclically adjusted debt/GNP ratio from 1984-88. This ratio, we have argued, should be the focus of attention in assessing the effects of budget deficits on productivity and long-term growth.

The change in the debt/GNP ratio, substituting equation (2) into equation (5), is:

$$(6)\quad \Delta\left(\frac{D_t}{Y^*_t}\right) = \frac{\sum_{j=1}^{n-1} E^j{}_t \;-\; \sum_{j=1}^{m} T^j{}_t}{Y^*_t} + \left(\frac{D_{t-1}}{Y^*_{t-1}}\right)\left(\frac{(r_t - g_t)}{(1 + g_t)}\right) - \left(\frac{L_{t-1}}{Y^*_{t-1}}\right)\left(\frac{r_t}{(1 + g_t)}\right) + \frac{\Delta L_t}{Y^*_t} + \frac{Z_t}{Y^*_t}$$

where:

$\Delta\left(\frac{D_t}{Y^*_t}\right)$ = change in the cyclically adjusted market debt to trend GNP ratio;

$\frac{\sum_{j=1}^{n-1} E^j{}_t - \sum_{j=1}^{m} T^j{}_t}{Y^*_t}$ = expenditure and tax influences: the ratio of cyclically adjusted expenditures (except net interest payments) minus taxes to trend GNP;

r_t = effective interest rate on cyclically adjusted market debt minus loans;

g_t = growth rate of trend GNP, in current dollars (trend real GNP times the actual GNP deflator);

$\frac{D_{t-1}}{Y^*_{t-1}}$ = lagged ratio of cyclically adjusted debt to trend GNP;

$\frac{L_{t-1}}{Y^*_{t-1}}$ = lagged ratio of loans to trend GNP;

$\Delta \frac{L_t}{Y^*_t}$ = ratio of net lending to trend GNP;

$\frac{Z_t}{Y^*_t}$ = ratio of debt-deficit discrepancy items to trend GNP.

Budget projections by the Administration and by the Congressional Budget Office cover the key elements in this equation, so that point estimates of the ratio of debt to GNP through 1988 could be based on one of these projections. The track record of these projections is not favorable, however. It seems more useful to explore the effects of a range of plausible assumptions on the debt-to-GNP ratio than to rely on any one projection.

The alternative assumptions we have used are:

(1) The ratio of expenditures (except net interest payments) less receipts to trend GNP:
   (a) remains at its 1983 estimated value of 1.0 percent;
   (b) falls evenly from 1.0 to 0 percent between 1983 and 1988;
   (c) rises evenly from 1.0 to 1.5 percent between 1983 and 1988.

(2) The effective interest rate and trend GNP growth rate (current dollars):
   (a) remain at their estimated 1983 values of 13.8 percent and 7.0 percent, respectively;
   (b) change to more favorable (for a falling ratio of debt to GNP) values of 11.0 percent for the interest rate and 9.0 percent for the trend growth rate.

(3) Ratios of loans, debt-deficit discrepancy items, and net lending to trend GNP remain constant at their estimated 1983 values of 6.5 percent, −0.7 percent, and 0.3 percent, respectively.

Table 10 shows the effects of these alternative assumptions on the debt/GNP ratio. There are six cases, corresponding to three alternative assumptions about the ratio of noninterest expenditures less receipts to trend GNP, and two about interest rates and growth rates. One extreme outcome is shown in the lower left box, representing an increase in the noninterest budget deficit ratio combined with a high interest rate and a low growth rate. In this case the debt-to-GNP ratio rises from 32.1 percent in 1983 to 43.7 percent in 1988. The other extreme case is shown in the middle right box, representing progressive reduction in the noninterest deficit to zero combined with a relatively low interest rate and high GNP growth rate. In this case the debt-to-GNP ratio falls from 32.1 percent in 1983 to 31.6 percent in 1988.

Table 10
Debt-to-GNP Ratio, 1983–88: Effects of Alternative Assumptions

"Budget decisions" factor assumptions	Debt/GNP ratio (percent) under alternative interest and GNP growth rate assumptions	
	No change in interest or GNP growth rates[1]	Lower interest rates, higher GNP growth rate[2]
No change in "budget decisions" factor[3]		
Debt/GNP ratio (percent) for:		
1983	32.1	32.1
1984	33.9	32.6
1985	35.7	33.1
1986	37.7	33.5
1987	39.8	34.0
1988	42.0	34.5
Falling "budget decisions" factor[4]		
Debt/GNP ratio (percent) for:		
1983	32.1	32.1
1984	33.7	32.4
1985	35.1	32.5
1986	36.5	32.4
1987	37.7	32.1
1988	38.8	31.6
Rising "budget decisions" factor[5]		
Debt/GNP ratio (percent) for:		
1983	32.1	32.1
1984	34.0	32.7
1985	36.0	33.4
1986	38.3	34.2
1987	40.9	35.1
1988	43.7	36.2

[1]Interest rate remains at its 1983 value of 13.8 percent; GNP growth rate remains at its 1983 value of 7.0 percent.
[2]Interest rate falls to 11.0 percent in 1984 and remains there during 1985–88; GNP growth rate rises to 9.0 percent in 1984 and remains there during 1985–88.
[3]Cyclically adjusted noninterest expenditures minus taxes as a percent of trend GNP remains at its 1983 value of 1.0 percent.
[4]Cyclically adjusted noninterest expenditures minus taxes as a percent of trend GNP declines evenly from its 1983 value of 1.0 percent to 0 percent in 1988.
[5]Cyclically adjusted noninterest expenditures minus taxes as a percent of trend GNP rises evenly from its 1983 value of 1.0 percent to 1.5 percent in 1988.

Overall, these results suggest that the ratio of debt to GNP is likely to rise over the next few years. Under the most favorable combination of assumptions, it could fall slightly, but under many less favorable but quite plausible combinations, it would rise by 2 to 12 percentage points. While the ratio is likely to rise, however, even under the least favorable combination of assumptions it would remain far below the 52.3 percent ratio of 1956 (or the still higher ratios of years closer to the end of World War II).

In the present state of knowledge, there is little more we can say. How much reduction in long-term growth follows from a rise of 5 or 10 points in the debt-to-GNP ratio is a question we cannot answer with any confidence. Our hope is that the measures presented in this paper will contribute to a firmer grasp of the economic consequences of deficits.

Appendix 1.—The Crowding-Out and Expansionary/Contractionary Effects of Fiscal Policy

To examine the consistency of some of the hypotheses about the effects of federal deficits reviewed in the first section of this paper, we analyze a theoretical model of a closed economy with three assets and a government budget constraint. The three assets are real capital goods, high-powered money, and government securities held by the public. Demands for the three assets are given by:

$$(1) \qquad \Delta k = \lambda_k[(a_0 - a_1 r + a_2 \pi^e)\, y - k_{-1}]$$

$$(2) \qquad \Delta\left(\frac{H}{P}\right) = \lambda_h\left[(b_0 - b_1 r - b_2 \pi^e)\, y - \left(\frac{H}{P}\right)_{-1}\right]$$

$$(3) \qquad \Delta\left(\frac{B}{P}\right) = \lambda_b\left[(c_0 + c_1 r - c_2 \pi^e)\, y - \left(\frac{B}{P}\right)_{-1}\right]$$

The sum of the three left hand variables is equal to private saving plus constant-dollar capital gains.[22] The government budget constraint is:

$$(4) \qquad H + B = D = \sum_{i=0}^{\infty} [P_{-i}(g_{-i} - t_{-i}) + r_{-i} B_{-(i+1)}]$$

Variable definitions are:

k = constant-dollar stock of real capital
H = current-dollar stock of high-powered money
B = current-dollar stock of government bonds held by the public, assumed to take the form of one-period securities
D = current-dollar stock of government bonds held by the public and by the monetary authority

[22]This private saving identity is the key to the relation of this model to an IS-LM model. Setting private saving plus government saving equal to investment gives an IS relation (with capital stocks). Equation (2) is an LM relation.

r = interest rate on bonds
P = index of the price level
π^e = expected rate of change of the price level
π = actual rate of change of the price level
y = constant-dollar national income after taxes
g = constant-dollar government purchases
t = constant-dollar government tax receipts (net of transfer payments)

The three parameters λ_k, λ_h, and λ_b, are speeds of adjustment. Their values depend on the time span over which the variables are measured; for very short time spans they are assumed to be slightly above zero, and for very long time spans they are assumed to be slightly below 1.0. The other parameters—the *a*'s, *b*'s, and *c*'s—are not time-dependent, and are all assumed to be positive. The coefficient measuring the response of the demand for government bonds to its own interest rate, c_1, is assumed to be larger than either of the coefficients measuring cross-responses, a_1 and b_1.

We will use the four equations to solve for capital stock, the interest rate, bonds held by the public, and nominal income (real income times the price level). The stock of high-powered money is assumed determined by monetary authorities, and the total deficit and debt by fiscal authorities. There is no automatic cyclical response of government purchases (g) or taxes (t), so there is no difference between the actual budget and a cyclically adjusted budget.

The model is incomplete. Since it does not contain an aggregate supply equation or a price-expectation relationship, it does not determine the split of nominal income between output and prices. Furthermore, equations (1)–(3) do not include the present value of expected future tax liabilities or some other representation of so-called "Ricardo-equivalence" notions. A model in which those ideas were prominent could have different properties from the one analyzed here. Finally, the model is limited to a closed economy.[23]

Some additional notation is helpful in presenting the solution. Instead of the three speeds of adjustment λ_k, λ_h, and λ_b, we will use transformed speeds of adjustment of the form:

$$(5) \qquad \lambda_i' = \frac{\lambda_i}{1-\lambda_i}$$

Note that while each λ_i lies between zero and 1.0, the corresponding λ_i' lies between zero and infinity. For some of the results below, furthermore, we will assume that the two financial speeds of adjustment, λ_h and λ_b, are the same. This is not a necessary assumption for any of the conclusions we draw; but is a plausible assumption that greatly simplifies some of the solutions.

[23]It could easily be extended however, to include an exogenous foreign interest rate, negatively related to domestic bond holdings and related with an uncertain sign to domestic capital stock. In this extended model, a rise in the foreign interest rate would increase domestic nominal income and increase the domestic interest rate. Its effect on the domestic capital stock would be ambiguous.

Finally, we define two composite parameters, f_1 and f_2, as follows:

$$f_1 = b_1 (a_0 + a_2\pi^e) - a_1 (b_0 - b_2\pi^e) \tag{6}$$

$$f_2 = c_1 (b_0 - b_2\pi^e) + b_1 (c_0 - c_2\pi^e) \tag{7}$$

The solution for nominal income, P_y, is:

$$P_y = \left(\frac{c_1 - b_1}{f_2}\right)\left\{\left(\frac{1 + \pi}{\lambda_h'}\right)\Delta H + \left(\frac{\lambda_h' - \pi}{\lambda_h'}\right) H\right\} + \left(\frac{b_1}{f_2}\right)\left\{\left(\frac{1 + \pi}{\lambda_b'}\right)\Delta D + \left(\frac{\lambda_b' - \pi}{\lambda_b'}\right) D\right\} \tag{8}$$

The signs of the expressions $(c_1 - b_1)/f_2$ and b_1/f_2 depend on the relative size of c_1 and b_1 and on the sign of f_2. We have already assumed that c_1 exceeds b_1. As for f_2, the two parenthetical expressions in its definition (equation (7)) are, respectively, the equilibrium money-to-income ratio when the nominal interest rate is zero and the equilibrium bond-to-income ratio when the nominal interest rate is zero. If we assume that there is no reason to hold bonds rather than money when the nominal interest rate is zero, then the second of the parenthetical expressions should be zero, and f_2 should be positive.

Under these assumptions, nominal income is directly related to both of two composite expressions, one that depends on the change and level of H and one that depends on the change and level of D. In the very short run, when the λ''s are nearly zero, the change terms in these expressions are much more important than the level terms; nominal income is directly related to the change in high-powered money and to the deficit (the change in D). In the very long run, when the λ''s approach infinity, the change terms vanish; nominal income is then directly related to the level of high-powered money and the level of the debt.[24]

The solution for the interest rate is

$$r = \left(\frac{b_1}{c_1}\right)\frac{\left\{\left(\frac{1 + \pi}{\lambda_b'}\right)\Delta D + \left(\frac{\lambda_b' - \pi}{\lambda_b'}\right) D\right\} - \left\{\left(\frac{1 + \pi}{\lambda_h'}\right)\Delta H + \left(\frac{\lambda_h' - \pi}{\lambda_h'}\right) H\right\}}{\left(\frac{c_1 - b_1}{f_2}\right)\left\{\left(\frac{1 + \pi}{\lambda_h'}\right)\Delta H + \left(\frac{\lambda_h' - \pi}{\lambda_h'}\right) H\right\} + \left(\frac{b_1}{f_2}\right)\left\{\left(\frac{1 + \pi}{\lambda_b'}\right)\Delta D + \left(\frac{\lambda_b' - \pi}{\lambda_b'}\right) D\right\}} - \left(\frac{c_0}{c_1}\right) + \left(\frac{c_2}{c_1}\right)\pi^e \tag{9}$$

[24]It is interesting that the empirical investigations of reduced-form relationships for nominal income usually imply that Py before taxes is related to the level of H and the change in D. That is not the form suggested by equation (8).

Under the same assumptions discussed after the solution for P_y, (9) implies that r is negatively related to a composite expression that depends on the change and level of high-powered money and positively related to a composite expression that depends on the change and level of government debt. Once more, in the very short run changes in the two assets matter much more than levels, while in the very long run the reverse is true. The reason for this difference between the short run and the long run, fundamentally, is that asset demands are less interest-elastic in the short than in the long run. Consequently, interest rate movements to clear asset markets are highly sensitive to changes in the policy-determined assets H and D in the short run and to levels of these assets in the long run.

Equations (8) and (9) together imply that the mix of monetary and fiscal policy affects the interest rate that corresponds to a given nominal income. It follows that the higher the debt *for a given nominal income,* the lower the capital stock for that income. But it does not follow that higher debt leads to lower capital stock *if we allow nominal income to change.* To analyze the complete effect of debt on capital stock, we need the solution for capital stock.

The solution for the capital stock is:

$$(10)\quad \left\{\left(\frac{1}{\lambda_k'}\right)\Delta k + k\right\} P = \frac{f_1}{f_2}\left\{\left(\frac{1+\pi}{\lambda_b'}\right)\Delta D + \left(\frac{\lambda_b' - \pi}{\lambda_b'}\right) D\right\} + \left[\frac{a_1}{b_1} + \frac{f_1}{f_2}\left(\frac{c_1 - b_1}{b_1}\right)\right]\left\{\left(\frac{1+\pi}{\lambda_h'}\right)\Delta H + \left(\frac{\lambda_h' - \pi}{\lambda_h'}\right) H\right\}$$

Like the previous two equations, this one is a composite of changes and levels. In the very short run it is a relationship between net investment, the change in high-powered money, and the deficit (the change in D). In the long run it is a relationship between the stocks of capital, of high-powered money, and of government debt.

The signs of the relationship, however, are unclear in this case. They depend on the sign of f_1, which can easily be negative for some parameter values and positive for others. A negative value is consistent with crowding out; that is, with a negative effect of government debt on capital stock. High sensitivity of the demand for capital to the interest rate (a high value of a_1) and low sensitivity of the demand for money to the interest rate (a low value of b_1) will lead to a negative f_1. To put it another way; if bonds and capital goods are close substitutes, and bonds and money are not, then crowding out will occur. The reverse conditions—close substitution between bonds and money and not between bonds and capital goods—will lead to a positive f_1, and therefore no crowding out.[25]

[25]For similar conclusions, see Darrel Cohen and J. Stuart McMenamin, "The Role of Fiscal Policy in a Financially Disaggregated Macroeconomic Model, *"Journal of Money, Credit, and Banking,* vol. 10, August 1978, pp. 322–36, and Benjamin M. Friedman, "Crowding Out or Crowding IN? Economic Consequences of Financing Government Deficits," *Brookings Papers on Economic Activity,* 2978:3, 593–641.

However, even in this model, with its ambiguity as to the direction of effect of government borrowing on capital stock, the *ratio* of capital to output is unambiguously negatively related to the *ratio* of the deficit (in the short run) or the debt (in the long run) to nominal income. An increase in debt *can* cause an increase in capital stock, but if it does, it causes a still larger percentage increase in income. The relationship between ratios is:

$$(11)\quad \left\{\frac{\left(\frac{1}{\lambda_k'}\right)\Delta k + k}{y}\right\} = \left(\frac{f_1}{b_1} + \frac{a_1 f_2}{b_1 (c_1 - b_1)}\right) - \left(\frac{a_1}{c_1 - b_1}\right)\left[\frac{\left(\frac{1+\pi}{\lambda_b'}\right)\Delta D + \left(\frac{\lambda_b' - \pi}{\lambda_b'}\right) D}{P_y}\right]$$

Analysis of this simple model thus supports the following propositions:

(1) With plausible assumptions about parameters, higher deficits in the short run and higher debt in the long run raise nominal income and raise nominal interest rates.

(2) These results, however, do not imply anything about crowding out—that is, about the effect of deficits or the debt on the capital stock. For some parameter values the model is consistent with crowding out while for others it is not.

(3) The capital-output ratio in the long run is related to the ratio of debt to income rather than to the deficit. If we are concerned about long-run growth of capital relative to output, then we should, by the logic of this model, focus on the ratio of debt to income rather than on the deficit.

Appendix 2
Relation of the National Income and Product Accounts (NIPAs) Deficit to the Change in the Market Value of Debt Held by the Public

Reconciliation items			Fiscal Years 1981	1982
NIPA deficit			57.8	112.2
Minus:	*Coverage differences*		17.3	13.9
	Receipts[1]		1.1	1.6
	Expenditures:	Geographical[2]	—4.5	—4.9
		Other[3]	20.7	17.2
	Financial transactions		—29.1	—20.0
	Receipts		0	0
	Expenditures:	Net lending	—28.7	—19.3
		Net purchases of foreign currency	0	0
		Other[4]	—0.4	—0.7
	Net purchases of land		7.6	2.2
	Expenditures:	Outer Continental Shelf	7.8	2.4
		Other	—0.2	—0.2
	Timing differences		3.5	4.7
	Receipts:	Corporate income tax	2.8	11.9
		Federal and state unemployment insurance taxes	—0.1	—1.1
		Withheld personal income tax and social security contributions	3.0	—3.0
		Excise taxes	0	0.7
		Other	—0.3	—0.2
	Expenditures:	Purchases of goods & services	—1.7	—2.2
		Interest	0.1	—1.0
		Transfer payments	0	—0.3
		Subsidies less current surplus of government enterprises	—0.3	—0.1
	Miscellaneous		0.4	0.5
	Receipts[5]		0	0.3
	Expenditures[6]		0.4	0.2
Equals:	Unified budget deficit		57.9	110.7
Plus:	Off-budget deficit		21.0	17.3
Equals:	Total budget and off-budget deficit		78.9	128.0
Minus:	*Asset accounts: Cash & monetary assets*		—1.8	—11.9
	U.S. Treasury operating cash		2.3	—10.5
	Special drawing rights		0.2	0
	Reserve position on the U.S. quota in the IMF		—2.4	—1.5
	Other		—1.9	0.1
	Asset accounts: miscellaneous		—4.3	—1.1
	Liability accounts		5.1	5.6
	Accrued interest payable to the public		3.0	3.6
	Allocations of special drawing rights		0.3	—0.4
	Deposit funds		1.8	0.7
	Other		0	1.7
	Transactions not applied to current year's surplus or deficit		0.7	0.4

Appendix 2 (Continued)
Relation of the National Income and Product Accounts (NIPAs) Deficit to the Change in the Market Value of Debt Held by the Public

Reconciliation items		Fiscal Years	
		1981	1982
Equals:	Change in outstanding debt held by the public (par value)	79.3	134.9
Minus:	Par-to-market conversion[7]	41.7	—79.2
Equals:	Change in outstanding debt held by the public (market value)	37.6	214.1

Sources: *Survey of Current Business* (July 1983), p. 56; *Monthly Treasury Statement* (September 1982), pp. 22-3.

Notes to Appendix 2

[1]Consists largely of contributions for social insurance by residents of U.S. territories.

[2]Consists largely of transfer payments to residents of U.S. territories.

[3]Consists of agencies not included in the unified budget, such as the Postal Service and the Federal Financing Bank, and net purchases of silver and minor coin metal.

[4]Includes capital gains on government loans.

[5]Consists largely of Treasury receipts from sales of foreign currencies to Government agencies.

[6]Consists largely of net expenditures of foreign currencies.

[7]Based on unpublished par-to-market ratios described in W. Michael Cox and Eric Hirschhorn, "The Market Value of the U.S. Government Debt; Monthly, 1942–1980," *Journal of Monetary Economics*, Vol. 11, No. 2 (March 1983), pp. 261–72.

Discussion

Barry P. Bosworth*

Frank de Leeuw and Thomas Holloway have provided us with an interesting paper that covers a wide range of issues connected with measuring the economic effects of the budget. I found the latter parts of the paper which are concerned with analyzing underlying sources of recent change in the budget and the tables that accompany that discussion to be of particular interest.

The first part of the paper is devoted to developing two issues:

1. An alternative to high employment GNP as a means of adjusting for cyclical fluctuations in the budget; and

2. The suggestion that the cyclically adjusted debt-GNP ratio is superior to the deficit-GNP ratio as a means of measuring the long-run crowding-out effect of the budget on the economy.

The authors' concept of an adjusted GNP measure based on the mid-expansion phases for the business cycle seems superior to the usual potential GNP concept of those applications where it is important that the cyclically adjusted series maintain the average level of actual GNP—perhaps, as they suggest, in computing cumulative values such as total debt. In other applications, I find that the aggregate supply or capacity concept of potential GNP is more appealing. The de Leeuw-Holloway measure differs from the Wharton concept of industrial capacity only in using the mid-expansion phase rather than the peak of the business cycle to establish trends. As such it suffers from the same problems discussed before with respect to the Wharton measures of capacity utilization. I find it difficult to accept the underlying notion of regularity to the business cycle that would allow the use of any phase as adequate for cyclical adjustment. I am particularly bothered by a cyclically adjusted GNP measure that implied that the associated unemployment rate has risen from 5.5 percent in 1972 to 8 percent in 1983.

I believe that the discomfort with using potential GNP to measure adjusted fiscal policy results more from the notion of potential GNP as a target. Since nobody expects the economy to reach potential for several years, focusing on the high-employment budget is not an adequate means of evaluating the mix of fiscal-monetary policy along a target path that is far below potential.

I find the second notion of using a debt-to-GNP ratio to evaluate the potential crowding out effects of the budget to be quite interesting. But here I have some questions.

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a. Doesn't the use of debt/GNP* ratio to measure crowding out correspond only to an economy that always operates at full resource utilization? Suppose government enacts a temporary tax reduction to assist in recovery from a recession. By doing so the deficit and the stock of debt in future periods are higher, but I don't see that investment is crowded out in the initial period or in the future. The assumption that the complex issue of crowding out of private investment can be simplified to a debt/GNP ratio seems to ignore the stabilization concept that lies behind the advocacy of an active fiscal policy.

Perhaps the authors have in mind some notion of a portfolio balance model where government and private debt are imperfect substitutes for one another (the Friedman paper)—that seems to be implied by the analysis of Appendix A. But certainly one cannot associate private debt with physical capital and government debt with consumption. In other words, I have some difficulty understanding the implied underlying model. It seems to me that one cannot avoid looking at the issue, as do several other papers at this conference, in terms of the deficit (a flow concept) relative to the balance of resource utilization and monetary policy at the time it occurs. I don't, in general, believe that a discretionary budget deficit which originates in a recession imposes costs in future periods. It is not clear what additional information about "crowding out" of private expenditures is provided by looking at the debt/GNP ratio.

Perhaps, de Leeuw and Holloway mean to stress the *change* in the debt rather than the deficit. Those two concepts differ by the inclusion of capital gains and losses in the market value of the debt and of financial transactions in the debt concept.

b. Shouldn't financial assets transactions be excluded from the debt concept? That is, use a measure of debt that corresponds to a cumulation of the NIA deficit plus capital gains. Suppose government credit agencies operated in a fashion identical to private financial intermediaries. We wouldn't report the assets of private financial intermediaries as crowding out the real expenditures of others. The exclusion of financial transactions would also seem to follow from the analysis of Appendix A.

I thought the analysis of budget trends in the second section was the most interesting part of the paper. In Table 2 the authors distinguished between inflation and discretionary policy actions as sources of change in the cyclically adjusted budget. Table 8 provides some additional detail. For example, in seeking the sources of change in the budget deficit from 1981 to 1983, the dominant discretionary action is on the expenditure side. The slowing of inflation is also of considerable importance. The tax cuts seem to count for very little. I wondered if the authors might comment on the difference between their numbers and the projections of CBO and OMB. The projections of those two agencies show a rise of about 1 percent in the ratio of expenditures to GNP between 1981 and 1988 and a drop of 2 to 3 percent in the revenues-to-GNP ratio. In other words, those agencies emphasize the tax cuts far more than expenditures as changing the path of the future deficit. It would be helpful in this regard if the authors could extend their analysis into the 1984–88 period by analyzing the CBO projections on a cyclically adjusted basis.

The material of Table 8 is also of interest in highlighting the importance of the relationship between the real interest rate and the growth of real GNP in projecting the path of debt/GNP. I assume that the interest rate would also be an equally critical factor in determining the path of the deficit. If so, the interest-rate-less-growth factor has added 2 to 3 percent to the annual deficit as a share of GNP in 1982–83 relative to the average of the 1970s. That seems very large compared to the data of Table 4. It is, I believe, only because of the sharp slowdown in their measure of trend GNP in the 1980s. The interest payment data of Table 4 is essentially $\frac{r \cdot D_{t-1}}{GNP^*_t}$, while that of Table 8 is $\frac{(r-q) \cdot D_{t-1}}{GNP^*_{t-1}}$.

Table 8 also provides a good illustration of the importance of coordinating fiscal-monetary policy with respect to a target path for GNP. The difference between r and q is basically a disequilibrium concept; but if r rises because of monetary restraint or q falls because of low growth prospects, their measure clearly brings out the need for offsetting changes in the budget deficit to maintain the same growth of the debt/GNP ratio.

The Theory of Optimum Deficits and Debt

Willem H. Buiter*

I. Introduction

This paper deals with some of the issues that arise in connection with the optimal financing of a given program of "exhaustive" public spending on goods and services. The determination of the size and composition of this real spending program is not considered. A more general view would encompass the optimal joint determination of the public sector's consumption and investment program and its method of financing, but even the less ambitious approach adopted here raises a very wide range of issues and considerations.

Government financial policy is about the management of the public sector balance sheet, broadly defined. It includes the choice of taxation versus borrowing. It also concerns the composition or structure of taxes (lump sum, direct, indirect, degree of progression, etc.) and the characteristics of the debt instruments issued by the government (interest-bearing or noninterest-bearing, legal tender, maturity, degree of indexing, etc.). Monetary policy, exchange rate management and foreign exchange market intervention therefore belong to financial policy as much as open market operations or bond issues "to finance the deficit." It should be obvious that questions concerning the distribution of income (intragenerational as well as intergenerational) are inextricably intertwined with questions relating to the financing of a given real spending program. Stiglitz (1983a,b) has emphasized the inevitable intertemporal and intergenerational risk-sharing attributes of financial policy, something I shall return to in Section II.

Like any other kind of government intervention in the economy, government financial policy can be rationalized in one of two ways. The first is intervention for purely distributional reasons. While they are of major importance, I shall not pay much attention in what follows to the distributional objectives of the government. The distributional consequences of alternative financing rules will, however, be central. Indeed financial policy influences real economic variables largely by affecting the intertemporal and interpersonal (including intergenerational) distribution of income and wealth. The second justification for financial policy is the identification of instance(s) of market failure together with the attribution to the government of the ability to undertake remedial welfare-improving actions that private

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agents either cannot undertake or do not find in their own perceived self-interest to undertake.

The market "imperfections" central to an appreciation of the potential welfare-improving role of financial policy are capital market imperfections. Included in this are any restrictions on the ability of private agents to effect intertemporal transfers of purchasing power in either direction at social intertemporal terms of trade. In the overlapping generations model with finite lives and without operative intergenerational gifts and bequests, the incompleteness of the set of forward markets (or the absence of a full set of Arrow-Debreu securities) is due to the "technological" constraint that the dead cannot consume goods and services and the legal constraint that private agents cannot impose binding financial obligations on the unborn. In real life this nonexistence of certain forward markets is augmented by a wide array of capital market imperfections. Private agents are constrained in their spending plans by the illiquidity and nonmarketability of certain assets such as pension rights and human capital (including expected future income tax cuts). Collateral requirements limit access to credit. These cash flow constraints, liquidity constraints, lack of suitable collateral, nonmarketability of certain assets and a host of similar capital market imperfections need not take the form of strict credit rationing but may instead merely be reflected in a market price of credit that is in excess of its shadow price.

My inability to borrow on the same terms as the U.K. government is of course not in and of itself evidence of market failure. Recent applications of the theory of market equilibrium under asymmetric information to credit markets (see, for example, Webb, 1981, Stiglitz and Weiss, 1981, 1983), however, have shown how adverse selection or moral hazard can generate privately rational but socially inefficient equilibria that may be characterized by credit rationing, excessive spreads between lending and borrowing rates, and so forth.

Granted the existence of significant and persistent capital market imperfections, does the "opportunity set" of the government differ from and in certain respects dominate that of private agents? In the overlapping generations model already referred to, there are two features that differentiate private and public possibility sets. First, the institution of government is longer-lived than the individual private agents. Frequently endowed with eternal life, governments can, in these models, enter into contracts that extend beyond the life-span of any given generation. In this way governments can be a substitute for some of the nonexistent forward markets. Second, the authorities have the power to tax, that is the power to impose unrequited charges or payments on individuals. For good reasons, governments are exceedingly jealous of this power and discourage private agents from assuming this prerogative which is classified as theft when exercised on private initiative.

The power to tax enables the government to redistribute income between members of the same generation at a point in time, over time for an (a group of) individual(s) and between generations. This power to tax is also the reason why, in an uncertain world, governments can borrow on terms

that are superior to those faced by private agents.[1] Total current and future national income is, subject to political constraints on the tax burden, the collateral for government borrowing. The risk of default through insolvency (but not of discretionary or dishonest default) is therefore less for government bonds than for private debt. Most governments also have the power to determine what shall be legal tender. Almost all have opted for a government monopoly of legal tender, thus adding directly to the attractiveness of those of their liabilities designated to be legal tender (their monetary liabilities) and improving indirectly the quality of all public debt. Most of the other differences between private and public opportunity sets referred to in the literature derive from the greater longevity of the institution of government and the government's power to tax.[2] The view of government financial policy I am advocating has governments acting as a superior financial intermediary, changing the composition of private sector portfolios over time and altering private disposable income flows. Well-designed policy interventions of this kind exploit the government's "comparative advantage" in borrowing to smooth out income streams and facilitate risk sharing. By exploiting its position as the "natural borrower," or borrower of first resort, governments can minimize the extent to which disposable income, current cash flow and the portfolio of liquid, marketable or realizable assets become binding constraints on private consumption, investment, production and portfolio allocation decisions.

This view of financial policy is at the opposite end of the spectrum from the ancient "debt neutrality" position as restated by Barro, 1974, (see also Buiter, 1979, 1980a and Carmichael, 1982). Debt neutrality, that is invariance of the real solution, trajectories of the economy underchanges in the borrowing-taxation mix prevails if financial policy cannot affect the intertemporal (including the intergenerational) distribution of income and terms of trade. With infinite-lived households or, equivalently, finite-lived households characterized by an operative chain of intergenerational gift and bequest motives, with private access to capital markets on the same terms as the government and with unrestricted lump-sum taxes and transfers, public sector financial policy is irrelevant. Relaxing any or all of these exceedingly restrictive assumptions causes this Modigliani-Miller theorem for the public sector to break down and a potential welfare-improving role for active financial policy to emerge.

Active financial policy is most easily defined as the orthogonal complement of passive financial policy. Passive financial policy I define as balanced budget financial policy, that is a continuous or period-by-period matching of receipts and expenditures. Weakly passive financial policy permits balanced budget redistribution; strictly passive financial policy compels taxes and taxes

[1]Clearly I.B.M. borrows on better terms than the state of Grenada. The insertion of the word "most" before "governments" and "private agents" would, however, merely clutter up the text.

[2]For example Webb, 1981 shows how government financial policy will be nonneutral in a world with asymmetric information, if it is less costly for the government to extract taxes from reluctant taxpayers than it is for private lenders to compel performance by dishonest borrowers.

net of transfers and subsidies to be the same. It is well-known that, for example in the overlapping generations model of Diamond 1965, a balanced budget social security scheme implemented through lump sum taxes on the young and lump-sum transfer payments to the old will depress capital formation. Most balanced budget interporal or intergenerational redistribution schemes can be reproduced in terms of their effects on all real endogenous variables by unbalanced budget policies involving public sector borrowing or lending. For example, the social security scheme just mentioned is isomorphic to government borrowing with debt service financed by new debt issues and by lump sum taxes on the young. Without risk of ambiguity I shall therefore identify active financial policies with policies that permit, under specified conditions, systematic and predictable departures from budget balance.

Active financial policy, as just defined, has a wide range of functions and consequences, only a few of which can be considered here. By influencing the interpersonal, intertemporal and intergenerational distribution of income it will affect risk sharing, the extent to which households can smooth consumption over the life cycle, and capital formation. All this can occur in models in which current goods and labor markets clear continuously. I shall discuss this briefly in Section II. If lump sum taxes are not feasible, the timing of distortionary taxes will influence the total excess burden or deadweight loss imposed on the economy. The same will hold if tax collection costs in any given period are a more than linearly increasing function of the marginal or average tax rate in that period. This is considered in Section III. Again this applies in labor and output market clearing models.

For models with a strong new classical flavour, it has been established that various contingent or conditional financial rules (monetary or fiscal feedback rules) which are, in general, inconsistent with continuous budget balance, will alter the joint distribution function of real economic variables by changing the information content of currently observed prices when there is incomplete information about the current state (Weiss, 1980, Turnovsky 1980, Buiter 1980b, 1981). While of some theoretical interest, this financial stabilization channel appears to be of secondary practical importance and I shall not consider it any further here.

In a world with persistent labor market and/or output market disequilibrium, the capital market imperfections that are the sine qua non of financial policy spill over into the markets for output and labor. For example, the existence of the multiplier, which is due to the inclusion of current disposable income as an argument in the private consumption function, over and above its contribution to permanent income, reflects a capital market imperfection—the difficulty of borrowing against the security of anticipated future labor income. In a fixed price model the operation of the multiplier amplifies the effect of demand shocks on output and employment. Financial policy entailing temporary deficits may be the appropriate government response.[3] The balanced budget multiplier theorem would appear to suggest

[3]First best policy would eliminate the market imperfections. The discussion assumes that this has been pursued as far as is possible.

that any desired response to demand shocks can be achieved without deficits by varying both exhaustive public spending and taxes net of transfers. I would argue that, to a first order approximation, optimal budgetary stabilization policy of this kind would involve varying taxes and transfers in response to demand shocks while leaving the path of public consumption and investment spending unchanged. The intuitive reasons for this are that if public sector consumption spending is worthwhile, it is worthwhile regardless of the aggregate demand shocks that afflict the economy and that the time profile of public sector capital formation is dictated within rather narrow limits by the time profile of future planned public sector production. The government's spending program on goods and services should be designed to achieve the best feasible public-private consumption mix out of permanent national income. The tax-transfer-borrowing and money creation rules should be aimed at optimizing national permanent income, keeping private disposable income in line with private permanent income and ensuring an adequate share of disposable, realizable (financial) private wealth in total or comprehensive private wealth, which includes such illiquid assets as human capital.

The above applies to the *optimal* design of exhaustive spending policies and financing policies. If, as in the United Kingdom today, certain categories of public spending (especially public sector capital formation) have been cut to levels that are well below most reasonable notions of optimality and if at the same time a "Keynesian" fiscal boost to aggregate demand is desirable, both structural (or allocative) and stabilization purposes can be served by a larger volume of spending on goods and services (social overhead capital formation and investment in some of the nationalized industries in the United Kingdom). In Section IV I review briefly some of the well-known arguments about the role of deficits and debt in short-run stabilization policy when there is disequilibrium in labor and product markets.

Concern about debt and deficits on the part of the authorities tends to derive from two alleged consequences of public sector deficits. First, to the extent that deficits are monetized they are feared to lead to inflation. Second, to the extent that they are not monetized but financed by issuing interest-bearing debt, they are feared to "crowd out" interest-sensitive private spending, especially private capital formation. This "crowding out" can occur either through upward pressure on real interest rates caused by additional borrowing or by displacing private capital formation at given real interest rates, as in Sargent and Wallace, 1981 (see also Buiter, 1981a, b; 1983). Section V considers in some depth the "eventual monetization" implied by the government's fiscal and financial plans and the long-term financial crowding out[4] implications of the government's budgetary and monetary policy. While these issues belong to the domain of positive rather than normative fiscal and financial policy, they are of considerable practical

[4]I only consider the familiar financial crowding out issue. Other forms of "direct" crowding out due to complementarity or substitutability between private and public consumption and investment etc. are not dealt with (see Buiter, 1977).

interest. On the principle that feasibility is a prerequisite for optimality Section V therefore analyzes the sustainability, consistency and credibility of fiscal, financial and monetary policy. The comprehensive net worth and the permanent income of the public sector are two central concepts in this analysis.

II. Financial Policy with Lump-Sum Taxes and Transfers When Goods Markets and Factor Markets Clear.

Using the analytical framework of the simple overlapping generations model without intergenerational gift and bequest motives, Stiglitz, 1983a,b establishes the following propositions for the case where unrestricted lump sum taxes and transfers are possible and output and factor markets clear.

Proposition I (Stiglitz 1983a)

An increase in the government deficit has neither real nor inflationary effects so long as the associated changes in (lump sum) taxes are distribution neutral and so long as the debt will eventually be reduced to its original level.

Proposition II (Stiglitz 1983b)

A temporary change in the structure (maturity composition, nature and degree of index linking, etc.) of the public debt has no real or price level effects provided it is accompanied by the appropriate lump sum taxes/subsidies to avoid any distributive effects.

Proposition III (Stiglitz 1983a,b)

A change in the interest rate paid on (unindexed) government debt financed by a change in the supply of such debt has price level effects but no real effects.

Note that all these propositions apply to an economy in which there is no explicit or implicit transactions technology. Government debt has a store of value function only; there is no special medium of exchange or means of payment function for a subset of the public sector's financial liabilities, that is, there are no monetary assets. "Inflation" in Stiglitz's models is a decline in the price of public debt in terms of real output. The first two propositions give the conditions under which the Modigliani-Miller theorem for the public sector holds in this economy. The third proposition is the familiar classical dichotomy.

The interest of Propositions I-III lies in the extreme restrictiveness of the conditions under which financial policy will be neutral.

Proposition IV (Stiglitz 1983a)

Stiglitz goes on to show that any anticipated changes in financial policy other than those described in propositions I, II and III have both real and

price level effects on the economy. Any unanticipated change has no real effects on the economy only if it doesn't change individuals' subjective probability distributions concerning future government financial policy and if all changes in debt are accompanied by changes in lump-sum taxes and subsidies to neutralize any distributional consequences.

Having established the nonneutrality of "almost all" financial policy actions or rules, the design of optimal financial policy can be tackled. Since the class of models under consideration is rather far removed from practical applications, I shall limit the discussion to two aspects of optimal financial policy.

Government Debt and Private Capital Formation

In the Diamond, 1965, version of the overlapping generations model, debt issues involve redistribution from the young to the old. This depresses saving and capital formation in the short run and lowers the steady-state capital-labor ratio. In such economies private decentralized decisionmaking can result in equilibria in which the real interest rate is below the natural growth rate. This dynamic inefficiency can be eliminated by issuing government debt to absorb excessive private saving. If the real interest rate exceeds the growth rate, such Pareto-improving financial policies are not feasible. Given the government's social welfare function (which would typically be strictly increasing in the welfare of each generation), social welfare improving financial policy actions may still exist. For example, budget surpluses and government lending can boost capital formation. The welfare loss this imposes on those currently old may be more than compensated for by the welfare gains of the young and of future generations.

Optimal Intertemporal Risk Distribution Schemes

The effects of financial policy on private capital formation occur even without uncertainty. In a stochastic environment, government financial policy can generate changes in the intertemporal (and specifically the intergenerational) distribution of risk. In the two-period overlapping generations model, individuals of different generations cannot trade risks in the market place. The longevity of the institution of government permits intergenerational risk sharing through the public debt-tax-transfer mechanism. A detailed analysis can be found in Stiglitz 1983a,b who shows that the optimal (in terms of an individualistic social welfare function)[5] intertemporal distribution of wealth and risk can be implemented, at a constant price level, through financial policy involving only a single financial instrument provided the government can impose age-differentiated lump-sum taxes and transfers. When lump-sum taxes and transfers cannot be fully adapted to individual characteristics, the existence of a variety of public sector debt instruments is potentially welfare-improving.

[5]Stiglitz, 1983a uses a social welfare function that is the discounted sum of each generation's utility. The proposition about optimal intergenerational risk-sharing transcends this specific parameterization.

The time profile of debt and deficits under optimal financial policy will be a function of all taste and technology parameters in the economy, of the stochastic shocks disturbing it, and of the authorities' objective functional. Generalizations are impossible other than the rather self-evident one that a policy of continuous budget balance is likely to be optimal under a set of conditions of measure zero.

III. Financial Policy with Distortionary Taxes and Transfers When Goods Markets and Factor Markets Clear

Recently Barro, 1979, 1981 and Kydland and Prescott, 1980 have applied a well-known "uniform taxation" theorem in public finance to the macroeconomic problem of optimal public sector debt and deficits in an economy with continuous full employment. In the absence of uncertainty and given suitable symmetry, homogeneity and separability assumptions, it is optimal to levy wage taxes at a constant proportional rate throughout an individual's lifetime. (See Sandmo, 1974, 1976, Sadka, 1977 and Atkinson and Stiglitz, 1980.) The argument assumes the nonavailability of lump-sum taxes and subsidies. The original public finance literature was formulated in terms of the deadweight loss or excess burden of fiscal programs involving distortionary taxes, whose minimization (under fairly strict conditions) required the equalization of planned tax rates over the present and the future. Barro's papers consider the possibility of tax collection costs being an increasing and strictly convex function of the ratio of the net total tax take to the tax base.[6] Even in nonstochastic models, a rigorous statement has not been given of the conditions under which the result holds true that the optimal total tax take as a proportion of GDP (or of labor income?) is constant over time, for an economy with the real-world plethora of direct and indirect taxes, taxes on labor and capital income and taxes on wealth. For a stochastic environment, Barro 1981 has argued that the deterministic constant planned tax rate solution translates approximately into a Martingale process for the tax rate τ, i.e.

$$(1) \qquad E(\tau_{t+i}|\Omega_t) = \tau_t \qquad i \geq 0$$

E is the conditional expectation operator and Ω_t the information set conditioning expectations formed at time t (assumed to include τ_t).

Equation (1) follows from its deterministic counterpart only by abuse of certainty equivalence. For (1) to be strictly correct, a LQG (linear-quadratic-gaussian) model structure is required. Given quadratic dead-weight losses, linear constraints and additive white noise disturbances, equation (1) follows. An important (and implausible) restriction this imposes is that of nonstochastic discount rates.[7]

[6]A nonfatal flaw in his analysis is the absence of collection costs in the government budget constraint and the independence of the tax base from collection costs and the time path of taxes. (See Kremers, 1983.)

[7]The same assumptions have to be made to obtain the Martingale property for the stochastic process governing consumption. See Hall, 1978.

Many empirical as well as conceptual problems stand in the way of a direct application of (1) to normative or positive policy design. How does one approximate the "average marginal tax rate" that belongs in equation (1)? What is the proper tax base to relate the tax rate to? Should one use taxes or taxes net of transfers and subsidies, as the theory suggests?

In spite of these and other objections to the strict "uniform expected tax rates over time" proposition, the notion that it is optimal to smooth planned tax rates relative to planned exhaustive public spending because collection costs and/or excess burdens increase more than linearly with the tax rate, is likely to be robust.[8] In the strict version of equation (1) the theory implies

[8]The crucial constraint in the derivation of the uniform intertemporal pattern of tax rates in Barro 1979 is the government's balance sheet constraint.

(i) $$\sum_{i=1}^{\infty} \frac{G_{t+i \mid t}}{(1+r)^i} + b_t = \sum_{i=1}^{\infty} \frac{T_{t+i \mid t}}{(1+r)^i}$$

$G_{t+i \mid t}$ is exhaustive public spending planned, at time t, for time $t+i$.

$T_{t+i \mid t}$ is taxes net of transfers planned at time t for time $t+i$.

For simplicity the real interest rate, r, is assumed constant. b_t is the total stock of real valued single-period bonds in period t. Equation (i) follows from the budget constraint given in (ii) only if the real interest rate exceeds the real growth rate of the tax base.

(ii) $$G_t + rb_{t-1} = T_t + b_t - b_{t-1}.$$

From (ii) it follows that

(iiia) $$\sum_{i=1}^{\infty} \frac{G_{t+i \mid t}}{(1+r)^i} + b_t = \sum_{i=1}^{\infty} \frac{T_{t+i \mid t}}{(1+r)^i} + \operatorname*{plim}_{N \to \infty} \frac{b_{t+N \mid t}}{(1+r)^N}$$

or

(iiib) $$\sum_{i=1}^{\infty} \frac{G_{t+i \mid t}}{Y_{t+i \mid t}} \left(\frac{1+n}{1+r}\right)^i + \frac{b_t}{Y_t} = \sum_{i=1}^{\infty} \frac{T_{t+i \mid t}}{Y_{t+i \mid t}} \left(\frac{1+n}{1+r}\right)^i + \operatorname*{plim}_{N \to \infty} \left\{ \left(\frac{1+n}{1+r}\right)^N \frac{b_{t+N \mid t}}{Y_{t+N \mid t}} \right\}$$

Y_t is real output and n its proportional rate of growth.

