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Current Fiscal Policy: Is it Stimulating Investment or Consumption?

Adrian W. Throop*

Although a major objective of current fiscal policy is to stimulate capital formation and productivity growth, the policy is internally inconsistent for this purpose. On the one hand, investment in plant and equipment has been promoted by accelerated depreciation allowances and liberalized investment tax credits. On the other, the cost of capital is being raised by the impact of large federal demands for credit on interest rates. Econometric simulations of the effects of alternative fiscal policies indicate that the net effect of current fiscal policy is actually to stimulate consumption rather than investment.

In 1981, the Reagan Administration embarked upon a bold program for dealing with the problems of high inflation and stagnant economic growth. Over the two previous decades, the inflation rate in the U.S. economy had risen from near zero to double digit levels, and the rate of growth of labor productivity had fallen from an average of around 2.5 percent per year in the 1950s and early 1960s to about 0.5 percent in the late 1970s. The Administration's program consisted of tax and spending reductions as well as regulatory reform to stimulate saving, investment and work effort, and a commitment to monetary stability to bring the rate of inflation down.

A main feature of the Administration's fiscal policy was the set of tax incentives for business investment provided in the Economic Recovery and Tax Act of 1981. However, these tax incentives alone could not stimulate more capital formation in plant and equipment without reducing other kinds of investment unless greater saving were forthcoming. The Economic Recovery and Tax Act of 1981 therefore also contained a reduction of personal income tax rates by a cumulative 23 percent over three years, partly on the theory that the resulting decline in marginal tax rates would stimulate a large increase in the private saving rate.

The actual outcome has been quite different, however. "Bracket creep," caused by rising nominal incomes, made the actual cut in marginal tax rates for households considerably less than 23 percent. Also, a rise in the after-tax return to saving due to tax cuts may theoretically either increase or decrease the saving rate; and since 1981 the private saving rate (personal plus business) has been relatively stable.[1] Finally, the large budget deficits resulting from tax cuts and spending increases has meant a fall, rather than a rise, in the national saving rate (private plus government). As a result, real interest rates have been bid up, and capital has been attracted from abroad. Although foreign capital inflows reduce the pressure on domestic real