Sensible solutions require that the debt-output ratio remains bounded forever. This would cause the last term on the right-hand side of (iii a,b) to vanish if $n < r$. If $n > r$, however, Ponzi games can work forever. Governments can forever service their debt by further borrowing without any risk of debt service requirements outstripping the government's collateral. A competitive, decentralized overlapping generations economy can have temporary and stationary solutions with $n > r$. Indeed, Carmichael, 1982 and Buiter, 1980a show that if there are intergenerational gift and bequest motives and if there is a stationary equilibrium in which the child-to-parent gift motive is operative, then such an equilibrium is necessarily dynamically inefficient with $n > r$. Like Barro, I make use of a government wealth constraint such as (i) in Section V. This means that unless $n < r$, the "no Ponzi game" restriction is imposed in an ad hoc manner.

that a temporary increase in public spending unaccompanied by a matching increase in real output (the tax base) should be financed at least in part by borrowing. A transitory increase in real output will, given public spending, be associated with a budget surplus. The "countercyclical" behavior of the deficit that will characterize the economy if the exogenous level of output follows a regular cyclical pattern and public spending is constant[9] has nothing to do with Keynesian fiscal stabilization policy or the operation of the automatic stabilizers, however. These are considered in the next section.

IV. Optimal Debt and Deficits When Labor and Output Markets Don't Clear

The Keynesian arguments for running larger deficits (smaller surpluses) when effective demand is depressed and smaller deficits (larger surpluses) when effective demand is buoyant are familiar. Tax cuts in the face of negative demand shocks (or the "automatic" decline of taxes and rise in transfer payments when economic activity falls, that are written into most existing tax and benefit laws) help maintain disposable income. To the extent that disposable income rather than permanent income is the binding constraint on private demand, such active financial policy helps dampen fluctuations in output and employment. In Keynesian models, with workers off their notional labor supply schedules and possibly firms off their notional demand curves for labor as well, avoiding demand-induced swings in real activity is sensible policy.

By reducing taxes (net of transfers) and increasing borrowing during the downswing, exhaustive public spending during the downswing will be financed to a larger extent by private agents who are not constrained by current disposable income—the purchasers of the bonds. Total consumption demand will therefore decline by less than if taxes, which I assume to fall equally on disposable-income-constrained and permanent-income-constrained private agents, had been kept constant during the downswing. When the economy recovers, the additional debt incurred during the downswing can be repaid out of higher than normal taxes. The demand effects of cyclical tax cuts during the downswing and tax increases during the upswing may not be symmetric if, as seems likely, more private agents are constrained in their spending by current disposable income during the downswing than during the upswing.

The smoothing out of consumption over the cycle permitted by countercyclical financial policy would be desirable because of its intertemporal allocative effects even if product and factor markets cleared. Its virtues are enhanced by the initial demand-disturbance-amplifying presence of labor and output market disequilibrium.

When used for cyclical stabilization, successful financial policy should not imply any trend increase in the real stock of debt or in the debt-output ratio. If real interest rates are increasing functions of current and anticipated future deficits, the transitory and reversible deficits that are associated with

[9]This can be taken relative to trend output.

countercyclical policy should have but minor effects on real interest rates. Thus, by raising the level of activity, countercyclical deficits absorb private saving in the short run without lowering the capital stock in the long run. If real interest rate determination is more myopic, even short run and reversible increases in deficits and debt may lead to significant crowding out of interest-sensitive private spending. In most existing macromodels such crowding out can be avoided by monetizing part of the deficit. Provided this monetization is reversed (and is *expected* to be reversed) in proper countercyclical fashion during the upswing, it should have no effect on trend monetary growth and thus on inflationary expectations.

For the sake of completeness, I will conclude this section with the familiar reminder that there are no "model-free" measures of the short-run effect of fiscal or financial policy on aggregate demand. Neither the uncorrected or raw deficit, nor the cyclically corrected deficit, nor the cyclically and inflation-corrected deficit nor the permanent deficit of Section V are proper measures of fiscal impact. The "demand-weighted" (that is, adjusted for the marginal propensity to spend on domestic output), cyclically corrected deficit calculated, for example, in the United Kingdom by the National Institute of Economic and Social Research, as well as the "demand-weighted", cyclically adjusted and inflation corrected deficit calculated for the United Kingdom by Buiter and Miller, 1983, are appropriate indices of the short-run demand effect of fiscal policy only in a static, rather old-Keynesian and expectations-innocent model.[10] The first best approach would be to simulate one's preferred model of the economy under different values of fiscal and financial policy parameters and to call the difference between the solution trajectories (or the statistics describing them) the measure of fiscal impact. These fiscal stance measures will therefore a) be model-specific, b) have time subscripts attached to them and c) be functions of when a particular fiscal or financial action (or rule change) was first anticipated, of its anticipated degree of permanence, and of the degree of confidence with which these expectations are held.

V. Longer-run Aspects of the Fiscal and Monetary Stance: Sustainability, Consistency and Credibility

Preoccupation with the current budget deficit or public sector borrowing requirement (PSBR) can be criticized for a variety of reasons. First, the budget deficit is likely to be a poor or even perverse indicator of the short-run cyclical demand effects of spending and taxation policy. Second, the size or change of the deficit bears no straightforward relation to the allocative or structural effects of government spending and tax programs. A third major reason for not paying too much attention to the PSBR is that it conveys little or no information on the *sustainability* of the fiscal stance, that is, on the *consistency* of long-term budgetary spending-taxation plans, monetary

[10]In the case of Buiter and Miller, 1983 the "inflation correction," or more appropriately, the debt service correction, presupposes that private financial intermediaries transform current interest payments from governments into permanent (disposable) real interest income flows to households.

targets and financial crowding out objectives. The level or change in the current deficit is uninformative as to the *credibility* of the government's budgetary, debt and monetary policy.

In what follows I combine the comprehensive accounting framework developed in Buiter, 1983 with the permanent cost of debt service approach of, Miller (Miller, 1982, Miller and Babbs, 1983). With this apparatus one can address the following issues. First, can previously planned spending programs be financed, given projected real output growth, without raising explicit tax rates or increasing seigniorage (the inflation tax)? Second, what is the "eventual monetization" implied by the fiscal stance; is the government's anti-inflationary monetary stance fiscally compatible and credible? Third, given the spending and taxation plans and the monetary target, is there likely to be financial "crowding in" or "crowding out," that is, is there a tendency for the real stock of interest bearing debt to fall or to rise (relative to trend output)?

To evaluate sustainability and consistency we complement the government budget constraint given in (2) by a comprehensive public sector balance sheet in (3):

$$(2)\qquad g+\dot{K}-\tau+i\frac{B}{p}+\frac{C}{p}-i^*\frac{\epsilon F^*}{p}-\rho_K K-\rho_R R+p_R\dot{R}$$
$$\equiv\frac{\dot{M}+\dot{B}+p_c\dot{C}-\epsilon\dot{F}^*}{p}\equiv P.S.B.R.$$

$$(3)\qquad W\equiv p_K K+p_R R+T+\Pi-\frac{(M+B+p_c C)}{p}+\frac{\epsilon F^*}{p}$$

where g is public sector consumption spending; K the public sector capital stock; τ taxes net of transfers, i the short nominal interest rate; B the stock of short nominal bonds; p the general price level; C the number of consols paying \$1 each period; i^* the foreign nominal interest rate; F^* the net foreign currency denominated assets of the public sector; ϵ the foreign exchange rate; ρ_K the rental on public sector capital; ρ_R the return to a unit of publicly owned natural resource rights; R the stock of publicly owned natural resource property rights; p_R the price of R; M the nominal stock of high-powered money; p_c the money price of a consol; W real public sector net worth; p_K the value of a unit of public sector capital in the public sector; T the present discounted value of future expected taxes net of transfers τ; Π the real capital value of the state's note issue monopoly and r the short real rate of interest. Public sector net worth is made up of tangible real assets, K and R, financial liabilities M, B, C and $-F^*$ and intangible assets T and Π. The capital value of the note issue monopoly Π is found by discounting the future income derived from the assets that are held to "back" the note circulation.

The public sector capital stock is valued not at replacement cost but as the present value of its future returns on the assumption that it remains in the public sector. The value of a publicly owned unit of capital (p_K) need there-

fore not be the same as its value in alternative (private) use or replacement cost which is set equal to 1. (See equation (2).) Indeed p_K could be negative. Without loss of generality the total (public + private) stock of natural resource property rights is treated as constant. $\dot{R} \gtrless O$ therefore means public sector acquisitions (sales) of natural resource rights. Oil discoveries as well as changes in the price of oil are represented by changes in p_R. For simplicity expected rates of return on all assets are assumed to be equalized.[11] This heroic

[11]We therefore assume that:

$$p_K(t) = \int_t^\infty p_K(s,t)\, e^{-\int_t^s r(u,s)\, du}\, ds$$

$$p_R(t) = \int_t^\infty p_R(s,t)\, e^{-\int_t^s r(u,s)\, du}\, ds$$

$$T(t) = \int_t^\infty \tau(s,t)\, e^{-\int_t^s r(u,s)\, du}\, ds$$

$$\Pi(t) = \frac{1}{p(t)} \int_t^\infty i(s,t)\, M(s,t)\, e^{-\int_t^s i(u,t)\, du}\, ds$$

$$= \int_t^\infty r(s,t)\, \frac{M(s,t)}{p(s,t)}\, e^{-\int_t^s r(u,t)\, du}\, ds$$

$$p_c(t) = \int_t^\infty e^{-\int_t^s i(u,s)\, du}\, ds.$$

$$i^*(t) = i(t) - \varepsilon_1(t,t)$$

$$r(t) = i(t) - p_1(t,t)$$

For any variable x, $x(s,t)$ is the value of x expected, at time t, to prevail at time s. $x_1(t,t) \equiv \lim_{\substack{h \to O \\ h > O}} \left(\frac{x(t+h,t) - x(t,t)}{h} \right)$ is the expected instantaneous rate of change of x.

$x_2(t,t) \equiv \lim_{\substack{h \to O \\ h > O}} \frac{x(t+h,\ t+h) - x(t+h,t)}{h}$ is the unexpected rate of change of x.

It is assumed that $x(s,t) = x(s)$ for $s \leqslant t$. Given some minor regularity conditions it then follows that $\dot{x}(t) = x_1(t,t) + x_2(t,t)$.

use of certainty equivalence is a serious limitation of the current presentation of the comprehensive wealth and permanent income approach. Index-linked bonds (short and/or long) could be added to the framework without complications. For expositional simplicity the entire maturity distribution of the public debt is represented by the shortest and longest maturities.

The PSBR in Britain is measured by the right-hand side of (2). Sales of existing public sector assets (natural resource rights and public sector capital) are put "above the line" and *ceteris paribus* reduce the PSBR where they involve the ending of majority public ownership. The public sector financial deficit on a national accounts basis places all sales of existing assets "below the line" with conventional borrowing and money creation.

The rate of change of public sector net worth $\dot{W}(t)$ can be decomposed into an anticipated part, $W_1(t,t)$, and an unanticipated part, $W_2(t,t)$. It is easily checked that the anticipated change in W is given by:

$$(4) \qquad W_1(t,t) = r(t)\,W(t) + (p_K(t) - 1)\,\dot{K}(t) - g(t)$$

$$= -\{g(t) - r(t)\,(T(t) + S(t)) - r(t)\left(p_K(t)K(t) + p_R(t)\,R(t) + \frac{\varepsilon(t)F^*(t)}{p(t)} - \frac{(B(t)+p_c(t)C(t))}{p(t)}\right) - (p_K(t)-1)\dot{K}(t)\}$$

where the present value of future seigniorage $S(t)$ is given by

$$(5) \qquad S(t) \equiv \int_t^\infty \frac{M_1(s,t)}{M(s,t)}\,\frac{M(s,t)}{p(s,t)}\,e^{-\int_t^s r(u,t)du}\,ds.$$ [12]

For *ex ante* or planning purposes only the expected change in $W(t)$ is relevant and we shall focus on this.

When $p_K = 1$, public sector net worth decreases if and only if there is a "real" deficit, that is, if public sector consumption expenditure exceeds the instantaneous (short run) real return on comprehensive public sector net worth, $r(t)\,W(t)$. Public sector capital formation does not affect public sector net worth if the shadow price of capital in the public sector, p_K, equals its opportunity cost, 1, but will raise (reduce) net worth if $p_K > 1$ (< 1).

One characterization of a sustainable fiscal plan requires public sector net worth to grow at the natural rate of growth of output, n. That is:

$$(6) \qquad W_1(t,t) = n\,W$$

[12]Unanticipated changes in W are due to unexpected changes in p_K, p_R, T, Π, p_c, ε and p. For example, the unexpected change in T is given by

$$T_2(t,t) = \int_t^\infty e^{-\int_t^s r(u,t)du}\,[\tau_2(s,t) - \tau(s,t)\int_t^s r_2(u,t)\,du]\,ds.$$

The present value of future taxes net of transfers increases if there is an unexpected increase in future values of τ and if there is an unexpected reduction in future discount rates (if $\tau(s,t) > 0$).

or

$$(6') \qquad g(t) = \bar{r}(t)\, W(t) + (p_K(t) - 1)\dot{K}$$

where $\bar{r} = r - n$.
and $n = \dot{\bar{y}}/\bar{y}$

If $g(t)$ were to exceed (fall short) of the right-hand side of (6'), public sector comprehensive net worth would be falling (rising) *ex ante* relative to trend GNP, $\bar{y}$. If $p_K K$, $p_R R$, T, S and $\frac{\epsilon F^*}{p}$ all grew at the natural rate, the entire decline (increase) in the public sector net worth—GNP ratio would come about through an increase (reduction) in the interest-bearing debt-GNP ratio. In most models not exhibiting debt neutrality, such an increase (decrease) in the "debt burden" causes financial crowding out (crowding in). The degree and time pattern of this financial crowding out (in) will of course be model specific. A simple model with full crowding out is given in Sargent and Wallace, 1981. (See also Buiter, 1982(a,b) and 1983.)

Even if $p_K(t) = 1$, a program satisfying (6'), which would keep the expected public sector net worth-trend GDP ratio constant, implies *anticipated* variations in the share of public consumption in trend net output, if the short real interest rate varies over time. An alternative and more desirable approach, following Hicksian permanent income notions, starts from the constraint (assumed to hold with strict equality) that the present value of public consumption must not exceed $W(t)$. That is:

$$(7) \qquad G(t) = W(t) \equiv p_K K + p_R R + T + S - \left(\frac{B + p_c C}{p}\right) + \frac{\epsilon F^*}{p}$$

where

$$(8) \qquad G(t) \equiv \int_t^{\infty} g(s,t)\, e^{-\int_t^s r(u,t)du}\, ds.$$

Given the value of tangible assets and liabilities, $p_K K + p_R R - \frac{B + p_c C}{p} + \frac{\epsilon F^*}{p}$, an increase in the public consumption spending program requires an increase in the present value of future explicit taxes-net-of-transfers (T) and/or in the present value of future seigniorage, S. An increase in S is commonly assumed to require an increase in the (average) future rate of monetary growth and thus in the rate of inflation.[13]

[13]This will not be so if the inflation elasticity of the demand for real high-powered money is negative and greater than unity in absolute value.

Other ways of raising public sector net worth discontinuously, at a point in time, to finance a costlier public consumption program are by improving the productivity of public sector capital (an increase in p_K) or, if $p_K < 1$, by a sale of public sector capital (at its replacement value) to the private sector, using the proceeds to reduce $\frac{B+p_c C}{p}$, say. Finally, default is an option, either *de jure,* by formally repudiating debt, or *de facto,* by engineering an upward jump in the price level (which is a possibility in most New Classical models), a downward jump in the price of long-dated bonds or, if $F^* > O$, a real depreciation of the currency.

Note that there are certain to be mechanisms at work in the economy that link the various items in (7) together. For example, in a Keynesian world, a cut in the spending program ($G(t)$) may lower the tax base and thus $T(t)$ even at given tax rates. If the economy exhibits financial crowding out (the displacement of private capital by public sector interest-bearing debt) a larger value of $\frac{B(t)+p_c(t)C(t)}{p(t)}$ might reduce $T(t)$, and so on.

We can rewrite (8) as

$$\int_t^{\infty} \frac{g(s,t)}{\bar{y}(s,t)} \, e^{-\int_t^s [r(u,t) - n] \, du} \, ds = \frac{W(t)}{\bar{y}(t)}$$

The constant, indefinitely sustainable, share of public sector consumption in trend GNP, $\left[\frac{g}{\bar{y}}\right]^p$, is given by.

$$(9) \qquad \left[\frac{g(t)}{\bar{y}(t)}\right]^p = \bar{R}(t) \, \frac{W(t)}{\bar{y}(t)}$$

where

$$(10) \qquad \bar{R}(t) = \left[\int_t^{\infty} e^{-\int_t^s [r(u,t) - n] \, du} \, ds\right]^{-1}$$

$\bar{R}(t)$ is the coupon yield on a real consol, when the instantaneous real rate of return is $r(t) - n$ and the strict expectations hypothesis holds, that is investors equate anticipated real rates of return.

Thus a share of public sector consumption in trend GDP in excess of $\left(\frac{g(t)}{\bar{y}(t)}\right)^p$ is unsustainable: it would lower permanent income. One way in which this unsustainability could show up would be through a steady rise in the real costs of narrowly defined debt service $\bar{R}\left(\frac{p_c C + B}{p}\right)$, that is through

increasing financial crowding out pressure. Two useful indicators of the (un)sustainability of the current fiscal stance are therefore the excess of current consumption over the value consistent with a constant ratio of net worth to trend output or "constant net worth deficit"

$$D^W(t) \equiv g(t) - \bar{r}(t)\, W(t) + (1 - p_K(t))\, \dot{K}(t) \tag{11a}$$

and the excess of current consumption over "permanent income" (that value of consumption consistent with a permanently constant share of public consumption in trend output or "permanent deficit."[14]

$$D^p(t)' \equiv g(t) - \bar{R}(t)\, W(t) \tag{11b}$$

The two indices coincide when the real rate of return is expected to be constant ($\bar{r}(t) = \bar{R}(t)$) and the public sector uses its capital with the same degree of inefficiency as the private sector ($p_K = 1$).

The direct approach to evaluating D^W *or* D^p is, from (11a,b), by the construction of an empirical proxy for W. For $D^W(t)$ we multiply this by the short real rate of interest net of the natural rate of growth; for $D^p(t)$ the real consol coupon yield net of the natural rate of growth must be estimated. Even more informative would be a complete calculation of both sides of (7). As this involves projecting the entire course of future public consumption spending, it is also more difficult in practice. Recent government pronouncements in the United Kingdom about the need for medium and long-term cuts in spending programs to stop the tax burden from rising, can be evaluated using this framework, however.

At this stage, a piecemeal approach to the calculation of D^p and D^W involving a series of "corrections" to the conventionally measured PSBR seems convenient. The various corrections required to go from the PSBR to the permanent and constant net worth deficits are summarized in equations (12a, b).

$$\begin{aligned} D^p(t) = {} & PSBR(t) - p_R(t)\, \dot{R}(t) - \dot{K}(t) + [\bar{R}(t) - i(t)]\, \frac{B(t)}{p(t)} \\ & + \left[\bar{R}(t) - \frac{1}{p_c(t)} \right] \frac{p_c(t)\, C(t)}{p(t)} - (\bar{R}(t) - i^*(t))\, \frac{\epsilon(t) F^*(t)}{p(t)} \\ & - \left(\bar{R}(t) - \frac{\rho_K(t)}{p_K(t)} \right) p_K(t)\, K(t) \\ & - \left(\bar{R}(t) - \frac{\rho_R(t)}{p_R(t)} \right) p_R(t)\, R(t) - (\bar{R}(t)\, T(t) - \tau(t)) - \bar{R}(t)\, S(t). \end{aligned} \tag{12a}$$

[14]This is by abuse of language, since this deficit can by construction not be permanent.

$$(12b) \quad D^W(t) = PSBR(t) - p_R(t)\,\dot{\bar{R}}(t) - p_K(t)\,\dot{K}(t) - \frac{p_1(t,t)}{p(t)} + n\frac{B(t)}{p(t)}$$
$$+ \left(\bar{r}(t) - \frac{1}{p_c(t)}\right)\frac{p_c(t)c(t)}{p(t)}$$
$$+ \left(n + \frac{p_1(t,t)}{p(t)}\right) - \frac{\epsilon_1(t,t)}{\epsilon(t)}\,\frac{\epsilon(t)F^*(t)}{p(t)}$$
$$- \left(\bar{r}(t) - \frac{\rho_K(t)}{p_K(t)}\right)p_K(t)\,K(t)$$
$$- \left(\bar{r}(t) - \frac{\rho_R(t)}{p_R(t)}\right)p_R(t)\,R(t)$$
$$- (\bar{r}(t)\,T(t) - \tau(t)) - \bar{r}(t)\,S(t).$$

Since $D^p(t)$ is probably the more interesting of the two measures, we shall concentrate on it. Taking the corrections to the PSBR in (12a) in turn:

$- p_R\dot{\bar{R}}(t)$: This is a proxy for those net sales of existing public sector assets that should be added to the PSBR to get the public sector financial deficit (PSFD) on a national accounts basis.

$- \dot{K}$: $g(t)$ in (12 a,b) is public sector consumption spending. Many categories of exhaustive public spending possess characteristics both of consumption and capital formation. In the illustrative figures for the United Kingdom given in Table 1 I finesse these problems by following standard national income accounting conventions. On this basis, estimates of public sector net capital formation (at replacement cost) which should be subtracted from the PSBR and PSFD as one of the steps to get to D^p, are available in the United Kingdom.

$+ (\bar{R} - i)\,\frac{B}{p} + \left(\bar{R} - \frac{1}{p_c}\right)\frac{p_c C}{p}$: this is not merely an inflation and real growth correction but also involves the permanent income smoothing reflected in the use of the long real interest rate.[15] (This last step is omitted in (12b).) In public sector permanent income, debt service on the bond debt should be evaluated by multiplying the real long run (consol) rate of interest net of the natural growth rate, $\bar{R}(t)$, into the market value of all bonds. Estimates for this correction for the United Kingdom and a discussion of its methodological foundations are given in Miller, 1982 and in Miller and Babbs, 1983. They are reproduced here in Table 1.

$- (\bar{R} - i^*)\frac{\epsilon F^*}{p}$: This corrects for changes in the domestic currency value of foreign currency denominated assets and liabilities as well as for domestic inflation, real growth and permanent income smoothing. It is very important for a number of LDCs which have borrowed externally in dollars or other

[15]For conventional inflation corrections see Siegel, 1979, Taylor and Threadgold, 1979 and Cukierman and Mortensen, 1983.

Table 1
Calculation of the Permanent Deficit

	PSBR	PSFD	Net Public Sector Capital Formation Correction $-\dot{K}$	Permanent Debt Service and Exchange Rate Correction $+[\bar{R}-i]\frac{B}{p}+\left[\bar{R}-\frac{1}{p_C}\right]\frac{p_C C}{p}$ $-[\bar{R}-i^*]\frac{\varepsilon F^*}{p}$	North Sea Oil Correction $-\left(\bar{R}-\frac{p_{\dot{R}}}{p_R}\right)p_R R$	Cyclical Correction $-(\bar{R}T-\tau)$	Structural and Demographic Tax-Transfer Correction.	Permanent Seigniorage Correction $-\bar{R}\dot{S}$	Permanent Deficit	
										% of GDP
1978	8354	7949	−2844	−5017	−1700	+4700		−187	2901	1.8
1979	12636	8271	−3006	−6461	−1400	+3900		−210	1040	.6
1980	12180	9869	−2625	−8215	− 900	+2700		−227	602	.3
1981	10583	8023	− 883	−9653	900	−2100		−240	−3953	−1.7
1982	5419	6734	0[a]	−9851	1900	−5000		−283	−6500	−2.5

[a]estimate

Sources:
— PSBR, PSFD: ET May 1983, 56
— $\dot{K}$: Blue Book 1982 ed. 1.7 for 1978–1981.
1982 own estimate.
— Permanent Debt Service Correction: Miller and Babbs, 1983.
— North Sea Oil Correction: Own calculations based on NIER, May 1983. F.J. Atkinson, S.J. Brook and S.G.F. Hall, "The Economic Effects of North Sea Oil," pp. 38–44; IFS, John Kay ed., *The Economy and the 1983 Budget;* M.P. Devereux, "Changes in the Taxation of North Sea Oil," pp. 75–79.
— Cyclical Correction: IMF World Economic Outlook, 1982, Table 49, p. 187.
— Permanent Seigniorage Correction: Monetary base x long-run real rate; Miller & Babbs, 1983.

hard currencies. (See Buiter, 1983.) Its significance for the United Kingdom and the United States is likely to be quite minor.

$-\left(\bar{R}-\frac{\rho_K}{p_k}\right)p_K K$: It is difficult to assess the size and magnitude of the excess of current income from public capital over permanent income and I do not attempt to do so. It is likely to be strongly procyclical.

$-\left(\bar{R}-\frac{\rho_R}{p_R}\right)p_R R$: North Sea oil revenues are currently at or near their expected peak value. While in the mid- and late seventies current oil revenue fell short of its permanent value (as perceived at the time) this situation is now reversed. The figures in Table 1 are merely illustrative but are quite conservative, in the sense that they are more likely to understate permanent oil revenue.

$-(\bar{R}T-\tau)$: It should be clear that *current* taxes net of transfers $\tau(t)$ is likely to be a poor proxy for $\bar{R}(t)\ T(t)$. The most important "corrections" to $\tau(t)$ required to obtain a better approximation to $\bar{R}(t)\ T(t)$ are the following:

(a) "Cyclical" corrections to tax receipts and transfer payments. The yield from several major taxes (income taxes, national insurance contributions, VAT, corporation tax) varies inversely with cyclical deviations of economic activity from its full employment, trend or natural level. The opposite correlation holds for such transfer payments as unemployment benefits. Cyclical corrections to the conventionally measured deficit are, from this perspective, desirable not because they provide a better approximation to the short-run demand effect of the budget, but as one step towards the calculation of public sector permanent income or of the permanent deficit.

In Table 1 I use the IMFs estimates of the cyclical correction.[16] These are very conservative in that they do not assign a zero cyclical correction to 1979 but instead assume the cyclically corrected deficit to be 2.3 percent of GDP larger than the actual deficit in 1979 and 1.4 percent of GDP in 1980.

This seems to indicate an expectation of a normal unemployment rate in the United Kingdom of 8 or 9 percent. The Institute of Fiscal Studies,[17] on the other hand, while coming up with very similar year-to-year changes in the cyclical correction, puts its level 2 to 2.5 percentage points of GDP higher. What matters for the sustainability calculation is that a reasonable proxy for the expected average future levels of capacity utilization and unemployment be used. These levels may well be functions of the fiscal policies adopted by the authorities and need not be equal to any "natural" or "full employment" values.

(b) There may be planned, projected or expected changes in the scale and scope of certain tax and benefit programs. For example, under existing legislation governing contributions and benefits, the greying of the United

[16]IMF World Economic Outlook.
[17]John Kay, 1983.

Kingdom population implies a growing excess of pension payments over contributions. Similar concerns have been voiced in the United States. While one could try to make some further rough structural or demographic corrections to the "cyclically corrected" tax and transfer total, I have not done so in Table 1.

$-\bar{R}S$: The perpetuity value of future seigniorage revenue is not so easily determined. Following the definition of $S(t)$ given in (7), one must estimate future government plans for monetary base growth $\frac{\dot{M}}{M}$ and future demands for real high-powered money balances $\frac{M}{p}$.

Note that

$$\bar{R}(t)\frac{S(t)}{\bar{y}(t)} = \bar{R}(t)\int_t^{\infty} \frac{M_1(s,t)}{M(s,t)} \quad \frac{M(s,t)}{p(s,t)\,\bar{y}(s,t)} \quad e^{-\int_t^s [r(u,t) - n]\,du} \, ds.$$

If both the rate of monetary growth and the income velocity of circulation of money are expected to be constant, then

$\bar{R}(t)\,S(t) \equiv \bar{R}(t)\left(\pi(t) - \frac{M(t)}{p(t)}\right) = \frac{\dot{M}(t)}{p(t)}$. . .permanent seigniorage income relative to trend output equals its current value. I will make this assumption, but the overall outcome is not very dependent on it as the amounts involved are fairly small.

Adopting the IFS cyclical correction instead of the one calculated by the IMF would lower the permanent deficit by 2 to 2.5 percent of GDP compared to the figures in the last column of Table 1. Together with a slightly more generous estimate of the permanent income from North Sea oil this would generate a 5 or 6 percent of GDP permanent surplus in 1982. This would leave room for a sizable sustainable increase in the share of public consumption spending in trend GDP over its current level and/or a cut in taxes or increase in transfer payments. Alternatively the government could choose to indulge in a bout of financial "crowding in," using its "permanent" surplus to reduce the real stock of interest-bearing debt. The U.K. economy, unlike that of the United States, would appear to have lots of fiscal elbow room.

Eventual Monetization

The apparatus developed here can be applied to the calculation of the "long-run" monetary growth rate implied by the fiscal stance.

From (5) and (7) it follows that

$$\int_t^{\infty} \frac{M_1(s,t)}{M(s,t)} \frac{M(s,t)}{p(s,t)} e^{-\int_t^s r(u,t)du} ds = G(t)$$

$$- \left[p_K(t) K(t) + p_R(t) R(t) + T(t) - \frac{(B(t) + p_C(t)C(t) - \epsilon(t)F*(t)}{p(t)} \cdot \right]$$

This tells us what the amount of revenue to be raised through the inflation tax is (in present value terms) *given* the spending program and the government's tangible and intangible nonmonetary assets and liabilities. Solving this for a constant rate of monetary growth $\frac{\dot{M}}{M}$ and a constant income velocity of circulation $V \equiv \frac{p\bar{y}}{M}$ yields

$$(13) \qquad \frac{\dot{M}}{M} = V\bar{R}(t) \left[\frac{G(t) - T(t)}{\bar{y}(t)} - \left(\frac{p_K(t)K(t) + p_R(t)R(t)}{\bar{y}(t)} \right) + \frac{B(t) + p_C(t)C(t) - \epsilon(t)F^*(t)}{p(t)\,\bar{y}(t)} \right]$$

If the long-run inflation rate is governed by the rate of growth of the money supply, say $\frac{\dot{p}}{p} = \frac{\dot{M}}{M} - n$, and if the inflation elasticity of velocity is less than unity, a higher monetary growth rate and a higher rate of inflation are implied by a higher present value of public spending relative to nonmonetary assets and liabilities. Only if the public sector's consumption and tax programs together with its nonmonetary assets and liabilities imply a high value of $\frac{\dot{M}}{M}$, is a fiscal correction a necessary condition for achieving credibility for an anti-inflationary policy. If we consider only stationary long-run equilibria, (13) becomes

$$(13') \qquad \frac{\dot{M}}{M} = \left[V \frac{g - \tau}{\bar{y}} - \bar{R} \left(\frac{p_K K + p_R R}{\bar{y}} \right) - \frac{(B + p_C C - \epsilon F^*)}{p\bar{y}} \right]$$

Eventual monetary growth is governed in steady state by the trend public sector current account (or consumption account) deficit, with debt service evaluated at the real interest rate net of the natural rate of growth. This deficit measure can differ dramatically from the conventionally measured public sector financial deficit or PSBR, which is often and erroneously taken as an indicator of eventual monetization. (See Sargent, 1981, Sargent and Wallace, 1981, and Buiter, 1982a,b and Buiter, 1983.)

VI. Conclusion

Bringing together in an integrated analytical framework the many heterogeneous perspectives on debt and deficits that were touched upon in this paper is left as an exercise for the reader. What is apparent even now is that the theory of macroeconomic policy design, as it relates to public spending, taxation, debt management, social security, and monetary and exchange rate policy, is a branch of the theory of public finance, albeit a rather underdeveloped branch. Most traditional public finance theory has been restricted to the case of Walrasian, market-clearing economies with a complete set of markets. Most macroeconomic analysis, except for some simple supply-side economics, ignores the efficiency aspects of fiscal and financial policy. The arbitrary and indeed very harmful dichotomy between "macroeconomic" stabilization policy—using fiscal and financial instruments to minimize deviations from full employment equilibrium—and "public finance" allocative or structural policy—altering the full employment equilibrium—can no longer be justified.

Both the "classical" and the "Keynesian" approaches to financial policy reviewed in this paper force one to conclude that a balanced budget policy is very likely to be harmful in a wide range of circumstances. While mere sound economic analysis is unlikely to convince those who are firmly committed to a balanced budget, it may help persuade a sufficient number of uncommitted citizens of the need to ban this spectre of false fiscal responsibility.

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Discussion

Rudolph Penner*

The Buiter paper provides an interesting and useful tour of various approaches to determining the optimum size of government deficits. In the neoclassical models described by Buiter, differing deficit policies have significant impacts on the distribution of welfare across individuals and across time. In Keynesian models, deficits can be used to smooth out economic fluctuations, while in Barro-type Ricardian equivalence models, deficits do not affect the aggregate savings level or aggregate demand but can be used as a device for smoothing out the level of the tax burden. As Buiter so clearly points out, all of these approaches lead to systematic and predictable variations in the optimum deficit. Therefore he warns against the simple-minded notion that balanced budgets are always good.

Balancing the budget is a mistake the United States is unlikely to make for a very long time. It is important to point out, however, that the proponents of a balanced-budget rule in this country are really enunciating not an economic theory but rather a political theory about collective decision-making.

I would like to spend a little bit of time on this topic even though it has little to do with the Buiter paper. He clearly takes the approach of accepting the level of exhaustive public expenditures as given, and the only question he raises is how you finance that expenditure level. His approach is very interesting and useful, but it has little to do with the fight over deficits in the United States. That involves a profound debate over the actual level and mix of exhaustive expenditures and transfers.

Oversimplifying only a bit, I think it fair to say that very few people in this country, regardless of political ideology, believe that our current deficit levels are optimum by any standard. The real fight is between those who would like to bring the level of total outlays down toward the level of current positive taxes and those who would prefer to raise taxes toward the level of current outlays and perhaps even to raise outlays somewhat. Both sides in this debate seem firmly convinced that the people are on their side.

Both sides can probably be convinced that either the level or the mix of spending, transfers, and taxes is quite wrong because of obvious logical and practical imperfections in our collective decision processes. But those imperfections are so complex, so pervasive, and so poorly understood that, while both sides may agree that the current budget outcome is strongly biased, they vehemently disagree about the direction of the bias.

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Those who advocate a balanced-budget rule are usually found on the conservative side of the political spectrum. They tend to believe that the level of total outlays is higher than what would be desired by that famous person, the median voter. While not all of the advocates of the balanced budget use exactly the same argument, I characterize—or perhaps caricature—the main stream of the argument as follows. In the good old days, there was a clear-cut presumption that the budget would be balanced over relatively short time periods. That notion imposed an external discipline that tended to sharpen collective decisionmaking regarding the level and mix of outlays.

Taxes are compulsory and therefore painful. Sales of government debt represent a voluntary exchange with no short-run pain and therefore, according to this view, lead to sloppiness in decisionmaking. Requiring all outlays to be tax-financed would lower the pain threshold, grab the voters' attention, and lead to a more critical examination of the outcome.

Whatever the merits of this argument, the traditional presumption in this country that budgets should be eventually balanced has been lost. In pure theory, and in the Buiter paper, that is advantageous because it allows us to exploit the efficiency gains that can be obtained by varying the deficits. Unfortunately, the definition of an optimum deficit depends on the choice of a model. The real problem today is that no variant of any of the very different models that Buiter describes in his paper has sufficient political acceptance and credibility to allow whatever rule you get from that model to act as a disciplinary device. If people really believed a particular model and the rules derived from it, then we would have a good substitute for a balanced-budget rule. But there lies the rub. We are now really operating without any rules at all and without much discipline.

The proponents of the balanced-budget rule know that it is crude. Nevertheless, some would like to resuscitate it by putting it in the Constitution. The practical problems associated with that are only slightly less than would be those of putting a Stigletz or Barro-type optimization rule in the Constitution.

This has been a rather long digression from the Buiter paper, and let me now turn specifically to some points in the paper.

Section 5 of the paper is the most interesting to me. Professor Buiter there gives us a comprehensive view of what the deficit really is. His equation incorporates every measure that I have ever heard suggested for adjusting the official deficit. He also carefully elaborates an expression for government net wealth. These concepts are used as a foundation for evaluating the stance of fiscal policy in the United Kingdom. With all of the adjustments, that stance looks pretty rosy.

The part of the analysis that I find hardest to deal with, when you try to make it operational, is what number to choose for the T in equation 3, that is, for the present value of all taxes minus transfers. What that number should be in the future is what everyone is arguing about in the United States. The transfer part of T requires some really profound value judgments, such as how entitled people are to entitlements. I suppose that

you could raise the same question about various types of exhaustive expenditures—that is to say, how committed we are to the long-run defense path that is implied by our treaty obligations, and so on. But I think that most of the political controversy revolves about how committed we are to providing a certain level of transfers. If you look at the problem quantitatively in the United States, social security dominates everything. That is to say, the present value of the stream of social security payments implied by current law just swamps all other nondefense programs, such as food stamps or AFDC or what have you. The enormity of our social security obligations rises even more dramatically if you define them to include medicare.

As I understand Buiter's analysis of the United Kingdom, he simply took current tax and transfer levels and adjusted them for the effect of the business cycle. I suspect that, if he had instead projected the spending implications of current law based on the aging of the population, and other factors, he might have ended up with such large increases in spending that the picture in the United Kingdom would seem much less rosy. On the other hand, the American example may be misleading because, whenever we do change social security spending we often change the tax side of the equation by a comparable amount so that the value of T, that crucial variable in Buiter's analysis, may not change very much. But that may turn out not to be true of medicare in the United States. We may eventually balance outlays and taxes, or we may deficit-finance the program. My main point is that we simply do not know what we are going to do at this point, and that makes it difficult to apply Buiter-type analysis.

Yet I do not want this kind of remark to be interpreted as diminishing the worth of the Buiter analysis. It can be used to experiment with all sorts of paths for the variables, and you can then ask whether the assumed fiscal policy is sustainable, or whether it eventually implies monetization of debt or, at the other extreme, government ownership of all of the resources of the country. Buiter has provided us with a very useful tool, but, as with most tools, it must be used carefully.

Implications of the Government Deficit for U.S. Capital Formation

Benjamin M. Friedman*

Widespread concern, even alarm, over the U.S. government's budget deficit has become one of the leading public policy issues of the decade. Talk about large federal deficits that will persist throughout the 1980s now dominates discussions otherwise intended to focus on specific spending needs—defense, for example, or medical care supports—or on tax restructuring. It also now dominates discussions about the proper course for monetary policy, about the effect of the dollar's international exchange rate on U.S. competitiveness, and about the outlook for the U.S. economy's continued expansion.

These fears are warranted, at least in part. To be sure, much of the discussion has not been carefully put, and some of the ideas expressed have been simply wrong. The chief problem in this regard has been the failure to distinguish clearly between passive deficits that emerge as a result of depressed levels of economic activity and fundamental deficits that persist even when the economy's labor and capital resources are fully employed. Many of the most frequently expressed criticisms of the U.S. government's deficit during fiscal years 1981–83, when economic weakness accounted for much of the deficit that the government then ran, were either largely or wholly misguided. By contrast, the deficits in prospect for fiscal years 1984–88 are indeed cause for concern.

The basic problem is that, under current policies or those now under active consideration, during 1984–88 the U.S. government will continue to run budget deficits at or near the recent unprecedented levels, even if the economy returns to a fully employed condition. (This prospect actually extends well beyond the next half-decade, but official estimates are available only through fiscal year 1988.) Increasingly during these years the deficit will reflect a fundamental imbalance between the government's revenues and expenditures at full employment, rather than a passive response to economic weakness as was the case during the past several years. If for some reason the U.S. economy continues to fall well short of full employment of its resources, then the average deficit realized during 1984–88 will be all the greater.

The principal reason why this indefinite continuation of unprecedentedly large U.S. government budget deficits is a problem is that, by sharply curtailing or even eliminating altogether the economy's net investment in new plant and equipment, it will cut deeply into the economy's ability over time to

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achieve improved productivity and hence a higher general standard of living. The U.S. economy's net capital formation rate is already low in comparison either with its own past experience or with that of major industrial economies abroad. A further erosion, of the magnitude likely to accompany the government deficits now in prospect for the balance of the 1980s, will be a step in the wrong direction.

The object of this paper is to argue that significant further "crowding out" of private-sector net capital formation is indeed the most likely consequence of the course on which U.S. fiscal policy is now set. It is also to argue that the several contingencies which could possibly allow the economy to continue on this course without seriously impairing its capital formation rate appear inadequate, either individually or in combinaton, to provide a genuine solution to this problem without a major policy change. Quick or easy answers are insufficient, and relying on all of the now-unforeseen happenstances to work in the right direction is imprudent. What the situation requires is a direct policy response.

Section I sets out the basic dimensions of the U.S. government deficit problem as it now stands, documenting the transition from (relatively) small deficits on average before 1981 to large deficits thereafter, and from passive deficits during 1981–83 to the prospect of a fundamental imbalance between revenues and spending during 1984–88. Section II uses relationships among familiar economic flows as an organizing device for placing these deficits in the context of the experience of and objectives for U.S. capital formation. Section III buttresses this flow-flow analysis by considering the prospective 1984–88 deficits through the lens provided by a set of less familiar relationships involving the economy's stocks of assets and liabilities outstanding. Section IV briefly summarizes the paper's chief conclusions.

I. The Dimensions of the Problem

Table 1 presents several alternative projections of the U.S. government deficit for each fiscal year during 1984–88. The first projection shown is a form of "do nothing different" baseline, useful as a convenient reference point—and perhaps also because there appears to be a large chance that the Administration and the Congress actually will respond to the situation by doing nothing different. The *current services* projection indicates the Administration's estimate of the likely deficit under a continuation of current tax and spending policies, adjusted to include the Administration's defense program. The table shows two versions of this current services projection, the first presented with the Administration's original budget proposals for fiscal year 1984 (in January) and the second presented as a part of the "midsession review" (in July). The more recent projection foresees smaller deficits than the earlier one, in part because it incorporates the 1983 Social Security legislation but also because it is based on a more optimistic set of assumptions

Table 1
Prospects for the U.S. Government Deficit, 1984–88

		1984	1985	1986	1987	1988
Current Services:	Budget Proposal	$249	$267	$284	$308	$315
	Midsession Review	217	220	233	244	224
Reagan Budget:	Budget Proposal	203	205	157	152	126
	Midsession Review	194	181	139	128	91
Adjusted Reagan:	Budget Proposal	203	205	203	201	177
	Midsession Review	194	181	182	177	144
Congressional Resolution		200	190	157	—	—
Adjusted Congressional Resolution		212	205	203	—	—

Notes: Deficits in billions of current dollars.
Deficit totals include "off-budget" outlays.
Years indicated are fiscal years.
Source: Office of Management and Budget, Congressional Budget Office.

about levels of economic activity.[1] Even so, both projections agree in showing that, if policy proceeds on a current services basis, the deficit will not shrink but will widen over time.

The next two projections in the table focus on policy responses proposed by the Administration. The *Reagan budget* projection indicates the Administration's estimate of the likely deficit after adoption of all of its current tax and spending proposals. Once again the table shows two versions of this projection, with the difference between them representing some combination of changes in the Administration's proposals and changes in the underlying economic outlook.[2] In contrast to the current services projections, both of the Reagan budget proposals show distinct progress in narrowing the deficit over time, especially from 1986 onward. The great bulk of that projected progress consists of revenues to be collected under the "contingency tax plan" proposed to take effect in 1986 unless economic growth is somehow sufficient to reduce the deficit to less than 2½ percent of gross national product (or about $100 billion) without it—an unlikely prospect at best, under any of the projections summarized here. The Administration has never even endorsed its own plan unambiguously, however, and recently official Administration spokesmen have declared it "dead."

The *adjusted Reagan* projection therefore shows deficits exactly corresponding to those in the Reagan budget projection, but adjusted to exclude

[1]Between the January and July estimates the Administration took account of the passage of the Social Security legislation, which will shrink future deficits, but chose to ignore the repeal of tax withholding on interest and dividend payments, which will have the opposite effect. The point is relevant below as well.

[2]Once again, the July estimates ignore the repeal of tax withholding on interest and dividend payments.

the revenues that that projection attributes to the contingency tax plan during 1986–88. (No other adjustments to the Administration's proposals are made, although some other elements are unlikely also.) Once again the table shows two alternative versions. Both show that, even with the adoption of all of the Administration's budget proposals except the contingency tax plan, the likely narrowing of the deficit will be modest and will not occur before 1988 in any case.

The final two projections shown focus on policy responses proposed by the Congress. The *Congressional resolution* projection indicates the deficit path for 1984–86 adopted as part of the First Congressional Budget Resolution for the 1984 fiscal year.[3] This deficit path is not unlike the corresponding years of the midsession review version of the Reagan budget projection, and indeed even the separate revenue and spending totals are closely similar. (The current disagreement between Congress and the Administration over budget matters is largely over the composition of spending, rather than the total of either spending or revenues.) Once again, however, much of the projected narrowing of the deficit is due to the inclusion of revenues from unlegislated—and, in this case, even unspecified—sources. The *adjusted Congressional resolution* projection therefore shows deficits corresponding to those in the Congressional resolution projection, but adjusted to exclude these unattributed revenues. As in the adjusted Reagan projection, the result is a deficit that shows no appreciable narrowing through 1986.

In sum, even after the recent improvement in the economic outlook there appears to be little prospect, under either current or likely alternative policies, for a significant reduction in the U.S. government's budget deficit during the remainder of the 1980s. The current services baseline shows an increasing deficit until 1988. The alternative policy proposals advanced by either the Administration or the Congress, once adjusted to exclude new tax plans now exhibiting much opposition and almost no support, show no further deficit growth but little shrinkage either. Further adjusting either set of proposals to allow for a realistically likely amount of slippage in holding to the stated spending targets would only worsen the corresponding deficit prospects.

Although nominal dollar magnitudes like those shown in Table 1 can sometimes be misleading in a growing economy, the deficits projected here are large even in comparison to the U.S. economy's expanding total size. Table 2 presents analogous projections stating each set of likely future deficits as percentages of the respective set of gross national product values used in deriving it. Allowing for economic growth and price inflation changes the appearance of the problem somewhat, but the resulting relative magnitudes are still very large. None of the projections that are most relevant shows a deficit materially below 4 percent of gross national product before 1988.

[3]The Congressional budget process employs a three-year horizon rather than the five years used by the Administration. The projection shown is that excluding the Congressional "reserve." Including the reserve would increase the projected deficit by $9 billion in 1984, $3 billion in 1985 and $2 billion in 1986. Unlike the Administration's July estimates, this projection allows for the repeal of tax withholding on interest and dividend payments.

Table 2
Prospective Deficits as Percentages of GNP, 1984–1988

		1984	1985	1986	1987	1988
Current Services:	Budget Proposal	7.1%	7.0%	6.9%	6.8%	6.4%
	Midsession Review	6.1	5.7	5.5	5.3	4.5
Reagan Budget:	Budget Proposal	5.8	5.4	3.8	3.4	2.6
	Midsession Review	5.5	4.7	3.3	2.8	1.8
Adjusted Reagan:	Budget Proposal	5.8	5.4	4.9	4.5	3.7
	Midsession Review	5.5	4.7	4.3	3.9	2.9
Congressional Resolution		5.6	4.9	3.7	—	—
Adjusted Congressional Resolution		6.0	5.3	4.8	—	—

Notes: Deficits as percentages of projected gross national product.
Deficit totals include "off-budget" outlays.
Years indicated are fiscal years.
Source: Office of Management and Budget, Congressional Budget Office.

Sustained government deficits of this magnitude, either in dollars or in relation to gross national product, will be unprecedented in U.S. peacetime experience. Table 3 shows, for purposes of comparison, the average budget deficits realized by the U.S. government during the 1950s, 1960s, and 1970s, as well as the deficits for each individual fiscal year since 1971. Despite the often expressed claim that the government's budget has "always" shown a large deficit, in fact persistent deficits larger than ½ percent of gross national product have been a feature of U.S. fiscal policy only since the 1970s. Moreover, until 1982 the deficit had exceeded 3 percent of gross national product only during 1975 and 1976, in the wake of the severe 1973–75 business recession. Analogous effects of the 1981–82 recession have now swollen the deficit to more than 4 percent of gross national product in 1982, and more than 6 percent in 1983.

Unlike these relatively isolated episodes of large deficits in the past, which largely reflected the shortfall of tax revenues and increase in transfer payments due to declining employment, incomes and profits in times of recession, the deficits projected in Tables 1 and 2 for the balance of the 1980s will increasingly represent a budget that would be unbalanced even at full employment. Table 4 presents historical data, comparable to that in Table 3, for the U.S. government's deficit computed on a "high employment" basis (and compared to potential, rather than actual, gross national product).[4] Effects of economic weakness have accounted for some three-quarters of the total cumulated deficit run during the last three decades, leaving only one-quarter as the result of expenditures and revenues that would have been unequal at full employment.

[4]The high employment deficit is not exactly comparable to that shown in Table 1–3, in that it corresponds to the deficit measured on a National Income and Product Accounts basis.

Table 3
Historical U.S. Government Deficit, 1951–1983

	Deficits in Billions of Current Dollars	Deficits as Percentages of GNP
Average, 1951–60	$ 1	0.0%
Average, 1961–70	6	0.5
Average, 1971–80	31	2.4
1971	23	2.2
1972	23	2.1
1973	15	1.2
1974	6	0.4
1975	53	3.6
1976	73	4.5
1977	54	2.9
1978	59	2.8
1979	40	1.7
1980	74	2.9
1981	78	2.8
1982	128	4.2
1983	195	6.1

Notes: Deficit totals include "off-budget" outlays.
Years indicated are fiscal years.
Source: Office of Management and Budget.

This difference between the actual and high employment budget concepts is especially important in determining what magnitudes constitute the outer limits of the U.S. economy's prior experience. In 1975 and 1976, for example, the actually realized deficits of $53 billion and $73 billion corresponded to high employment deficits of $15 billion and $21 billion, respectively. In 1981 the budget would have shown a small surplus if the economy had been fully employed, and in 1982 the actually realized deficit of $128 billion would have been only $19 billion at high employment. In comparison to the economy's size, the largest high employment deficits run during the last three decades were 1.5 percent and 1.9 percent of potential gross national product in 1967 and 1968, respectively.

Although precise esimates do not exist for all of the projections shown in Tables 1 and 2, it is clear that prospects for the remainder of the 1980s are well outside this prior experience. The Administration's estimates corresponding to the budget proposal version of the current services projection show a "structural" component rising from $181 billion out of the total $249 billion projected for fiscal year 1984 to $306 billion out of the $315 billion

Table 4
Historical Deficits on a High Employment Basis, 1955–1983

	Deficits in Billions of Current Dollars	Deficits as Percentages of Potential GNP
Average, 1955-60	–$ 6	–1.0%
Average, 1961-70	–0	–0.1
Average, 1971-80	13	0.8
1971	9	0.9
1972	10	0.9
1973	14	1.1
1974	5	0.3
1975	15	1.0
1976	21	1.2
1977	19	1.0
1978	20	1.0
1979	2	0.1
1980	18	0.7
1981	–7	–0.2
1982	19	0.6
1983	n.a.	n.a.

Notes: Deficits are on a national income and product accounts basis.
Negative values indicate surplus.
Years indicated are fiscal years.
Source: U.S. Department of Commerce.

projected for 1988.[5] Hence the growing structural deficit accounts for more than all of the projected growth in the actual deficit, as the economy returns to approximately full employment during this period. Similarly, the Congressional Budget Office's estimates underlying the construction of the adjusted Congressional resolution projection imply a structural component rising from $128 billion out of $212 billion in 1984 to $147 billion out of $203 billion in 1986. Because of the effects of the economy's recovery, the slight narrowing projected here for the actual deficit masks a continued widening of the deficit at high employment. In contrast to the previous maximum of 1.8 percent (in 1968) for the high employment deficit as a percentage of actual gross national product,[6] the adjusted Congressional resolution projection implies values remaining at or above 3.5 percent throughout.

[5]The Administration did not publish new high employment estimates as part of the mid-session reveiw.

[6]This value does not correspond to that in Table 4 because of the use of actual rather than potential GNP in the denominator.

What is extraordinary about the U.S. government deficits projected for 1984–88, therefore, is not just that they will be large but, more importantly, that they will represent a fundamental imbalance between the government's revenues and its expenditures. It is not possible to dismiss them simply by assuming that rapid growth will quickly restore the economy to full employment. The projected deficits are increasingly deficits at full employment, and in the absence of a return to full employment the deficits that actually emerge will only be larger. The issue now facing U.S. fiscal policy is not the familiar one of the role of automatic stabilizers, or even the desirability (or lack thereof) of temporary active deficits as discretionary stabilizers, but rather the effects of sustained deficits at full employment as a permanent feature of the economy's ongoing development. Among the most important of those effects is the impediment that such deficits will place in the way of the economy's ability to undertake capital formation.

II. The Perspective of Economic Flows

The most familiar way to address the question of the likely impact of sustained government deficits on an economy's capital formation is to exploit the perspective provided by relationships among economic flows. Table 5 summarizes the history of the balance between saving and investment in the U.S. economy since World War II by presenting data showing the economy's respective totals of net saving and net investment, together with the major components of each, expressed as percentages of gross national product. The table also includes, as memorandum items separate from these totals, corresponding data showing the economy's capital consumption and gross private saving (equal to net private saving plus capital consumption).

What stands out immediately in the upper part of Table 5 is the relative constancy of U.S. net private saving (in the second row) in relation to gross national product. The economy's net private saving rate, consisting of personal saving plus corporate retained earnings, represents the share of total output that the private sector as a whole makes available to finance new investment beyond what is necessary simply to replace depreciating stocks of business and residential capital.[7] It is the starting point, therefore, in any analysis of prospects for net capital formation.

Despite substantial variation since World War II in such factors as tax rates, price inflation, real rates of return and income growth trends—all of which could in principle affect saving behavior—the U.S. economy's net private saving rate has hovered closely about 7 percent throughout this period. As the summary statistics in Table 6 show, the net private saving rate's postwar mean has been 7.2 percent, with a standard deviation around the mean of only 1 percent. The net private saving rate has displayed no significant time trend during this period, once the data are corrected for cyclical variation. It has varied in a modestly procyclical pattern, however,

[7]Personal saving includes saving by unincorporated businesses. Corporate saving is adjusted to remove artificial profits due to the use of first-in-first-out inventory accounting, and artificial profits (or losses) due to accounting depreciation allowances greater than (or less than) true economic depreciation.

Table 5
U.S. Net Saving and Investment, 1946–1983

	1946–50	1951–55	1956–60	1961–65	1966–70	1971–75	1976–80	1981	1982	1983
Total Net Saving	10.3%	6.8%	6.9%	7.4%	7.6%	6.4%	5.7%	5.1%	1.5%	1.1%
Net Private Saving	7.6	7.2	7.1	7.8	8.1	7.6	6.5	6.1	5.3	5.1
Personal Saving	4.0	4.7	4.7	4.3	5.0	5.6	4.2	4.6	4.1	3.3
Corporate Saving	2.6	2.5	2.4	3.5	3.1	2.0	2.3	1.5	1.2	1.8
State-Local Govt. Surplus	0.1	−0.1	−0.2	0.0	0.1	0.6	1.2	1.2	1.0	1.4
Federal Govt. Surplus	2.6	−0.3	0.0	−0.4	−0.6	−1.8	−2.0	−2.2	−4.8	−5.4
Total Net Investment	9.6%	7.4%	6.6%	7.6%	7.3%	6.7%	5.8%	5.0%	1.5%	1.0%
Net Foreign Investment	1.4	0.1	0.5	0.8	0.2	0.3	−0.2	0.1	−0.3	−0.6
Private Domestic Investment	8.2	7.3	6.1	6.8	7.1	6.4	6.0	4.9	1.8	1.6
Plant and Equipment	3.8	2.8	2.6	2.9	4.0	3.1	2.9	3.0	1.9	n.a.
Residential Construction	3.3	3.4	3.0	2.9	2.0	2.6	2.4	1.2	0.7	n.a.
Inventory Accumulation	1.2	1.0	0.6	1.0	1.1	0.7	0.7	0.6	−0.8	−0.8
Memoranda: Capital Consumption	7.7%	8.5%	9.3%	8.5%	8.4%	9.3%	10.5%	11.2%	11.7%	12.8%
Gross Private Saving	14.4	15.7	16.4	16.3	16.4	16.9	17.0	17.2	16.9	16.7

Notes: Data are averages (except for 1981–83) of annual flows, as percentages of gross national product.
Data for 1983 are for first half only.
Total net saving and total net investment differ by statistical discrepancy.
Detail may not add to totals because of rounding.
Source: U.S. Department of Commerce.

Table 6
Summary Statistics for Saving Ratios, 1949–1982

	Mean	Standard Deviation	Normalized Standard Deviation	Significant Trend	Detrended Standard Deviation	Significant Cyclicality
Net Private Saving	7.16%	1.02%	14.2%	None	1.03%	Procyclical
Personal Saving	4.64	.85	18.4	None	.86	Procyclical (?)
Corporate Saving	2.52	.88	35.0	Negative (?)	.85	Procyclical
Gross Private Saving	16.19	1.14	7.0	Positive	.86	None

Note: Trend and cyclicality are measured by ordinary-least-squares regression equations of the form

$$S_t = \alpha + \beta t + \gamma_1 X_t + \gamma_2 X_{t-1}$$

where S is in turn each specific saving rate, t is a linear time index, and X is alternately capacity utilization and the unemployment rate reciprocal.

which accounts for the slightly higher than average saving rate during the 1960s and (in part) for the distinctly lower than average saving rate thus far during the 1980s.

Of the two components of net private saving considered individually, the personal saving rate has varied less in relation to its typical size than has the corporate saving rate. Neither has displayed much time trend, although the corporate saving rate has shown a small, and only marginally significant, negative trend.[8] Both have varied procyclically, although the cyclical element in corporate saving is easily significant at standard confidence levels while that in personal saving is only marginally so.[9]

Previous discussions of the stability of saving in the United States have more typically followed "Denison's Law" in focusing on gross, rather than net, private saving.[10] The phenomenon documented by Denison was the stability, during the early postwar years (and in comparison to 1929), of the U.S. economy's gross private saving rate. Inspection of the memorandum items in Table 5 readily indicates, however, that on balance until the 1980s, as the capital consumption rate has increased, the gross private saving rate has increased along with it.[11] In other words, what appears to have been approximately level is the net, not the gross, saving rate. The summary information presented in Table 6 confirms this impression. Alone among the four saving

[8]The point estimate of the trend is − .02 percent per year. The associated t-statistic is − 1.9 if the cyclical variable is the unemployment rate reciprocal, and − 1.7 if it is capacity utilization.

[9]For the corporate saving rate, the largest t-statistic on the current or lagged cyclical term is 3.0 (for the unemployment rate reciprocal) or 2.9 (for capacity utilization). For the personal saving rate, the corresponding values are 1.7 and 2.0, respectively.

[10]The original contribution was Edward F. Denison, "A Note on Private Saving," *Review of Economics and Statistics,* XL (August, 1958), pp. 261–267. See, more recently, Paul A. David and John L. Scadding, "Private Savings: Ultrarationality, Aggregation, and 'Denison's Law'," *Journal of Political Economy,* LXXXII (March/April, 1974), pp. 225–249.

[11]The increase in the capital consumption rate has reflected both a rising capital intensity and a shift in the composition of the capital stock toward (shorter lived) equipment and away from (longer lived) plant.

measures included, gross private saving has displayed a significant positive postwar trend.[12]

If government budgets were always balanced (and if the foreign account were balanced too), the share of the economy's output available for net capital formation would simply be the share set aside as net private saving. Given the experience since World War II, that would mean a relatively steady 7 percent of gross national product over time. In the presence of government surpluses or deficits, however, what is available for net investment is net private saving plus any government surplus, or less any government deficit.

As Table 5 shows, in recent years public sector saving and dissaving have played an increasingly prominent role in affecting the U.S. economy's overall saving and investment balance. Since the 1970s state and local governments, in the aggregate, have run ever larger budget surpluses on a consolidated basis, as current pension surpluses have grown faster than operating deficits.[13] By contrast, during this period the budget deficits run by the federal government have grown progressively larger in relation to gross national product.[14] These two trends have been in part offsetting, but increasingly unequal. By the early 1980s the federal government's deficit had grown far beyond the aggregate surplus of state and local governments. Under any of the projections shown in Table 2, it will remain so.

The U.S. economy's *total* net saving, consisting of the relatively steady net private saving plus government saving or dissaving, has therefore declined sharply since the low-deficit days of the 1950s and 1960s. The economy's total net investment, which differs from total net saving only by a fairly small statistical discrepancy, has of course declined in equal measure. Table 5 presents data for U.S. net investment, comparable to the data for net saving, and these too indicate a sharp decline in recent years. Because of a change from positive net foreign investment on balance before the mid 1970s to negative net foreign investment on balance thereafter, the deterioration of net domestic investment has been less severe than that of total net investment. Even so, net domestic investment has declined from 6.9 percent of gross national product on average during the 1960s to 6.2 percent on average during the 1970s, and only 3.0 percent thus far during the 1980s. All components of net domestic investment—business plant and equipment, residential construction, and business inventory accumulation—have shared in this decline.

In the context of this historical experience of the U.S. economy's balance of saving and investment, the implications of the U.S. government deficit projections shown in Table 2 are clear enough. If the deficit remains in

[12]The point estimate is .05 percent per year, with t-statistic above 4.5 regardless of the choice of cyclical variable.

[13]The data exclude accrued pension liabilities, however, so that the pension surpluses reported here do not imply that these governmental units are funding their pensions in excess of accruing liabilities.

[14]The data shown in Table 5 differ from those shown in Table 3 because they measure the deficit on a National Income and Product Accounts basis; the most important element in this distinction is the exclusion of off-budget outlays. In addition, the data in Table 5 refer to calendar years.

the range of 4 to 6 percent of gross national product, as now seems likely under some combination of the current services and adjusted Reagan projections, it will absorb substantially in excess of half of the private sector's normal net saving. In the absence of a vast expansion in government saving at the state and local level, which appears highly improbable, the federal government's deficit will therefore keep the U.S. net capital formation rate depressed throughout this period.

Moreover, as the discussion in Section I has already emphasized, once the economy returns to (or nearly to) full utilization of its resources the problem will bear little resemblance to the capital formation decline observed during 1981–83. With ample unemployed resources available throughout the economy, and the budget nearly balanced on a full employment basis, it is implausible to suppose that the federal deficit was responsible for the low rate of capital formation during these years. The opposite is a better description, as weakness in the investment sector both fed upon and added to weakness elsewhere in the economy, and therefore caused tax revenues to fall and transfer payments to rise. Even larger deficits, representing an active fiscal response to the 1981–82 recession, would probably have led to more capital formation rather than less in the preponderance of industries in which inadequate product demand constituted the real impediment to investment.

As the economy recovers toward full employment, however, the situation will change. Fewer unemployed or underemployed resources will be available. Product demand will not be weak. The source of the budget deficit will be not economic slack but a fundamental imbalance between the government's expenditures and its revenues. In the absence of some break from historical experience that is now difficult to foresee, the continuation of large government deficits under these conditions will then constitute a substantial impediment to capital formation.

But what if...? To be sure, any of several possible outcomes could alleviate this problem. It is never possible to foresee all of the relevant contingencies, and some contingencies that now appear possible but unlikely may eventuate anyway. It is therefore useful to consider, at least briefly, some of the events that could materially help to avoid this situation, were they to come about. Four seem especially relevant:

(1) What about a rise in the net private saving rate? After all, there is nothing magic about the 7 percent net private saving rate, and at least some of the rhetoric surrounding the passage of the Economic Recovery Tax Act of 1981 (which has done much to account for today's deficit outlook) suggested the prospect of a sharp increase in saving. To date the saving rate has fallen rather than risen, as Table 5 shows, but what if the combination of new tax incentives and higher pretax rates of return now significantly raises the saving rate? Cannot the U.S. economy then finance both large government deficits and a recovery of net capital formation?

Such an outcome is conceivable but unlikely for several reasons. First, on a priori grounds even the sign of the effect of higher interest rates on saving behavior is unknown, and to date the available empirical evidence has

been mixed to say the least.[15] There is little basis for confidence that greater returns will elicit substantially more saving. Second, despite the rhetoric that accompanied it, the 1981 tax bill contained few specifically targeted saving incentives. Except for the new IRA and Keogh account provisions—and to a large extent even they will affect infra-marginal rather than marginal saving flows for many individuals—most of the tax reduction enacted in 1981 consisted of general across-the-board rate cuts. Finally, because the projected deficits for the balance of the 1980s are so large, even an astonishing 50 percent increase in the saving rate, from the 7 percent historical norm to 10–11 percent, would only be sufficient to permit a net capital formation rate equal to that of the 1970s—hardly a period to emulate in this context. In sum, whatever rise in the net private saving rate does occur (if any) is highly unlikely to represent a solution to the problem.

(2) What about newly liberalized depreciation allowances, bolstered by a resurgence of business profits during the economic expansion? In addition to changes in the individual income tax, the 1981 legislation substantially reduced prospective corporate profit tax liabilities through the introduction of the new Accelerated Cost Recovery System. Although the argument motivating this change primarily focused on the "supply side" idea of increasing marginal after-tax returns to corporate investment, rather than the traditional "Keynesian" idea of simply leaving more funds in corporate hands to spend after taxes, cannot the latter effect still be important?

The principal reason why larger profits and more generous depreciation allowances will probably not solve the problem is that, over time, either companies will pay them out as higher dividends or shareholders will offset them with lower personal saving. More sophisticated econometric evidence confirms the casual impression given by Table 5 in this regard. The relative constancy of the net private saving rate means that, on balance, shareholders compensate for the saving that corporations do on their behalf by adjusting the saving that they do directly.[16] Rearranging the composition of net private saving is not the same as raising its total.

(3) What about foreign capital inflows? With net foreign investment already negative on balance since the late 1970s, and increasingly so in the early 1980s, why cannot foreign investors add their savings to those of Americans so as to finance the U.S. government deficit and U.S. domestic capital formation?

Further increases in foreign capital inflows will no doubt occur, but they are an unsatisfactory solution to the problem for several reasons. First, as is the case with possible saving rate responses, the likely magnitude is insufficient. Because capital inflows in the range of 3 to 5 percent of U.S. gross national product would have extreme consequences for world financial markets and the world economy, governments abroad would almost surely turn to

[15]On the a priori indeterminacy of the effect of interest rates on saving, see, for example, Martin Feldstein, "The Rate of Return, Taxation and Personal Saving," *Economic Journal,* LXXXVIII (September, 1978), pp. 482–487.

[16]See, for example, Franco Modigliani, "The Life Cycle Hypothesis of Saving and Intercountry Differences in the Saving Ratio," in Eltis, Scott and Wolfe (eds.), *Induction, Trade and Growth: Essays in Honour of Sir Roy Harrod* (Oxford: Clarendon Press, 1970).

some combination of interest rate incentives and formal restrictions to resist them—as they have already done to some extent.[17] Second, the mirror image of a capital account inflow is a current account deficit. Solving the budget problem with capital inflows would simply mean substituting a crowding out of the U.S. economy's foreign sector, through high real exchange rates, for the crowding out of the investment sector that would otherwise come about through high real interest rates.[18] To a significant extent, that too is already happening. Third, borrowing from foreigners is fundamentally different from borrowing from ourselves. Only a year or so of net capital inflow equal to the government deficit would wipe out the total U.S. international investment position, and subsequent inflows would increasingly render the United States a net debtor nation.

(4) Finally, what about government investment? Physical investment undertaken by the private sector is not the only kind of capital formation relevant to the economy's long-run prospects for growth and productivity. Basic infrastructure in forms usually provided by government matters also, as does human capital. To what extent are the projected U.S. government deficits shown in Table 2 due to government spending for either physical or human capital formation, so that the resulting crowding out of private sector investment will represent merely a change in the composition of the economy's overall investment rather than a change in the total?

Unfortunately from this perspective, proposed government spending for purposes of nonmilitary capital formation is shrinking rather than growing. The reduced emphasis on manpower development and training that has already taken place, together with that proposed for the near future, is well known. In addition, federal government spending on nonmilitary physical investment has also declined sharply, and proposed future spending will continue this downward trend. Direct federal outlays for nonmilitary physical investment declined from 2.5 percent of all federal expenditures in fiscal year 1965 to 1.3 percent in 1980. The Reagan Administration's budget proposals for fiscal year 1984 further reduce such outlays to only 0.9 percent of the total. Similarly, federal grants to state and local governments in support of capital projects declined from 4.2 percent of all federal expenditures in 1965 to 3.9 percent in 1980, and the Administration's proposals reduce them further to only 3.0 percent in 1984. Reduced government capital formation compounded the decline in private sector investment during the 1970s, and under current proposals it will continue to do so in the 1980s.

In sum, the stark prospects for the effect of sustained full employment government deficits on U.S. capital formation suggested by the relationships among basic economic flows remain after consideration of these four "what if's." It is still possible, of course, that each possibility suggested will come about, and that their sum will be sufficient to solve the problem. Never-

[17]For evidence on the limitations of international capital mobility in this context, see Martin Feldstein and Charles Horioka, "Domestic Saving and International Capital Flows," *Economic Journal,* XC (June, 1980), pp. 314–329.

[18]The subject of exchange rate effects of the deficit lies beyond the scope of this paper, but it is potentially very important. Indeed, the two sets of effects are complemenary. See Krugman's paper in this volume.

theless, it is surely imprudent to base important public policy decisions on an assumption that each of the relevant random outcomes will fall in just the right direction.

III. The Perspective of Asset and Liability Stocks[19]

One reason for seeking to go beyond the familiar flow-flow analysis of the U.S. government's deficit prospects developed in Section II is simply the desire to have an alternative analysis either to reinforce or to refute the results of the more conventional approach. A perhaps more compelling reason, however, is the fear that well-known measurement problems may distort the meaning of changes over time in some of the flows which are most central to the conventional analysis. For example, public debt interest payments included in the current services and adjusted Reagan deficit projections shown in Table 2 amount to 3.3 percent of gross national product and 2.9 percent, respectively, on average during 1984–88—large amounts in comparison to the average projected deficits. Given prior and continuing price inflation, some part of these interest payments really represents a repayment of debt principal, but how much? Allowing for these and similar adjustments is by itself a significant task, and a difficult one at that.[20]

An alternative approach is to base the analysis instead on relationships involving stocks of assets and liabilities outstanding. To the extent that nominal interest payments include repayment of debt principal, for example, focusing on movements over time in debt stocks (relative to, say, gross national product) effectively compensates for this effect. Stock-flow relationships are both less familiar and potentially more complicated than flow-flow relationships, especially in a dynamic setting, so that spelling out formal analytical models is in this case more challenging.[21] Nevertheless, data on U.S. stock-flow relationships exhibit sufficient regularity to facilitate an analysis readily comparable to that of Section II. To anticipate, this alternative analysis reinforces the conclusions summarized there.

The chief regularity that stands out in the U.S. economy in this regard is the close relationship of the *total* debt outstanding, issued by *all* U.S. borrowers other than financial intermediaries, to U.S. gross national product.[22]

[19]This section draws in part on two earlier papers. See Benjamin M. Friedman, "Debt and Economic Activity in the United States," in Friedman (ed.), *The Changing Roles of Debt and Equity in Financing U.S. Capital Formation* (Chicago: University of Chicago Press, 1982); and "Managing the U.S. Government Deficit in the 1980s," in Wachter and Wachter (eds.), *Removing Obstacles to Economic Growth* (Philadelphia: University of Pennsylvania Press, forthcoming).

[20]The most comprehensive effort to date along these lines is that summarized in Robert Eisner and Paul J. Pieper, "A New View of the Federal Debt and Budget Deficits," *American Economic Review*, forthcoming. See also the paper by de Leeuw and Holloway in this volume.

[21]Most formal models of economic growth treat stocks of financial assets in fairly rudimentary ways, and abstract from liabilities (and therefore inside assets) altogether.

[22]The reason for excluding the debt of financial intermediaries is simply to avoid double counting. The resulting total is analogous to Gurley and Shaw's concept of primary securities. See John G. Gurley and Edward S. Shaw, *Money in a Theory of Finance* (Washington: The Brookings Institution, 1960).

The U.S. economy's total debt ratio has displayed essentially no trend, and only a limited amount of cyclical variation, throughout the post World War II period. More importantly for the purpose at hand, the stability of this relationship between outstanding debt and nonfinancial economic activity has not merely represented the stability of a sum of stable parts. Neither private sector debt nor government debt has borne a stable relationship over time to economic activity, but their total has.

The heavy solid line at the top of the chart shows the total credit market indebtedness of all U.S. nonfinancial borrowers as of the end of each year since the Korean War, measured as percentages of fourth-quarter gross national product, as well as the corresponding total indebtedness as of midyear 1983, measured as a percentage of gross national product in the second quarter of the year. The lines below divide this total into the respective indebtedness of each of five specific borrowing sectors: the federal government, state and local governments, nonfinancial business corporations, other nonfinancial businesses, and households.

The strong stability of the *total* nonfinancial debt ratio stands out plainly in contrast to the variation of the individual sector components shown below. Although the total debt ratio rose sharply during the most recent business recession, as gross national product in the denominator weakened while substantial credit expansion continued, data for the first half of 1983 already show the beginning of a return toward the historical norm of about $1.45 of debt for every $1 of gross national product.[23] The experience of a similar, though less pronounced, cyclicality in prior recessions also suggests that the 1982 bulge does not represent an interruption of the basic long-run stability. Moreover, the stability of the U.S. economy's total debt ratio is of longer standing than the three decades plotted in the chart. With the exception of a sharp rise and subsequent fall during the depression of the early 1930s (when much of the debt on record had defaulted de facto), and to a lesser extent during World War II, the total debt ratio in the United States has been roughly constant since the early 1920s.[24]

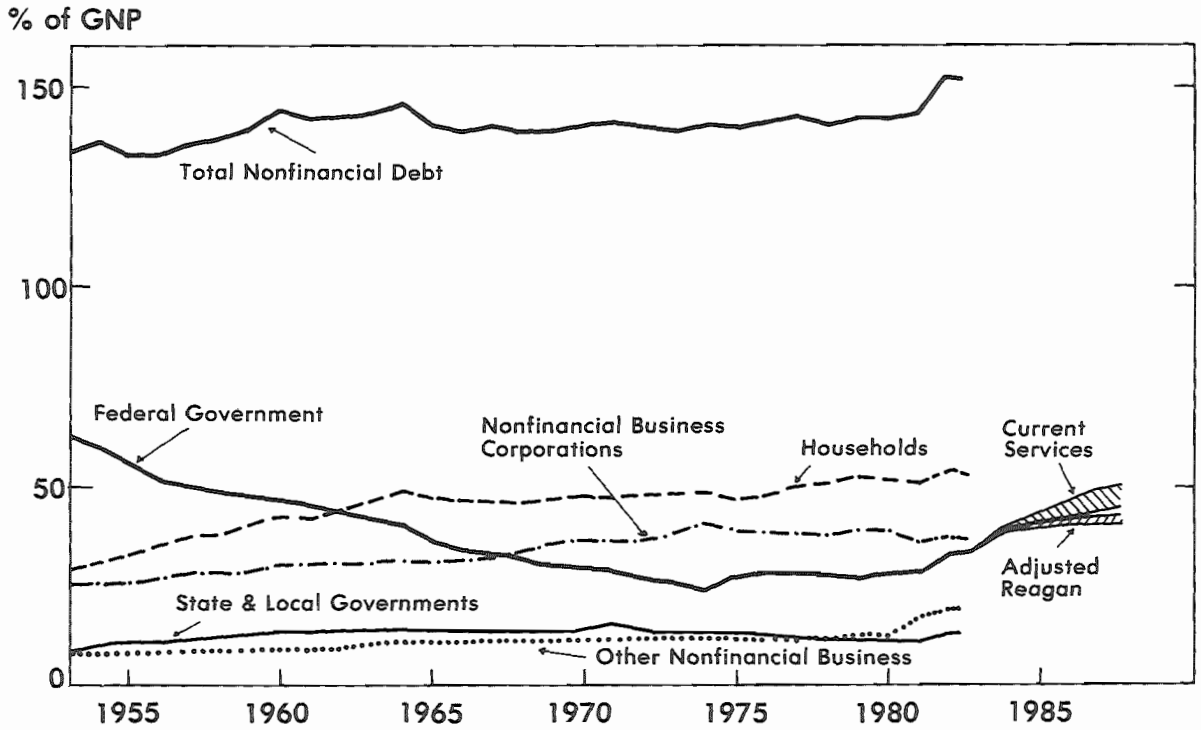
By contrast, the individual components of the total debt ratio have varied in diverging ways both secularly and cyclically. In brief, the post World War II secular rise in private debt has largely mirrored a substantial decline (relative to economic activity) in public debt, while cyclical bulges in public debt issuance have mostly had their counterpart in the abatement of private borrowing. Households have almost continually increased their reliance on debt in relation to their nonfinancial activity throughout this

[23]The "income velocities" of the major monetary aggregates also exhibited unusual movements in 1982. For a comparison of the stability of the debt-GNP relationship to that of analogous relationships for the monetary aggregates, see Benjamin M. Friedman, "The Roles of Money and Credit in Macroeconomic Analysis," in Tobin (ed.), *Macroeconomics, Prices and Quantities: Essays in Memory of Arthur M. Okun* (Washington: The Brookings Institution, 1983).

[24]For a discussion of the behavior of the total debt ratio since World War I, see Benjamin M. Friedman, "Post-War Changes in the American Financial Markets," in Feldstein (ed.), *The American Economy in Transition* (Chicago: University of Chicago Press, 1980). See Friedman, "Debt and Economic Activity in the United States," for a review of behavioral hypotheses that could account for this phenomenon.

Figure 1

Outstanding Debt of U.S. Nonfinancial Borrowers



period. Both corporations and unincorporated businesses have also issued steadily more debt, on a relative basis, except for temporary retrenchments during recession years. State and local governments steadily increased their relative debt issuing activity during the 1950s and 1960s, but just as steadily reduced it during the 1970s. Finally, except only for 1975–76 and 1980–83—years marked by large deficits due to recession and its aftermath, as Tables 3 and 4 show—the federal government has reduced its debt ratio in every year to date since 1953, although this relative debt reduction has also been slower in years when even milder recessions have temporarily inflated. the government's deficit (and, again, depressed gross national product in the denominator).

Given the long-standing stability of the U.S. economy's total debt ratio, the evolution of the federal government's debt ratio provides a useful perspective on the magnitude and import of the federal budget deficit. During the post World War II period as a whole, the federal debt ratio has declined not just from 62.9 percent in 1953 but from 103.4 percent in 1946. Indeed, the 24 to 29 percent range in which the federal debt ratio fluctuated during the 1970s, and until 1982, corresponded favorably to the 27.4 percent value in 1918. The past decade has already marked an important departure from prior experience, however. The years 1975 and 1976 were the first since 1953 in which the government debt ratio rose, and the renewed decline during 1977–79, which was subsequently reversed by the recession years 1980–82, was not sufficient to reduce the ratio to its 1974 low. The government debt ratio rose still further during 1983, and the deficit projections shown in Tables 1 and 2 indicate that it will continue to do so for the foreseeable future.

This increase in the federal government's debt ratio is relevant to the implications of fiscal policy for private capital formation because, in the context of a stable economy-wide total debt ratio, it represents a useful summary measure of the net impact of federal deficits on the environment for private financing. If the government deficit were sufficiently small, or if either real economic growth or price inflation were increasing the gross national product sufficiently rapidly, then the government debt ratio would be falling—as it was, almost continuously, throughout the first three decades following World War II. Conversely, when the deficit is sufficiently large in relation to the economy's size and growth, then the government debt ratio is rising—as it did during 1975–76, and has during 1980–83. Moreover, the nature of this stock-flow relationship is that, by comparing the nominal stock of outstanding government debt to the nominal gross national product, it implicitly allows not only for economic growth but also for the real capital gain that the government earns by inflating away its prior debt obligations. A further incidental, but also helpful, result of focusing on the government debt ratio measure is that it also readily illustrates the lack of fundamental importance to be attached to a precisely balanced government budget in a growing economy.

If the economy's total outstanding debt remains approximately stable in relation to gross national product over time, then a sustained movement in the government debt ratio implies an offsetting movement in the aggregate

debt ratio of the private sector. A falling government debt ratio like that experienced during 1946–74 implies a rising private debt ratio, while a rising government debt ratio like that during 1975–76 and 1980–83 implies a falling private debt ratio. The relevance in turn of a rising or falling private debt ratio for the economy's ability to undertake capital formation stems from the traditionally close connection in the United States between debt financing and net private investment, including both homebuilding and investment in new plant and equipment.[25]

In the absence of a major change in financing patterns, therefore, the economy's ability to achieve a greater capital intensity—that is, to increase its capital stock in relation to total output—depends at least in part on the private sector's ability to increase its debt in relation to gross national product. Over time, however, the private sector's debt ratio moves inversely with the government debt ratio. In the end, the rise or fall of the *government* debt ratio is therefore likely to be an important factor shaping the relationship between growth of the capital stock and growth of the economy's total output.

The shaded extensions to the "Federal Government" line plotted in the chart indicate the respective implications for the government debt ratio associated with several of the projected 1984–88 deficit paths shown in Table 1. Under the budget proposal version of the *current services* projection, the U.S. government's outstanding debt will rise from 33.4 percent of gross national product as of midyear 1983 to 51.0 percent at the end of fiscal year 1988. Under the midsession review version of the same projection, the corresponding rise will be smaller—to 44.5 percent in 1988—because of different assumptions about economic growth, Social Security legislation, and the other factors discussed in Section I. The actual outcome under a continuation of current tax and spending legislation will probably be between these two extremes. The upper shaded extension in the chart plots the range implied by these two versions of the current services projection (each with its respective underlying assumptions about the growth of gross national product) for 1984–88.

The lower shaded extension plots the analogous range implied by the budget proposal and midsession review versions of the *adjusted Reagan* projection. These projected deficits imply increases in the government debt ratio to 39.5 percent and 42.4 percent, respectively, at the end of fiscal year 1988. Once again, the actual outcome under the adoption of all of the Administration's tax and spending proposals except the contingency tax plan (and with the repeal of interest and dividend withholding) will probably lie within this range. The figure does not show an analogous range for the adjusted Congressional resolution projection, because in this context it is undistinguishable from the range already shown for the adjusted Reagan projection through 1986.

[25]The nonfinancial corporate business sector, which typically accounts for three-quarters of all U.S. investment in plant and equipment, relied on external debt financing for 64 percent of its total net sources of funds on average during 1956–80. This percentage presumably understates the importance of external funds in financing *net* investment. Within this period business corporations' reliance on external debt has shown an irregular but nevertheless increasing trend. Unincorporated businesses financing new plant and equipment and households financing new homebuilding have also relied heavily, and increasingly, on borrowed sources of funds.

The main point of the set of extrapolations illustrated in the chart is that the ranges for both the current services and the adjusted Reagan deficit projections will continue to carry the government debt ratio further upward, instead of returning it toward the 24.8 percent postwar low reached in 1974, or stabilizing it at the 1982 level of 30.1 percent or even the midyear 1983 level of 33.4 percent. These projected further increases will raise the government debt ratio to levels last experienced two decades or more ago—the early 1960s under the adjusted Reagan projection, or the 1950s under the current services projection.

A sustained increase in the government debt ratio of anything like these magnitudes will be unprecedented in the U.S. economy's postwar experience. If the economy's total debt ratio continues to remain near its historical norm, this increase in the government debt ratio therefore implies a comparably unprecedented decline in the private sector's debt ratio. As of midyear 1983, the debt ratios of the household and combined (corporate and unincorporated) nonfinancial business sectors were 53.2 percent and 53.0 percent, respectively—already down from 53.9 percent and 54.5 percent, respectively, at yearend 1982. A decline of 15 to 25 percent, applied either to households or businesses alone or to both together, will represent a substantial readjustment. The market forces (chiefly high real interest rates) which constrain the private sector to limit its debt expansion to a slower pace than that of nonfinancial economic activity—and not as a temporary retrenchment in recession, but on a sustained basis at full employment—will probably also affect private sector capital formation.

Although a renewed depression of residential construction could perhaps be sufficient to reduce household mortgage borrowing by enough to absorb the entire required decline in the private sector's debt ratio, especially under the smaller adjusted Reagan deficits, even that extreme outcome would probably not permit any growth at all in the business sector's debt ratio—nor would sacrificing homebuilding to such an extent necessarily be desirable anyway.[26] More probably, business debt relative to income will also have to decline in order to make room for the ballooning federal government debt. Without the ability to raise external funds in the credit market, the business sector will largely have to forego taking advantage of the recently legislated investment incentives unless it turns massively to equity financing—an unlikely prospect in light of long-standing U.S. business financing patterns. In terms of the factors directly confronting business investment decisions, the problem will be that the increased real cost of financing (and, for some companies, reduced availability) will outweigh the added attractiveness of new investment due to the large favorable tax changes. Under these conditions business net capital formation will probably decline still further from the recent low level.

The conclusion of this analysis from the perspective of stock-flow relationships therefore matches the conclusion reached in Section II on the basis of flow-flow relationships. In the absence of some break from historical pat-

[26]Mortgage debt typically constitutes nearly two-thirds of all debt owed by U.S. households.

terns of economic behavior that is now difficult to foresee, the continuation of the large government deficits now projected even for after the economy's return to full employment will constitute a substantial impediment to the U.S. economy's net capital formation.

But, once again, what if...? Here too, several contingencies could materially alleviate this problem, were they to come about. Two seem especially worth consideration:

(1) What about equity financing? There is no necessary reason why businesses (or, for that matter, households) must finance net capital formation so heavily on a debt basis. Why cannot the nonfinancial corporate business sector rely more on some combination of retained earnings, bolstered by the newly liberalized depreciation allowances, and new stock issues? By doing so, the business sector can reduce its aggregate debt-equity ratio, and hence enable the economy to achieve a greater ratio of capital to gross national product despite a lower ratio of private debt to gross national product.

Greater reliance on equity financing of capital formation would indeed reduce the need for debt financing, but it is unlikely to be a sufficient solution to the problem for two (essentially identical) reasons. First, as the discussion in Section II has already noted, over time personal saving responds so as to offset sustained changes in the volume of corporate retained earnings. In the context of relationships among asset and liability stocks, what would therefore be needed is not just a change in business financing preferences but a change in the portfolio preferences of the individuals who ultimately hold the corporate sector's outstanding debt and equity claims. Second, reliance on new external equity issues in sufficient volume to matter much here would be entirely out of character for the U.S. nonfinancial corporate business sector. New equity issues provided only 5 percent of corporations' total sources of funds on average during 1956–82. During this period what new equity corporations did issue was often preferred stock, and one industry (utilities) accounted for much of the small amount of common stock.[27] Further, even a continuation of new equity issues at the record $33 billion per annum pace set in the first half of 1983 would make only a limited contribution to the problem illustrated in the chart, even on the strong assumption that none of the larger volume of new issues was a substitute for retained earnings.[28]

(2) What about a rise in the economy's total debt ratio? There is no a priori reason for the total debt ratio to be 145 percent—or, for that matter, any other constant value. An increase to 160 percent or 170 percent would enable the economy to absorb the projected increase in the government debt ratio (at least through 1988) without requiring any offsetting decrease in the

[27]For a review of the interrelation between preferred equity and debt in U.S. corporate sector balance sheets over a half-century, see John H. Ciccolo, Jr., "Changing Balance Sheet Relationships in the U.S. Manufacturing Sector, 1926–77," in Friedman (ed.), *The Changing Roles of Debt and Equity in Financing U.S. Capital Formation* (Chicago: University of Chicago Press, 1982).

[28]For a comprehensive review of the experience of the U.S. corporate sector's aggregate balance sheet from several perspectives, see Robert A. Taggart, Jr., "Secular Trends in Corporate Finance," in Friedman (ed.), *Corporate Capital Structures in the United States* (Chicago, University of Chicago Press, forthcoming).

private debt ratio. Surely the equilibrium total debt ratio (if it exists) is not invariant to changes in such factors as asset returns, taxes, economic risks, bankruptcy arrangements, international financial integration, and so on. Given the changes that have occurred during the past six decades in all of these potentially important determinants of aggregate debt levels, is it not more puzzling that the U.S. economy's total debt ratio has remained so steady over this period than unreasonable to expect that it may rise in the future?

The relative constancy of the U.S. economy's total debt ratio indeed stands as a major puzzle, but it does not follow that a deviation from past behavior, in a specific direction, is therefore likely. At the a priori level, there is no lack of theoretical structures that could determine the economy's aggregate debt in a fixed relation to its gross national product, given certain patterns of preferences and prevailing external circumstances. Such models can focus on the behavior of either borrowers or lenders, or (more plausibly) on both.[29] The puzzle is that the observed total debt ratio has not changed much despite large changes in some of the presumably important circumstances (like those listed above). In terms of standard models relating asset holding and liability issuing to income levels, such a result implies that various income and wealth elasticities are close to unity, while various substitution elasticities are weak at best.

In the absence of a fully articulated and carefully tested model with both a theoretical structure and a set of empirical parameter estimates that can account for this phenomenon, some degree of caution about whether it will continue is entirely appropriate. Wholly disregarding the observed experience is not appropriate, however. To whatever extent the absence of a satisfactorily articulated and tested model warrants reservations about the future evenness of the U.S. economy's total debt ratio, its absence precludes any confident judgment that the debt ratio will move in a specific direction. As is the case with the relative constancy of the economy's net private saving rate in the discussion in Section II, only a major and sustained deviation from prior experience would eliminate the negative implications for capital formation described here. Such a break from the past is, of course, always possible. There is no ground, however, for judging it likely. Simply assuming that it will occur is hardly a sound basis for making public policy.

In the absence of such a change, the analysis of stock-flow relationships here provides further support to the conclusion suggested by the flow-flow relationships examined in Section II. Sustained U.S. Government deficits of the magnitude now projected for the balance of the 1980s will probably be a significant impediment to U.S. capital formation.

[29]See again the brief discussion in Friedman, "Debt and Economic Activity in the United States."

IV. Summary of Conclusions

Under either current tax and spending legislation or any set of alternatives now commanding serious support, the U.S. government's budget deficit will remain unprecedentedly large during the balance of the 1980s. The unusual feature of this deficit is not just its size, even in relation to a growing economy, but the fact that it will persist even after the economy returns to full employment of its resources. In the past, large federal government deficits have mostly been a passive response to economic weakness. The deficits now projected for the remainder of the 1980s will, instead, increasingly represent a fundamental imbalance between the government's expenditures and its revenues.

Analysis of the U.S. economy's balance of saving and investment since World War II suggests that the continuation of large sustained government deficits at full employment will stand in the way of an increase in the economy's already low rate of net capital formation. Deficits of the size now projected will absorb more than half of the economy's net private saving. Such a drain is warranted during times of business recession, when the private economy generates an excess of saving over investment anyway, but not on a continuing basis at full employment. In the absence of a break with prior experience that is difficult to foresee or consider likely, these deficits will constitute a major impediment to a revival of U.S. net capital formation in the 1980s.

Analysis of the U.S. economy's stocks of assets and liabilities outstanding further supports this conclusion. Continuation of government deficits of the size now projected will lead to a rise in the government's outstanding debt, relative to nonfinancial economic activity, that will be unprecedented in U.S. peacetime experience. If the economy's total debt ratio remains approximately stable, as it has over many years, this rise in the government debt ratio means that the economy's private sector will not be able to increase its outstanding debt in pace with the economy's growth. Given the importance of debt in financing capital assets in the United States, this squeeze on the economy's private debt ratio also implies an inability to achieve any major increase in U.S. net capital formation during the remainder of the 1980s.

Discussion

Robert M. Solow*

I have no basic quarrel with Ben Friedman's paper. Once you accept the idea that outstanding government debt can absorb cumulative private saving, the broad outline of his argument follows pretty straightforwardly. One can always quibble over the numbers. But his main point doesn't depend on a half a percent here and there; it is larger scale than that. There are parts of his argument that seem less securely based than others. I find myself falling into the well-known economist's line: "It's OK in practice, but does it work in theory?" But I rather expect Friedman will agree with me on this score, and we share the expectation that a plausible account can be given of the statistical regularities he depends on.

Everyone knows by now that it is possible to invent a world in which bond-financed tax reduction automatically evokes incremental private saving to offset the government's dissaving, so the national saving rate is invariant to deficit finance on the part of the Treasury. But I have the impression that hardly anyone takes that story seriously as more than a virtuoso cadenza. Our world is just not enough like that world. I presume that is Friedman's opinion too. He doesn't even bother to mention the abstract possibility of invariance because he is not writing an abstract paper. In his Table 5, for instance, the increase in the federal deficit (or combined federal-state-local deficit) after 1970 is accompanied not by an increase in net private saving but by a decrease. Let us accept the universe.

My comments therefore amount to a number of queries and remarks on various aspects—empirical and analytical—of Friedman's findings.

(1) The paper gives the unmistakable impression that Friedman regards the rise in government dissaving which, with the apparent constancy of the net private saving rate, implies a fall in the net investment quota, as a Bad Thing. But he does not say what he thinks the appropriate remedy would be. Lower public spending and higher tax rates by themselves, would be contractionary in an economy which is not expected in these projections to reach high employment even in 1988. Would he rather see an aggregatively neutral but distributionally regressive shift of the tax burden from investment to consumption, or would he rather see fiscal contraction offset by monetary ease?

Any attempt to subsidize investment through the tax system will inevitably be regressive. Any effective investment incentive is likely to increase after-tax profits. If aggregate neutrality is to be preserved, the revenue loss will have to be recouped somewhere. If it is from transfer payments, the regressivity is compounded. A distributionally neutral tax increase brings us

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to my second alternative. These are difficult choices and anyone who recommends facing them owes us a suggested resolution.

(2) As Friedman points out, one of the advantages of the analysis in terms of the stock of debt relative to GNP is that it corrects for the increasing weight—and now very large weight—in the federal deficit of high nominal interest payments which really represent return of capital eroded by inflation. I wish he had carried some of this sort of analysis into the flow statistics even approximately in view of the possibility that the consumption component of those interest payments—certainly of the inflation-premium part and maybe of the rest as well—may be quite small.

I can imagine a scenario in which a deficit bloated by large interest payments on the debt fails to have the normal automatic-stabilizing effect because the marginal propensity to spend interest proceeds is so small.

(3) I am not sure I understand exactly the meaning of the total credit-market indebtedness of all U.S. borrowers other than financial intermediaries, i.e., the numerator of the ratio whose behavior is described in Figure 1. If a nonfinancial U.S. corporation holds some Treasury bills, I presume those as well as the corporation's own debt are included in the total. Wouldn't it be better to have some sort of breakdown of private wealth, with and without government debt, in the numerators? Maybe just measurement problems make it impossible to do the stock analysis after a little more netting out.

(4) One of the reasons Friedman gives for dismissing the chance that the growing public debt might drive production investment into equity finance, rather than crowding it out entirely, is that debt and equity securities appear to be very poor substitutes for one another.

This would suggest that small changes in relative supplies would be accompanied by large changes in relative yields. Has this happened?

(5) The reason I ask about that is because one can easily imagine models of growth in which optimizing households would achieve a constant ratio of wealth to income. We have to take it on faith, I suppose, that a plausible theory of financial structure could lead to the ultimate constancy of Friedman's ratio as well. I don't find that hard to believe; but so much of the force of the analysis in stock terms depends on the apparent constancy of this hybrid ratio of debt to GNP that I would feel more comfortable if there were direct evidence that federal debt displaces private debt in some ultimate portfolio sense.

(6) Friedman is very careful to distinguish between the consequences of federal borrowing when the economy is very slack and when the economy is near full employment. In one case it is the *job* of the deficit to absorb private saving and thus to keep aggregate income from falling. In the other, the deficit may divert saving from productive investment. We all know that, but it bears repeating in any publication that has circulation outside the profession.

There is a real danger that untimely tax increases, in the name of deficit-busting, could have the perverse effect of keeping the economy from achieving full employment in 1986 or 1988 or whenever. Those projections

of falling unemployment through 1988 are not serious forecasts. A long expansion is by no means guaranteed, only a possibility to be cultivated.

It is equally important to emphasize the role of high real rates of interest in the dynamics of the public debt. To the extent that it contributes to the persistence of high real interest rates, Federal Reserve complaints about the deficit are faintly reminiscent of the well-known story of the boy who murdered his parents and threw himself on the mercy of the court as an orphan.

Discussion

Albert M. Wojnilower*

Psychologists tell me that individuals who think they are or should be omnipotent often experience deep guilt when they are unable to achieve their goals. Since no one is omnipotent, the sense of guilt may have no basis in reality. Whether it does or not, however, the tendency often is to displace the blame for the failure to achieve perfection onto causes and persons that are quite innocent.

Many American economists, their proud claims for forecasts and policies disappointed, may be evincing this syndrome. It is a manifestation of a similar syndrome in the country as a whole. We all look back with nostalgia to those lost halcyon days of the 1940s and 1950s when the United States did in fact bestride the world with effortless self-confidence—and we look for villains to blame.

The concern that Ben Friedman and others feel about the presumed inadequacy of investment is, it seems to me, one aspect of this hopeless search. First, there may be nothing to be guilty about: it is not at all clear that the ratio of investment in national output has declined significantly. Of course this ratio is and always will be less than we think it ought to be, because people always are and will be accusing themselves of making less provision for the future than they should. Second, what we commonly label as "investment" for accounting and econometric purposes does not necessarily correspond at all closely to what is needed to provide a rich future for our children. (If we have any children or care what happens to them, which these days is not to be taken for granted!) Third, and most germane to this discussion, to the extent we are or in future may be underinvesting, it is not the federal budget deficit that is the villain. Friedman is right to be concerned that by undertaking an excessive total of spending commitments, public and private, we may be piling up big trouble for the future. We may well face an incipient deficit in the national budget of real resources. But displacing the blame onto the federal deficit is a copout. It diverts attention from genuine issues to statistical abstractions and wastes our limited political attention.

Are We Guilty of Underinvesting?

Is the net investment ratio really falling? The purpose of this section is to raise questions about the reliability of the data on which the allegation of the falling investment rate is based. Of course, even if it could be demonstrated that the investment ratio was rising rather than falling, it would still be argued that, if not for the budget deficit, investment would rise faster

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still and that this would be desirable. Nevertheless, it is useful to be reminded that the measurement problems are serious and complex, and that how they are treated can make a considerable difference in the *Gestalt* of the situation.

Students of American national income accounts will recall the alarm that used to be expressed over the declining rate of personal saving. Later, with less fanfare, the figures were revised upward. Thus, the rate of saving out of disposable income for the decade 1970–79 is now given as 7.3 percent, compared with the 6.4 percent published in 1980.

The investment story has its similarities. Measures of the current capital stock are derived by adding annual estimates of deflated business and housing investment to, and subtracting the appropriate depreciation from, the previous year's similarly derived stock. Serious problems arise in the measurement of nominal investment, and even more so as regards the price deflators and depreciation. For a long time, the investment lobby was able to cite a low and sometimes falling rate of gross investment relative to GNP. Suddenly in October 1980, after publication in the *Survey of Current Business* of major upward revisions in plant and equipment purchases going back to 1948, the official statistics no longer supported this case. According to the new figures the domestic investment rate, especially for plant equipment, had been rising! Fortunately, by inserting the little word "net" in front of "investment," the worriers were able to republish their jeremiads without rewriting.

Why should growth of net investment be lagging, when gross investment isn't? Essentially it is because beginning with 1975 the annual data show an abrupt shift within the investment total away from long-lived structures toward shorter-lived equipment. As a result, the depreciation subtracted in reducing gross investment to net has lurched upward. At least until the next major data revisions, our allegedly laggard net investment is not the penalty for high living, but for having changed the investment mix. Since the change probably took place for good reason, I find it hard to get terribly upset about it.

After all, we want capital goods not for their own sake, but for the sake of their output. As between two equal purchases of short- and long-lived capital goods, the shorter-lived one will yield the greater annual services (as indicated by the larger depreciation). So there is no reason for current regret—indeed, the opposite.

The issue is what happens later, if the capital good expected to be shorter-lived does indeed wear out sooner (which is not altogether certain, since depreciation, much like the size of oil reserves, is an economic as well as a technological variable). In this regard, I would be inclined to take a "permanent consumption" view of investment and expect that the asset will be replaced in full. For the same purchase price today, a family may buy a fancy refrigerator (or a firm a fancy computer) with a 10-year life or a plain machine with a 15-year life. Whichever its choice, the family or firm has committed, with or without realizing it, to replace the machine in 10 or 15 years. Chances are that if the fancier 10-year machine is chosen today, it will be replaced with a similar or still fancier machine 10 years hence. Thus

today's shift to shorter-lived investment might be viewed as an implicit commitment to more investment in the future.

In our national income accounting system, only business purchases, but no government or household purchases whatsoever (other than of residences), are permitted to be counted as investment. Friedman deals with a part of this problem in his discussion of the investment intensity of federal expenditures. Each year, the federal budget (Special Analysis D) reports the amount of federal investment outlays. Most of these turn out to be military (although some federal grants-in-aid are noted as financing outlays on physical capital by states and localities). To debate what military purchases should be recorded as investment, and whether bullets should count for less than bases, would take us far afield. Let it be noted, however, that in one tabulation not used by Friedman, the budget also adds outlays for research, development, and education. This broader definition might well be appropriate for private investment as well and, as demonstrated by the papers given here last year, would considerably modify some prevailing impressions about these matters.

The facts are less than ironclad. The entire climate of the debate might be altered by taking some statistical judgments differently. But let us leave this to be disputed by our research assistants.

What Kind of Investment Do We Want?

The label "deficit" is pejorative. It reeks of waste. "Investment," on the other hand, competes with Lincoln's mother's dog in its wholesome qualities. Such are the unavoidable semantic burdens under which this discussion labors. But as economists, we are supposed to know that what counts is not what is spent but what is produced. We also know, as already mentioned, that the correspondence between actual investment and what we define as investment in our national accounts leaves much to be desired. And why of all people should economists, who are suckled on the milk of "diminishing returns," take the view that when it comes to investment, more must always be better?

Our recent history is replete with monstrous examples of misdirected, that is to say, wasted investment. In the years before the oil price shocks, when the price of energy may have been unrealistically low, we enjoyed a major boom in the construction of electric utilities and investment in electrical equipment. When the price of oil exploded, the usefulness of many of these undertakings was called into serious doubt. The higher oil price prompted, in its turn, a huge wave of investments in the search for oil and oil substitutes. Reducing the dependency on OPEC oil was urgent if we were to conduct foreign policy free of blackmail, but it made no commercial sense since the cartel had ample production capacity and cost advantage with which to undercut most of the new finds. Now that the oil price has leveled off far below the forecast prices that prompted the energy investment boom, that sector of capital spending has plummeted. We are pleased to count the investments already made in our capital stock, but what is the true value of a capital stock that is unused?

In the recent revision of its capacity statistics, the *Federal Reserve Bulletin* (July 1983) plaintively reports:

> The latest revision of data on the real capital stock in manufacturing by the Department of Commerce has produced a troublesome puzzle: growth in the capital stock is estimated to have increased substantially during 1973–79 and again during 1979–1981; yet...data from business and trade associations imply a slowdown in capacity growth after 1973.

It is possible for private investment, just like government spending, to be wasted.

If our investment ratio had been lower because these by hindsight misdirected investments had not been made, would we be worse off today—even if the same resources had been used up in pure consumption? And had they been used to build sturdier highway bridges, or a stronger military more respected in the Middle East, would we be worse off today—even if those outlays had increased the federal deficit? Making the right investments is more important than making more investments.

One of the problems with policies designed to promote investment is that they tend to stimulate replication of those investments that already exist and may be redundant—and to do so especially during the exuberant phase of business upswings when anticipation of future demand and prices is most overoptimistic. But more dinosaurs do assuage our statistical guilt: a new industrial policy to subsidize the building of long-lived but empty textile factories or unusable nuclear power plants, financed by a heavy tax on short-lived office computers, would get our depreciation down and our net investment back up.

A great ambivalence in all these discussions surrounds homebuilding. Sometimes homebuilding is counted as investment, that is to say, with the anointed. Many writers, however, relegate it to consumption (thumbs down). Much more is at stake than a matter of definitional choice. Suppose standard analysis were correct in its assertion that smaller budget deficits would give us the same national income with lower interest rates and more investment. The actual additional investment would consist mainly of housing, which has the largest response to the lower interest rates. I don't believe that outcome is at all what the investment advocates want to achieve.

Let me hasten to add, however, that in my opinion the standard analysis mostly holds only for small changes over short intervals. The computer games in which, by manipulating monetary policy with the left hand and fiscal policy with the right, we can produce the same level of output with any interest rate, or alternatively with any desired proportion of investment and consumption, are highly instructive pedagogical devices—but they are only games. Houses are not built to have their boilers and airconditioners running at cross-purposes, so that any combination of rooms can be heated and others chilled at the same time. Neither is our economy.

To determine whether we need more investment and what kind, we will have to overcome the handicap that our data define investment not primarily by what is produced, but rather by whom it is bought. The computer

in my office is an investment, but the home computer on which I am drafting this paper is not. A new race track or casino is an investment, but a new public school or state university building is not. Indeed they fall into that most disreputable of the GNP categories, a nonmilitary government expenditure. A kidney machine in a private hospital is an investment, but in a Veteran's Administration hospital it is not. A medical check-up or the cost of a college education, because the expenditure is by a household, is consumption. More casinos and more privately owned kidney machines, no matter how desirable and profitable, will not help solve what is worrying Friedman and others, myself included. For that, we will have to search our souls, not our statistics.

Do Deficits Hurt Investment?

For a small corner grocery, it is probably correct to assume a close correspondence between bank loans and inventories. But the larger the enterprise, the less likely is any close relation between particular sources of funds and particular expenditures. We would not try to relate specific federal outlays to specific taxes or borrowings. Trying to associate the public's purchases of the government securities which finance the deficit with specific changes in the composition of private expenditure is not likely to be much more fruitful. At this Olympian level of aggregation, fungibility of sources and uses of funds is so great that categorizing particular sources of funds as supportive of, or hostile to, particular outlays is largely conjectural.

Government deficits may well promote rather than deter investment. The government may borrow to finance its own investment outlays. It may borrow to finance grants-in-aid that are earmarked for state and local investment outlays. It borrows to finance the investment tax credits, accelerated depreciation allowances, and other subsidies that support private investment. Would narrowing the budget deficit by the abolition of these tax incentives promote private capital spending? It is hard to visualize realistic circumstances in which a larger deficit would not be associated with larger profits and investment than if the deficit were smaller.

A similar lack of a predictable relationship between borrowing and aggregate investment also holds for borrowing by other sectors. Borrowing by business isn't necessarily for investment. Businesses do borrow to finance the extension of consumer credit or to pay dividends, with the result that consumption rather than investment is expanded. And consumer credit, like tax cuts, may stimulate retail sales, boosting the profits of industry and furthering investment.

In most circumstances more borrowing and more spending raise the level of nominal income, investment, and saving. If the extra debt is private debt, private saving will tend to expand, because someone has to hold the extra securities. Economists used to call this "forced" saving. If the extra securities are government securities, private saving again will be higher but national saving as we measure it cannot be, because the larger government

deficit is defined as dissaving (even if the government spent every penny on machinery and structures).[1] To be sure, if greater borrowing enlarges income unduly, the result will be inflation, but as long as prices inflate faster than costs, profits and investment will thrive.

As one who has done so much to deepen our understanding of "crowding in" and "crowding out," Friedman is well aware of these relationships. Were the sides reversed, he could no doubt make my case much more elegantly. I suspect that—perhaps like one of his namesakes—he has been diverted from doing so by his fascination with an apparent statistical regularity. I refer, of course, to the constancy he claims to have found in the ratio of domestic nonfinancial debt to GNP. It is this that leads him to infer that relative growth in the federal debt must come at the expense of business debt and investment.

Now I have a great deal of affinity for "natural" ratios. My favorite is the long-range stability of sorts exhibited by the personal saving to disposable income ratio, for which history and sociology provide a good deal of justification, and which just might be the kernel of truth at the center of Friedman's ratio. Be that as it may, however, in the last couple of years the apparent constancy of his ratio has evaporated (Table 1), as government borrowing has exploded without crowding out any other components. A stock of liabilities that can rise by 10 percent of GNP in one year is hardly to be viewed as stable.

The recent surge in the ratio would be even greater, but the level no longer abnormal, were it not for the questionable omission of corporate equity securities. While new stock issues have been quantitatively minor for a long time, in the last three quarters they have run at a $32 billion annual rate and been the dominant source of corporate external funds. Were Friedman to include equities with their large price fluctuations, his ratio would no longer seem stable, nor would it be in any obvious danger of rising "out-of-bounds" because of prospective budget deficits (Chart 1). But if the concern is that growth in the stock of government liabilities might crowd out private liabilities, why should not corporate equity be counted?

Even if one accepted the Friedman ratio and its stability, this would nevertheless be consistent with huge year-to-year fluctuations in the ratio of debt generation to GNP, and in its distribution among sectors (Chart 2). These data also highlight a strong uptrend from cycle to cycle in the borrowing-to-GNP ratio. The reason this uptrend does not carry over to the Friedman ratio until recently probably is that his ratio starts out from an exceptionally high level due to war debt. Even his ratio would show an uptrend, however, had he not decided for unexplained reasons to exclude foreign debt.

In sum, I question whether Federal debt has been or threatens to be inimical to business borrowing or investment. Within a business cycle context, surely, it is business borrowing to finance investment that, once having gathered momentum, is virtually impossible to deter except through a credit

[1]For what little it is worth, for annual changes (1930–1982) the simple correlation between the ratios of (a) the federal national-income accounts surplus to GNP, and (b) total private saving to GNP, is −0.72. When the budget moves toward surplus, private saving tends to decline.

Table 1
Outstanding Debt Issues by Nonfinancial Borrowers as Percent of 4th Quarter GNP

	Total	U.S. Govt.	St. & Local Govt.	House-Holds	Nonfin. Business	Memorandum: Foreign
1952	127.8	61.5	8.7	26.0	31.6	4.2
1953	134.5	62.9	9.7	29.3	32.6	4.5
1954	136.8	61.5	10.9	31.2	33.2	4.4
1955	133.8	56.0	11.3	33.4	33.2	4.0
1956	133.4	51.9	11.6	35.5	34.5	4.0
1957	135.9	50.0	12.2	37.4	36.2	4.2
1958	137.3	49.5	12.9	38.1	36.8	4.4
1959	139.8	48.1	13.4	40.5	37.7	4.3
1960	144.0	46.8	14.3	43.3	39.7	4.5
1961	142.0	44.9	14.2	43.3	39.6	4.6
1962	143.4	43.6	14.5	44.7	40.5	4.8
1963	143.7	41.5	14.6	46.3	41.2	5.0
1964	145.4	40.2	14.7	48.3	42.3	5.3
1965	141.2	36.6	14.4	47.9	42.3	5.2
1966	139.2	34.3	14.1	47.4	43.4	5.0
1967	140.6	33.9	14.2	47.2	45.2	5.1
1968	139.1	32.5	14.1	46.8	45.7	5.0
1969	139.2	30.0	14.3	47.4	47.5	5.0
1970	142.0	29.8	14.8	47.7	49.7	5.0
1971	142.0	29.5	15.1	47.6	49.8	5.0
1972	140.3	27.6	14.7	47.9	50.1	4.9
1973	139.4	25.4	14.1	48.7	51.3	4.9
1974	142.1	24.5	14.2	49.1	54.3	5.4
1975	141.1	27.5	13.7	47.9	52.0	5.6
1976	142.9	29.1	13.4	48.9	51.5	6.2
1977	143.5	28.8	12.7	50.5	51.5	6.2
1978	141.0	27.4	12.0	51.4	50.3	7.1
1979	144.0	26.5	11.7	53.9	51.9	7.3
1980	144.3	27.1	11.5	53.7	52.0	7.7
1981	142.6	27.4	10.7	52.6	52.0	7.8
1982	151.5	31.9	11.6	53.8	54.2	7.3
1983 June†	152.9	33.8	12.6	53.6	52.9	7.1

†Author's estimate of midyear outstandings as percent of 2nd Quarter GNP.
Source: "Flow of Funds Accounts," Board of Governors of the Federal Reserve System.

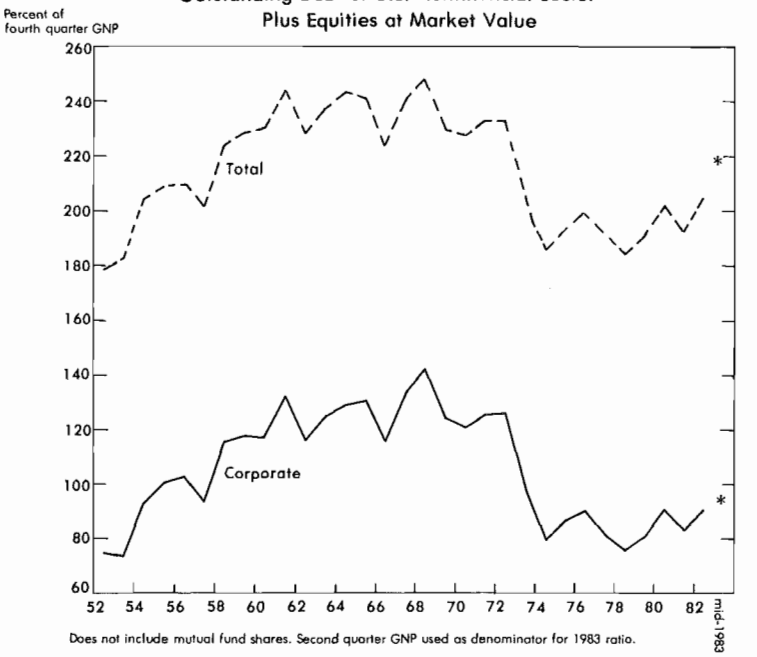
crunch. At such prosperous times it is household borrowing, primarily for the purchase of durables and housing, that is the principal loser in these crowding-out episodes. Friedman should be pleased. Unhappily, once household borrowing declines sharply, soon private investment also falls in response to disappointing retail sales. When consumption is chilled, so is the rest of the economy. Could it be that the path to investment bliss is simply large borrowing by all sectors all the time?

What Does It Really Mean to Reduce the Deficit?

The budget is like the weather. Everybody complains about it but nobody does anything about it—and no one is expected to. Whenever any-

Chart 1

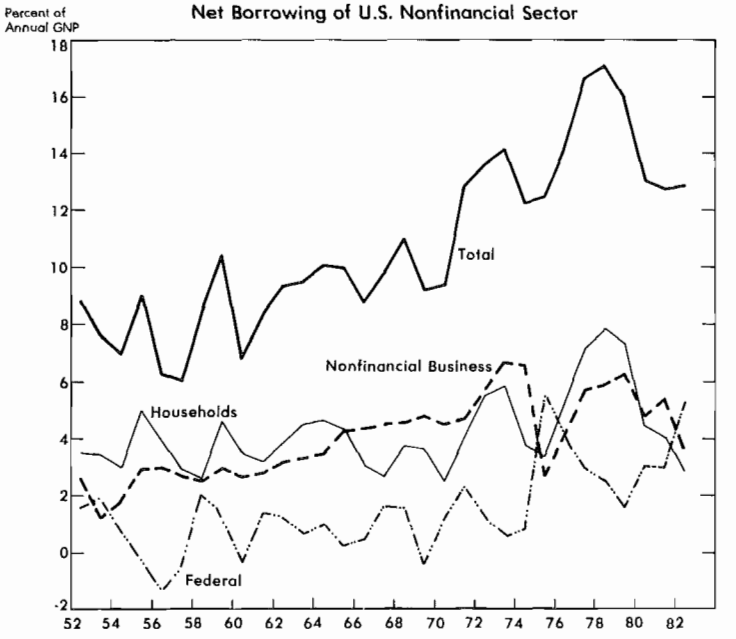
Outstanding Debt of U.S. Nonfinancial Sector
Plus Equities at Market Value



Does not include mutual fund shares. Second quarter GNP used as denominator for 1983 ratio.

Chart 2

Net Borrowing of U.S. Nonfinancial Sector



one does try to influence the weather, the rest of us become very apprehensive, because we sense danger in disturbing the balance of nature. Analogously, profound budgetary changes may endanger the balance of the economy. The transformation of budgetary policy wrought by President Reagan, whatever its accomplishments, also had large risks and costs, some of which may not become apparent for a long time. Radically transforming the budget again, even in a direction many of us would prefer, would expose us to a new set of hazards.

How could we significantly reduce the deficit, and what would be the fallout? Look first at the expenditure side. Of about $850 billion spending in fiscal 1984, some $300 billion will go for retirement payments and Medicare, $250 billion for the military, and over $100 billion for interest. These three expenditure categories, aggregating $650 billion out of an $850 billion total, are programmed to rise rapidly for the foreseeable future. In the present political climate, talk of spending cuts that will be significant in aggregate is demagoguery.

But let us suspend disbelief for a moment. Cutting military outlays would probably yield the most direct and reliable benefits in the release of financial and real resources for private investment. If this is what Friedman and others advocate, let them say so. It is a subject well worth debate, even if it can't be framed in an econometric model.

Once we leave the military budget, other spending reductions are much more problematical in their results. If we focus on curtailing civilian outlays other than the transfers to the elderly, it seems quite probable that infrastructure and education outlays would suffer most. These, however, are just the sectors that Friedman, to his credit, would like to spare. And if we cut the expenditures for the elderly, who knows how the society might react? I do not mean to swallow whole the Barro proposition[2] that just as much would be provided to the elderly by the public acting as individuals as is now done collectively, but some offsets to a reduction in governmental transfers surely would develop, including less saving by the elderly. All in all, selecting those nonmilitary spending cuts that would reliably promote investment is so difficult that, even in the absence of the obvious political constraints, it hardly seems worth the effort.

The picture as respects tax increases is similar. Presumably these would be chosen to target consumption. But of course there is and has been a lot of investment in the consumer goods industries and the firms that produce equipment for them. A successful consumption tax will not encourage such investment; indeed, existing investments will be devalued. For what could be a prolonged transitional period, the net impact on investment might even be adverse. There is a flavor in these discussions that perhaps we really want to invest only in those endeavors that produce capital goods which produce still more capital goods *ad infinitum,* but never more consumer goods. Investment for investment's sake!

Furthermore, it is treacherous to presuppose that aggregate consumption can in fact be reduced by taxation. Friedman himself notes, in several

[2]Robert J. Barro, *The Impact of Social Security on Private Saving: Evidence From the U.S. Time Series,* American Enterprise Institute, 1978.

contexts, the tendency of personal saving to adjust to compensate for saving rate changes in other sectors. It takes *force majeure,* such as war, crop failure, a cutoff in vital imports, or high unemployment to drive a society down from what it regards as its rightful standard of living. In totalitarian countries it takes brutal repression. In the United States, we may have been able to limit consumption modestly in wartime. In peacetime we have only experienced consumption declines when unemployment has increased sharply. And bringing on the recessions and unemployment has depended on stern credit crunches to prevent people from borrowing more in order to replace the purchasing power being destroyed by inflation or other forms of taxation.

This does leave a case for taxing away future income increases before they become incorporated in the "rightful" living standard. The proposed "contingency" tax (I don't know whether to call it Martin Feldstein's or the Administration's) would serve this role. Of course we already have a similar tax that is about to lapse. It is known, affectionately, as "bracket creep." It recognizes, as the tax system should, that the prices of what government buys will rise faster than the general price level. But in 1985, to the joint applause of such fiscal conservatives as Jack Kemp, the *Wall Street Journal,* and the *New York Times,* it will disappear. Who wants to bet strongly that the contingency or any other tax will take its place? Absent crisis, rarely if ever are people willing to impose genuine inhibitions on their own living standard.

The deficit is a bogus issue. Viewing ourselves for the moment as a closed economy without international linkages, reductions in the underlying budget deficit are meaningful only if the public recognizes and consents to material reductions in real military spending, in outlays for and by the elderly, and/or in the consumption standard of the population at large.

Do We Have to Do it All?

But of course we are not a closed economy. We can and do draw real and financial resources from abroad. Thus we are not limited in domestic investment by our own saving, nor in our total use of resources by what we alone can produce. That a nation's use of resources can be greatly augmented by drawing on the rest of the world is familiar from recent LDC practices, as well as from numerous episodes in the history of the United States and other countries.[3] There is, to be sure, a pleasant symmetry to a world in which those who are poorer and less developed borrow from the richer. As a practical matter, however, it is at least as realistic for the strong to draw on the weaker, as the United States is doing now. It may even make economic sense because, the textbook notwithstanding, the marginal return to capital is not necessarily highest where the capital stock is small. Chad or Chile are not necessarily the ideal places in which to invest. Ideology and

[3]"Specifically, over the past two decades, changes in the national saving rate have increasingly been matched by changes in net foreign rather than domestic investment." George M. von Furstenberg, "Domestic Determinants of the Current Account Balance of the United States," *Quarterly Journal of Economics,* August 1983.

culture do matter. In any event, we are not having to beg foreign governments to support the dollar, as we had to during the Vietnam years. It is investors the world over who insist on stampeding into American assets.

Huge quantities are involved. One way to look at these inflows is as a way to finance increases in Friedman's debt ratio without pinching domestic borrowers. Conceptual and statistical difficulties abound in relating the international accounts to Friedman's numbers, but the following result is illustrative. Using the current-account deficit as the measure of net capital inflow (Table 2), foreign net lending to the United States in the year to mid-1983 spurted so dramatically as to "finance" virtually a full percentage point increase in his ratio. If the inflow were to continue at the $26½ billion rate of these four quarters for yet another year—and many forecasts project an even higher number—another percentage point will be financed. Because Friedman's ratio relates the stock of debt to (a presumably growing) GNP, the offset from the capital inflow is "permanent" until such time as capital *outflow* (current-account surplus) resumes at a growth rate faster than that of GNP.

So long as the structural geopolitical and tax considerations that are lending the dollar its strength persist, and our economy grows more rapidly than the rest of the world, large inward flows of capital also will persist. Business investment here will do well, as recent surveys of capital spending plans already are foreshadowing. The budget deficit will further the inflows because the nature of international political and credit risks and market imperfections is such that U.S. Treasury securities fulfill for the rest of the world, especially for official accounts, the same functions that money-market deposits perform for our domestic public. The $26½ billion capital inflow of July 1982 to June 1983 included $22½ billion in recorded net foreign purchases of Treasury obligations. Government securities are our most successful export. The instrument and the technical facilities for its purchase and sales boast incomparable comparative advantage.

I suggested earlier that the true issue in assessing the need and potential for additional investment was not the deficit but the military program, the resources devoted to the prolonging of high-consumption longevity, and the consumption standard in general. The international aspects mean that it is to some extent a question of "our" standard of living against "theirs." Foreigners may well argue that longer lifespans in the United States are competing with potential reductions in infant mortality abroad. Americans may argue that the free world is stealing a free ride on our military build-up. Ever since President Reagan took office, I have been warning foreign clients that if other industrial countries refused to accept larger military burdens directly, they would nevertheless end up sharing the burden through a deterioration in their terms of trade with the United States.

These are ugly issues.

How Are We Guilty?

Our problem is not an unbalanced federal but an unbalanced national budget. As a nation and as individuals, we are probably committed to expend more in real resources than we will be able to produce. Many of these

Table 2
Net U.S. Stock of Foreign Capital as Percent of GNP

	4th Qtr. GNP $ billions	Balance on Current Account $ millions	Cumulative Balance on Current Account $ millions	Cumulative Balance on Current Account as % of GNP
1946	220.7	4,885	4,885	2.21
1947	244.0	8,992	13,877	5.69
1948	265.9	2,417	16,294	6.13
1949	256.8	873	17,167	6.68
1950	306.3	-1,840	15,327	5.00
1951	339.2	884	16,211	4.78
1952	360.0	614	16,825	4.67
1953	363.1	-1,286	15,539	4.28
1954	375.6	219	15,758	4.20
1955	411.0	430	16,188	3.94
1956	432.1	2,730	18,918	4.38
1957	444.0	4,762	23,680	5.33
1958	467.0	784	24,464	5.24
1959	495.0	-1,282	23,182	4.68
1960	504.8	2,824	26,006	5.15
1961	542.6	3,822	29,828	5.50
1962	574.3	3,387	33,215	5.78
1963	612.4	4,413	37,628	6.14
1964	648.8	6,822	44,450	6.85
1965	717.2	5,428	49,878	6.95
1966	774.9	3,031	52,909	6.83
1967	823.3	2,582	55,491	6.74
1968	900.3	612	56,103	6.23
1969	962.0	394	56,497	5.87
1970	1,009.0	2,328	58,825	5.83
1971	1,105.8	-1,436	57,389	5.19
1972	1,233.5	-5,795	51,594	4.18
1973	1,376.7	7,138	58,732	4.27
1974	1,473.8	2,120	60,852	4.13
1975	1,621.8	18,277	79,129	4.88
1976	1,772.5	4,206	83,335	4.70
1977	1,988.9	-14,514	68,821	3.46
1978	2,281.6	-15,447	53,374	2.34
1979	2,502.9	-967	52,407	2.09
1980	2,736.0	421	52,828	1.93
1981	3,032.2	4,588	57,416	1.89
1982 1st half	3,070.2†	1,998	59,414	1.94
1982 2nd half	3,109.6	-13,217	46,197	1.49
1983 1st half	3,272.0†	-13,299	32,898	1.01

†Second quarter GNP.
Note: Current account cumulative from 1946.
Source: U.S. Department of Commerce, *Survey of Current Business.*

expenditures are liable to be wasteful from the standpoint of those who will come after us.

The large budget deficit is harmful mainly because it undermines discipline in federal as well as national spending. Its very size makes most feasible economies in government spending seem so small as to be meaningless and not worth the political effort. On the national and international level, the huge mass of Treasury debt engendered by the deficit and the need to maintain the unquestioned liquidity of that debt make it much more difficult to discipline aggregate demand.

But aside from the damage it does by undermining economic discipline, the budget deficit itself is not important—only how it is spent. As regards military outlays, to be sure, possibly the international tensions in our world are such that outlays should not be restrained, although, as mentioned earlier, that is surely a subject open to greater debate. A more serious issue is, I believe, the intensifying economic conflict between the elderly and the young. In light of the fraying of the bonds of family and community, of course the elderly want their economic claims established on the basis of irrevocable entitlement. The young support the aged in this view, because the young desire the same privilege as they age, and because they rightly fear the extraordinary material risks—at present uninsurable except through government—of supporting their parents under modern conditions of longevity and medical care. Because belief in the hereafter has waned, the aged wish to live longer, and at a higher consumption standard. For similar reasons, and because they labor under the ineradicable cloud of nuclear holocaust, the young also aspire to more immediate and larger consumption. To some extent, they are balancing their budgets by more work and fewer children. It is comforting to talk about a bloodless and abstract budget, rather than to face the terrifying ethical and societal issues that have made the budget what it is.

Fortunately for us the rest of the world has been furnishing us a critical and growing margin of resources. The large trade deficit we are generating is a sign of this shortfall. Were it not for this inflow of goods at low prices that reflect the strength of the dollar, we would even now be at the threshold of an inflationary surge that would force us to throttle back our economy. Cyclically as well as long range, however, this reliance on others has its risks and limits. Far easier, however, to flog the budget than to seek to determine an appropriate balance between the rights and obligations of free-world leadership.

If trees are to be planted whose shade is to be enjoyed by our heirs, we need to choose the right trees (whether or not they happen to be labeled "investment"); to find a mutually caring and respectful balance between young and old; and to avoid undue exploitation by or of others. Whether progress toward these goals increases or reduces the budget deficit is immaterial.

Let it be recognized, too, that every aspect of the task is a matter not only of calculation but also of conscience. The economic and moral choices are duals: each economic decision implies a moral choice and vice versa. By conducting the national debate as though the moral dimension did not exist, we assure that the debate will remain fruitless and richly earn the burden of guilt the deficit inspires.

International Aspects of U.S. Monetary and Fiscal Policy

Paul Krugman*

Introduction

Since 1980 U.S. macroeconomic policy has diverged from that of other major industrial countries. While most countries responded to the inflationary impact of the 1979 oil shock by tightening their fiscal policies, the influence of supply-side doctrine has led the United States into a dramatic fiscal loosening. After 1979 all major countries moved towards tighter monetary policies; but until mid-1982 the United States was more determined in this respect than most others. Indeed, despite the fiscal stimulus the United States managed to have a deeper recession than the rest of the industrial world.

The impacts of this divergence in policies on the world economy in general and on U.S. trade in particular have been dramatic. But there is a good deal of disagreement about just what these impacts are, and about the appropriate response. The purpose of this paper is to lay out a framework for thinking about the effects of this kind of policy divergence, and to suggest some tentative conclusions about the current situation.

Readers should be forewarned that this is a "low-tech" paper. It neither sets out an econometric model nor develops a theoretical approach based on careful analysis of microfoundations. Instead, the empirical content, such as it is, consists of rough exploratory data analysis, while the theoretical analysis is in the Mundell-Fleming tradition of small-scale, *ad hoc* modeling. The justification for this crudity is of course that it has the compensating advantage of flexibility. We are now in an international macroeconomic situation which is quite different from anything previously experienced. In time the theory and econometric work necessary for a detailed and rigorous treatment of this situation will be done (although by that time the situation will have shifted again—generals are not alone in their tendency to be ready to fight the lost war). In the meantime, however, there is a place for ad-hockery and first-cut analysis.

The paper is in four parts. The first part is background: an account of the divergent trends in fiscal and monetary policy and of the macroeconomic and financial developments which have accompanied these trends. The second part lays out a framework for analysis. It suggests that a slightly modified version of the Mundell-Fleming or "IS-LM-BP" model is a useful way to think about recent developments. The third part of the paper addresses the problem of the strong dollar from a U.S. point of view: should the United States do something to drive the dollar down to where it belongs?

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Finally, the last part turns to the issue of macroeconomic interdependence and international coordination of policies.

I. Background: Monetary and Fiscal Policies in Industrial Countries

The inflationary impact of the oil shock of 1979 forced the governments of industrial countries to make a hard choice. There were (and are) only three logically consistent ways to approach a situation of uncomfortably high inflation. The first is to learn to live with it, by indexing most long-term economic arrangements to more stable measures of value. The second is to try to legislate inflation down through some kind of incomes policy. The third is to reduce inflation by creating excess capacity in the economy.

In 1979 and 1980 there was virtually a consensus that only the last choice was workable. A policy of monetary (and initially fiscal) restraint was instituted with bipartisan support in the United States and similar if generally less dramatic steps were taken in most other major countries. The three-year global recession which followed can be viewed in broad outline, if not in detail, as a choice in which a remarkably wide cross-section of leaders in the industrial world concurred.

From 1981 onward, however, it became clear that the U.S. policy *mix* was diverging from that in the rest of the industrial world. Fiscal policy, though initially tightened, shifted increasingly towards stimulus, while monetary policy was more strongly disinflationary in the United States than elsewhere.

A. *Fiscal policy*

During the 1970s the United States actually ran much closer to a balanced budget than other industrial countries. Table 1 shows a comparison of budget deficits as a share of GDP for the United States and for six other large industrial countries. Over the 1974–80 period the United States was

Table 1
Fiscal Policy: Actual Budget Balances, as % of GDP

	1974-81 average	1981	1982	1983*	1984*
United States	−.4	−1.0	−3.8	−4.4	−3.9
Japan	−3.6	−4.0	−4.1	−3.4	−2.5
Germany	−3.2	4.0	−3.9	−3.7	−3.1
France	−.8	−1.9	−2.6	−3.4	−3.3
United Kingdom	3.8	−2.5	−2.0	−2.5	−2.5
Italy	9.4	11.7	12.0	−11.6	12.4
Canada	−1.6	−1.2	−5.3	−6.5	−5.7
Non-U.S. average	−3.5	−4.0	−4.4	−4.4	−4.0

*OECD forecasts

Source: Organization for Economic Cooperation and Development

clearly much less inclined towards deficit finance than the rest (although some of the deficits, such as Italy's, are exaggerated by inflation). It is arguable that the United States, with the lowest savings rate among the seven countries, needed to run a smaller deficit; but in any case the effect of divergent attitudes towards fiscal deficits after 1981 soon eliminated the difference. U.S. deficits grew sharply as a share of GDP, while they levelled off elsewhere.

The rise in the U.S. budget deficit was in part, of course, the result of the recession in this country. At the same time, however, recession was also tending to increase deficits abroad, so that the stability of foreign deficits actually reflected a substantial reduction in "full-employment" or "structural" deficits. Table 2 reports the OECD's estimates of those changes in budget balances not resulting from cyclical movements. Although the indicated U.S. fiscal loosening is considerably smaller than that in Table 1, there is a considerable fiscal tightening elsewhere. The *relative* movement in U.S. fiscal policy remains very large, some 4½ percent of GNP from 1981 to 1984.

Table 2
Fiscal Policy: Discretionary Changes in Budget Balance (net of cyclical factors)

	1981	1982	1983*	1984*
United States	1.0	−1.1	−0.6	−0.1
Japan	0.6	0.1	1.4	1.4
Germany	0.2	1.5	1.3	1.0
France	−1.1	0.2	0	1.2
United Kingdom	2.8	1.8	0	−.3
Italy	−2.4	1.2	1.9	0.4
Canada	1.6	0.4	−0.8	0.9
Non-U.S. average	.3	1.0	0.8	0.9

*OECD forecasts

Source: See Table 1.

B. *Monetary policy and income*

From 1980 through mid-1982 this country followed a more disinflationary monetary policy than other countries by any measure. The substantial loosening of our monetary policy since then has not fully made up the difference; it remains to be seen whether, as many expect, U.S. monetary policy will again tighten in the future.

The preceding paragraph was written as if the tightness of monetary policy were something easily measured. In fact, there are a number of possible measurements. In Part II of this paper I will propose a measure which will doubtless annoy most people. For the moment, however, it will suffice to look at the more conventional measures. Table 3 shows growth rates of M1 in the United States and other major industrial countries. The table sug-

Table 3
Monetary Policy: M1 Growth

	1980	1981	1982	Recent*
United States	9.0	5.2	4.8	14.5
Japan	.8	3.7	7.1	−.1
Germany	2.4	0.9	3.2	19.1
France	8.0	12.3	14.8	5.1
United Kingdom	4.5	10.2	8.2	12.8
Italy	15.9	11.1	12.8	16.2
Canada	3.9	3.0	0.8	14.2
Non-U.S. average	4.5	6.1	7.8	9.1

gests a much more dramatic deceleration in this country than elsewhere until the summer of 1982, then a reversal. It is interesting to note the low recent money growth in France and Japan, both of which have (for different reasons) been strongly concerned about their exchange rates.

Differential monetary policies have had an effect on income growth which more than outweighs the effect of differential fiscal policies. Table 4 shows that the recession in the United States produced a greater shortfall of growth from its previous average than that elsewhere. If 1979 is taken to represent a year of more or less normal output, and the trend from 1973–1979 is taken as an estimate of trend growth, the U.S. GDP gap in 1982 was 7.5 percent, vs. 4.2 percent for other large industrial countries. (These numbers would be larger if we used end-of-year figures rather than annual averages).

Table 4
Real GDP Growth

	1973-79	1980	1981	1982	1983*
United States	2.6	−0.3	2.3	−1.7	3.0
Japan	3.6	4.9	4.0	3.0	3.3
Germany	2.4	1.9	0.2	−1.1	0.5
France	3.1	1.1	0.2	1.7	−0.5
United Kingdom	1.4	−2.0	−2.0	1.2	1.8
Italy	2.6	3.9	−0.2	−0.3	−0.5
Canada	3.3	0.5	3.8	−4.8	2.0
Non-U.S. average	2.9	2.3	1.4	0.8	1.4

*OECD forecasts

C. *Interest rates and exchange rates*

Through mid-1982, the United States experienced a substantially greater increase in real short-term interest rates than other countries. The increase represented a combination of higher nominal interest rates and lower inflation, and can be explained as the result of more severe disinflationary monetary policy in this country than elsewhere.

Through mid-1982 there seemed to be a close association between the real interest differential and the dollar's exchange rate. The extraordinary rise in the dollar from its low point in 1980 to mid-1982 could in effect be explained by an equally extraordinary rise in U.S. real interest rates, not fully matched by other countries.

Events in the second half of 1982, however, caused some doubts to emerge about whether policy divergence in itself was enough to explain the dollar's strength. The reversal of U.S. monetary policy in the summer of 1982 brought about a considerable drop in interest rates; yet the dollar not only remained strong but actually rose further. This led some observers to conclude that such factors as political uncertainty, rather than purely economic factors, were the crucial determinants of the dollar's strength.

A more careful look at the evidence suggests, however, that the extent to which the exchange rate was defying economic forces in late 1982 has been exaggerated. Table 5 presents a comparison, developed by the OECD, of interest rate *changes* from June to December 1982. There are two important points. First, the decline in U.S. interest rates was partly matched by a decline in interest rates elsewhere, so that the interest rate *differential* did not narrow as much as a look at U.S. rates alone would suggest.

Table 5
Changes in Interest Rates, end-June to end-December, 1982

	Short-Term	Long-Term
United States	−5.4	−3.3
Japan	−.2	−.6
Germany	−2.9	−1.9
France	−2.8	−.6
United Kingdom	−2.6	−2.3
Italy	−1.4	−.7
Canada	−4.2	−4.2
Non-U.S. average	−1.9	−1.4

Second, the interest differential on long-term securities narrowed much less than that on short-term assets. This presumably reflected the belief of the markets—a belief which turned out to be justified—that the decline in U.S. short-term rates was a temporary phenomenon.

It is argued in the appendix to this paper that the relevant interest differential for exchange rate determination is a differential on real, long-term rates. What Table 5 shows is that despite the perception of a major decline in U.S. interest rates in the second half of 1982, the long-term nominal differential fell by less than 2 percentage points. The question then becomes whether changes in relative inflation expectations offset this decline. None of the ways in which we attempt to measure inflationary expectations is very satisfactory. My personal impression is that the second half of 1982 was marked in this country by a revolution of falling expectations about inflation, as the true depth of the recession became apparent. If this is a correct

perception, it may well be that the second half of 1982 actually saw a *rise* in the relevant interest differential between this country and other industrial countries.

This is hardly a conclusive discussion. The point is that it remains a viable working hypothesis that the strength of the dollar has basically reflected the divergence in macroeconomic policies between the United States and other industrial countries, rather than other exogenous factors.

D. *U.S. external balances*

The end result of the divergence in macroeconomic policies between the United States and other industrial countries is a surge in U.S. external deficits, both on merchandise trade and on the current account. In 1982, despite the strength of the dollar, these deficits increased only modestly. This was partly because the full effects of the exchange rate on trade take time to be felt. It was also importantly due to the greater depth of the recession in this country than elsewhere, which had the effect of masking the U.S. loss of competitiveness. As the U.S. economy recovers, most observers now expect record trade and current account deficits this year, unprecedented deficits next year.

II. A Framework for Analysis

In the last decade international macroeconomic theory has become an increasingly sophisticated field. The simple extensions of the IS-LM model developed by Mundell and Fleming have been followed by models which emphasize price dynamics, intertemporal optimization, and portfolio behavior under uncertainty. These newer models have yielded valuable insights. Yet bread-and-butter analysis of international macroeconomics continues to rely heavily on the older approach. For the purposes of understanding the current international situation the Mundell-Fleming model remains a useful starting point. The most important modification required is, I will argue, in our specification of the behavior of the monetary authorities rather than of private agents.

A. *The Mundell-Fleming model*

The basic Mundell-Fleming model is an IS-LM framework to which a rudimentary international sector has been appended. Trade flows depend on the exchange rate and income, capital flows on the interest differential. The exchange rate adjusts so as to insure a balanced flow of payments.

There are many expositions of the Mundell-Fleming model, and it need not be restated here.[1] The only important thing at this point is to recall the main conclusions about the effects of monetary and fiscal policy with a floating exchange rate.

[1]A relatively modern exposition is given in Dornbusch and Krugman (1976).

Monetary policy: A monetary expansion leads to a lower interest rate, a capital outflow, and depreciation of the expanding country's currency. To accommodate the capital outflow the currency must depreciate so much that the trade balance actually improves, so that monetary expansion by one country actually has a contractionary effect on demand in the rest of the world.

Fiscal policy: A fiscal expansion raises the interest rate and leads to a capital inflow. Whether the currency appreciates or depreciates depends on how sensitive capital flows are to interest differentials. In either case, the counterpart of the capital inflow is a worsening of the trade balance which transmits part of the increase in demand to the rest of the world.

Few sensible observers would quarrel with the argument that monetary expansion at least temporarily lowers interest rates and leads to currency depreciation, though the perverse effect of monetary expansion on demand abroad may raise some doubts. More controversial, however, are the effects of fiscal policy. In the Mundell-Fleming model the effect of fiscal expansion on the exchange rate is ambiguous, while the effect on foreign income is clearly positive. In recent discussions of international issues, however, unqualified assertions have been made that U.S. fiscal deficits raise the value of the dollar. At the same time, many observers have claimed that U.S. fiscal deficits actually have a *contractionary* effect on the rest of the world.

These views do not by and large represent judgments about parameter values or differences of opinion about the appropriate macroeconomic model. What they reflect instead is a view about the proper characterization of monetary policy. The traditional Mundell-Fleming analysis of fiscal policy asks what happens when fiscal policy is changed, holding the money supply constant. This is a reasonable question, but in the present context it is not very relevant. To discuss the effects of fiscal policy it is necessary to ask how the monetary authorities will actually react—and this will probably not involve holding the money supply constant.

B. *Restating monetary and fiscal policy: the IS-PV Model*

Neither in this country nor in others have the monetary authorities held strictly to aggregate targets. Instead, they have modified their targets whenever that has seemed necessary to achieve desired macroeconomic results in terms of growth and inflation. A number of observers have called for an explicit acknowledgement of this position, and have called for targeting not of M1 or M2 but of MV—that is, of nominal GNP.

Central banks have resisted any such explicit targeting. Nonetheless, it may be reasonable as a first cut to hypothesize that monetary authorities are in effect attempting to peg nominal GNP. They are not, of course, fully successful in this, but the error seems to be uncorrelated with other policies. The Federal Reserve is at the time of writing tightening its policies to offset a strong fiscal stimulus. They may do too little, allowing an undesirably fast recovery; or they may do too much, causing the recovery to stall. But the point is that if fiscal policy were less stimulative, the Fed would feel less need to tighten, and the net effect on the *expected* pace of recovery would be ambiguous.

Beyond its rough realism, adopting the working assumption of nominal income targeting by the monetary authorities has two useful features. First, it simplifies the analysis of fiscal policy. Second, it helps clarify the discussion of exchange rate policy by making natural the distinction between questions of the *level* of output and questions of its *composition*.

Consider, then, the Mundell-Fleming model where the monetary authorities engage in nominal income targeting. The effect is to replace the conventional upward-sloping LM curve with a vertical monetary authority response function, which I will call the PV curve.[2] Income is determined by the central bank; given this level of income, fiscal policy can only shift the composition of output by altering the interest rate. In effect we restore the classical full-employment view of fiscal policy even for situations when the economy is not at full employment.

What are the international trade implications of fiscal policy? Figure 1 illustrates the simple story which results. Two countries are shown, with IS curves drawn for a given exchange rate. We assume that at that initial exchange rate, external payments are in balance.

An expansionary fiscal policy in country A has the initial effect of pushing up the IS curve in that country. The resulting increase in interest rates would, however, lead to a balance of payments surplus at the initial exchange rate. Thus country A's currency appreciates. The appreciation acts directly to offset the interest differential, while at the same time acting to narrow that differential. Because A's goods have become less competitive, A's IS curve shifts down while B's shifts up.

Thus the effect of a fiscal expansion in one country is unambiguously to cause an exchange rate appreciation and also to raise interest rates both at home and in the rest of the world.

What about the assertion that U.S. fiscal deficits actually have a contractionary effect in the rest of the world? This should be understood as a statement about policy reaction functions. In the case illustrated in Figure 1, country A's fiscal expansion did not affect GNP in the rest of the world; but it did lead to a depreciation of country B's currency. Suppose that country B does not want to have a depreciating currency, perhaps because of the inflationary impact. Then to limit the fall in its currency country B must either (i) match A's fiscal expansion, or (ii) tighten its monetary policy. If fiscal policy is inflexible, monetary policy must do the job. The result is illustrated in Figure 2. The initial effect of A's fiscal expansion is to push up its IS curve; as A's currency appreciates, its IS curve shifts back down and *both* the IS and PV curves shift back in B. Thus given the hypothesized monetary authority reaction functions, concerned with nominal GNP in one country and the exchange rate elsewhere, a fiscal expansion in one country actually can lead to a contraction abroad.

Is this scenario reasonable? I would argue that it is for at least one major country, Japan. Japan is unwilling to see the yen depreciate for fear of provoking a protectionist response in the United States. At the same time,

[2]For Paul Volcker.

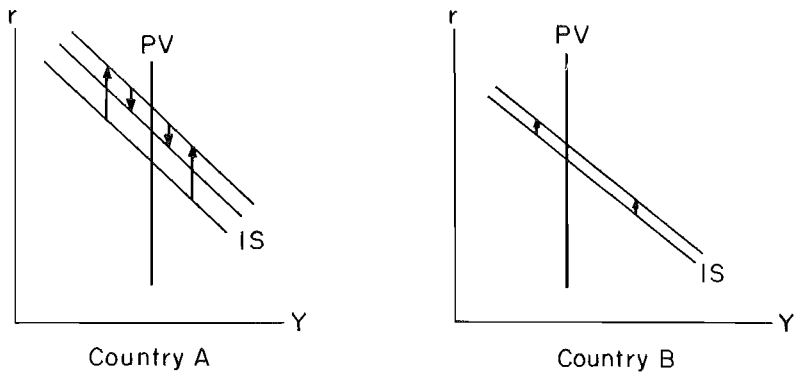

Figure 1

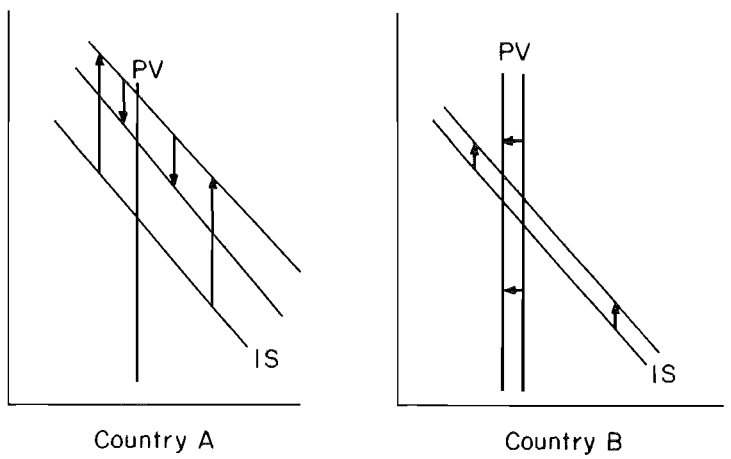

Figure 2

Japan is committed for domestic reasons to a policy of reducing budget deficits. The result is that when U.S. fiscal deficits drive up interest rates, Japan must respond by slowing money growth. In a sense which must be carefully stated but is nonetheless real, U.S. fiscal stimulus probably has a contractionary effect on activity in Japan.

C. *Dynamics and expectations*

To apply the simple framework just described to real-world phenomena it is necessary to make some allowance for the complications introduced by dynamics and expectations. Some of these issues, like the role played by lags in the adjustment of trade flows to the exchange rate, are not very controversial. But there has been some confusion over the appropriate treatment of expectations both of inflation and of future interest rates.

One view, associated particularly with the Council of Economic Advisers (see for example, the *Economic Report of the President* for 1983) is that the relevant interest rates for exchange rate determination are *real, long-term* rates. This view gests that anticipations of future fiscal deficits, by raising long-term rates, can tend to keep the current exchange rate high. The CEA view has, however, been challenged by many observers, who point out two aspects of actual international capital movements which seem to contradict this view. First, investors deciding in which country to place their money are deciding between two financial assets, rather than making a choice between financial and real assets, so that it seems unclear why *real* yields should matter. Second, the most volatile international investment is in short-term securities, so that it seems unclear why *long-term* yields should be emphasized.

These observations are valid, but do not necessarily contradict the CEA view. Even if investors do not care about real returns or invest in long-term instruments in a speculative market, it is still appropriate to focus on the long-term real interest differential.

A formal statement of the argument is given in the appendix. The intuitive sense behind the statement may be helped by making two points. First, high interest rates will not make for a strong currency if they are simply an offset to high inflation, suggesting that it is the real interest rate which matters—not because investors are choosing between real and financial assets, but because high inflation will be reflected other things equal in a depreciating currency, reducing the domestic financial yield measured in foreign currency. Second, an interest rate increase which is perceived as very temporary will have less effect on the exchange rate than one which is expected to persist. This suggests that what matters is a weighted average of expected future interest rates—in effect, a long-term rate. The reason is not because investors plan to buy and hold, but because the expected future course of interest rates affects the expected future course of the exchange rate—which is relevant even to short-term investors.

The emphasis on real long-term rates as determinants of the exchange rate should be interpreted, then, as shorthand for a view of the exchange market as one in which investors attempt to look forward to future funda-

mentals. The main objection to this view would be to question whether the markets are really that rational.

III. Policy Responses to the Strong Dollar

The first two parts of this paper have laid out some suggestive data and a simple theoretical framework on which to hang those data. The message is by and large a conventional one: actual and expected tight monetary and loose fiscal policy in the United States have led to a strong dollar and a massive U.S. trade deficit; the efforts of other countries to support their currencies in the face of the U.S. policy mix may have caused a deeper recession outside this country than would otherwise have been the case.

The next question is what to do about it. It is commonly stated that the dollar is overvalued. It is certainly unusually strong, and probably stronger than it would be given an optimal set of policies. The simple statement that the dollar is overvalued, however, seems to suggest that any policy which brings the dollar down is desirable. This is a dubious conclusion. A strong case can be made for the argument that in a *conditional* sense the strong dollar is desirable—that unless fundamental macroeconomic policies, especially fiscal policy, are changed, using other policies to reduce the value of the dollar will not be a good idea. There is also a contrary case, but it is a surprisingly shaky one.

A. *Effects of the strong dollar*

As a backdrop to our discussion of policy, it is useful to review the major effects of a strong dollar. These basically fall into four categories: the direct effect on U.S. competitiveness; on inflation; on aggregate demand and employment; and on interest rates and investment.

1. *Competitiveness*

This is not the place for a detailed discussion of econometric estimates of the impact of the exchange rate on U.S. trade. The point which is clear from most estimates is a straightforward one: essentially *all* of the actual and anticipated deterioration in U.S. external balances can be attributed to the strength of the dollar. Cyclical factors are important determinants of trade, but have so far acted to mask the effects of the strong dollar (because of the relatively deep U.S. recession) rather than to add to these effects. The expectation of growing U.S. deficits arises partly from the prospect that U.S. recovery will remove this mask, partly from lagged effects of the exchange rate. Other factors, such as the LDC debt crisis and the drop in oil prices, have been relatively small and largely offsetting. As for the alleged effects of foreign trade and industrial policies, these have had no discernible effects.

2. *Inflation*

Exchange rate appreciation leads to lower prices for imports and other tradable goods, thereby providing an anti-inflationary bonus. To the extent

that wages are explicitly or implicitly indexed this disinflationary impact can spread to the economy as a whole. The massive appreciation of the dollar since 1980 has clearly been a significant factor in the moderation of U.S. inflation.

As Buiter and Miller (1982) have emphasized, however, this is only a transitory gain. In the long run, as the exchange rate returns to purchasing power parity, the inflation gains from exchange rate appreciation must be paid back. Indeed, a full analysis shows that they must be paid back with interest.[3]

Despite their transitory nature, however, the inflationary consequences of exchange rate changes play a crucial role in generating international macroeconomic interdependence, as discussed in Part IV of this paper.

3. *Aggregate demand and employment*

When we approach the question of the aggregate demand effects of the strong dollar we enter a controversial area. The *direct* impact of the strong dollar, via its effect on net exports, is of course to depress demand and employment. One's estimate of the *full* effect, however, depends on one's model of the economy and especially on one's model of the behavior of the monetary authorities.

My view should already be clear from the discussion in Part II of the paper. The Federal Reserve can, I would argue, usefully be viewed as attempting to peg GNP (if not too successfully). This implies that a decline in net exports will be met with a decline in interest rates which leads to offsetting increases in other components of demand. To a first approximation, the strong dollar thus has no effect on demand on employment.

4. *Interest rates and investment*

If one accepts the "PV curve" view of monetary policy, the consequences for one's view of the interest and investment impact of the strong dollar are clear. The strength of the dollar leads to lower interest rates and higher investment than would otherwise be the case. In the current context, the strength of the dollar helps limit the "crowding out" caused by the combination of loose fiscal and tight monetary policies.

One way of stating this is in terms of the adjustment shown in Figure 1. There, after fiscal expansion pushes country A's IS curve to the right, exchange rate appreciation pushes it partway back to the left. The result is a lower interest rate and, implicitly, higher investment than would have been the case had the exchange rate adjustment somehow been prevented.

Alternatively, the argument can be stated in terms of the savings-investment identity. Definitionally, U.S. investment equals private sector

[3]A country which experiences a temporary exchange rate appreciation will have a worse current account and therefore end up with less net claims on foreigners than would otherwise have been the case. Because of this, it will eventually have lower net income from investments, and will thus ultimately have to have a *lower* real exchange rate than if it had never had the initial appreciation.

savings, less the government budget deficit, plus the current account deficit. In other words, the external deficit has as its counterpart a net capital inflow. This capital inflow allows a higher level of investment to be sustained for a given level of the government deficit than would otherwise be the case. In this sense, foreign capital inflow can be said to be financing part of the budget deficit—whether foreigners actually buy Treasury offerings or not.

These two ways of stating the point are equivalent, although they can be made to sound different. The important point is that the argument that the strong dollar helps sustain investment is not an outlandish concept, but a straightforward conclusion from a conventional framework.

B. *Policy options*

Given these effects of the strong dollar, what should be done? There are three serious options: tighter fiscal policy, looser monetary policy, and capital controls. There is also a nonserious option, exchange market intervention.

1. *Fiscal policy*

Given our assumptions about monetary policy, a tighter U.S. fiscal policy would lead to lower interest rates, a lower dollar, and (with some lag) an improved U.S. external position. In terms of the savings-investment identity, the reduction in government dissaving would be reflected in increases both in domestic investment and in net foreign investment.

This is a desirable outcome by almost anyone's accounting. It is not, however, something likely to happen soon. In any case, to favor a tighter fiscal policy, which would have a lower dollar as one of its consequences, is not at all the same thing as simply favoring a lower dollar.

2. *Monetary policy*

A looser monetary policy would clearly help drive down the dollar. The question is whether the looser policy is desirable. This depends basically on how fast you want to disinflate, and whether you like the pace the Federal Reserve has chosen. Last fall, it was relatively easy to advocate looser money; at the time of writing, with the economy growing rapidly, the case is less clear. Whatever one's views on the subject, they do not (or should not) depend primarily on the exchange rate. As is the case with fiscal policy, advocating a looser monetary policy, which would weaken the dollar, is not the same as simply advocating a lower dollar.

3. *Capital controls*

If one is neither able to tighten fiscal policy, nor willing to loosen monetary policy, the only practicable way to bring down the dollar is probably with capital controls—either capital import controls by the United States or capital export controls by other countries. And some influential commenta-

tors, such as Bergsten (1982) and Dornbusch (1982) have in fact advocated such controls.

There would certainly be administrative problems and microeconomic costs associated with controls, but these are not the central issue. It is probably possible to devise capital controls which would succeed in lowering the dollar. The key question is whether one wants a lower dollar, *given current monetary and fiscal policies.*

It is crucial to pose the question this way, rather than to ask in general terms whether the dollar is overvalued. If the dollar is somehow brought down without changing the underlying macroeconomic policies which brought it up, there must be a tradeoff. In particular, a weaker dollar must—as we have already seen — mean higher interest rates and lower investment.

To put it baldly, is a (say) $30 billion improvement in the trade balance worth a $30 billion reduction investment?[4] Conventional growth analysis will almost surely say that it is not. The social return on domestic investment is probably higher than on foreign investment even in normal times, because of the tax wedge. Furthermore, in the mid-1980s the crowding out of investment by budget deficits will probably mean that only relatively high return investments would have been undertaken in any case.

To make the case for capital controls one has to argue that too much of the crowding out of investment by the U.S. budget deficit is falling on net foreign investment, too little on domestic investment. If world capital markets were perfectly integrated, one would expect a fiscal deficit anywhere to crowd out investment equally around the world. Since the United States accounts for only about 40 percent of the OECD's GNP, and less of its investment, this would imply a current account deficit of at least 60 percent of the U.S. budget deficit—much more than we have observed so far or than anyone is currently forecasting. This leaves unclear by what standard the actual capital inflow may be judged as being too large.

This is not to say that no arguments can be made for trying to bring the dollar down. Several arguments are discussed below. First, however, it is necessary to treat briefly the question of exchange market intervention.

4. *Exchange market intervention*

Instead of using capital controls to bring the dollar down, we could attempt to use exchange market intervention. As long as such intervention is "sterilized"—that is, not allowed to affect monetary policy—it will have two problems. First, it will probably be ineffective. Second, if it is effective, it will have the same doubtfully desirable macro effects as capital controls.

The effectiveness of sterilized intervention has been the subject of a great deal of empirical work, as well as of an international summit-related study. The evidence is not as tight as one might wish, but in general there is little reason to believe that sterilized intervention can do much beyond limited smoothing of the exchange rate.

[4]This is actually not quite fair. To the extent that savings respond to interest rates, part of the trade balance improvement could come at the expense of consumption.

More to the point, the macroeconomic effects of intervention if it works are the same as those of capital controls: to lower the dollar while raising interest rates, and thus to trade off an improved trade balance for lower investment. It is useful in this context to think of intervention as an officially sponsored capital outflow which is being used to offset private capital inflows; the net effect is as if a restriction were simply placed on the net inflow.

If it could work, intervention might be preferable to capital controls because it is cleaner in its microeconomic effects, and because it is easier to shut off. But in macroeconomic terms, it is no different.

C. *The Case for a Weaker Dollar*

I have made rather strongly the case that weakening the dollar through means other than getting our monetary-fiscal house in order is not a desirable thing. Some contrary arguments, however, deserve to be briefly mentioned.

1. *Adjustment costs*

The strength of the dollar causes resources to move out of exporting and import-competing sectors. When the dollar declines, these resources will come back. The adjustments will have a real cost; if markets fail to perceive the temporary nature of the shift, resources will be wasted in unnecessary movement between sectors. By stabilizing the dollar these costs might be avoided.

There are two problems with this argument. First, it presumes that markets are excessively short-sighted—a shaky foundation on which to base policy. Second, it assumes that stabilizing the exchange rate would reduce total adjustment; in fact, while adjustment by tradable sectors would be less, adjustment by other interest-sensitive sectors such as construction would actually have to be larger.

2. *Permanent loss of competitiveness*

Many businessmen and policymakers are concerned that a sort of ratchet effect may occur in international competition: that once markets have been lost through a period of currency overvaluation, they will not be regained when the currency returns to its normal level. This cannot be true in quite the sense that it is often stated; the United States cannot permanently lose its competitiveness in everything. But there may be a valid point here: in a world where dynamic scale economies are important, as they surely are for many U.S. exports, a period of unusual strength for a country's currency may have to be followed by a period of unusual weakness as the country is obliged to reestablish market positions.

3. *Political considerations*

The most important argument for doing something about the dollar is not really an economic one. It is the argument that the strength of the dol-

lar, by feeding protectionism, will lead to an irreversible breakup of the liberal trading system. A large trade deficit may be preferable to a cut in investment on purely economic grounds, but the political repercussions from the trade deficit will be more severe and last longer.

This is a powerful and respectable argument. It should, however, be made clearly and honestly, with full admission of the economic consequences. Accepting a basically undesirable policy in order to appease dangerous political forces may be good political economy; but one should be clear that is the proposal, and not go back to find reasons why the policy was good economics, too.

IV. The Scope for International Cooperation

The message of this paper so far has been that the U.S. trade deficit is part of a general crowding out of investment by tight monetary and loose fiscal policies. Without a change in these policies, there is not a compelling case—except perhaps a political one—for doing anything specifically to improve the U.S. external balance. And since monetary policy has been reasonably flexible in the last year, it is fiscal policy which is cast as the villain.

The perspective so far has, however, been a strongly U.S. centered one. One naturally wonders whether, even given the problem of U.S. fiscal policy, there is not some scope for improved results through international cooperation on monetary policies.

In this final section of the paper I will briefly sketch out a crude analysis of the possibilities for international cooperation on monetary policy. This analysis suggests that if it were not for the U.S. fiscal problem, there would be scope for coordination; but that the U.S. fiscal problem makes monetary coordination a doubtful proposition.

A. *The Interdependence of Monetary Policies: Conventional Analysis*

There is a view of international monetary interdependence which has been "in the air" in many recent discussions and has been formalized in an important recent paper by Sachs (1983). The key element in this view is the way that tight money, by inducing exchange rate appreciation, can be used to "export" inflation. In the simplest analysis, this leads countries to pursue disinflationary strategies which are individually rational but collectively too severe.

To do this analysis right requires careful distinctions between stocks and flows, and also careful treatment of dynamic issues.[5] For the purposes of this paper it is enough to do the analysis wrong but quickly.

1. *International monetary reaction functions*

Consider a world of two countries A and B, choosing levels of their nominal incomes Y_A and Y_B. We assume that the countries are attempting

[5]The most important dynamic issue is the point, alluded to in Part III of the paper, that the inflation gains from appreciation must be given back. Sachs shows that this does not eliminate the interdependence, though it probably reduces it.

to work down inherited inflation, and are thus in a position where both unemployment and inflation are uncomfortably high.

From the point of view of A's monetary authority, a monetary expansion abroad is helpful because it leads to a depreciation of B's currency and thus a fall in import prices. So we can, as in Figure 3, draw a set of indifference curves in Y_A, Y_B space. If A takes B's monetary policy as given, we can draw a reaction function like AA through the bottoms of these indifference curves. In a typical model, e.g., a linear-quadratic setup, the reaction function will be upward sloping: the more expansionary B's policy, the more expansionary A's will be. We can also derive a similar schedule for B. If the countries act noncooperatively, equilibrium will be where the schedules cross.

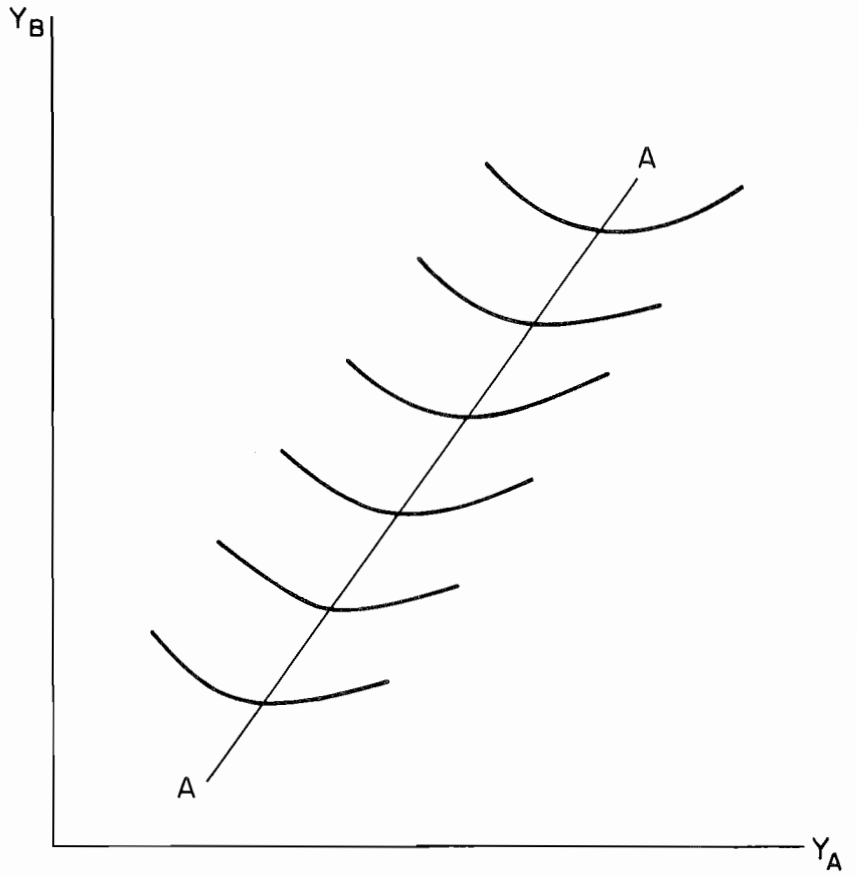

Figure 3

2. *The scope for cooperation*

In this simple view, there are clear mutual gains even without cooperation if one country takes on a leadership role. Figure 4 illustrates the situation. AA and BB are the reaction functions, $I_A I_A$ and $I_B I_B$ the indifference curves corresponding to the noncooperative outcome. Any point in the shaded area is preferable to the noncooperative outcome for both countries. Since this area lies to the northeast of the noncooperative point, this says that in the absence of cooperation, monetary policy ends up being too tight.

The logic of this result is clear. Each country is tempted to pursue an excessively tight monetary policy because of the possibility of exporting inflation to the other,—or, more charitably, neither country is able to pursue a looser monetary policy without importing inflation via currency depreciation.

It is also worth noting that if one country recognizes the interdependence of macro policies, it can unilaterally take on a leadership role to the benefit of *both* countries. For example, it can by adopting a looser policy move to a point such as S, which is not an optimum but is still unambiguously better than the noncooperative outcome.

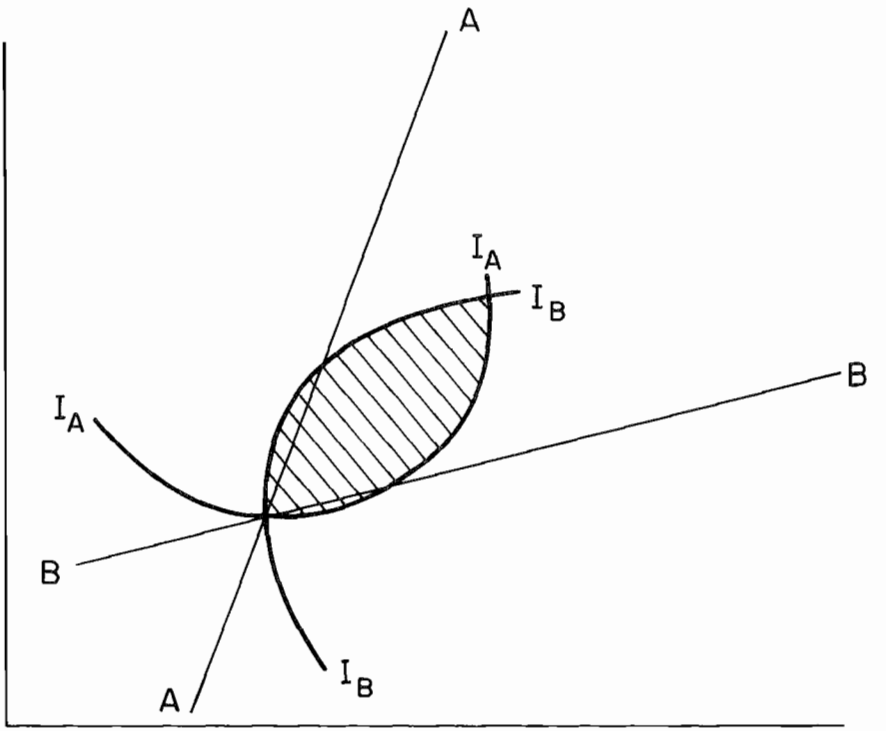

Figure 4

This analysis seems to provide a clear case for at least some coordinated monetary expansion. Unfortunately, thanks to the problem of U.S. fiscal policy, the situation is not so clear-cut.

B. *The Current Dilemma*

The reason why the simple analysis of international monetary interdependence is not too helpful in the current situation is that the United States has a mixed and perhaps perverse interest in foreign monetary policy. Because of expansionary U.S. fiscal policy, a monetary policy which the Federal Reserve regards as suitably anti-inflationary is associated with an unusually strong dollar. Instead of being constrained in monetary expansion by concern that the dollar will depreciate, the U.S. monetary authorities may actually be constrained in pursuing disinflationary policies by concerns about the strong dollar. For this reason, it is unclear whether this country would prefer to see looser or tighter monetary policies abroad.

Without pushing this too hard, it is worth examining the consequences if, because of an out-of-control fiscal policy, a country would actually prefer to see tight money abroad. Figure 5 illustrates the situation. Country A's indifference curves are now reversed in orientation. The zone of mutual improvement now lies *southeast* of the noncooperative solution. In other words, to strike a deal the United States would have to offer a more expansionary domestic monetary policy in return for tighter money abroad. In effect, this would be a cooperative, *unsterilized* intervention to bring down the dollar.

Note also that a sophisticated United States taking other countries' monetary reactions into account, would be inclined to follow a tighter monetary policy than otherwise, as indicated by point S. What is happening is that this country feels freer to disinflate because it knows that the induced reactions of other countries will dampen the resulting rise in the dollar. Unfortunately, U.S. sophistication about international repercussions here leads to a situation in which other countries end up worse off.

It is probably a mistake to push this analysis any further. The United States does not in fact have a clear-cut desire for tighter monetary policies abroad. Nor does it have a clear-cut desire for foreign monetary expansion. Because of its expansionary fiscal policy, this country has an ambiguous and uncertain attitude toward foreign monetary policies.

It is hard to see much realistic possibility for monetary coordination in this situation. Coordination would essentially amount to a trade, each country giving the others something they want. The United States has something other countries want—monetary expansion—but it cannot make a trade because it does not know what it wants.

V. Conclusions

The divergence in monetary and fiscal policies between the United States and other advanced countries has led to an unusually strong dollar and the prospect of huge U.S. external deficits.

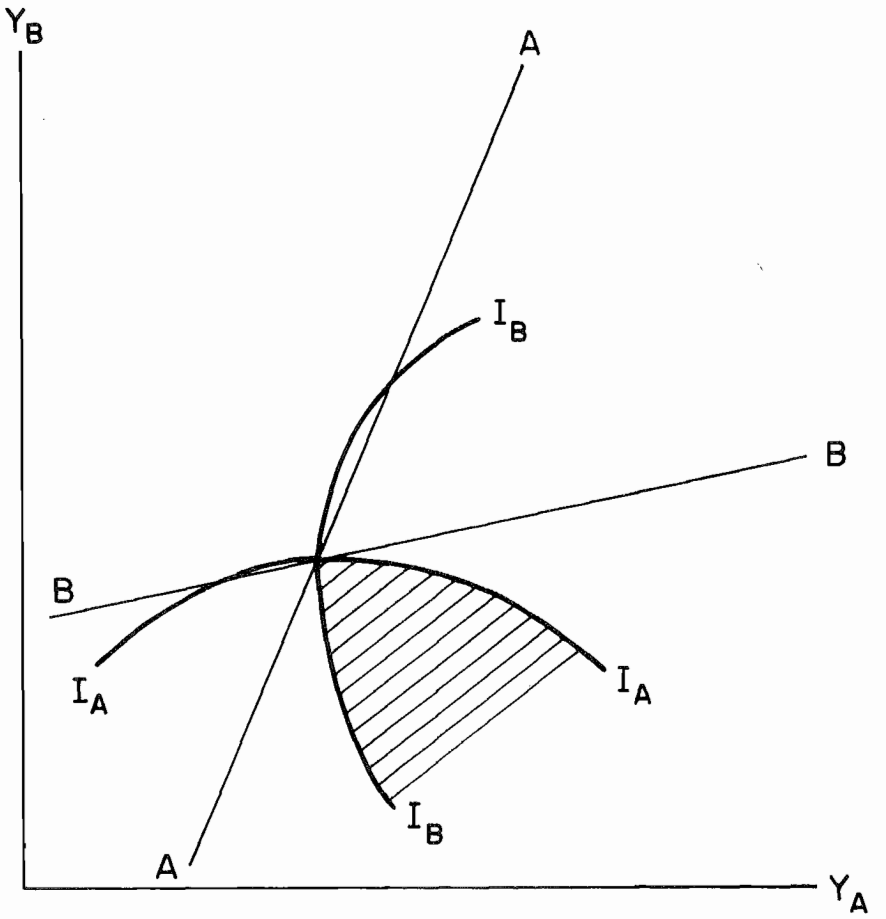

Figure 5

Of the various policy responses which might bring the dollar down, none except tighter fiscal policy seems very appealing, and that seems politically impossible. Looser money might be inflationary, while capital controls would raise interest rates and crowd out investment. The prospects for international cooperation on monetary policies, a reasonable proposal in normal circumstances, are vitiated by the effects of divergent fiscal policies.

Appendix: Interest Rates and The Exchange Rate

The purpose of this appendix is to make algebraically the point that if investors are forward-looking, the exchange rate should depend on the differential in real, long-term interest rates.

Consider the following stripped down statement of the relationship between interest rates and the exchange rate:

$$(A.1) \qquad e_t + p_t - p_t^* = \alpha + \beta\,[i_t - i_t^* + {}_te_{t+1} - e_t]$$

where e_t = log of the exchange rate

${}_te_{t+1}$ = log of the exchange rate expected at time t to prevail at $t+1$

p_t, p_t^* = logs of domestic and foreign price levels

i_t, i_t^* = domestic and foreign interest rates

As observers have urged, this equation relates the current real exchange rate to the differential in expected *nominal, short-term* returns.

Yet if investors use expectations of future fundamentals in forming their views, (A.1) can be shown to yield a relationship between the exchange rate and *real, long-term* interest rates.

Let us define

$$(A.2) \qquad \tilde{e}_t = e_t + p_t - p_t^*$$

the real exchange rate; and

$$(A.3) \qquad r_t = i_t - {}_tp_{t+1} + p_t$$

the real interest rate. Then we can rewrite (A.1) as

$$(A.4) \qquad e_t = \frac{\alpha}{\beta + 1} + \frac{\beta}{\alpha + 1}\,[r_t - r_t^* + {}_t\tilde{e}_{t+1}]$$

so that the real exchange rate depends on real returns and the expected *future* real exchange rate. But if investors have consistent expectations about interest rates, we can rewrite once more to get

$$(A.5) \qquad \tilde{e}_t = \frac{\alpha}{\beta + 1} + \frac{\beta}{\beta + 1} \sum_{j=0}^{\infty} \left(\frac{\beta}{\beta + 1}\right) [{}_tr_{t+j} - {}_tr^*_{t+j}]$$

The current exchange rate thus depends on a weighted average of current and future real interest differentials. If the current exchange rate is sensitive to the yield differential—i.e., β is large—the weight on future differentials will be large, and in effect the relevant rate will be a long-term rate.

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Discussion

Richard N. Cooper*

Krugman has presented us with an ingenious, wide-ranging paper on open economy macroeconomics. His strategy is to put us into an analytical straitjacket, and then to tell us that we should be grateful for being able still to wiggle our hands. My strategy will first be to offer some comments on Krugman's analysis within his straitjacket, and then to suggest that we should not be satisfied to stay within the straitjacket. I conclude with some observations about the future course of monetary and fiscal policy.

With nominal income held constant, Krugman suggests that budget deficits crowd out private investment via higher long-term interest rates, and that the deterioration of the current account brought about by an appreciation of the dollar offers partial relief to this crowding out, by importing real resources from abroad. Without the deterioration of the current account, he argues, interest rates would be even higher and the crowding out would be even greater. This has a very classical ring to it. The magnitudes however are important to keep in mind. Some preliminary work by Earle and Summers suggest that in the U.S. economy crowding out by budget deficits has a much lower impact on business investment than is usually implied in qualitative discussions of this issue. In particular, they find that a Federal deficit of $1.00 reduces business investment by only $.20—and investment in business equipment would decline by only about two-thirds of that. The rest of the adjustment comes from an increase in private savings ($.20), an increase in foreign savings ($.25—this is the effect that Krugman emphasizes—, an increase in state and local government surpluses ($.10), and a reduction in investment in residential structures ($.25). Thus it is very far from the mark to suggest that government deficits will reduce business investment by anything close to one to one, as is often implied.[1] Even if we were to eliminate the increase in foreign savings, the impact on business would be less than a third of the government deficit, and the impact on equipment investment would be less than $.20 on the dollar.

But even this relatively small effect neglects the fact that business investment—and particularly the composition of business investment—is not merely influenced by interest rates, in the context of fixed total nominal demand, but is also influenced by the exchange rate, a factor which Krugman fails to take into account. Balance of payments adjustment theory emphasizes the impact of changes in real exchange rates on new investment. A currency depreciation encourages investment in the export- and import-competing industries, in anticipation of or in response to larger orders from home and abroad. Currency appreciation discourages investment in the entire tradable sector if stiff import competition is expected to last for the indefinite

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[1]These results are broadly consistent with the large model simulations shown in Richard Kopcke's paper at this conference, Tables 4 and 5.

future. Incorporating this effect within Krugman's framework implies that we end up encouraging investment in commercial and residential structures (the nontradable sector) and discouraging investment—I would even be prepared to argue that investment could decline sharply—in the tradable sectors. In short, the relief that Krugman sees coming through the exchange rate implies a shift in the composition of investment from equipment to structures that runs strongly against the tilt that we have built into our tax structure, which is designed to encourage investment in equipment relative to structures and residences, presumably on the assumption that that is a good way to encourage business firms to adopt best practice techniques of production in a technologically progressive environment.

Thus a dollar that is expected to remain strong will discourage investment in most tradable sectors of the economy and may as well reduce the quality of total investment. The sharp decline in investment and output in manufacturing induced by stiff import competition, in addition, would evoke strong protectionist responses by important segments of the American economy. My greatest concern about the present configuration of macroeconomic policy, which Krugman acknowledges as legitimate, is that it will result in undermining the liberal trade system.

A key feature of Krugman's argument is that long-term interest rates—which are influenced by expected future budget deficits—affect the exchange rate. He dazzles us with two pages of algebra where two sentences of prose would do: so long as expectations of tomorrow's values affect today's values, and so on into the future, the indefinite future influences present values. As with crowding out, however, the key question concerns the magnitude of the influence of expectations of distant future values on today's values. I would conjecture that the cone of uncertainty surrounding these expectations widens considerably as one projects into the future, and that as a consequence the weights associated with distant expected future values on today's values fall very sharply. Thus while we can concede that long-term interest rates have *some* impact on current exchange rates, relatively short-term interest rates (and other factors) have a far greater influence. Uncertainty about budget deficits in the more distant future may well raise long-term interest rates; it is less clear why it should raise the current exchange rate of the dollar.

This brings us to Krugman's assumption about monetary policy, which plays a central role in his analysis. Krugman adopts an open economy IS-LM framework, with the added assumption that the Federal Reserve targets increases in nominal income, so that for any given period nominal income must be taken as fixed. This target for the Federal Reserve has become increasingly popular among economists. But as far as I can tell, it has not yet in fact become the target of the Federal Reserve; and in my view it is not desirable that it should become the Fed's target.

U.S. GNP rose by 8.8 percent in 1980, 12.2 percent in 1981, and 4.0 percent in 1982. This does not give the appearance of a steady growth in nominal income. If the Fed does target the growth in nominal income, it is either extraordinarily inept in reaching the target, or else it changes the target markedly from year to year, suggesting that the target is not in fact fixed in anything

but a quite short run. The growth in M3 has been much steadier during this period.

Moreover, it is highly undesirable that the growth in nominal income should be targeted. Such a target would require that any autonomous increase in prices lead to a depression of output. I recognize that some economists are inclined to deny that autonomous increases in the price level can ever take place. That however is to put analysis before observation. We have observed sharp increases in world oil prices twice in the past decade, resulting in a deterioration in the nation's terms of trade. Price increases can also come about through changes in domestic policy. For example, deregulation of natural gas prices under existing contract arrangements would lead to a marked (even if nonsustainable) increase in prices, as would the introduction of a national value-added tax. It would be highly undesirable if such changes in policy would lead, through Federal Reserve action, to a recession. Holding the price level constant in the face of such disturbances can be done only by depressing other prices enough to offset the prices that have increased, and in our economy that can be done only by depressing output for a period. Sometimes that may be the best course of action, but at others it will not be.

One attraction of the notion that the Federal Reserve should target nominal income is that it would put business managers and labor union leaders on notice that the Federal Reserve will not accommodate the private decisions that they make on wages and prices. If the Federal Reserve holds a steady course with respect to nominal income, it is argued, the choice between price level and employment would then be left up to those at the bargaining table. It is sometimes suggested that this strategy, in a rough and ready way, was used successfully by West Germany to restrain wage settlements. Whereas in a context of national wage bargaining a nominal GNP target for the central bank might conceivably influence the wage bargains that were actually struck, that is highly unlikely in a system as decentralized as that of the United States. No single party has any incentive to hold *his* wages or prices to the level implied by the national target at full employment. In a system of decentralized wage and price setting, a noninflationary environment can be maintained only through some combination of wage and price guidelines (perhaps reinforced by tax or other incentives) and/or a degree of labor market slack sufficient to keep wages and prices from rising in the face of autonomous disturbances to the price level. The problem is complicated even further by virtue of the fact that unions seek to help their most senior members, whose interests lie in higher real wages, even if it means higher unemployment for others—at least up to the point at which the existence of the union itself is threatened. (The United Steel Workers and the United Automobile Workers pressed for ever higher wages despite the discipline of stiff import competition.) So this potential attraction of a nominal GNP target is not likely to work in the United States, although it could conceivably be effective in countries with a high degree of unionization and national wage bargaining.

What then should be done? The logical prescription to come out of Krugman's analysis, augmented by the compositional effects on investment I

have already discussed, is that we should work very hard to reduce Federal budget deficits. I favor that. On Krugman's analysis, a substantial reduction in future budget deficits should have a substantial effect on long-term interest rates and on the exchange rate. I suspect the effects on both, and especially on the exchange rate, would be relatively small. Long-term interest rates are not likely to fall markedly so long as short-term interest rates are as high as they have been. Monetary policy has been extraordinarily tight in recent years, given the weak state of the economy, and that tightness has been reflected in high nominal and real short-term interest rates and in a strong dollar.

To point out that monetary policy has been extraordinarily tight is not the same as suggesting that there is a simple solution to current problems. Monetary policy was tightened and kept tight to reduce actual and expected inflation; and it has succeeded, albeit at the cost of a deep, long, and wasteful depression in output below the economy's capacity to produce.

The Fed must be ever watchful of rekindling inflationary expectations, which could undo some of the costly gains that have been achieved. Can the Fed pursue easier monetary policy without rekindling inflationary expectations? I do not know, but I believe the Fed should be constantly probing on the side of expansion. We are now experiencing the enormous cost of having persuaded the financial community that a perfectly respectable long-run equilibrium theory appropriate for the stationary state of the economics textbook is also appropriate for the quarter-to-quarter or even the week-to-week management of an actual economy. Keynes in his grave can take satisfaction at another powerful illustration of his statement concerning the influence of ideas, good or bad, on men of affairs. It is up to the academic community to begin the process of reeducation. But in the meantime the Fed must take these jumpy and misguided expectational effects into account.

One way to probe on the side of expansion is to engage in exchange market intervention, a course that Krugman discards much too hastily. Krugman notwithstanding, intervention in the right setting can have an influence on exchange rates. First, as he points out, unsterilized intervention is really monetary policy. Unsterilized purchases of foreign currencies by the Fed would increase the money supply, but the announcement of an intention to reduce a dollar that is too strong might well be received quite differently (and more favorably) by financial markets than would just another weekly increase in the money supply.

Even sterilized intervention can have some effect on exchange rates, however—partly by altering the composition of dollar and nondollar assets in private hands around the world, but much more by signaling that the U.S. authorities are not indifferent to the exchange rate and are prepared to take steps to influence it. Given the central role of the dollar in the world financial system, any such intervention should be undertaken in close collaboration with other leading countries, including the orchestration of the announcement effects. But in markets that are as heavily influenced by expectations as Krugman avers, skillfully handled intervention could become an important supplement to monetary and fiscal policy.

Discussion

Otto Eckstein*

The paper by Paul Krugman possesses an exceptional clarity and comprehensiveness. It is a very useful contribution. But it is also a very discouraging paper, and I disagree with its basic premise.

Krugman accepts the standard argument on the effect of our current fiscal policy on our international trade position, an argument most prominently associated with his recent boss, Martin Feldstein. He accepts the desirability of bringing the dollar to a more realistic level. But he then argues that it is questionable whether any of the means that are available to accomplish this goal will be of net benefit if the fiscal policy is taken as given. A lower dollar, with no other changes, would reduce the trade deficit, but if nominal GNP is given by a monetary policy targeted on this aggregate, this reduction would raise interest rates and would reduce investment by a similar amount. This follows from the identity of national income accounting: with Y, C and G given, a change in X—M must produce an equal change in I (though actually C would also be cut by higher interest and exchange rates, switching some of the burden away from investment, and it is doubtful that monetary policy is targeting Y). It turns out that the IS-PV model reduces to a simple form of the "absorption" approach.

Where the paper goes astray is in its acceptance of the political inevitability of the budget deficit. That deficit is what this conference is all about, and the paper was to deal with the implications of that deficit. Qualitatively, his arguments are fine, but quantitatively he leaves us with the impression that it is not all that serious a matter, and that if the budget deficit is beyond repair, then the dollar should probably be left alone.

To reach those conclusions requires a more precise assessment of the damage that the current value of the dollar is doing to the long-run development of the American economy. So let me pose the following four questions and provide some admittedly preliminary quantitative answers.

1) To what extent is the budget deficit the cause of high real long-term interest rates?
2) To what extent are the high real long-term interest rates the cause of the high value of the dollar?
3) How much damage is the high value of the dollar doing to our trade performance?
4) How serious is the trade deficit to the nation's long-run economic development?

My answers to these questions are generally more alarmist than Krugman's, though on some matters of detail my reading of the facts leads me to a somewhat weaker position.

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The Budget Deficit and Interest Rates

The simplest of modern equations for interest rates explains the yield on a 10-year government bond by means of an adaptive price expectations variable with a decay rate of .21 and with the ratio of the monetary base to GNP as a measure of policy pressure. It shows an unexplained variation of 300 basis points in 1981–82, though it is nearly back on track, I believe temporarily, this year. I take this 300 basis point deviation as the upper limit of the effect of prospective budget deficits on interest rates. This explanation of the extraordinary interest rate bulge competes with others, including various measures of risk such as the increased variability of bond prices which created larger risk premia, the variability of the money supply and of the inflation rate.

The effect of the budget deficits on interest rates could be seen most clearly in the closing months of 1982, when the second $100 billion of deficit was discovered: the actual inflation record was improving dramatically and the forecasts of inflation were coming down by one to two points, yet interest rates refused to decline any further. A conservative estimate of the effect of the discovery of the prospective $200 billion deficit is an increase of interest rates of 150 basis points. The rest of the real interest rate level of 5 percent to 6 percent is probably due to other factors, the higher risk premia created by the adoption of a monetarist regime, and long-term fears of inflation.

Interest Rates and the Dollar

According to purchasing power parity calculations or international comparisons of unit labor costs, the dollar is overvalued by 20 percent to 25 percent. Why is the market keeping it so expensive? There are two possible explanations: the differential in real interest rates, and the phenomenon of "flight capital." Of the two factors, interest rates seem to be the dominant one, at least as indicated by the small differential between the yields on U.S. dollars and Eurodollars.

Combining the two hypotheses, the budget deficit must be acknowledged to be a major—but not the sole—explanation of the overvalued dollar. Real interest rates would be higher than normal even without a budget deficit and would raise the dollar. But a significant share of the overvaluation must be traced to the budget.

The "Overvalued" Dollar and U.S. Trade Performance

The merchandise trade deficit averaged about $26 billion in the years 1977 to 1981, rose to $32 billion last year, is headed for $54 billion this year, and is expected to fall in the $70 to $100 billion range in 1984. A recent DRI study by Sara Johnson[1] confirms that the dollar's appreciation was a major contributing factor, explaining about half of the trade deficit in 1982 and

[1]Sara Johnson, "The Cost of a Strong Dollar," *The Data Resources Review of the U.S. Economy,* July 1983 pp. 1.29-1.32.

most of it in early 1983. This is a weaker statement than the assertion by Krugman, however, who feels that "essentially all of the actual and anticipated deterioration in U.S. external balances can be attributed to the strength of the dollar." Further, the deficits of the late 1970s occurred when the dollar was relatively cheap, and were probably due to the stronger cyclical recovery of the United States. More significantly, the prospective $70 to $100 billion deficits are due to a combination of a strong dollar, a relatively stronger cyclical development of our economy, and a structural deterioration of our international competitive position. To be sure, an exchange rate even lower than the rates of the late 1970s might have overcome the structural deterioration, but most analysts considered those rates already too low, and our allies were protesting bitterly about them.

If the numerical analysis focuses on the goods and services or current account balances, including the surge of interest income, then all of the recent deterioration can be attributed to the exchange rate and international disparities of cyclical strength. But the prospective current account deficit of $50 to $70 billion still cannot be explained by these "temporary" factors. It is due to structural factors, particularly the flood of dollars received as interest and on capital account, and the loss of competitive position.

The Dollar and Trade Performance

Does a large trade deficit matter? Krugman recognizes that dynamic economies to scale can create permanent losses and that the expensive dollar does create adjustment costs. But he advances these points with little urgency and much qualification.

On this point, too, I would part company from the Krugman (CEA?) point of view. Dynamic economies to scale are the decisive factor in determining who will provide the world with airplanes, computers, machinery, and many other products, and they make a major contribution to the success of such industries as automobiles and steel. The United States has already suffered vast losses because of the checkered history of the dollar and the weak international trade policies of the last 30 years.

In summary, then, while Krugman's paper is an exceptionally lucid application of open-economy macroeconomics to the problem of the budget deficit and its impact on the trade balance, I find myself in disagreement on two fundamental points: first, the budget problem will not keep; every month without a serious attempt to reduce the deficit costs our economy dearly in high interest rates, lost capital formation, an overvalued dollar, and permanent losses in our international trade position. The message of this conference should be: "let's deal with the budget problem quickly and strongly because it is seriously damaging our economic future."

Second, while I share Krugman's belief that the budget deficit is a major influence on our trade position, I do not believe that it is the only cause of it. Interest rates would be high anyway, and the dollar expensive. Even allowing for cyclical disparities among countries, there is a structural trade problem, created by 30 years of monetary, fiscal and trade policies. These problems must also be dealt with in forthright fashion if the U.S. economy is to recapture its growth potential.

Will Big Deficits Spoil the Recovery?

Richard W. Kopcke*

Since 1979 the federal government's unified budget deficit has been growing. This year the deficit should rise to 6 percent of gross national product, an historic high for peacetime, and, as shown in Table 1, common projections foretell of deficits remaining near 5 percent of GNP at least until 1986. Previously, peacetime deficits seldom rose as high as 3 or 4 percent of GNP. Consequently, the administration and the Congress are devising plans to reduce the deficit to approximately 2 or 3 percent of GNP by the late 1980s.

Depending on business conditions and the course of monetary policy, there are periods when the fiscal policy runs deficits as it restores and sustains high employment production. We appear to be in the middle of such a period. According to the consensus forecast, the current mixture of monetary and fiscal policy seems to be encouraging a steady recovery that will not overshoot high employment GNP. Unless there is a change in the mix of fiscal and monetary policies, attempts to reduce the deficit through tax hikes or spending cuts alone may reduce the growth of GNP and investment spending.

The recovery may be acceptable, but it is certainly not the best we could hope for. Although the federal government's budget may not be balanced in the near future, the huge prospective deficits may signify the wrong mixture of monetary and fiscal policies. For example, many advocate swapping fiscal stringency (spending cuts or tax hikes) for some monetary leniency (lower interest rates) so that the prospective path of recovery remains unchanged while home building, business fixed investment, or net exports increase and the debt servicing costs of developing countries can be reduced. But there are limits to which fiscal policy can be relied upon to reach a preestablished deficit target while using monetary policy to sustain GNP growth. Preset deficit targets may lead to policies that cannot be sustained for long if the necessary monetary leniency implies that real rates of interest, after taxes, must drop to or below zero, or if short-term interest rates must remain too far below long-term yields. This paper uses three large econometric models to assess how different blends of fiscal and monetary policies alter the composition of GNP.

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Table 1
The Federal Government Deficit as a Percent of GNP

	Baseline Congressional Estimates[1]		Congressional Estimates[1]		Administration Estimates[6]	
	Reported Deficit[2]	Standardized Deficit[3]	Reported Deficit[4]	Standardized Deficit[5]	Reported Deficit[7]	High-Employment Deficit[8]
1982	3.6	0.6	3.6	0.6	3.8	0.3
1983	6.4	2.3	6.4	2.3	5.6	1.2
1984	5.5	2.3	5.1	1.9	4.6	0.7
1985	5.2	2.6	4.5	1.9		
1986	5.1	2.8	3.4	1.1		

[1]Congressional Budget Office, Congress of the United States, *Economic and Budget Outlook: An Update, August 1983.*
[2]Figures from Table A-3, page 112; baseline unified deficit divided by projected GNP.
[3]The baseline unified budget deficit standardized at 6 percent unemployment, divided by standardized GNP. Figures from Table 5, page 13; plus the difference between the baseline deficits in Table A-3, page 112, and Table 11, page 59, divided by standardized GNP; and less the following adjustment for net interest expense. (Net stock of federal debt/standardized GNP − .31) ⋆projected interest rate on federal debt ⋆.65: the recent growth of the stock of debt, due to underemployment, is not allowed to increase standardized net interest expense. The factor .65 accounts for the loss of tax revenue due to the lower net interest expense.
[4]Figures from Table 11, page 59; baseline unified budget deficit divided by projected GNP.
[5]The baseline unified budget deficit standardized at 6 percent unemployment (including the net interest adjustment described in note 3), divided by standardized GNP. Figures from Table 5, page 13.
[6]Bureau of Economic Analysis, Department of Commerce, estimates using projections from the Office of Management and Budget's "Mid-session Review of the 1984 Budget," July 25, 1983.
[7]National Income and Product Accounts measure of the current services budget deficit.
[8]Estimates of the deficit at high-employment levels of production (including the net interest adjustment described in note 3) — at an unemployment rate of 5.1 percent in fiscal year 1984 — divided by high employment GNP. See deLeeuw et al., (1980).

I. Fiscal Policy, Deficits, and Economic Activity

Contemporary macroeconomic analysis may be divided into two broad schools of thought: the classical tradition and the Keynesian tradition. Economists belonging to the classical tradition generally believe that agents seeking their self-interests in auction markets achieve an efficiency in the production and distribution of goods and services. Consequently, government's role in society should be limited, and there is little justification for countercyclical fiscal policy to assure the high employment of resources. According to classical thought, whatever the size of the budget deficit, it is government spending that crowds out private spending. Higher taxes cannot diminish the government's claim on GNP.

Keynesians, on the other hand, believe that markets are incapable of reconciling the inevitable differences among the expectations of households and businesses in a manner guaranteeing full employment. As a result, Keynesians generally advocate an active role for fiscal and monetary policies. Depending on business conditions, the policy that sustains high employment may entail budget deficits at some times, while at other times the appropriate policy may entail budget surpluses at high employment. By failing to sustain high employment, the government policy may reduce the rate of capital formation and the growth of living standards.

The Classical Tradition

Today monetarists, proponents of rational expectations, neoRicardians, and ultrarationalists, among others, represent the classical tradition. The monetarists believe that in auction markets taste and technology are the irrepressible forces behind spending, saving, and investment decisions (M. Friedman 1956, 1968, 1971; Patinkin 1965). Changes in fiscal policy and monetary policy might temporarily disturb market equilibria, but, in the long run, society arrives at new equilibria (conditioned by fiscal policy) in which monetary policy simply dictates the rate of inflation. Monetarists generally believe that an active fiscal policy (except for a rock bottom role such as the provision of a national defense) can only diminish social welfare by interfering with and redirecting market forces. The economy is inherently stable.[1]

The rational expectations approach (Sargent and Wallace 1975, Lucas and Sargent 1978, and Sargent 1979) introduces an equilibrium theory of the business cycle, reconciling much of the classical tradition with the occurrence of "underemployment." Business cycles arise as households and businesses react to unanticipated events. For countercyclical fiscal policy to mitigate

[1]It is ironic that many monetarists have built their macroeconomics on classical microeconomics. Hahn (1965) noted that money has no positive exchange value in Patinkin's model so this model and others like it cannot serve as an adequate foundation for a monetary theory. Perhaps this flaw can be patched up by putting money and other financial assets in the utility function. The utility of these assets is not direct, it depends on their ability to facilitate transactions, to yield warmth, diminish hunger, etc. in the future so this utility itself must depend on interest rates and prices. Putting these assets in the utility function is therefore one way of treating expected future utility. In any case, the unique link between money and the price level vanishes once a spectrum of financial instruments is introduced.

these cycles, it must successfully foresee and offset these unanticipated events.[2] Here, as in monetarism, fiscal policy is not ineffectual—changes in tax rates, for example, can eventually alter the equilibrium capital-labor ratio—but rational expectations, like monetarism, discourages the active fine tuning of tax laws and spending programs to stabilize economic growth. Here, as in monetarism, markets "clear," but rational expectations distinguishes itself by assuming that households and businesses have sufficient (but not necessarily perfect) knowlege of one another's rules for making economic decisions. Errant forecasts give rise to frustrations, but errors tend to be minor and *not systematic*.[3]

Both the neoRicardian and ultrarationalist theories essentially assume that Debreu's (1972) version of classical equilibrium prevails. The neoRicardian theory (Barro 1974, 1979, 1981) contends that households and businesses regard government spending as a substitute for private spending and that they regard deficit financing as a promise of future taxation. A temporary increase in government spending may increase national income temporarily as factors of production exchange more work today for less work tomorrow, but a permanent increase in government spending depresses the permanent income of households and businesses so private spending declines as much as public spending rises. Government spending must be financed either by taxes or by issuing bonds. Either way, a permanent $1 rise in government spending entails the same increase in the present value of tax liabilities because bond issues merely delay the collection of taxes.

Ultrarationalism (David and Scadding 1974) takes neoRicardian theory one step further. Government spending may be divided into public consumption and public investment spending. Public consumption spending displaces private consumption dollar for dollar, and public investment displaces private investment dollar for dollar. According to some ultrarationalists, deficits can displace private investment spending dollar for dollar if government investments are perfect substitutes for private investments and government finances all of its investment spending and only its investment spending

[2]Lucas and Sargent (1978) also contend that these policy changes themselves must not be anticipated by households and businesses. This seems to be redundant. If the fiscal authority can predict shocks (events not systematically related to previous events) and adjusts policy accordingly, how can I predict fiscal policy successfully without knowledge of these shocks?

[3]Ironically, rational expectations begs a theory of knowledge that cannot be justified rationally (Hume 1966, 1978, Ayer 1972, Quine 1970, Keynes 1965, Robinson 1965, B. Friedman 1978, 1979, Berkman 1980, Arrow 1978, 1982): rational expectations requires households and businesses to understand more of society's causal relationships than is logically possible from mere deduction and observations. Proponents of rational expectations believe that households and businesses can discover how the economy works through observation and deduction. So it is no accident that many of rational expectations' supporters are also proponents of testing for "causality." Rationality is objectivity.

Because deduction and observation alone cannot identify natural laws, rational expectations itself must rest on some nonrational means of "knowing." This theory illustrates the powerful economy embedded in the postulate of the auctioneer who at once provides information and arbitrates among diverse self-seeking agents. Without the auctioneer, households and businesses must make systematic errors unless their maintained hypotheses match nature's mechanics.

by issuing bonds. In both the neoRicardian and ultrarational models countercyclical fiscal policy has little effect and consequently little justification.[4]

In summary, the classical tradition has its share of distinct schools of thought, but they all discourage the active use of fiscal policy for fine tuning the course of GNP. Some conservatives who follow the tradition recommend budget balance over sizable deficits to limit the role of government (by constraining government spending) and to limit the rate of inflation (by not tempting the central bank to "monetize" the debt). Buiter (1983) contends that whatever the merits of this political science, such conclusions are not necessarily supported by classical economic analysis. Nor do these fears appear to be justified by the experience shown in Charts 1, 2, 4, and 5.

The classical tradition says little of government deficits directly. Instead it compels those who would change taxes or spending to examine the potential influence of these proposals on the course of economic development. Government policy might foster investment spending by encouraging businesses to employ more capital with each laborer, but the supply and demand schedules for labor and capital, not the size of the deficit, dictate the proper strategy (Hall and Jorgenson 1967, M. Friedman 1968, 1971, Nelson 1976, Johnson 1981, Moore 1981, Kopcke 1980, 1982).

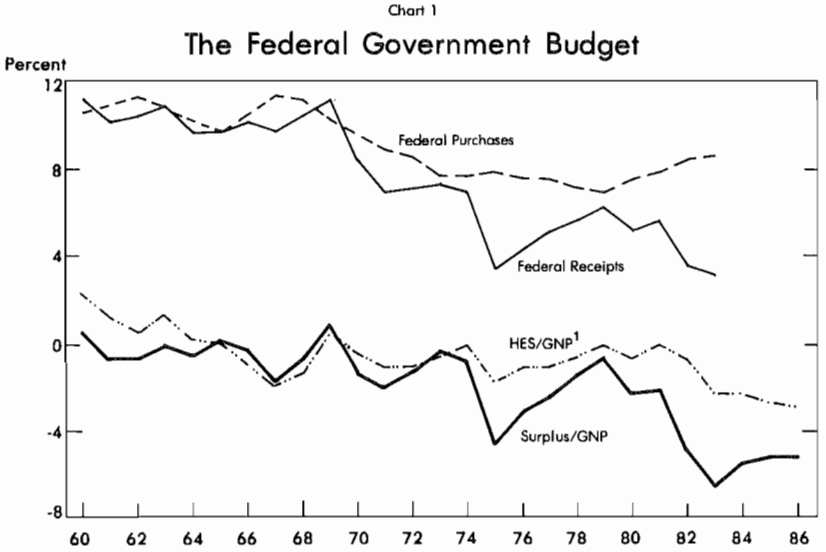
Given the classical assumptions of high employment, it is government spending itself that crowds out spending by households and businesses. Higher taxes cannot ease the government's claim on GNP. Some recommend personal tax hikes to shift some of the burden of greater government spending from investment to consumption, but such a policy cannot avoid the diversion of resources from consumption (and from investment by industries producing consumer goods and services) to favor spending by industries producing goods and services for the government.

The Keynesian Tradition

Keynes had little intention of overturning classical analysis; a few patches—albeit important patches—could salvage the classical tradition. Markets are incapable of reconciling the inevitable differences among the expectations of households and businesses in a manner guaranteeing full employment, but the government could allow classical theory to come into its own by assuring this high employment. Keynes contended that fiscal policy can do much to restore high employment during recessions, and the majority of contemporary Keynesian models supports this conclusion.

[4]Both of these theories have their critics some of whom belong to the classical tradition themselves. Fiscal policy can influence the use of national resources (Teigen 1980, Ripley 1980) and the distribution of national income (Danziger et al. 1980, Oates 1980). Barro discusses only lump sum taxes, but if taxes and liabilities are tied to income, sales, or consumption, tax policy (or the growth of government debt) can influence the behavior of households and businesses (Buiter 1979, Buiter and Tobin 1979, Tobin and Buiter 1980, Rosen 1980, Hall and Jorgenson 1967, Nelson 1976, Kopcke 1980, Buchanan 1976, Tobin 1965, Burmeister and Phelps 1971, Christ 1980). If capital markets are not perfect, these strong neoRicardian and ultrarationalist conclusions collapse (Feldstein 1982, Tobin and Dolde 1971, Arak 1982).

Chart 1



[1] Projections taken from Table 1. Historical data from B.E.A.

Chart 2

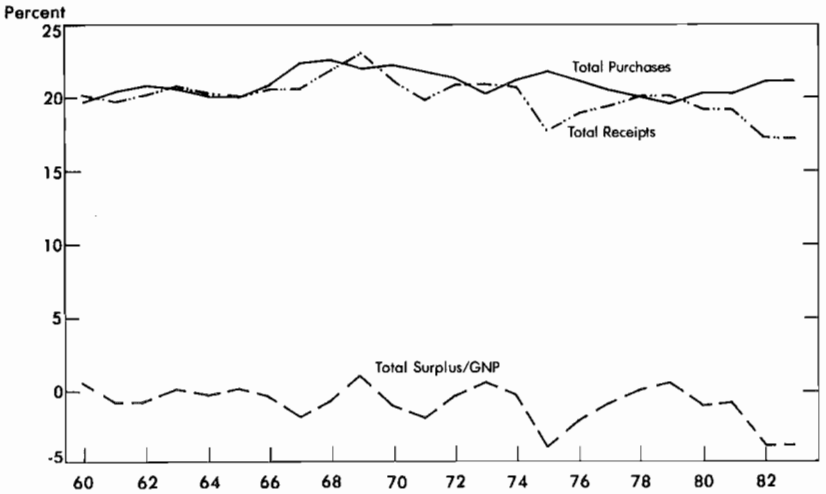
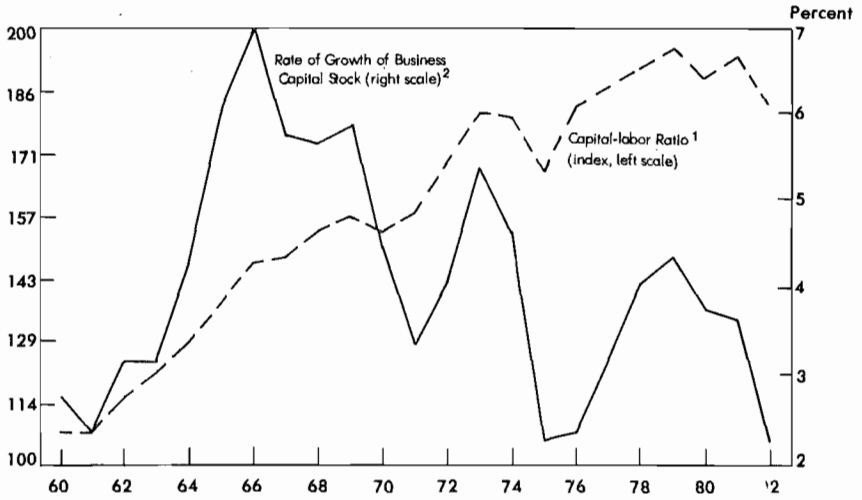


Chart 3

The Growth of the Capital Stock

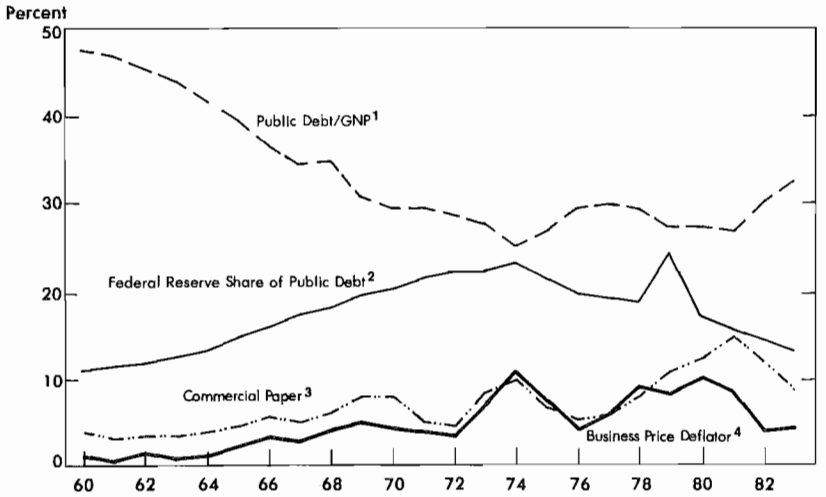


[1] Ratio of net stock of real nonresidential nonfinancial corporate capital to hours worked by all nonfinancial corporate workers, multiplied by the capacity utilization rate

[2] Rate of growth in the net stock of real nonresidential nonfinancial corporate capital

Chart 4

The "Monetization" of Federal Debt



[1] Federal debt held by the public, including the Federal Reserve

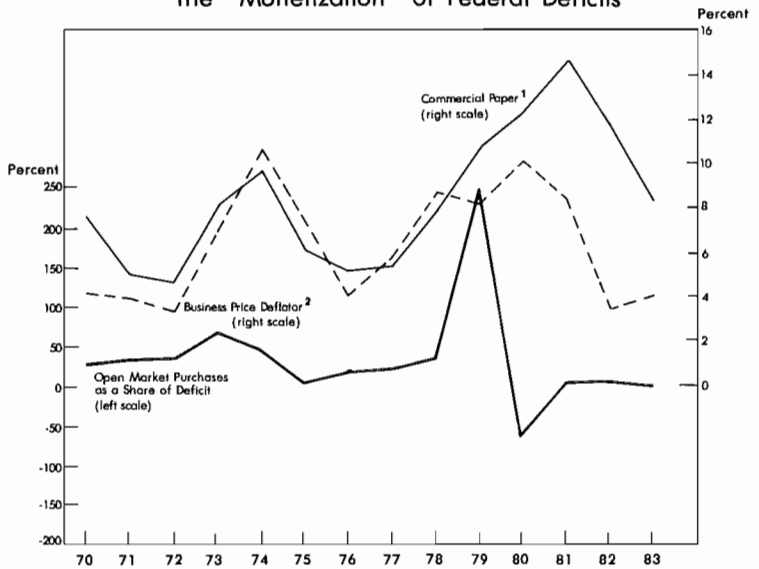
[2] The Federal Reserve's portion of the federal debt held by the public

[3] 6-month prime commercial paper rate

[4] 4th quarter to 4th quarter percentage change

Chart 5

The "Monetization" of Federal Deficits



[1] 6-month prime commercial paper rate

[2] 4th quarter to 4th quarter percentage change

Keynesian theories and models distinguish themselves by allowing that aggregate demand—the sum of desired consumption, investment, and government spending—need not equal the supply of goods and services at full employment. In other words, households' desired saving does not match businesses' desired borrowing at full employment. If households wished to save more than businesses planned to borrow, aggregate demand would fall short of supply, and businesses would accumulate unwanted inventories of unsold goods, prompting lower production plans, creating unemployment, thereby eventually reducing capital formation.[5] In this case, Keynesians contend that fiscal policy (and monetary policy) can increase aggregate demand to match supply at full employment. At high employment, then, a successful policy guarantees that the government's deficit equates the total supply of savings with the total demand for that savings. Depending on business conditions, the state of expectations, and the government's strategy, the budget at times may be in deficit for policy to maintain high employment and the growth of living standards while at other times the budget may show a surplus at high employment. At times, then, deficits at full employment are welcome. At other times, a policy that entails a deficit can be harmful, causing aggregate demand to exceed supply, perhaps crowding out investment spending as a result. There is no guarantee that nature will permit government

[5]Keynes did not believe the interest rate could equate the supply of savings with the demand for savings without income changing at the same time.

surpluses and deficits to average out over any specific interval of time, nor is there any guarantee that past surpluses and deficits should guide or set a standard for future fiscal policy. The deficit is a by-product of government policy interacting with economic circumstances.

The Hicks-Hansen IS-LM model is the most familiar Keynesian model (Blinder and Solow 1973, 1974). Consider the following streamlined version:

$$(1) \quad Y = C + I + G$$

$$(2) \quad C = c_0 + c_1 (Y + rB - T) + c_2 (M + B)$$

$$(3) \quad I = i_0 + i_1 Y - i_2 r$$

$$(4) \quad G = g_0$$

$$(5) \quad T = t_0 + t_1 Y + t_1(rB)$$

$$(6) \quad r = r_0 + r_1 Y/(M+B) - r_2 M/(M+B),$$

where Y is national income, C is consumption, I is investment, G is government spending, T is taxes (less transfers), r is the interest rate, M is the money stock, B is the stock of bonds (and equity), and (6) is the familiar money demand equation set equal to an exogenous money stock, then converted to an interest rate equation. This model can be solved for its equilibrium value of income:

$$(7) \quad Y = (g_0 - c_1 t_0)\, m + (a)\, m$$

where $a = (c_0 + c_1 B(r_0 - r_2 M/M + B))\,(1 - t_1) + c_2(M+B) + i_0$

$$- i_2(r_0 - r_2 M/(M+B)))$$

$$m = (1 - c_1(1 - t_1(1 + r_1 B/(M+B)) + r_1 B/(M+B) -$$

$$i_1 + i_2 r_1/(M+B)))^{-1}$$

Income is not a function of the deficit ($T - G = t_0 + t_1 Y + t_1 rB - g_0 - rB$) so neither interest rates (6) nor investment (3) are proper functions of the deficit.

In this model, a \$10 billion spending hike (g_0) raises equilibrium income (Y) more than a \$10 billion tax cut (t_0) raises income, even though either action would lower the high employment surplus (HES) by \$10 billion. The change in income is 10 to 40 percent greater for the spending hike than for the tax cut.[6] Therefore, the correlation between changes in the HES and changes in equilibrium income will be low if the alterations in fiscal policy at times

[6]Without the wealth effect ($c_2 = 0$) the value of c_1 appears to be about .9; with the wealth effect, a popular feature of many modern consumption functions, the value of c_1 appears to be about .65 (Modigliani 1971, p. 75). The value of c_1 may drop even further if human wealth is included.

arise from new spending policies but at other times arise from new tax policies. In fact, the well-known "balanced-budget multiplier theorems" show that matched changes in government spending and taxation alter income even though the HES does not change and that a fiscal policy relying on modest spending cuts and somewhat larger tax cuts might increase equilibrium income only a little (or even reduce income) while reducing the HES substantially.

The government can reduce a deficit by reducing its spending (g_0) or increasing lump sum taxes (t_0). According to (7), either step also would reduce income, interest rates, and investment.[7] To increase income and investment during a recession, government spending must increase, taxes must be reduced, or both. A kind of crowding out occurs in this last case, however. The rise in equilibrium income increases the transactions demand for money, thereby increasing interest rates unless the money stock changes. Despite these higher yields, investment spending increases. The magnitude of the crowding out that occurs depends on the size of the money stock, not the size of the deficit.

The conclusion that crowding out occurs whenever income rises has several qualifications. Keynesians agree with classical economists that, as GNP approaches the economy's productive capacity, an increase in government spending is more likely to displace consumption and investment spending. Furthermore, if this hypothetical economy trades with other nations, all linked to one another by perfect capital markets, then fiscal policy's influence on income and investment will tend to be small—net exports will be displaced by fiscal expansion (Mundell 1962; Fleming 1962; Dornbusch 1978, 1980, pp. 193–214; Fieleke 1982).

Macroeconomic theorists have done much to embellish this streamlined model over the years. Two-assset models, like the one above, featuring bonds (capital) and money assume from the start that government debt is a perfect substitute for private equity and debt. Instead, the model might feature a richer spectrum of assets allowing for degrees of complementarity among capital, bonds, and money (Tobin 1965, 1969, 1982; Cohen and McMenamin 1978; B. Friedman 1978, 1980, 1983; Roley 1981, 1983, Frankel 1983). As it stands the model also lacks a government budget constraint (Christ 1968, 1978, 1979; Silber 1970; Meyer 1975). As the government runs deficits, the stock of government bonds will grow and, other things equal, the ratio of government bonds to money in the public's portfolio will increase, mandating higher equilibrium rates of interest. The IS-LM model does not represent this dynamic interaction between the flow of goods and services and asset stocks because it was supposed to apply to an interval of time so short that asset stocks change only negligibly. Many now believe that the design of a successful fiscal policy requires planning ahead, so the government budget constraint is a more popular feature of macromodels. If the stock of government bonds can change with time so can the stock of other assets, like

[7] I am assuming that $(i_1 - i_2 r_1/(M+B))$ is positive as seems almost a certainty. Otherwise, any nonmonetary shock that increases income must crowd out investment, even though the shock increases income by a multiple of itself.

capital. We eventually end up adopting models in which prices and wages may change along with asset values. Unfortunately, this step is not costless because the analysis of fiscal policy now depends on the course of monetary policy. In a sense fiscal and monetary policy no longer appear to be so distinct, suggesting that we should be examining a unified government policy rather than fiscal policy alone.[8]

This more dynamic macromodel enlivens the crowding out controversy. The static macromodel demonstrated that tax cuts may increase GNP when the economy is not at high employment, thereby increasing savings and investment along with the deficit. To this analysis of income flows, the dynamic model contributes an analysis of asset stocks. Tax cuts that foster the growth of GNP also increase the market value of factories, equipment, houses, human capital, and other assets comprising the private capital stock. In other words, a lenient fiscal policy may promise greater deficits, but it also increases the market value of assets by promising higher utilization rates and greater earnings (Tobin 1969, 1982). The flow of new government debt securities therefore need not elbow its way into private asset portfolios, displacing business securities, because the relatively sharp increase in the value of private assets can create space for government debt if it is not a perfect substitute for private securities.[9]

Just as debt complements equities in some portfolios (pension and life insurance funds, for example), liabilities of the Federal Reserve complement debt in other portfolios (depository institutions and some mutual funds, for example). A stock market rally, prompted by forecasts of greater earnings, may tend to depress debt yields relative to equity yields,[10] but debt yields will rise relatively quickly if the stock of debt grows much faster than the supply of Federal Reserve liabilities. These higher debt yields, in turn, will raise equity yields, or discourage further debt issues, or both. Therefore some of fiscal policy's secondary clout—the increase in the present value of earnings on capital, the increase in real wealth, and the crowding in of debt—depends on the course of monetary policy even in this more dynamic model.

[8]This conclusion is not peculiar to Keynesian models; it also crops up in some classical models (Miller 1982).

[9]To the extent the government issues short-term debt, private bond issues may be crowded in all the more. If bonds and equity were close substitutes, then the increase in stock prices would discourage long-term debt issues in favor of short-term debt issues. However, institutional rules of thumb concerning the mix of bonds and stocks in professionally managed portfolios (the 60/40 split) and empirical estimates, imply that bonds and equity are not very close substitutes. (See also Roley 1983, B. Friedman 1978, 1980, 1983, and Frankel 1983.)

[10]Suppose a 50 percent increase in prospective earnings, other things equal, raises the prospective return on equity by 50 percent as well. If equity prices rise 50 percent, suppose this prospective return on equity is pushed back to its former value. But, because stocks and bonds are not perfect substitutes, portfolio managers will not be willing to watch their equity positions grow 50 percent while their bond positions rise less quickly unless the return on equity rises relative to the return on bonds. As a result, equity prices may not rise the full 50 percent, bond prices may rise, or both.

Unlike the classical tradition, Keynesians generally advocate the active use of fiscal policy to stabilize GNP near high employment.[11] Yet, like the classical models, Keynesian models do not suggest that the deficit is an appropriate measure of fiscal policy. Fiscal policy can change aggregate demand to match supply at full employment. Depending on business conditions, the appropriate fiscal policy at times may entail budget deficits to reach or sustain high employment GNP, while at other times the appropriate policy may bring budget surpluses. Current deficits do not necessarily crowd out investment spending as long as fiscal policy does not push aggregate demand above supply or harm the prospects for future growth. An exclusive reliance on fiscal policy to achieve and sustain high employment GNP is somewhat artificial, however. In Keynesian macromodels, fiscal and monetary policies are not so distinct. The growth of investment spending and GNP depends on the mix of tax rules, spending programs, and monetary policy adopted by policy makers. In principal, the government can foster the maximal growth of living standards by choosing a policy mix that sustains both high employment GNP and an appropriate volume of investment spending.

II. The Econometric Models' Tales: Some Consequences of Changing the Policy Mix

According to the Keynesian tradition, fiscal policy or monetary policy can foster economic growth when resources are underemployed for prolonged periods. As discussed above, the exclusive use of fiscal policy may stimulate GNP growth while restraining investment more than desired for want of monetary accommodation. Conversely, the exclusive use of monetary policy may foster too much investment spending. These observations suggest that an appropriate blend of monetary and fiscal policies can achieve at once the desired growth of GNP and the desired mix of consumption, home building, business fixed investment, and net exports.

Tables 4 to 7 describe some of the consequences of combining personal income tax hikes with more lenient monetary policy. Table 4 shows the baseline projections for three large econometric models from 1984 to 1988.[12] For the projections shown in Table 5, personal income tax liabilities are increased

[11]Given the undeniable role of uncertainty in Keynesian models, critics contend that optimal control counsels caution. Some go one step further, advocating neutrality (Brunner 1980). But what is neutrality: A constant rate of growth of government bonds? A constant ratio of government spending to (potential?) GNP? Constant tax rates by income class? Does neutrality even require that something be constant? If so, perhaps the growth of GNP should be constant? Perhaps transfer payments should vary with the business cycle? Unfortunately, defining neutrality (especially outside the steady state) presumes a knowledge sufficient to justify some degree of action. Or, put another way, ignorance denies us the option of a neutral policy: one theorist's definition of neutrality is another's definition of activism.

[12]I do not wish to encourage critical model comparisons or to encourage anyone to attribute the results of these experiments to the forecasters who maintain these models so I have chosen not to disclose the identities of the models. Tables 4 to 7 are intended only to illustrate our "best guesses" about the effect of policy changes in the composition of GNP.

I did not adjust the baseline model forecasts to match one another because the subsequent experiments then might reflect the effects of my tinkering as well as the effects of the alternative policy mixtures.

Table 2
Gross Saving and Investment as a Percent of GNP[1]
(in percent)

		Government Balance			Business Balance				
	Personal Saving	Total	Federal	State and Local	Total	Retained Earnings[2]	Capital Consumption[3]	Gross Investment[4]	Foreign Balance[5]
1946	6.6	2.5	1.5	0.9	−7.0	0.9	6.7	−14.6	−2.3
1947	2.2	6.2	5.8	0.5	−5.1	2.0	7.4	−14.5	−4.0
1948	4.3	3.3	3.2	0.1	−6.1	3.8	7.7	−17.6	−0.9
1949	2.9	−1.3	−1.0	−0.3	−1.4	3.8	8.4	−13.7	−0.3
1950	4.2	2.7	3.1	−0.4	−8.0	2.5	8.2	−18.7	0.6
1951	4.8	1.9	2.0	−0.1	−7.4	3.2	8.2	−17.9	−0.3
1952	5.0	−1.1	−1.1	0.0	−4.2	2.4	8.4	−15.0	−0.2
1953	5.1	−1.9	−1.9	0.0	−4.1	2.0	8.5	−14.5	0.3
1954	4.6	−2.0	−1.7	−0.3	−3.1	2.3	9.0	−14.4	−0.1
1955	4.1	0.8	1.1	−0.3	−5.1	3.3	8.6	−17.1	−0.1
1956	5.0	1.2	1.4	−0.2	−5.1	2.5	9.1	−16.8	−0.6
1957	5.0	0.2	0.5	−0.3	−3.9	2.3	9.4	−15.6	−1.1
1958	5.2	−2.8	−2.3	−0.5	−2.3	1.8	9.7	−13.7	−0.2
1959	4.3	−0.3	−0.2	−0.1	−4.0	2.8	9.2	−16.0	0.2
1960	3.9	0.6	0.6	0.0	−3.5	2.4	9.2	−15.0	−0.6
1961	4.4	−0.8	−0.7	−0.1	−2.8	2.4	9.0	−14.2	−0.7
1962	4.1	−0.7	−0.7	0.1	−3.2	3.2	8.6	−15.1	−0.6
1963	3.7	0.1	0.0	0.1	−3.3	3.4	8.5	−15.2	−0.7
1964	4.6	−0.4	−0.5	0.2	−3.2	3.7	8.3	−15.3	−1.1
1965	4.9	0.1	0.1	0.0	−4.0	4.3	8.1	−16.4	−0.8
1966	4.8	−0.2	−0.2	0.1	−4.4	4.2	8.0	−16.6	−0.4
1967	5.5	−1.8	−1.6	−0.1	−3.4	3.7	8.2	−15.4	−0.3
1968	4.8	−0.7	−0.7	0.0	−3.8	3.2	8.2	−15.3	−0.1
1969	4.3	1.1	0.9	0.2	−4.9	2.4	8.4	−15.8	0.0
1970	5.6	−1.1	−1.2	0.2	−4.2	1.5	8.8	−14.5	−0.2

Table 2 (cont'd.)
Gross Saving and Investment as a Percent of GNP[1]
(in percent)

		Government Balance			Business Balance				
	Personal Saving	Total	Federal	State and Local	Total	Retained Earnings[2]	Capital Consumption[3]	Gross Investment[4]	Foreign Balance[5]
1971	5.6	−1.8	−2.0	0.2	−4.4	2.1	8.9	−15.4	0.1
1972	4.4	−0.3	−1.4	1.1	−4.9	2.6	9.0	−16.4	0.5
1973	5.9	0.6	−0.4	1.0	−6.1	2.4	8.8	−17.3	−0.5
1974	5.9	−0.3	−0.8	0.5	−5.5	0.9	9.5	−15.9	−0.3
1975	6.1	−4.1	−4.5	0.3	−1.1	1.9	10.3	−13.3	−1.2
1976	4.8	−2.1	−3.1	1.0	−2.7	2.2	10.2	−15.0	−0.3
1977	4.1	−0.9	−2.4	1.5	−3.9	2.8	10.1	−16.9	0.7
1978	4.1	0.0	−1.4	1.4	−4.7	2.9	10.3	−17.9	0.7
1979	4.0	0.6	−0.7	1.3	−4.7	2.3	10.6	−17.5	0.1
1980	4.2	−1.2	−2.3	1.2	−2.9	1.2	11.1	−15.3	−0.2
1981	4.6	−0.9	−2.1	1.2	−3.4	1.5	11.2	−16.1	−0.1
1982	4.1	−3.8	−4.8	1.0	−0.6	1.2	11.7	−13.5	0.3
1983[6]	3.3	−4.0	−5.4	1.4	0.1	1.8	11.6	−13.3	0.7

[1]All data taken from the table reconciling gross saving and investment in the National Income and Products Accounts.
[2]Undistributed corporate profits with inventory valuation adjustment and capital consumption adjustment.
[3]Corporate and noncorporate capital consumption allowances with capital consumption adjustment.
[4]Gross private domestic investment.
[5]Net capital grants received less net foreign investment.
[6]Average of first two quarters.

Table 3
Gross Investment as a Percent of GNP

		Fixed Investment			
	Total	Total	Nonresidential	Residential	Inventory
1946	14.6	11.5	8.0	3.5	3.1
1947	14.5	14.8	9.9	4.9	−0.2
1948	17.7	15.9	10.1	5.7	1.8
1949	13.7	14.8	9.4	5.4	−1.2
1950	18.7	16.4	9.5	6.9	2.3
1951	17.9	14.8	9.5	5.3	3.1
1952	15.0	14.1	9.0	5.1	0.9
1953	14.5	14.4	9.4	5.0	0.1
1954	14.4	14.8	9.3	5.5	−0.4
1955	17.1	15.6	9.6	6.0	1.5
1956	16.8	15.7	10.4	5.3	1.1
1957	15.6	15.3	10.6	4.7	0.3
1958	13.7	14.1	9.3	4.8	−0.4
1959	16.0	14.9	9.4	5.4	1.2
1960	15.0	14.4	9.6	4.8	0.6
1961	14.2	13.8	9.2	4.7	0.4
1962	15.1	14.0	9.2	4.8	1.1
1963	15.2	14.2	9.2	5.0	1.0
1964	15.3	14.4	9.6	4.8	0.9
1965	16.4	15.0	10.5	4.5	1.4
1966	16.6	14.8	11.0	3.8	1.9
1967	15.4	14.1	10.5	3.6	1.3
1968	15.3	14.4	10.4	4.0	0.9
1969	15.8	14.8	10.7	4.0	1.0
1970	14.5	14.2	10.5	3.7	0.3
1971	15.4	14.7	10.0	4.7	0.7
1972	16.4	15.6	10.2	5.4	0.9
1973	17.3	15.9	10.8	5.1	1.4
1974	15.9	15.0	10.9	4.0	1.0
1975	13.2	13.8	10.2	3.6	−0.5
1976	15.0	14.3	10.1	4.2	0.7
1977	16.9	15.7	10.7	5.0	1.2
1978	17.9	16.6	11.5	5.1	1.2
1979	17.5	16.9	12.0	4.9	0.6
1980	15.3	15.6	11.7	3.9	−0.4
1981	16.1	15.5	11.9	3.5	0.6
1982	13.5	14.3	11.3	3.0	−0.8
1983[1]	13.3	14.1	10.4	3.7	−0.8

[1]Average of first two quarters.

Table 4
Baseline Forecasts of Three Econometric Models[1]

	4 Qtr. Inflation Rate[2]	4 Qtr. Real GNP Growth Rate	Unemployment Rate	3 Mo. T Bill Rate	AAA Corporate Bond Rate	Federal Deficit/ GNP	Retained Earnings/ GNP[3]	Personal Saving/ GNP	Personal Consumption/ GNP[4]	Business Fixed Investment/ GNP[5]	Residential Investment/ GNP[6]	Net Exports/ GNP[7]	Total Government Purchases/ GNP[8]
						MODEL A							
1983:3–1984:2	4.9	4.5	8.9	9.0	11.8	5.2	2.2	3.3	66.1	10.4	3.4	0.2	19.1
1984:3–1985:2	5.6	3.9	8.1	8.6	11.5	4.6	2.5	3.1	65.8	10.6	3.5	0.2	19.0
1985:3–1986:2	6.1	3.4	7.7	8.7	11.9	4.3	2.7	3.5	65.4	11.1	3.5	0.2	18.8
1986:3–1987:2	6.9	3.1	7.3	8.0	11.8	3.4	3.0	3.5	65.0	11.3	3.7	0.3	18.3
1987:3–1988:2	6.4	3.1	6.9	7.5	11.5	2.7	3.1	3.2	65.0	11.7	3.6	0.4	17.9
						MODEL B							
1983:3–1984:2	3.9	3.8	9.2	8.4	11.6	5.4	2.6	3.4	66.1	11.0	3.2	0.0	18.8
1984:3–1985:2	4.4	4.3	8.5	7.2	10.3	4.6	2.8	3.0	65.3	11.8	3.2	0.0	18.7
1985:3–1986:2	4.1	4.2	7.7	7.2	9.1	3.4	3.2	2.8	64.4	12.7	3.7	0.2	18.1
1986:3–1987:2	4.2	3.1	7.2	6.9	8.5	2.5	3.4	2.4	64.0	13.4	4.1	0.1	17.7
1987:3–1988:2	3.8	2.4	7.2	5.5	8.0	1.9	3.6	1.7	63.7	13.8	4.5	−0.1	17.5
						MODEL C							
1983:3–1984:2	5.0	5.1	8.9	9.3	11.9	5.5	2.8	3.7	65.7	10.7	3.5	0.6	19.1
1984:3–1985:2	4.9	3.5	8.1	9.1	11.5	5.2	3.3	3.9	65.2	11.0	3.6	0.5	18.9
1985:3–1986:2	5.0	3.1	7.9	9.3	11.5	5.1	3.3	4.1	65.1	11.4	3.3	0.5	18.8
1986:3–1987:2	5.1	3.7	7.5	8.4	11.3	4.6	3.0	4.0	64.7	11.6	3.4	0.7	18.8
1987:3–1988:2	5.7	3.2	7.2	8.0	11.0	3.9	2.7	3.9	64.4	11.8	3.5	0.8	18.8

[1]These forecasts are the unadjusted simulation paths of the three models in late September 1983.
[2]Percent change in GNP deflator, fourth quarter over fourth quarter.
[3]Undistributed corporate profits with inventory valuation and capital consumption adjustment, matching the concept reported in Table 2.
[4]Real personal consumption as a percent of real GNP.
[5]Real business fixed investment as a percent of real GNP.
[6]Real residential investment as a percent of real GNP.
[7]Real net exports as a percent of real GNP.
[8]Total real government purchases as a percent of real GNP.

Table 5
Alternative Forecasts for Small Personal Tax Increases[1]
(Change From Baseline Forecast)

	4 Qtr. Inflation Rate	3 Mo. T Bill Rate	AAA Corporate Bond Rate	Federal Deficit/ GNP	Retained Earnings/ GNP	Personal Saving/ GNP	Personal Consumption/ GNP	Business Fixed Investment/ GNP	Residential Investment/ GNP	Net Exports/ GNP	Total Government Purchases/ GNP
						MODEL A					
1983:3–1984:2	+0.1	−2.5	−1.1	−1.1	+0.1	−0.6	−0.3	0.0	+0.2	+0.2	0.0
1984:3–1985:2	+0.1	−3.3	−2.1	−1.3	+0.1	−0.4	−0.6	0.0	+0.3	+0.2	+0.1
1985:3–1986:2	+0.2	−5.1	−3.7	−2.0	+0.1	−0.6	−1.0	0.0	+0.4	+0.5	+0.1
1986:3–1987:2	−0.1	−5.1	−4.9	−2.0	+0.2	−0.5	−1.3	0.0	+0.4	+0.9	+0.4
1987:3–1988:2	−0.2	−5.4	−5.6	−2.1	+0.2	−0.4	−1.5	+0.1	+0.4	+1.0	+0.5
						MODEL B					
1983:3–1984:2	0.0	−1.6	−0.4	−1.0	0.0	−0.8	−0.3	+0.1	+0.3	0.0	0.0
1984:3–1985:2	−0.1	+0.1	−0.3	−0.9	+0.1	−0.6	−0.2	+0.2	+0.2	0.0	0.0
1985:3–1986:2	+0.2	−0.3	−0.4	−1.4	+0.1	−1.0	−0.4	+0.2	+0.3	+0.1	0.0
1986:3–1987:2	+0.1	−0.2	−0.3	−1.6	+0.1	−0.9	−0.5	+0.2	+0.3	+0.1	0.0
1987:3–1988:2	+0.3	−0.5	−0.3	−1.4	0.0	−0.8	−0.5	+0.2	+0.3	+0.1	0.0
						MODEL C					
1983:3–1984:2	+0.1	−1.6	0.0	−1.0	+0.1	−0.7	−0.4	0.0	+0.2	0.0	+0.1
1984:3–1985:2	0.0	−0.9	+0.1	−1.0	0.0	−0.5	−0.5	+0.1	+0.2	+0.2	+0.1
1985:3–1986:2	+0.1	−2.1	+0.1	−1.6	+0.1	−0.9	−0.8	+0.1	+0.3	+0.3	+0.1
1986:3–1987:2	+0.1	−1.5	+0.1	−1.6	+0.1	−0.7	−0.8	+0.2	+0.3	+0.4	+0.1
1987:3–1988:2	+0.1	−1.5	+0.1	−1.6	0.0	−0.8	−0.9	+0.2	+0.2	+0.5	0.0

[1]Personal taxes increase $30 billion in FYs 1984 and 85 and $50 billion in FYs 1986, 87, and 88, while monetary policy is relaxed so that projected real GNP matches that of the baseline simulation.

Table 6
Alternative Forecasts for Medium Personal Tax Increases[1] (Change From Baseline Forecast)

	4 Qtr. Inflation Rate	3 Mo. T Bill Rate	AAA Corporate Bond Rate	Federal Deficit/ GNP	Retained Earnings/ GNP	Personal Saving/ GNP	Personal Consumption/ GNP	Business Fixed Investment/ GNP	Residential Investment/ GNP	Net Exports/ GNP	Total Government Purchases/ GNP
						MODEL A					
1983:3–1984:2	+0.1	−2.2	−1.0	−1.1	+0.1	−0.6	−0.3	0.0	+0.2	+0.2	0.0
1984:3–1985:2	+0.3	−5.3	−3.1	−2.2	+0.1	−0.9	−0.9	0.0	+0.4	+0.3	+0.1
1985:3–1986:2	+0.4	−8.1	−5.6	−3.6	+0.3	−1.2	−1.7	0.0	+0.8	+0.7	+0.2
1986:3–1987:2	*	*	*	*	*	*	*	*	*	*	*
1987:3–1988:2	*	*	*	*	*	*	*	*	*	*	*
						MODEL B					
1983:3–1984:2	0.0	−1.6	−0.4	−1.0	0.0	−0.8	−0.3	+0.1	+0.3	0.0	0.0
1984:3–1985:2	0.0	−1.5	−0.7	−1.9	+0.2	−1.4	−0.5	+0.2	+0.5	0.0	0.0
1985:3–1986:2	+0.2	−0.6	−0.8	−2.8	+0.2	−2.0	−0.9	+0.3	+0.7	+0.2	−0.1
1986:3–1987:2	+0.2	−0.1	−0.5	−2.7	+0.1	−1.8	−1.0	+0.4	+0.6	+0.2	−0.1
1987:3–1988:2	+0.5	−0.5	−0.4	−2.6	0.0	−1.5	−1.1	+0.3	+0.7	+0.2	−0.1
						MODEL C					
1983:3–1984:2	+0.1	−1.6	0.0	−1.0	+0.1	−0.7	−0.4	0.0	+0.2	0.0	+0.1
1984:3–1985:2	+0.2	−2.4	0.0	−1.9	0.0	−1.1	−0.8	+0.1	+0.4	+0.2	+0.1
1985:3–1986:2	+0.2	−3.6	+0.1	−3.0	+0.1	−1.7	−1.5	+0.2	+0.7	+0.5	+0.2
1986:3–1987:2	+0.2	−2.8	+0.2	−3.0	+0.1	−1.4	−1.6	+0.3	+0.7	+0.6	+0.1
1987:3–1988:2	+0.2	−2.6	+0.2	−3.0	+0.1	−1.4	−1.7	+0.3	+0.5	+0.8	0.0

[1]Personal taxes increase $30 billion in FY 1984, $60 billion in FY 1985, $100 billion in FYs 1986, 87, and 88, while monetary policy is relaxed so that projected real GNP matches that of the baseline simulation.

*Simulation stopped because short-term interest rates became negative.

Table 7
Alternative Forecasts for Large Personal Tax Increases[1]
(Change From Baseline Forecast)

	4 Qtr. Inflation Rate	3 Mo. T Bill Rate	AAA Corporate Bond Rate	Federal Deficit/ GNP	Retained Earnings/ GNP	Personal Saving/ GNP	Personal Consumption/ GNP	Business Fixed Investment/ GNP	Residential Investment/ GNP	Net Exports/ GNP	Total Government Purchases/ GNP
						MODEL A					
1983:3–1984:2	+0.1	−2.3	−1.1	−1.1	+0.1	−0.6	−0.3	0.0	+0.3	+0.2	0.0
1984:3–1985:2	+0.4	−7.5	−4.1	−3.5	+0.1	−1.5	−1.3	0.0	+0.6	+0.4	+0.1
1985:3–1986:2	*	*	*	*	*	*	*	*	*	*	*
1986:3–1987:2	*	*	*	*	*	*	*	*	*	*	*
1987:3–1988:2	*	*	*	*	*	*	*	*	*	*	*
						MODEL B					
1983:3–1984:2	0.0	−1.6	−0.4	−1.0	0.0	−0.8	−0.3	+0.1	+0.3	0.0	0.0
1984:3–1985:2	0.0	−3.6	−1.2	−2.9	+0.3	−2.3	−1.0	+0.2	+0.8	0.0	−0.1
1985:3–1986:2	+0.2	−0.2	−1.1	−4.2	+0.3	−3.0	−1.4	+0.5	+1.1	+0.3	−0.1
1986:3–1987:2	+0.3	−0.2	−0.9	−4.0	+0.2	−2.6	−1.6	+0.5	+0.9	+0.3	−0.2
1987:3–1988:2	+0.6	−0.5	−0.5	−3.9	+0.1	−2.3	−1.6	+0.5	+1.1	+0.3	−0.1
						MODEL C					
1983:3–1984:2	+0.1	−1.6	0.0	−1.0	+0.1	−0.7	−0.4	0.0	+0.2	0.0	+0.1
1984:3–1985:2	+0.4	−3.1	+0.1	−3.0	+0.1	−1.7	−1.3	+0.1	+0.8	+0.3	+0.2
1985:3–1986:2	*	*	*	*	*	*	*	*	*	*	*
1986:3–1987:2	*	*	*	*	*	*	*	*	*	*	*
1987:3–1988:2	*	*	*	*	*	*	*	*	*	*	*

[1]Personal taxes increased $30 billion in FY 1984, $100 billion in FY 1985, $150 billion in FYs 1986, 87, and 88, while monetary policy is relaxed so that projected real GNP matches that of the baseline simulation.

*Simulation stopped because short-term interest rates became negative.

by $30 billion in fiscal years 1984–1985, and by $50 billion in fiscal years 1986–1988. In Table 6, the tax increase is $30 billion in 1984, $60 billion in 1985, and $100 billion in 1986 to 1988. Finally in Table 7, personal income taxes rise $30 billion in 1984, $100 billion in 1985, and $150 billion in 1986 to 1988.

According to Table 4, all three models forecast fairly similar recoveries during the next five fiscal years. In all models the unemployment rate declines to about 7 percent by fiscal year 1988. In all models real growth averages 3.6 percent during the five year interval, and in fiscal year 1988 real growth in models A and C averages about 3 percent while real growth averages 2.4 percent in model B. Apparently the economy is making a smooth transition to a 7 percent unemployment rate.

Models A and C project the inflation rate to increase to roughly 6 percent in fiscal year 1988. As a result, the corporate bond yields in these models remain above 11 percent.[13] In model B the corporate bond yield drops to 8 percent as the inflation rate falls below 4 percent in 1988.

The models project different budget deficits. Model B assumes that indexing of the personal income tax will not take place as scheduled in 1985, and it forecasts a steady decline in the deficit as a percent of GNP to 2 percent.[14] Models A and C assume that indexing will take place and forecast that federal deficits will fall to 3 or 4 percent of GNP in fiscal year 1988. All of these estimates are considerably below those shown in the first column of Table 1.

In models A and C, investment as a percent of GNP rises about 1 percentage point over the five years. In B investment increases almost 3 percentage points. In all models investment spending appears to be rising to at least 12 percent of GNP by the end of fiscal year 1988. In C, retained earnings fail to rise relative to GNP, while earnings rise about 1 percentage point in models A and B.

Despite similarities in their baseline forecasts, the three models respond differently to these changes in policy mix. In model A all interest rates decline dramatically to increase net exports and investment demand enough to match the decline in consumption spending resulting from the small tax hike. For the medium and large tax hike simulations, no feasible drop in yields could maintain the GNP growth path. In model B personal savings drops somewhat more with the tax hike, and, because the interest elasticity of net exports and investment spending is greater than in A, interest rates fall much less. In model C personal saving declines almost as much as savings in B, and yields decline more than in B but not as much as in A to foster adequate spending.

In all three models the alternative policy mixtures modestly increase real business fixed investment as a percent of GNP. This result is not too surprising because these changes in policy mix do not alter real GNP growth,

[13]Suppose a bond buyer's marginal tax rate is 35 percent, then the real yield after taxes appears to be about 1 percent in fiscal year 1988 according to all three models.

[14]With model B's low inflation forecast, the lack of indexing raises personal tax rates only modestly by 1988.

and the inflation rate changes very little in these alternative simulations. Consequently, corporate retained earnings and the corporate bond yield also change very little as the policy mix changes in models B and C.

In all models, the combining of personal income tax hikes with more lenient monetary policy principally reduces consumption spending to favor net exports and residential construction. For model B, the alternative policy mixtures reduce interest rates negligibly. For model A interest rates must drop so much that the alternative policies featuring medium and large tax hikes are not feasible. Finally, in model C the switch to more lenient monetary policies alters bond yields very little while short-term interest rates fall considerably. For example, in the medium tax hike alternative for model C, the gap between long-term and short-term yields remains near 500 basis points for fiscal years 1986 to 1988. The "stability" of this projection may be questionable: for at least three years, short-term yields remain far below bond yields and barely match the rate of inflation.

Perhaps model C best represents the effects of changing the policy mixture.[15] The small tax hike policy mix cuts the federal deficit about 40 percent by 1988, reducing it to about 2.3 percent of GNP. The medium tax hike simulation reduces the deficit to about 1 percent of GNP. For both of these alternative strategies, households pay for the tax hike by reducing both saving and spending, with consumption spending falling only 10 to 20 percent more than personal saving by 1988. Consequently, the increase in total fixed investment spending and net exports together is a little more than half the size of the tax hike because government spending and inventory investment change negligibly in the alternative simulations shown in Tables 5 and 6.

Although net exports increase very little at first, by 1988 the rise in net exports roughly matches that of total fixed investment spending in Tables 5 and 6. Net exports and total investment spending each eventually rise by about one-quarter of the amount of the personal tax hike. In turn, a little more than half of the increase in total investment is accounted for by home building so the increase in business fixed investment is about one-tenth the size of the tax hike.

In summary, the alternative blends of policy raise government saving by the amount of the personal income tax hike. Because these alternative policy strategies, by design, do not change national income (GNP), the rise in government tax receipts essentially is offset by a matching drop in household disposable income. The resulting increase in government saving is matched by a relatively large rise in household borrowing (almost three-quarters of the increase in government saving), a decline in capital flows from abroad (about

[15]The interest elasticities of investment spending and net exports appear to be relatively low for model A. For those who believe the accelerator theory best describes investment demand (Kopcke 1982), etc., model A may be the most realistic alternative, however. Those who maintain model B believe that their exchange rate equation has a "surprising" response to increasing deficits; the dollar depreciates as deficits rise. As a result, simulations shown in Tables 5 to 7 understate the rise in net exports and, consequently, overstate the change in other spending. Altogether, then, the responses of interest rates, spending, and personal saving appear to be most plausible for model C.

one-quarter of the increase in government saving), and a very small increase in business borrowing.[16]

III. Conclusion

According to common projections, the federal government's budget deficit may remain near 5 percent of GNP well into the late 1980s. To some, big deficits apparently suggest that fiscal policy is too lenient: the recovery will violate prudent speed limits, aggregate demand will exceed supply once high employment is attained, and the volume of investment spending will be inadequate because high employment production is not sustainable under these conditions or because a restrictive monetary policy must drive up interest rates.

To begin to assess our current fiscal policy, we should consider first our current and prospective circumstances. The economy is not now near full employment, nor has it been near full employment for at least three years. Aggregate demand apparently falls well short of supply at high employment GNP. Consequently, the appropriate fiscal policy may entail large deficits.

Nevertheless, common projections of very large deficits seem to suggest that fiscal policy has gone too far. The model forecasts shown in Table 4, representing the consensus forecast, suggest otherwise. Given our circumstances, including the course of monetary policy currently expected by forecasters, fiscal policy does not seem to be pushing the recovery beyond any speed limits. Indeed, five years from now the unemployment rate will be about 7 percent as the economy's growth rate slows to match the rate of potential growth.

Even though the current strategy will produce a gradual recovery, it may not be the best policy for restoring full employment. To assess alternative strategies, several model simulations were performed that combined personal income tax increases with more lenient monetary policy. The results of these simulations, shown in Tables 5 to 7, are not very encouraging for those who hope to stimulate business fixed investment by changing the policy mix, however. Swapping tighter fiscal policy for a more lenient monetary policy seems to raise business fixed investment relatively little because the swap, by design, does not alter the growth of GNP and, therefore, does not increase corporate profits or reduce either the inflation rate or bond yields. Models can err, of course, but this conclusion sounds intuitively plausible. Of course, this is only one set of experiments; more complex changes in tax rules—including more investment incentives, for example—may achieve greater success.

[16]In model B, the rise in household borrowing is 80 percent of the increase in government saving because of the small change in net exports. In model A, for the small tax hike, the rise in total government saving is less than the tax hike because low interest rates induce additional state and local government spending. In this model, the drop in interest rates is also large enough to increase net exports dramatically. As a result, the increase in household borrowing is about half the size of the rise in total government saving as consumption spending falls dramatically.

The case for a new policy mix featuring a more restrictive fiscal policy does not rest entirely on fostering business fixed investment. Policymakers may wish to reduce short-term interest rates, thereby encouraging home building, reducing exchange rates, boosting net exports, or reducing the debt service costs of developing countries. The policy simulations for model C shown in Tables 5 and 6 suggest that net exports, after a few years, will rise by one-quarter of the amount of a personal tax hike and residential investment will rise by one-sixth of the amount of the tax hike. The models also suggest that long-term yields cannot be reduced by changes in the mix of monetary and fiscal policies. Short-term yields may decline, but if they do so, they will be out of line with long-term yields and inflation.

If we desire a more rapid recovery of investment spending (especially home building), higher net exports and lower debt servicing costs for developing countries, without increasing GNP growth, economic theory recommends a tax hike structured to encourage capital deepening coupled with a more lenient monetary policy.[17] Social priorities permitting, a spending cut may also be considered. Tax hikes alone are a bad bet. Tax hikes by themselves can reduce interest rates and the deficit, but these ends are achieved at the expense of investment spending and GNP growth. It is a bad bet for policymakers to turn from their ultimate goals to follow intermediate targets that can be misleading statistics.[18]

[17]It is not clear whether monetary policy can influence investment incentives at full employment. For example, in some growth models the intertemporal discount rate is fixed by the utility function (Sidrauski 1967); in others the intertemporal discount rate is determined by the saving rate and portfolio balance relationships (Tobin 1965). In the former, monetary policy cannot influence capital intensity; in the latter, monetary policy can influence the rate of capital formation by depressing the real return on money, that is by increasing inflation.

[18]Let g, an endogenous variable, be the goal and i be the intermediate target. Steering i along some preset path would offer little guarantee that g would meet its target, unless the reduced form equations for i and g were $i = f(X)$ and $g = h(Z, f(X))$ where the variance of Z is small or Z has "little influence" (say, small beta coefficients). (I assume the target for i is not set independently of the function h and forecasts of Z.) A close correlation between i and g or Z and X is no guarantee that these conditions are satisfied because by controlling i the correlation structure between Z and X is altered. (See also B. Friedman 1977.)

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Discussion

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Kopcke's paper addresses a central question: Are deficits at 5 percent of GNP extending into the indefinite future anything to worry about? Kopcke's answer, in short, is no. In fact, he even raises the possibility that they should be larger. For example, in his conclusion he states that because the economy is so far below full employment, "the appropriate fiscal policy may entail large deficits." He implies that they should be even larger than 5 percent of GNP when he goes on to state, "fiscal policy does not seem to be pushing the recovery beyond any speed limits. Indeed, five years from now the unemployment rate will be about 7 percent...."

I am not persuaded by Kopcke's arguments. He uses an IS-LM model and three large macroeconometric models to seek answers to his deficit question—analytical tools which I believe are inadequate for the problem at hand. Instead, based on an equilibrium growth model which can address the question, I conclude that financing a permanent deficit at 5 percent of GNP will require significant inflation.

Kopcke's Macroeconomic Analysis Is Inadequate

The macroeconomic models Kopcke uses to examine the economic consequences of permanent deficit policies are inadequate for at least three reasons. First, they cannot distinguish among alternative debt financing rules. Second, the macro relationships in these models cannot be expected to remain invariant under a change from historical deficit policies to one of large, permanent deficits (according to the Lucas critique). Third, they cannot address the optimal tax structure questions which are basic to the issue of permanent deficit financing. Each reason is discussed in more detail below.

• Kopcke's Models Cannot Distinguish among Alternative Debt Financing Policies

Theory and common sense suggest that the path of prospective deficits, which is determined in part by the government's debt financing rule, should affect expectations of interest rates and inflation, thereby affecting behavior today. A deficit caused by a temporary tax cut and for which the resulting debt is serviced by higher taxes in the future is quite different from a deficit caused by a permanent tax cut and for which the resulting debt is serviced by increased money creation and bond issue in the future. Yet, Kopcke's IS-LM and macroeconometric models make no such distinction.

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The views expressed in this comment are those of the author and not necessarily those of the Federal Reserve Bank of Minneapolis or the Federal Reserve System.

For example, changing the financing rule to service more debt by higher taxes in the future and, thus, to lower the path of prospective deficits has no effect in Kopcke's models in the current period. Such a change in rule in these models only has effects as the tax increases actually take place, and each tax increase unambiguously lowers real output when it takes effect. So as long as the economy is below full employment, these models will always suggest that, no matter what deficits are today, they should be even larger. That is because policy actions which raise deficits are always stimulative and the financing of the resulting debt is irrelevant.

Given this unattractive implication of these models, it is not surprising that Kopcke and others at this conference play the game of examining different mixes of monetary and fiscal policies while holding the path of GNP constant. It would be more direct and natural to hold the path of money constant and then ask how large the deficits should be to stimulate GNP in order to return the economy promptly to full employment. Since the answer would be that the deficits should be even larger than the huge ones now projected, having the models address this natural question would make their deficiencies too apparent.

- **The Relationships in Kopcke's Models Are Not Invariant to a Change in Deficit Policies**

Although deficits at 5 percent of GNP have occasionally occurred in the past at times of recession, they have never persisted at that level as the economy recovered. Thus, the deficit policy being contemplated now is very different from the policy or policies which were in effect in the past. For reasons spelled out in Lucas and Lucas-Sargent we cannot expect macroeconomic relationships to remain invariant under such a change in policies. The estimated responses of interest rates and inflation to larger deficits under the prospective deficit policy are likely to be very different from their responses under the historical policy. (See Miller 1983 for evidence that these responses are sensitive to the policy in effect.)

- **Kopcke's Models Cannot Address Optimal Tax Structure Questions**

In considering a policy of permanent deficits the question naturally arises, How is it possible for the government to permanently spend more than it takes in? In a real sense it cannot. The resources which go out must come in. A permanent deficit policy can be feasible if implicit taxes can raise the amount by which expenditures exceed explicit revenues. Thus, a desirable permanent deficit policy is one which produces a desirable mix between explicit and implicit taxes. It is a question of optimal tax structure, with distorting explicit and implicit taxes. Because Kopcke's macro models consider neither individual welfare nor deadweight losses associated with alternative taxes, they simply are not constructed to deal with questions of optimal tax structure.

Equilibrium Growth Models Can Analyze Persistent Deficit Policies

Equilibrium growth models, such as those of Bryant-Wallace, Lucas-Stokey, and Miller (1982), can be used to analyze persistent deficit policies. Because they are explicitly micro based and dynamic in nature, they are not subject to the criticisms made of Kopcke's models. (See Miller-Rolnick for a fuller discussion of equilibrium modelling.)

I do agree with Kopcke that it would be preferable to have a model which can deal in a unified way with countercyclical and growth issues. Countercyclical policy is concerned with how large the deficits should be in recessions and how fast they should be reduced in recoveries to smooth the business cycle. Growth policy is concerned with how large deficits should be on average over the business cycle in order to promote real growth. The deficit question being addressed deals primarily with the second policy concern. Until models are developed which can deal with both growth and countercyclical issues, it then seems most logical to analyze Kopcke's deficit question in terms of steady states of equilibrium growth models, if we think of steady state as meaning average over the business cycle.

• **The Steady-State Budget Identity Is a Useful Frame of Reference**

Most of the implications I want to draw from equilibrium growth models for permanent deficit policies can be briefly described by referring to the government's steady-state budget identity:

$D = t_m \cdot M + t_B \cdot B$, where

$D =$ the real deficit net of interest

$M =$ the real monetary base

$B =$ the real market value of privately held government bonds

$t_m =$ the implicit tax rate on money

$t_B =$ the implicit tax rate on bonds.

This relationship is derived assuming a constant rate of inflation Π, a constant real interest rate ρ, and a constant rate of real growth υ. For given rates Π, ρ, and υ, the income velocities of M and B are assumed invariant over time (see Miller 1983 for more detail). The identity states that the difference between government expenditures and explicit revenues must be collected in implicit taxes on money and bonds.

The implicit tax rates are simple functions of the key economic variables Π, ρ, and υ. Given my assumptions, the implicit tax rate on money is approximately the sum of inflation and real growth, $t_m \approx \Pi + \upsilon$, and the implicit tax rate on bonds is approximately the difference between real growth and the real interest rate, $t_B \approx \upsilon - \rho$. The expression for the implicit tax rate on

bonds, for example, indicates that bond issue provides a steady stream of revenue to the government when the growth in real demand for bonds v is greater than the cost of servicing the bonds outstanding ρ.

Some qualitative implications about deficit policies can be drawn from the steady-state budget identity and general considerations of money and bond demands. An immediate implication is that permanent deficits are feasible only when they do not exceed the maximum take from implicit taxes. The maximum take will depend on, among other things, institutional factors in the economy which affect the demands for money and bonds and demographic factors which affect real growth.

The identity, together with a theory of the demands for M and B, implies that deficit policies (paths of D) and monetary policies (paths of M) must be coordinated. For a given deficit policy there are a limited number of monetary policies which are feasible.[1] The feasible policies are the ones which generate the implicit taxes required to finance the real deficit net of interest.

The identity and theory also imply that the incidence of deficits depends on the mix of implicit taxes. A monetary policy characterized by a lower M/B leads to more crowding out. A policy which relies on greater use of inflation as an implicit tax leads to economizing on money balances.

Within this framework of optimal tax structure, a policy which permanently lowers explicit taxes could, conceptually, either raise or lower real GNP. Such a change in policy just changes the mix of explicit and implicit taxes, and the outcome depends on whether policy is moved closer to or further away from the optimal mix.

• The Steady-State Budget Identity Indicates Projected Deficits Could Require High Inflation

On very optimistic assumptions the steady-state budget identity implies that a permanent deficit at 5 percent of GNP requires a steady-state inflation rate of 6 percent. The risk—and the probability—however, is that it is much higher.

My back-of-the-envelope calculation determines what inflation rate is needed this year to finance a deficit at roughly 5 percent of GNP, assuming specific long-run average values for ρ and v. Given my steady-state assumptions, this inflation estimate works for all time. To get D, I take 5 percent of current GNP, roughly \$150b, and subtract interest payments, roughly \$90b, so that D = \$60b. I take M to be \$200b and B (which should be the stock of outside, or unbacked, bonds in private hands) to be \$1,000b. I assume this ratio of M to B is maintained over time. Then, assuming optimistically that v = 4 percent and ρ = 0 implies Π = 6 percent:

$$D = (\Pi + v)M + (v - \rho)B,$$

which under my assumptions becomes $60 = (\Pi + .04)(200) + (.04 - 0.0) \times (1{,}000)$ or $\Pi = .06$.

[1]A monetary policy can be characterized by the initial stock of money to bonds, M/B, and by the growth of money and bonds over time, $\dot{M}/M = \dot{B}/B$.

The identity and assumptions imply the following: (a) for each percentage point increase in the real interest rate, the steady-state inflation rate rises by 5 percentage points; (b) for each percentage point decline in the rate of real growth, the steady-state inflation rate rises by 6 percentage points. Thus, a deficit net of interest of 2 percent of GNP with steady-state rates of real growth and interest of 3.5 percent and 1.0 percent, respectively, requires a 14 percent steady-state inflation rate.

Large, Permanent Deficits Are a Matter for Concern

In summary, I am concerned about the prospect of permanent deficits at 5 percent of GNP. They imply that we must implicitly tax roughly 2 percent of GNP. I believe, but cannot substantiate, that implicit taxes are distorting relative to available explicit taxes. If these deficits crowd out and cause the difference between the real growth rate and real interest rate to be narrower than it appears to have been historically, we are going to have a lot of inflation.

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The Deficit and the Fiscal and Monetary Policy Mix

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Policy Balance

Risks are involved in the setting of instruments for economic policy. These risks are that policies will not work out as contemplated because of misjudgment of the underlying economic situation, misperceptions of economic agents' behavior, external shocks to the economy, or ever-present random error. Spreading the risk is a good principle of broad applicability. Policymakers would be well advised not to gamble on an all-or-nothing venture with a single policy instrument, but in choosing many instruments for setting policy so as to minimize the risk of failure, it is important to have a balanced policy. There are at least two reasons for seeking policy balance. In the first place, there is a problem of distribution of burden sharing. All too often, American policy has become lopsided, particularly in credit squeezes, and the housing sector has correspondingly undergone a vicious cycle of recession-recovery phases. Why should this one sector bear the burden of adjustment so heavily?

Secondly, we may have policy failure because loopholes for evasion of the effects of policy are likely to be discovered, or things happen in the economy to thwart the policy, outside the frame of reference of the single instrument. Overreliance on monetary policy alone has prompted a creative private financial system to seek new avenues of activity. The use of Eurocurrency markets, off-shore banking affiliates, money market funds, bank commercial paper and many other devices have interfered with the expected working of monetary policy, and basic ratios, such as the velocity ratio, on which some policy analysts depend, have become variable in such a way as to counteract intended policy lines. A person depending on steady velocity patterns for pursuit of single-minded monetary policy would have had a rude shock in this past recession because M1 velocity growth became negative, for the first time in 20 years, and by a wide margin.

Policy imbalance may arise even if more than one instrument is used, but if the imbalance puts different measures at cross-purposes, policy objectives may not be reached. Sometimes the consequences get out of hand, as they did during 1981 and 1982, when fiscal and monetary policies were seriously imbalanced.

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With these thoughts in mind, I shall make the objective of this paper an attempt to find a balanced policy mix of fiscal and monetary instruments that improves macroeconomic performance, while observing, at the same time, the budget deficit. We hope we can find a policy mix that will lead to better macro performance with a declining budget deficit.

The Scope of Macroeconomic Fiscal Policy

One could look for fiscal innovation to see if new ways of taxing or spending work better than present instruments. I shall not explore such issues as value-added taxation, an expenditure tax, or a flat tax. I shall confine this analysis to such established instruments as the personal income tax, investment tax credits, indirect taxes (excise, sales, property), nonmilitary spending, military spending and transfer payments to individuals.

Within this macroeconomic framework, the policy options are fairly clear. The federal government can spend on goods and services or on transfers and expect the conventional multiplier stimuli to follow from these choices. An expansion of federal expenditures will contribute to economic expansion (GNP) by an amount in excess of the public injection of funds, and a restriction of federal expenditures will contribute to economic retardation in a similar way. Expenditure on new goods and services by the government contributes directly to GNP, and the induced expenditures add to the total. Increased transfer payments have no direct effect, only indirect effects; so the overall multiplier result is somewhat smaller.

This is conventional wisdom, and it has worked in the past. The result shows up in all "mainstream" models of the economy and would be denied only in such idiosyncratic models as the St. Louis Model, of well-known monetarist persuasion.

Most mainstream models yield the same qualitative result, but they may differ in estimating the quantitative impacts. Another feature of the qualitative pattern of dynamic fiscal multipliers is that they rise and fall, along a business cycle path. In the first place, they induce inventory build-up (draw-down) after a stimulus (restraint), and stock-adjustment behavior leads to an early reversal. Secondly, the expansion of the economy following a net spending injection generates rises in interest rates and the price level, unless offset by some other policies, and these tend to slow the expansion of investment, housing, and purchases of consumer durables. In some models, an expansionary path is quickly brought back to a zero-effect. In others, the peak effect, after an injection, is reached in about two or three years and then brought down gradually, but not necessarily to zero.

The side-effects and relationships with other policy centers in the economy are important and must be considered. An economic expansion generated by a fiscal injection of funds will lead to higher interest rates, in the usual pattern, only if the monetary authorities fail, or refuse, to accommodate the expansion. This is the point of policy balance. If monetary rules and decisions are unaffected, we will get the expected result, outlined above. If monetary authorities strongly accommodate an expansion by trying to supply enough reserves to keep interest rates from

rising, the tendency of the multiplier process to reverse itself will be moderated and possibly even avoided. Naturally, if monetary policy works at cross-purposes with the fiscal expansion, it can be entirely counteracted.

The other side effects of a spending increase come from the financing of the federal deficit, the potentially inflationary effects of an expansion, and the international repercussions of balance of trade/payments changes. Higher spending levels without corresponding revenue changes will, in the first instance, bring about an increase in the federal deficit. Eventually, there will be feedback effects to trim the deficit as a result of having an enlarged tax base and an induced reduction of transfer payments, but it depends on tax/transfer rates and regulations whether the reduction in the deficit will be as large as the initial increment.

Let us assume that the deficit will increase. Will that rise necessarily cause interest rates to go up because of crowding out between public and private needs for capital financing? Also, will the rise in the deficit necessarily lead to a monetary expansion that will generate inflation?

The capital market consists of activity in many sectors on both the *sources* and the *uses* side of the account. The sources side includes personal saving, business saving, and foreign saving. If the public sector is in deficit, it is dissaving and could attract funds away from private investment uses, unless some other saving source is also increased. It is entirely possible that business and foreign savings could supply funds on a large enough scale to offset the drain caused by the public deficit. In a business expansion, corporate savings tends to rise quickly by large amounts. Our tax system now favors the rapid build-up of capital consumption allowances. These sources loom very large at the present time, and for the next few years. A great deal of foreign funding may seek domestic business opportunities; a strong stock market can be attractive for equity financing, especially given the large reductions that have taken place in capital gains taxation. Finally, the monetary authorities can supply reserves to the banking system to allow financial institutions to supply loan capital to enterprise for investment. Many combinations are possible in a complete sources-and-uses analysis. There is no reason to focus attention primarily on the "crowding out" line of analysis; it can definitely be avoided.

If investors develop adverse expectations and feel that "crowding out" will occur, they may cause bond markets to retract, as in 1981, and the mere existence of deficit prospects can drive up interest rates and cut off investment planning. But this outcome will generally go together with expectations of inflation. An increase in monetary accommodation could lead to inflationary expectations, but it need not. Inflation depends on many things:

(i) raw material prices (especially imported)
(ii) unit wage costs
(iii) exchange rates

Ample supplies of raw materials, relative to demand, wage restraint, productivity gains, and a strong currency can all restrain inflation. These

conditions vary a great deal. At present, they are probably favorable, on balance, for the inflation outlook, and if people can see good reports month-by-month on price statistics, they are likely to restrain their inflationary expectations. Conditions in labor markets have much to do with wage gains, and high levels of unemployment for some time to come will do much to hold wage gains to moderate rates.

By and large, this analysis has been for the domestic economy. It is important to consider some external side effects. We are a fully *open* economy. The most immediate external effect of a fiscal expansion is a tendency for imports to increase. For a large part, this displaces domestic activity and holds down GNP expansion. The leakage in the conventional multiplier evaluation of mainstream econometric models is well known, but there are other effects, too. If the fiscal measures being undertaken are unilateral, the net foreign position will tend to deteriorate, and this, by itself, should bring down the exchange value of the dollar, discourage imports, encourage exports, and restore some domestic activity. Dollar depreciation could produce some inflation and this would be counter-expansionary. But if interest rates rise enough, either through natural supply-demand pressure in credit markets or through perverse expectations in bond and stock markets, the dollar could strengthen, as happened in 1981–83. A strong dollar holds down inflation, but it also contributes to a negative net export position and restrains the multiplier effect of a fiscal expansion. This analysis obviously has many cross currents, and the actual outcome will depend on the situation at the time the fiscal policy is introduced—the *initial* conditions. Depending on the expectations and fears in world markets initially, the effect could go either way—either reinforce or retard a fiscal stimulus. At present, the strength of the dollar reflects such things as political instability, flight to quality investments, and fears of protectionism (leading to direct investment in the United States). Generally speaking, domestic effects of fiscal expansion should prevail over the multitude of possible external side effects, but certainly any fiscal analysis must make a simultaneous full-dress appraisal of international effects.

Fiscal policy has been examined up to this point, mainly as an expenditure increment, either an increase in outlays on goods and services by public authorities or an increase in transfer payments, either in civilian or military sectors.

An increase in transfers is, by and large, the opposite of a tax cut. There is more sympathy at the present time for fiscal policy associated with tax change than with expenditure changes. Tax cuts are favored over expenditure increases because of concern over the size of the government establishment. On a restrictive plane, there would be more sympathy for expenditure cuts than for tax increases. But we should look here at some particular aspects of tax cuts.

Tax cut multipliers like those associated with transfer payment increases, tend to be smaller than multipliers associated with expenditures on goods and services but they are preferred, as indicated above, by many economists who fear for public sector activities. Recent preoccupation with

tax rate cuts has been aimed at reducing the progressivity of the personal tax system. This is taken to an extreme by advocates of a flat tax, but appears in milder form in the rate cuts, across the board by the Kemp-Roth type of cuts advocated by the present Administration under the guise of supply side economics.

The progressivity of the tax system provides built-in stabilization because revenues rise fast on the upswing (dampening the tendency for further upward movement) and fall fast on the downswing (helping to put more purchasing power in people's hands).

We lose the automatic stabilizing power by concentrating on cuts in tax rates but we are supposed to gain by improving incentives. The long-awaited incentive gains of greater work effort and higher rates of saving supposed to be forthcoming after the three phases of the Kemp-Roth system have never materialized. The personal savings rate is as low as ever. In fact, it reached the very low value of 3.9 percent just as the third phase was put into place. Eventually the savings rate should recover somewhat, but not because of the incentives of supply side economics; it will be because of a more settled economic environment in which people can plan ahead with a greater feeling of personal stability. Also, cyclical recovery in productivity will occur, but not because of tax incentives. It is simply a matter of having increased output in the recovery, with a tendency for employers to lag in rehiring workers. The denominator of the productivity ratio is under restraint as the numerator recovers along a natural business cycle path.

Tax cuts, particularly in recession, are not bad; they provide the usual kind of stimulus for economic recovery, predictable according to received Keynesian multiplier doctrine. That is what happened in the autumn of 1982 and all during 1983.

But the more the rate structure of the tax system is weakened, the harder it is to generate revenues during the upswing; therefore budget deficits are more persistent. That is our present predicament. So many revenue sources were lost in the tax cuts of 1981, 1982, and 1983, that budget balance remains a distant goal. It used to be the case in connection with econometric model simulation that it was easy to find policy mixes that stimulated economic activity, that simultaneously achieved full employment together with budget balance. In fact, the latter came quickly, even ahead of restoration of full employment. Now it is extremely difficult to find plausible policies that will restore full employment and budget balance before the end of the decade.

"Bracket creep" associated with price rises and also with genuine advancement is a tax collector. As inflation set in during the late 1970s, the federal budget was brought fairly close to balance, but the present statutory provision to index the tax system will weaken the revenue generating powers of the system under the influence of price rises. This is going to prolong the presence of large federal deficits.

Taxing and tax cutting can take place in so many ways that effects of changes in this area are difficult to enumerate. Investment tax incentives have strategic importance for a volatile but dynamic component of GNP.

This component has a special impact on productivity; so extraordinary arguments can be made for increasing investment tax credits or liberalizing depreciation guidelines for tax purposes. Changes in indirect taxes affect the price level directly and also affect some closely related demand functions. Price rises through indirect tax increases restrain spending, or cuts in indirect taxes bring down prices and stimulate spending. In this paper, I am not searching for an ideal tax system, simply some macroeconomic effects that can serve a strong recovery pattern.

Ordinary theory of economic policy would suggest the pursuit of monetary measures in their own right, expanding the volume of reserves in order to make credit more plentiful at prevailing or lower interest rates and contracting the volume of reserves in order to make credit less plentiful at prevailing or higher interest rates.

I shall not take up the issue of the type of monetary *target*; I shall focus on the *instruments*, and use either excess reserves or interest rate movements as indicators of the degree of tightness.

Interest and credit-sensitive lines of activity will be affected, expanding in an easier credit market and contracting in a tighter credit market. That means expansion or contraction of activity in housing (lead sector), private capital formation or consumer durables. These are often bellwether sectors and mean a great deal for the course of economic activity. It should be pointed out that significant lags are involved in reaction to interest rates or credit availability. The lags are longest for fixed investment activity.

Expansion through monetary policy reduces the deficit more than through "equivalent" fiscal policy, measuring equivalence by the feasibility and acceptability of action. At the present time, fiscal changes of $30–$50 billion are quite acceptable on an annual basis. Similarly, monetary changes that increase unborrowed reserves by $5 to $10 billion in one year are also acceptable. The fiscal stimulus initially increases the deficit, and if economic activity generates enough revenues or cuts down enough on transfer payments, the deficit may eventually fall from the values in a baseline path. With a purely monetary expansion, the deficit will be reduced soon after the pace of economic activity quickens. If interest rates fall, public interest costs will fall and reduce the overall deficit.

If monetary expansion induces fears of inflation and nominal interest rates follow price movements, we could have a result in which actual inflation with higher interest rates leads to larger deficits, both because of interest costs to government and the slowing of economic activity. Prudent monetary expansion, however, need not generate such excessive fears of inflation, especially if there are not contrary movements in fiscal policy and if monetary expansion is gradual and prudent.

Monetary policy cannot, however, be carried out in geographical isolation, especially in a floating rate world. Lower interest rates, ceteris paribus, make dollar holding less attractive. Capital should flow to seek higher rates elsewhere, leading to exchange depreciation. Exports will be stimulated and imports discouraged. This makes for better real growth at home, but exchange depreciation also generates domestic inflation through

higher import costs. The inflation effect will generally retard production growth.

The international effects are difficult to generalize because they depend on the economic situation in several countries simultaneously. Monetary expansion with lower interest rates may work out as outlined above; capital may flow out and bring about exchange depreciation. But the situation of the past few years in which many countries were simultaneously depressed worked differently. Interest rates were kept high in the United States because of an unfortunate combination of fiscal and monetary policies during 1981–83. Our partners wanted to bring down their own interest rates to stimulate investment but could not as long as U.S. rates were significantly higher because their moving to lower rates would have generated a severe capital flight to America. Once our rates did fall, however, our partners followed suit immediately. There was no induced capital flight. The capital flows that did take place occurred for quite separate reasons. An American interest rate reduction amounted, in effect, to a coordinated reduction, and the gains of policy coordination are being realized because of secondary trade reverberations among countries. The dollar is not being depreciated as interest rates have fallen. It may come later, but more from the pressure of an adverse current account balance.

Some Wharton Annual Model Simulations

Many things are taking place simultaneously; many instruments can be changed. In this section, I shall attempt to find a policy combination that addresses the issues of improving overall economic performance and at the same time helps to reduce the federal budget deficit below what it otherwise would have been.

Foremost in my own mind is the priority of achieving a better rate of unemployment. There are many routes to full employment, and I am seeking one that leaves inflation and budget deficits at acceptable levels. It is not a single-minded search for better labor market conditions, and it is not a single track policy selection.

In other times, I would unhesitatingly have established an unemployment target of 4 percent or less. The demographic changes, the life style changes, and the drift towards acceptance of much higher rates, in the neighborhood of 10 percent, have meant, in a practical sense, that the old targets are not feasible in the short run. I therefore adopt the arbitrary modest target of reaching 6 percent unemployment by 1986. This target fits better with what I interpret to be the interests of this meeting; personally I aim for stronger targets.

What will the deficit be at this unemployment rate (6 percent) by 1986? To answer this question, full simulation of a large model is required, and the answer will not be unique. This might seem strange to those who are attracted by the concept of full employment budget deficits (or surpluses). I object to this concept however. Full employment means pressure, to some extent anyway, on the price level and unless the price level is specified, the

so-called full employment deficit cannot be calculated, for both sides of the budget are very sensitive to the price level, and also to nominal interest rates.

A fiscal expansion to reach full employment, so defined, implies one deficit; a monetary expansion implies another, and a balanced mixture yet another. External performance has a major impact on the budget balance; therefore, the domestic policies being pursued have external implications which feed back on the budget.

While the pure concept of a full employment deficit (or surplus) is not meaningful, the budget position associated with any particular policy mix is an estimable number. There are many budget balances, each associated with different policy options, and each option is to be examined by a model simulation. This is the conceptual framework being adopted here. It is, in my opinion, much more general and powerful than the narrow concept of a full employment balance.

First, let us examine a baseline case and a pure fiscal policy alternative. The base case is one of moderate growth, averaging 3.2 percent over the decade 1982–92. Inflation winds down from 6 percent in 1982 to 5 and then 4 percent towards the end of the decade. It is temporarily low at 3.2 percent in 1983. Unemployment reaches 10 percent in 1982 but declines over the decade of moderate growth to about 6.5 percent. There are two cyclical interruptions in 1986 and 1990, when unemployment rises briefly again. Interest rates decline to about 8 percent at long term and 6 percent at short term.

The federal deficit reaches approximately $200 billion in 1983 (NIA concept, calendar year) and gradually recedes under the assumed pressures of some spending cuts and dropping of indexing after 1985. But the deficit does not vanish; it is still as high as $74 billion in the baseline forecast in 1992.

A steady growth rate, expenditure restraint, dropping of indexing, a pick-up in inflation in 1984–88, and lower interest rates all contribute to a lowering of the deficit, but the rate schedule is now such that balance cannot be attained in the foreseeable future.

This is a less than satisfactory state of economic affairs, and some policy experiments will be simulated to see if they can improve upon the unemployment figures without appreciably worsening inflation or increasing the deficit, except temporarily.

The baseline simulation starts out in the early years as a careful forecast, derived from the Wharton Quarterly Model, where latest figures on public policy and other input values are assessed as carefully as possible. The Wharton Annual Model is lined up to the cyclical characteristics of the Wharton Quarterly Model solution. Then, the longer term baseline path is one of smooth evolution. Most exogenous variables follow trends, but policy instruments are set at levels that would enable the model to produce long-run properties—saving rate and wage shares at steady long-run values, equality between the real growth rate and real interest rate, and no major imbalances, such as external deficit or surplus, steady growth of money

supply, and price stability. The techniques of optimal control can be used here, to fix exogenous input variables at levels that bring the system to a balanced growth rate. The baseline is, therefore, a reference solution that conforms to certain preassigned properties.

These various properties hold simultaneously but not forever. For one thing, there are cycles. These arise endogenously and occur, as growth recessions, later in the decade, (1986,1990).

The target of this analysis is to reach 6 percent unemployment by 1986. The fiscal measures are increases in defense and nondefense spending and cuts in tax revenues through imposition of indexing of the withholding system at the beginning of 1985. Recall that indexing was not used in the baseline case. The public expenditure increase builds up from about $2.7 billion (1972 prices) in 1983 to about $17 billion in 1986, and then there is no further increment above the baseline.

Table 1
Government Expenditure
(1972 $ billion)

	Baseline	Scenario		Baseline	Scenario
1982	116.2	116.2	1988	142.8	160.0
1983	121.0	123.8	1989	147.7	164.9
1984	124.6	132.0	1990	152.6	169.8
1985	128.4	140.8	1991	157.5	174.7
1986	133.0	150.2	1992	162.2	179.4
1987	137.8	155.0			

The scenario unemployment rate reaches 5.87 percent for the year average 1986 but the federal deficit instead of declining rises very significantly. It goes back over $200 billion by 1989 in this scenario. By 1986 the estimated deficit figures are almost $190 billion. The fiscal stimulus leads to slightly higher prices and interest rates.

The deficit does not go away under the influence of this expansionary policy intervention. Accordingly, a monetary policy intervention is proposed. Growth in M2 is increased by 2.98 percentage points over the baseline path in 1983 and the level is held to a 4.0 to 6.0 percentage point spread until 1992. Real GNP outperforms the base case by a spread (in level) of more than 2 percentage points each year. The scenario outperforms the base case in these episodes. The federal government deficit is reduced by about $45 billion, but it still remains at a formidable level, $98 billion in 1986 and $83 billion in 1987.

Table 2
Money Supply
($ billion)

	Scenario	Baseline		Scenario	Baseline
1982	1878	1878	1988	3278	3112
1983	2130	2069	1989	3515	3336
1984	2362	2270	1990	3738	3538
1985	2596	2470	1991	4030	3756
1986	2787	2637	1992	4342	4072
1987	3027	2868			

So monetary policy contributes more to deficit reduction than does pure fiscal policy. An even better way to get to full employment (estimated as 6.0 percent unemployed in 1986) is to have outside demand growing. We accordingly raised export targets and treated them as being realized. In this case, the budget deficit does wither away by 1992, but it is as large as $90 billion in 1986. It is little better than monetary policy in reducing the deficit, while hitting the employment target. In the case of export stimulation, the decade growth rate is raised to 3.5 percent, and inflation is held under 4.0 percent by the end of the decade. Productivity growth is stronger than in other cases.

Table 3
Exports of Goods and Services
($ bill. 1972)

	Baseline	Scenario		Baseline	Scenario
1982	147.2	147.2	1988	191.9	225.6
1983	136.2	144.3	1989	200.9	234.3
1984	149.1	165.4	1990	208.1	241.4
1985	166.7	191.3	1991	218.1	251.3
1986	174.4	208.1	1992	228.5	261.8
1987	183.1	216.9			

The export stimulus was carried out in the usual way, as for a closed economy, and there is no assumption about dollar exchange rate variation, in spite of the fact that the current account rapidly goes into a strong surplus position. In the case of the monetary scenario, however, with a lower American interest rate, dollar depreciation was introduced so that the time path of the effective exchange rate was depreciated about 5 percent below the baseline path.

Table 4
Some Principal Indicators—Baseline vs. Scenario

	GNP ($ bill. 1972)				Inflation (percent)			
	Base	Fiscal Policy	Monetary Policy	Export Expansion	Base	Fiscal Policy	Monetary Policy	Export Expansion
1982	1475	1475	1475	1475	6.0	6.0	6.0	6.0
1983	1521	1526	1532	1533	3.2	3.2	3.5	3.1
1984	1602	1617	1628	1629	4.8	4.7	4.9	4.6
1985	1671	1700	1711	1714	5.6	5.6	5.9	5.6
1986	1699	1744	1740	1758	5.4	5.4	5.7	5.6
1987	1767	1818	1799	1826	4.9	5.1	5.3	5.3
1988	1823	1880	1846	1879	5.0	5.2	5.3	5.4
1989	1866	1926	1886	1917	4.1	4.3	4.4	4.4
1990	1897	1961	1921	1946	4.1	4.2	4.3	4.1
1991	1965	2037	1997	2017	4.0	4.1	4.3	3.9
1992	2023	2105	2057	2080	4.0	4.1	4.4	3.9
	Unemployment (percent)				Federal Budget* ($billions)			
1982	9.7	9.7	9.7	9.7	−151	−151	−151	−151
1983	10.0	9.8	9.8	9.8	−198	−202	−192	−189
1984	8.8	8.2	8.1	8.2	−176	−186	−154	−156
1985	7.6	6.4	6.3	6.5	−148	−175	−109	−112
1986	7.7	5.9	6.1	6.0	−146	−190	−98	−90
1987	7.1	4.8	5.4	5.1	−129	−185	−83	−66
1988	6.6	4.0	5.3	4.5	−100	−170	−56	−30
1989	6.9	4.0	5.8	4.8	−114	−202	−70	−42
1990	7.3	4.2	6.3	5.4	−124	−231	−72	−50
1991	6.8	3.5	5.8	4.9	−96	−222	−34	−16
1992	6.5	2.8	5.4	4.5	−74	−217	−3	+17

*NIA concept, calendar year

The model simulations show the deficit problem in figures. The present initial conditions, the present legal/institutional framework (taxes and transfer systems) leave us in a predicament. At 6 percent unemployment, now called a full employment position, there are many differences in fiscal balance, depending on the path of the economy. The concept of a high employment budget deficit or surplus is quite elusive. The deficit could be anywhere from $90 to $190 billion. The worst path to higher employment generates a deficit of $190 billion against just $90 billion in the most favorable case. It is all a matter of how we, in the economy, get to a position of fairly full employment.

Looking at all three scenarios, it is evident that they are not all the same. The fiscal policy scenario is clearly an outsider. But a balanced mixture is surely better than any of the policies by themselves.

These policy packages are not unique and surely capable of being improved upon, but they do show the elusiveness of the underlying problem. While it used to be easy to find a budget balancing configuration for the economy it is now very difficult to round out the search in time for implementation. But it does appear from the calculations made for this

paper, that one policy component must be a significant easing of monetary policy and related conditions. An expansionary monetary policy and an "accommodating" fiscal policy would seem to be extreme, but should lead to good balance. Fiscal policy can be used both to hold down the deficit and possibly give some added growth to the overall economy. It must then be squarely merged with a strong monetary policy. This could provide the moderate but steady kind of expansion that the financial community would like. These policies should correspondingly try to help to hold down interest rates. That has been our greatest nemesis in trying to get a sustained expansion underway.

The baseline scenario has, in a sense, some fiscal policy implicit in its design since it eliminates tax indexing in 1985. This is the point at which indexing is to begin in a statutory sense. Since fiscal policy is being implicitly used to hold down the deficit it is being "accommodative." When monetary stimulus is imposed on this particular baseline projection, we have, in the context of the present debate, a combination of monetary and fiscal policy that is designed to achieve a high level of employment (unemployment at 6 percent in 1986) and a much reduced deficit.

If this monetary/fiscal mix could be supplemented by international coordination of policies towards fiscal and monetary stimulus, where applicable, and of policies towards trade liberalization, the outcome would look even better. This would be the ideal mix, not only across policies but also across countries.

Given the modest goals—6 percent unemployment by 1986—we might consider additional policies to bring down the so-called natural rate of unemployment, i.e., achieve an even stronger macroeconomic performance. In this respect, I am impressed with the arguments of my colleague, Albert Ando, who argues that structural policies must supplement conventional macroeconomic policies if the natural rate of unemployment is to be lowered.[1] He may favor structural policies aimed at restoring competition where it is impeded. For my own tastes, I prefer use of what is now called industrial policy.[2]

[1]Albert Ando, "Coordination of Monetary and Fiscal Policies," paper presented at the Bank of Japan's Centenary Conference on *Monetary Policy in Our Times*, Tokyo, June 22–24, 1983.

[2]See my papers on "Identifying the Sources of Structural Change," paper presented at the Federal Reserve Bank of Kansas City's Conference, Jackson Hole, Wyo., August 1983; and "In Search of an Optimistic Scenario for the 1980s," paper presented to the Wharton-Reliance Symposium, University of Pennsylvania, Philadelphia, May 1–3, 1983.

Postscript

In response to Saul Hymans' comments on some aspects of the baseline projection and even more so for the stimulative scenarios, I want to explain why the economy achieves operations at very low rates of unemployment without heating up inflationary pressures.

The American economy in the past enjoyed high employment (low unemployment) without inflation for protracted periods of time. Will we never realize such combinations again?

It should be pointed out that demographic trends favor our returning to economic operations at low levels of unemployment with relative price stability.

The rate of growth of the labor force, which expanded at more than 2 percent annually while the baby boom generation was being introduced as workers, made it difficult to achieve low levels of unemployment for many years. This cohort has been absorbed and has received on-the-job training by now. In the Wharton Annual Model projection, labor force growth slows down to about 1 percent, a very significant shift. This also reflects the end, by assumption, of the large influx of women into the paid labor force. It will be much easier to reach low levels of unemployment again without undue pressure on prices. Another factor supporting this result is the revival of productivity growth. The decline in productivity was only temporary. The greatest energy conversion problems are behind us now. We know more about coping with the environment, and many of the new technologies promote productivity growth. The combination of slow growth of the labor force, recovery of productivity growth, low unemployment, and low inflation all fit together. It was not the pattern of the 1970s, but it can be the pattern of the 1980s. That is the conclusion of the Wharton Annual Model analysis, and I feel comfortable with this result.

Appendix

Tables AI–AIV give more detail than the abbreviated tables in the main text. They correspond to the same baseline simulation and associated scenarios that are listed in Table 4.

Table A I
The Wharton Long-Term Model April 1983 Forecast
Selected Indicators

				1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
1	GNP$	I	GROSS NATIONAL PRODUCT (CUR $)	3058	3251	3589	3953	4237	4623	5008	5337	5648	6087	6519
2	.GNP$	I	% CHANGE	4.1	6.3	10.4	10.1	7.2	9.1	8.3	6.6	5.8	7.8	7.1
3														
4	GNP	I	GROSS NATIONAL PRODUCT (72 $)	1475.7	1520.6	1602.0	1670.6	1699.1	1766.6	1822.9	1865.6	1896.6	1965.3	2023.3
5	.GNP	I	% CHANGE	−1.8	3.0	5.4	4.3	1.7	4.0	3.2	2.3	1.7	3.6	3.0
6														
7	PDGNP	I	GROSS NAT. PROD. DEFL. (1972 = 100.0)	207.2	213.8	224.0	236.6	249.3	261.7	274.7	286.1	297.8	309.7	322.2
8	.PDGNP	I	% CHANGE	6.0	3.2	4.8	5.6	5.4	4.9	5.0	4.1	4.1	4.0	4.0
9														
10	NPT	I	POPULATION (MILLIONS)	232.90	235.57	238.21	240.74	243.22	245.62	247.94	250.19	252.33	254.44	256.50
11	NPT	I	% CHANGE	1.3	1.1	1.1	1.1	1.0	1.0	.9	.9	.9	.8	.8
12														
13	NLC	I	LABOR FORCE (MILLIONS)	110.25	113.06	115.23	117.01	118.18	119.97	121.54	123.27	124.61	126.13	127.47
14	NLC	I	% CHANGE	1.5	2.6	1.9	1.6	1.0	1.5	1.3	1.4	1.1	1.2	1.1
15														
16	NRLC*		PARTICIPATION RATE	63.8	64.6	65.0	65.3	65.2	65.5	65.7	66.0	66.1	66.3	66.4
17	NRLC*		% CHANGE	−.1	1.2	.7	.4	−.1	.5	.3	.5	.2	.3	.1
18														
19	NEHT	I	EMPLOYMENT (MILLIONS)	99.53	101.76	105.06	108.08	109.04	111.48	113.46	114.81	115.47	117.51	119.19
20	NEHT	I	% CHANGE	−.9	2.2	3.2	2.9	.9	2.2	1.8	1.2	.6	1.8	1.4
21														
22	WRC$	I	WAGE RATE PER WEEK, ALL INDUSTRIES	359.0	374.8	398.7	429.7	461.8	492.9	525.5	553.6	582.9	615.4	648.6
23	WRC$	I	% CHANGE	6.0	4.4	6.4	7.8	7.5	6.8	6.6	5.3	5.3	5.6	5.4
24														
25	GNPPP	I	PRODUCTIVITY — ALL INDUSTRIES	14.827	14.943	15.248	15.457	15.583	15.847	16.066	16.249	16.425	16.725	16.975
26	GNPPP	I	% CHANGE	−.9	.8	2.0	1.4	.8	1.7	1.4	1.1	1.1	1.8	1.5

Table A I
The Wharton Long-Term Model April 1983 Forecast (cont'd.)
Selected Indicators

				1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
27														
28	XMFPP		PRODUCTIVITY — ALL MANUFACTURING	17.843	18.580	19.267	19.945	20.261	20.794	21.372	22.010	22.405	23.072	23.723
29	.XMFPP		%CHANGE	.2	4.1	3.7	3.5	1.6	2.6	2.8	3.0	1.8	3.0	2.8
30														
31	GNPPC	I	REAL PER CAPITA GNP (THOU 72 $)	6.336	6.455	6.725	6.939	6.986	7.192	7.352	7.457	7.516	7.724	7.888
32	GNPPC	I	%CHANGE	−3.1	1.9	4.2	3.2	.7	3.0	2.2	1.4	.8	2.8	2.1
33														
34	YPD/NPT		REAL PER CAP DISP INC (THOU 72 $)	4.534	4.670	4.780	4.866	4.917	5.015	5.074	5.146	5.193	5.283	5.355
35	YPD/NPT		%CHANGE	−.1	3.0	2.4	1.8	1.1	2.0	1.2	1.4	.9	1.7	1.4
36														
37	CPUBT$	I	CORPORATE PROFITS BEFORE TAXES	173.2	194.4	273.2	334.5	312.0	347.1	384.5	378.1	371.0	421.0	462.8
38	CPUBT$	I	%CHANGE	−25.4	12.3	40.5	22.4	−6.7	11.3	10.8	−1.7	−1.9	13.5	9.9
39														
40	FRMCS	B	MOODY'S CORP. BOND RATE, AVG (%)	14.94	11.96	10.16	9.74	9.75	9.89	9.87	9.46	8.85	8.35	7.98
41	FRMLCDS	B	LRG TIME DEP (NEGOT CD's), AVG (%)	12.27	8.07	7.90	8.45	8.54	8.50	8.08	7.04	6.49	6.54	6.21
42	FM2$	B	MONEY SUPPLY, M2 BASIS (CURRENT $)	1878.4	2068.5	2269.6	2469.5	2637.3	2867.6	3111.7	3336.5	3537.5	3796.1	4072.0
43	.FM2$	B	%CHANGE	7.9	10.1	9.7	8.8	6.8	8.7	8.5	7.2	6.0	7.3	7.3
44														
45	NRUT	I	UNEMPLOYMENT RATE (%)	9.73	10.00	8.83	7.63	7.74	7.08	6.65	6.87	7.33	6.84	6.49
46	YPDSAVR	B	SAVINGS RATE (%)	6.65	7.17	7.02	6.70	6.35	6.24	5.95	5.99	5.93	5.56	5.46
47														
48	GVSURPF$	I	SURPLUS OR DEFICIT, FEDERAL (CUR $)	−150.8	−198.1	−176.2	−148.4	−146.0	−129.4	−100.3	−114.5	−123.9	−96.5	−74.3
49	GVSURPS$	I	SURPLUS OR DEF, STATE & LOC (CUR $)	31.4	49.7	53.1	57.3	56.1	60.1	61.7	60.9	54.5	58.2	54.9
50														
51	WBC$/YN$		COMPEN. TO EMLOYEES TO NAT. INCOME	76.2	75.7	74.2	74.0	74.8	74.9	75.2	75.4	75.7	75.5	75.5
52	CPABT$/YN$		PROFITS TO NATIONAL INCOME	6.5	7.6	10.0	11.2	10.3	10.5	10.5	9.9	9.2	9.5	9.6

Table A II
The Wharton Long-Term Model Structural vs. Cyclical Deficit—Fiscal
Selected Indicators

				1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
1	GNP$	I	GROSS NATIONAL PRODUCT (CUR $)	3058	3262	3620	4018	4345	4760	5180	5537	5874	6352	6828
2	.GNP$	I	% CHANGE	4.1	6.7	10.9	11.0	8.1	9.5	8.8	6.9	6.1	8.1	7.5
3														
4	GNP	I	GROSS NATIONAL PRODUCT (72 $)	1475.7	1526.0	1616.7	1700.0	1743.5	1817.9	1880.3	1926.2	1960.8	2037.4	2104.6
5	.GNP	I	% CHANGE	−1.8	3.4	5.9	5.2	2.6	4.3	3.4	2.4	1.8	3.9	3.3
6														
7	PDGNP	I	GROSS NAT. PROD. DEFL. (1972 = 100.0)	207.2	213.8	223.9	236.4	249.2	261.8	275.5	287.5	299.6	311.8	324.4
8	.PDGNP	I	% CHANGE	6.0	3.2	4.7	5.6	5.4	5.1	5.2	4.3	4.2	4.1	4.1
9														
10	NPT	I	POPULATION (MILLIONS)	232.90	235.57	238.21	240.74	243.22	245.62	247.94	250.19	252.33	254.44	256.50
11	NPT	I	% CHANGE	1.3	1.1	1.1	1.1	1.0	1.0	.9	.9	.9	.8	.8
12														
13	NLC	I	LABOR FORCE (MILLIONS)	110.25	113.06	115.23	117.05	118.25	120.10	121.72	123.49	124.87	126.42	127.77
14	NLC	I	% CHANGE	1.5	2.5	1.9	1.6	1.0	1.6	1.3	1.5	1.1	1.2	1.1
15														
16	NRLC*		PARTICIPATION RATE	63.8	64.6	65.0	65.3	65.2	65.6	65.8	66.1	66.2	66.4	66.6
17	NRLC*		% CHANGE	−.1	1.2	.7	.4	−.1	.5	.3	.5	.2	.3	.2
18														
19	NEHT	I	EMPLOYMENT (MILLIONS)	99.53	102.00	105.79	109.52	111.31	114.33	116.83	118.58	119.59	122.03	124.21
20	NEHT	I	% CHANGE	−.9	2.5	3.7	3.5	1.6	2.7	2.2	1.5	.8	2.0	1.8
21														
22	WRC$	I	WAGE RATE PER WEEK, ALL INDUSTRIES	359.0	375.1	399.4	431.2	464.5	496.7	530.5	559.2	588.3	620.5	653.5
23	WRC$	I	% CHANGE	6.0	4.5	6.5	7.9	7.7	6.9	6.8	5.4	5.2	5.5	5.3
24														
25	GNPPP	I	PRODUCTIVITY — ALL INDUSTRIES	14.827	14.961	15.282	15.523	15.664	15.901	16.095	16.244	16.396	16.696	16.945
26	GNPPP	I	% CHANGE	−.9	.9	2.1	1.6	.9	1.5	1.2	.9	.9	1.8	1.5

Table A II
The Wharton Long-Term Model Structural vs. Cyclical Deficit—Fiscal (cont'd.)
Selected Indicators

				1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
27														
28	XMFPP		PRODUCTIVITY — ALL MANUFACTURING	17.843	18.632	19.369	20.115	20.446	20.886	21.404	21.978	22.359	23.065	23.746
29	.XMFPP		%CHANGE	.2	4.4	4.0	3.8	1.6	2.2	2.5	2.7	1.7	3.2	3.0
30														
31	GNPPC	I	REAL PER CAPITA GNP (THOU 72 $)	6.336	6.478	6.787	7.061	7.169	7.401	7.584	7.699	7.771	8.007	8.205
32	GNPPC	I	%CHANGE	−3.1	2.2	4.8	4.0	1.5	3.2	2.5	1.5	.9	3.0	2.5
33														
34	YPD/NPT		REAL PER CAP DISP INC (THOU 72 $)	4.534	4.682	4.815	4.952	5.056	5.191	5.285	5.385	5.457	5.579	5.685
35	YPD/NPT		%CHANGE	−.1	3.3	2.8	2.8	2.1	2.7	1.8	1.9	1.3	2.2	1.9
36														
37	CPUBT$	I	CORPORATE PROFITS BEFORE TAXES	173.2	197.3	279.5	348.3	332.9	368.1	409.1	403.3	397.8	455.0	503.8
38	CPUBT$	I	%CHANGE	−25.4	13.9	41.7	24.6	−4.4	10.6	11.1	−1.4	−1.3	14.4	10.7
39														
40	FRMCS	B	MOODY'S CORP. BOND RATE, AVG (%)	14.94	11.98	10.20	9.81	9.86	10.03	10.06	9.70	9.11	8.59	8.19
41	FRMLCDS	B	LRG TIME DEP (NEGOT CD's), AVG (%)	12.28	8.14	7.98	8.56	8.73	8.66	8.37	7.33	6.73	6.74	6.36
42	FM2$	B	MONEY SUPPLY, M2 BASIS (CURRENT $)	1878.4	2073.9	2286.3	2505.5	2698.3	2948.9	3213.5	3457.9	3676.2	3957.6	4260.9
43	.FM2$	B	%CHANGE	7.9	10.4	10.2	9.6	7.7	9.3	9.0	7.6	6.3	7.7	7.7
44														
45	NRUT	I	UNEMPLOYMENT RATE (%)	9.73	9.78	8.20	6.43	5.87	4.81	4.02	3.98	4.23	3.47	2.79
46	YPDSAVR	B	SAVINGS RATE (%)	6.65	7.24	7.22	7.25	7.19	7.19	6.98	7.11	7.16	6.83	6.77
47														
48	GVSURPF$	I	SURPLUS OR DEFICIT, FEDERAL (CUR $)	−150.8	−201.5	−186.5	−175.0	−189.8	−185.1	−170.2	−202.4	−231.4	−221.8	−217.3
49	GVSURPS$	I	SURPLUS OR DEF, STATE & LOC (CUR $)	31.4	50.3	54.8	61.8	63.6	69.9	74.0	75.1	71.3	79.5	81.7
50														
51	WBC$/YN$		COMPEN. TO EMLOYEES TO NAT. INCOME	76.2	75.6	74.1	73.8	74.7	75.0	75.3	75.6	75.9	75.6	75.5
52	CPABT$/YN$		PROFITS TO NATIONAL INCOME	6.5	7.7	10.1	11.4	10.6	10.6	10.5	9.9	9.2	9.6	9.8

Table A III
The Wharton Long-Term Model Faster Monetary Growth and Earlier Exchange Rate Depreciation
Selected Indicators

				1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
1	GNP$	I	GROSS NATIONAL PRODUCT (CUR $)	3058	3287	3665	4079	4387	4775	5161	5503	5845	6334	6814
2	.GNP$	I	% CHANGE	4.1	7.5	11.5	11.3	7.6	8.8	8.1	6.6	6.2	8.4	7.6
3														
4	GNP	I	GROSS NATIONAL PRODUCT (72 $)	1475.7	1532.1	1628.1	1711.0	1740.5	1798.6	1845.6	1885.8	1921.0	1996.2	2056.7
5	.GNP	I	% CHANGE	−1.8	3.8	6.3	5.1	1.7	3.3	2.6	2.2	1.9	3.9	3.0
6														
7	PDGNP	I	GROSS NAT. PROD. DEFL. (1972 = 100.0)	207.2	214.5	225.1	238.4	252.1	265.5	279.6	291.8	304.3	317.3	331.3
8	.PDGNP	I	% CHANGE	6.0	3.5	4.9	5.9	5.7	5.3	5.3	4.4	4.3	4.3	4.4
9														
10	NPT	I	POPULATION (MILLIONS)	232.90	235.57	238.21	240.74	243.22	245.62	247.94	250.19	252.33	254.44	256.50
11	NPT	I	% CHANGE	1.3	1.1	1.1	1.1	1.0	1.0	.9	.9	.9	.8	.8
12														
13	NLC	I	LABOR FORCE (MILLIONS)	110.25	113.07	115.20	117.04	118.25	120.09	121.69	123.42	124.72	126.19	127.51
14	NLC	I	% CHANGE	1.5	2.6	1.9	1.6	1.0	1.6	1.3	1.4	1.0	1.2	1.0
15														
16	NRLC*		PARTICIPATION RATE	63.8	64.6	65.0	65.3	65.2	65.6	65.8	66.1	66.2	66.3	66.4
17	NRLC*		% CHANGE	−.1	1.2	.6	.4	−.1	.5	.3	.5	.1	.3	.1
18														
19	NEHT	I	EMPLOYMENT (MILLIONS)	99.53	102.02	105.87	109.64	111.09	113.55	115.26	116.32	116.87	118.94	120.68
20	NEHT	I	% CHANGE	−.9	2.5	3.8	3.6	1.3	2.2	1.5	.9	.5	1.8	1.5
21														
22	WRC$	I	WAGE RATE PER WEEK, ALL INDUSTRIES	359.0	377.4	402.7	436.0	470.4	503.2	536.5	564.6	594.7	629.7	667.1
23	WRC$	I	% CHANGE	6.0	5.1	6.7	8.3	7.9	7.0	6.6	5.2	5.3	5.9	5.9
24														
25	GNPPP	I	PRODUCTIVITY — ALL INDUSTRIES	14.827	15.017	15.378	15.606	15.667	15.839	16.012	16.212	16.437	16.782	17.042
26	GNPPP	I	% CHANGE	−.9	1.3	2.4	1.5	.4	1.1	1.1	1.2	1.4	2.1	1.5

Table A III
The Wharton Long-Term Model Faster Monetary Growth and Earlier Exchange Rate Depreciation (cont'd.)
Selected Indicators

				1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
27														
28	XMFPP		PRODUCTIVITY — ALL MANUFACTURING	17.843	18.737	19.506	20.140	20.294	20.663	21.187	21.887	22.402	23.158	23.823
29	.XMFPP		%CHANGE	.2	5.0	4.1	3.2	.8	1.8	2.5	3.3	2.4	3.4	2.9
30														
31	GNPPC	I	REAL PER CAPITA GNP (THOU 72 $)	6.336	6.504	6.835	7.107	7.156	7.323	7.444	7.538	7.613	7.845	8.018
32	GNPPC	I	%CHANGE	−3.1	2.6	5.1	4.0	.7	2.3	1.7	1.3	1.0	3.1	2.2
33														
34	YPD/NPT		REAL PER CAP DISP INC (THOU 72 $)	4.534	4.667	4.802	4.910	4.962	5.041	5.076	5.131	5.174	5.270	5.346
35	YPD/NPT		%CHANGE	−.1	2.9	2.9	2.2	1.1	1.6	.7	1.1	.8	1.8	1.4
36														
37	CPUBT$	I	CORPORATE PROFITS BEFORE TAXES	173.2	205.7	293.7	360.8	330.8	353.8	388.0	386.5	388.8	448.1	491.5
38	CPUBT$	I	%CHANGE	−25.4	18.8	42.8	22.9	−8.3	6.9	9.7	−.4	.6	15.3	9.7
39														
40	FRMCS	B	MOODY'S CORP. BOND RATE, AVG (%)	14.94	11.62	9.36	8.59	8.41	8.53	8.48	8.04	7.43	6.93	6.59
41	FRMLCDS	B	LRG TIME DEP (NEGOT CD's), AVG (%)	12.27	6.75	6.53	7.15	7.19	7.06	6.67	5.62	5.06	5.15	4.88
42	FM2$	B	MONEY SUPPLY, M2 BASIS (CURRENT $)	1878.4	2130.2	2362.3	2596.3	2787.1	3027.4	3277.8	3515.3	3738.2	4030.4	4342.4
43	.FM2$	B	%CHANGE	7.9	13.4	10.9	9.9	7.3	8.6	8.3	7.2	6.3	7.8	7.7
44														
45	NRUT	I	UNEMPLOYMENT RATE (%)	9.73	9.77	8.10	6.32	6.06	5.45	5.29	5.75	6.29	5.75	5.35
46	YPDSAVR	B	SAVINGS RATE (%)	6.65	7.10	6.95	6.66	6.20	5.95	5.52	5.51	5.45	5.12	5.05
47														
48	GVSURPF$	I	SURPLUS OR DEFICIT, FEDERAL (CUR $)	−150.8	−191.5	−153.7	−108.7	−98.3	−83.1	−56.3	−69.8	−72.3	−33.7	−3.4
49	GVSURPS$	I	SURPLUS OR DEF, STATE & LOC (CUR $)	31.4	49.9	56.4	63.5	62.6	64.6	64.3	63.4	58.9	65.2	62.5
50														
51	WBC$/YN$		COMPEN. TO EMLOYEES TO NAT. INCOME	76.2	75.5	73.9	73.7	74.9	75.5	75.8	75.7	75.7	75.3	75.4
52	CPABT$/YN$		PROFITS TO NATIONAL INCOME	6.5	7.8	10.4	11.5	10.3	10.1	10.1	9.7	9.1	9.5	9.5

Table A IV
The Wharton Long-Term Model Structural vs. Cyclical Deficits—Exports
Selected Indicators

				1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
1	GNP$	I	GROSS NATIONAL PRODUCT (CUR $)	3058	3275	3640	4045	4383	4792	5200	5539	5853	6305	6757
2	.GNP$	I	% CHANGE	4.1	7.1	11.1	11.1	8.4	9.3	8.5	6.5	5.7	7.7	7.2
3														
4	GNP	I	GROSS NATIONAL PRODUCT (72 $)	1475.7	1533.1	1628.6	1713.7	1758.3	1825.7	1879.1	1916.9	1945.7	2017.2	2080.0
5	.GNP	I	% CHANGE	−1.8	3.9	6.2	5.2	2.6	3.8	2.9	2.0	1.5	3.7	3.1
6														
7	PDGNP	I	GROSS NAT. PROD. DEFL. (1972 = 100.0)	207.2	213.6	223.5	236.0	249.3	262.5	276.7	289.0	300.8	312.6	324.8
8	.PDGNP	I	% CHANGE	6.0	3.1	4.6	5.6	5.6	5.3	5.4	4.4	4.1	3.9	3.9
9														
10	NPT	I	POPULATION (MILLIONS)	232.90	235.57	238.21	240.74	243.22	245.62	247.94	250.19	252.33	254.44	256.50
11	NPT	I	% CHANGE	1.3	1.1	1.1	1.1	1.0	1.0	.9	.9	.9	.8	.8
12														
13	NLC	I	LABOR FORCE (MILLIONS)	110.25	113.06	115.24	117.06	118.27	120.14	121.77	123.55	124.91	126.43	127.75
14	NLC	I	% CHANGE	1.5	2.5	1.9	1.6	1.0	1.6	1.4	1.5	1.1	1.2	1.0
15														
16	NRLC*		PARTICIPATION RATE	63.8	64.6	65.0	65.3	65.2	65.6	65.8	66.1	66.3	66.5	66.5
17	NRLC*		% CHANGE	−.1	1.2	.7	.4	−.1	.5	.3	.5	.2	.3	.1
18														
19	NEHT	I	EMPLOYMENT (MILLIONS)	99.53	102.03	105.78	109.46	111.16	114.06	116.24	117.57	118.14	120.18	121.97
20	NEHT	I	% CHANGE	−.9	2.5	3.7	3.5	1.6	2.6	1.9	1.1	.5	1.7	1.5
21														
22	WRC$	I	WAGE RATE PER WEEK, ALL INDUSTRIES	359.0	375.2	399.2	431.3	465.6	498.7	533.2	561.9	590.0	621.1	653.5
23	WRC$	I	% CHANGE	6.0	4.5	6.4	8.0	7.9	7.1	6.9	5.4	5.0	5.3	5.2
24														
25	GNPPP	I	PRODUCTIVITY — ALL INDUSTRIES	14.827	15.027	15.395	15.655	15.817	16.006	16.165	16.304	16.469	16.785	17.053
26	GNPPP	I	% CHANGE	.9	1.3	2.5	1.7	1.0	1.2	1.0	.9	1.0	1.9	1.6

Table A IV
The Wharton Long-Term Model Structural vs. Cyclical Deficits—Exports (cont'd.)
Selected Indicators

				1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
27														
28	XMFPP		PRODUCTIVITY — ALL MANUFACTURING	17.843	18.712	19.461	20.166	20.465	20.828	21.294	21.859	22.264	22.990	23.689
29	.XMFPP		%CHANGE	.2	4.9	4.0	3.6	1.5	1.8	2.2	2.7	1.9	3.3	3.0
30														
31	GNPPC	I	REAL PER CAPITA GNP (THOU 72 $)	6.336	6.508	6.837	7.118	7.229	7.433	7.579	7.662	7.711	7.928	8.109
32	GNPPC	I	%CHANGE	−3.1	2.7	5.0	4.1	1.6	2.8	2.0	1.1	.6	2.8	2.3
33														
34	YPD/NPT		REAL PER CAP DISP INC (THOU 72 $)	4.534	4.689	4.823	4.937	5.017	5.118	5.170	5.229	5.264	5.351	5.424
35	YPD/NPT		%CHANGE	−.1	3.4	2.9	2.4	1.6	2.0	1.0	1.1	.7	1.6	1.4
36														
37	CPUBT$	I	CORPORATE PROFITS BEFORE TAXES	173.2	205.0	293.3	366.1	356.5	386.4	422.4	413.4	405.8	462.1	510.4
38	CPUBT$	I	%CHANGE	−25.4	18.4	43.0	24.8	−2.6	8.4	9.3	−2.1	−1.9	13.9	10.4
39														
40	FRMCS	B	MOODY'S CORP. BOND RATE, AVG (%)	14.94	11.99	10.21	9.81	9.89	10.11	10.19	9.84	9.20	8.59	8.09
41	FRMLCDS	B	LRG TIME DEP (NEGOT CD's), AVG (%)	12.28	8.19	7.94	8.56	8.86	8.81	8.53	7.44	6.67	6.58	6.16
42	FM2$	B	MONEY SUPPLY, M2 BASIS (CURRENT $)	1878.4	2080.2	2298.6	2521.2	2719.2	2968.4	3226.1	3460.8	3667.1	3933.3	4220.5
43	.FM2$	B	%CHANGE	7.9	10.7	10.5	9.7	7.9	9.2	8.7	7.3	6.0	7.3	7.3
44														
45	NRUT	I	UNEMPLOYMENT RATE (%)	9.73	9.76	8.21	6.49	6.01	5.06	4.54	4.84	5.42	4.94	4.52
46	YPDSAVR	B	SAVINGS RATE (%)	6.65	7.29	7.27	7.04	6.79	6.59	6.16	6.12	6.00	5.57	5.43
47														
48	GVSURPF$	I	SURPLUS OR DEFICIT, FEDERAL (CUR $)	−150.8	−188.8	−155.5	−111.9	−89.6	−65.6	−29.9	−42.3	−50.1	−15.6	−17.0
49	GVSURPS$	I	SURPLUS OR DEF, STATE & LOC (CUR $)	31.4	51.9	58.1	65.8	68.1	71.8	72.6	70.6	64.4	70.7	70.8
50														
51	WBC$/YN$		COMPEN. TO EMLOYEES TO NAT. INCOME	76.2	75.3	73.6	73.2	74.0	74.5	75.0	75.2	75.4	75.0	74.9
52	CPABT$/YN$		PROFITS TO NATIONAL INCOME	6.5	8.0	10.5	11.8	11.0	10.9	10.7	10.1	9.5	9.9	10.1

Discussion

Saul H. Hymans*

Introduction

Professor Klein's paper is based on two sets of assumptions. For mathematicians assumptions can hardly be controversial. One mathematician says "given A, B must follow." Subsequent arguments, if any, involve whether or not it has been properly shown that B must follow. Sometimes economists view assumptions in the same way as mathematicians, but not always; and in the policy branches of our subject, often not. If the B which must follow is itself a policy prescription, or if it implies a policy prescription, we soon find ourselves arguing about whether the A that is the "given" is an adequate description of reality.[1] In this spirit, I want to begin by considering the controversial or noncontroversial nature of Klein's two sets of assumptions.

The Noncontroversial Assumption Set

Klein's noncontroversial assumptions occur in the very beginning of the paper and have to do with the factors which condition the success or failure of economic policies—what Klein calls the risks that policies will not work out as contemplated. These risks derive from 1) failure to understand the initial conditions, 2) failure to understand completely (or to have properly measured) the normal central tendencies of the economic behavior that will process both the initial conditions and the chosen policies, 3) shocks external to the normal central tendencies of behavior, and 4) random disturbances. These presumptions seem to me to be entirely noncontroversial. As all decision-theorists know, the implication of conditions of risk is that decision-makers (in this case, economic policy-makers) should avoid an "all-or-nothing venture with a single policy instrument." Klein counsels the use of many instruments so as to minimize the overall risk of failure and, further, opts for a balanced set of policies where balance is defined as having two characteristics. Policies are balanced if they result in a reasonably equitable sharing of burdens and benefits (on a disaggregated basis), and if they avoid component elements which work at cross purposes.

Without being much more specific about the substantive content of these noncontroversial assumptions, we cannot say anything about the specific kinds of policies which ought to be pursued in some mixture in any given circumstance. And that brings me to the controversial assumptions.

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[1]Milton Friedman long ago told us that it doesn't much matter whether A is accurate, as long as B works. But if B doesn't quite work, or doesn't always work, we go quite naturally back to wondering about A.

The Controversial Assumption Set

This set of assumptions embodies Klein's behavioral assumptions which put substantive content into the notion that we possess some understanding—albeit imperfect—of the normal central tendencies of (macro)economic behavior. Klein is perfectly clear in this regard when he states "the federal government can spend on good and services or on transfers and expect the conventional multiplier stimuli to follow from these choices...(further)... An increase in transfers is, by and large, the opposite of a tax cut." This is, of course, a bare bones rendering of the behavioral assumption. As one would expect, Klein goes on to include a rather sophisticated discussion of factors which influence the size of the net multiplier and the dynamics of the multiplier process. The discussion pays considerable attention to the nature of the monetary policy which accompanies the fiscal policy, the expectational factors and effects which derive from the context in which the fiscal policy is set, Mundell-Fleming effects and other international repercussions, and so on.

But these are all details, no matter how important, and the thrust of the behavioral assumption is clear. The assumption "... is conventional wisdom, and it has worked that way when applied in the past." Further, says Klein even though "there is no doubt that any fiscal analysis must make a simultaneous full dress appraisal of international effects... Generally speaking, domestic effects of fiscal expansion should prevail over the multitude of possible external side effects."

This is pretty controversial stuff nowadays. It wasn't very controversial when I started to study economics in the mid-1950s, and it was close to gospel a decade later just after the Kennedy/Johnson tax cuts. But it soon became a little bit suspect, and nearly became downright nonsense by the mid-1970s under the double-whammy of born-again Monetarism and the first-birth of Rational Expectations macroeconomics. In the past few years, however, we have witnessed a major loss of faith in the Monetarist prescription. The extreme volatility of interest rates inherent in attempting slavishly to target the growth of the money stock has simply been too costly to bear. And the Policy Ineffectiveness Theorem associated with the Rational Expectations theorists has turned out to be basically an old theorem about the consequences of perfect and pervasive price flexibility—itself a grossly counterfactual proposition.

In my judgment, therefore, Klein's assumption of behavior is once again gaining adherents. My reading of Willem Buiter's and Richard Kopcke's contributions to this Conference is consistent with that view; Christopher Sim's recent Brookings paper (*Brookings Papers on Economic Activity*, 1:1982, pp. 107-52) was perhaps seminal in this regard; and I have argued that point on theoretical grounds myself elsewhere ("Macroeconometrics Amidst Sense and Nonsense," RSQE Working Paper R-111.83, August 1983 Revised, forthcoming in *Prevision et Analyse Economique*).

Nonetheless, the view of economic behavior embodied in Klein's statements are still highly controversial and the econometric simulation policy

analyses which he has carried out in his paper will meet with skepticism on conceptual grounds in some quarters. I hasten to repeat that I am not in those quarters, and let me argue why we shouldn't be by turning to some of the substance of today's policy dilemma.

The Current Policy Problem

Why are we concerned about the current state of the macroeconomy? We are concerned because we're nowhere near what we consider to be a high employment state, and haven't been for a number of years. We're concerned because the consensus appears to be that it's going to take some time—measured conventionally as two or three years at the soonest—to get reasonably close to a high employment state. We're concerned that interest rates are unusually high, are generally regarded as most likely to remain high for as far as is worth worrying about, and may remain so high as to prevent a return to high employment even as soon as two or three years from now. At worst, we are concerned about another recession by 1985. And we are concerned that big—maybe even rising—federal deficits have something sinister to do with all of this.

Let's take it for granted that the American economy is inflation-prone. Let's take it for granted that the status-quo fiscal policy is about what we're going to have to live with for the next few years anyway, and that the status-quo policy implies what is, by historical standards, a large high employment deficit. Let's also grant that these are not secrets; they're well-known and fully expected.

Why, then, aren't we at or rapidly on the way toward a full employment macroequilibrium characterized by something like 5-6 percent inflation, 8-9 percent interest rates, and $100 billion federal deficits? The macroeconomic theory of the new era implies that we should be. We ought always to be about at full employment unless we're being hit by strong unexpected events of one kind or another, and that doesn't seem to be our current problem. Perhaps we ought to be generating big consulting fees for public finance economists so that they can deal with the undesirable distributive effects of inflation and a growing federal debt, but their overall macroeconomic effects should be trivial. Apparently they're not, and the key, in my view, is that most markets simply aren't flex-price-as-if-auction in nature. Money markets, of course, come pretty close and sometimes dominate the result; but other important markets are characterized by stubbornly administered prices. Real quantities in the economy can differ considerably and persistently from the levels consistent with high employment. And if many of these quantities are too low on that criterion, just ask the relevant economic agents how they'd react if fiscal and/or monetary policies increased their liquidity or purchasing power, or somebody else's who might buy from them.

The Econometric Simulations

To this point, all my comments about Professor Klein's paper have been distinctly positive. I liked just about everything that he said he was going to

do, and why he chose to do it. When he came to do it, however, the results made me a bit uncomfortable.

Consider first the baseline simulation. As I understand the baseline case, it's the Wharton forecast for the first several years, followed by a kind of status-quo policy and exogenous variables extrapolation, except that the tax indexation set to begin in 1985 has been repealed in Philadelphia. Klein doesn't like the results of this baseline simulation because unemployment remains above 6 percent through 1992 and the deficit remains too high. But recall the details of the simulation. The unemployment rate declines from 10 percent in 1983 to 7.7 percent in 1986 to 6.9 percent in 1989 and to 6.5 percent in 1992. Although the deficit is still $114 billion in 1989 and $74 billion in 1992 that hardly seems problematical from any historical perspective: by 1989 the deficit has declined to 2.1 percent of nominal GNP and by 1992 it is only 1.1 percent of nominal GNP—not all that different from the 1960s and early 1970s. Will the deficit problem really become that trivial by the second half of the 1980s—which after all is only a few years from now? Further, consider the rate of inflation in the baseline simulation. By the end of the decade unemployment is below 7 percent while inflation is still decelerating and averages only 4 percent during 1989-92 with unemployment reaching 6.5 percent. If that tradeoff is accurate, then I'll agree with Klein that we ought to insist on much better unemployment performance than comes out in the baseline case. But I'm skeptical.

And my skepticism is heightened when I look at the scenario with a more stimulative fiscal policy; namely tax indexation beginning in 1985 and higher levels of both defense and nondefense spending to reach an unemployment rate target of about 6 percent for 1986. This requires that *real* federal expenditures rise by $17.2 billion or 13 percent above the baseline path by 1986, and then remain $17.2 billion above the base path thereafter. This scenario does leave us with a deficit of a little over $200 billion in the early 1990s, but even then it is on a steadily declining path as a fraction of GNP and reaches 3.2 percent of GNP in 1992. That's a little worse than the early 1970s—but I'd bet that it would correspond to a federal debt-to-GNP ratio that's declining at least by the later years of the 1980s. What I find most incredible, however, is the unemployment/inflation picture in this alternative scenario. By the late 1980s the unemployment rate has declined to 4 percent and a few years later it's below 3 percent. The cost in inflation is virtually zero. We get an additional one-tenth of one percentage point in the inflation rate with unemployment below 3 percent—a drop of more than 3½ percentage points from the base case. I simply don't believe it! And given the sensitivity of the budget balance to the price level I'm not sure what to conclude about the size of the deficit either.

For many good reasons, which have virtually no implications regarding the quality of our econometric models for two- to three-year runs, these models can be lethal weapons when pushed for long periods of time in policy simulations. We'd better be extremely careful in calibrating them for real-time, extended analyses aimed at providing policy advice; I'd hate to add fuel to the skepticism of those who believe that the whole policy analysis exercise is conceptually inappropriate.

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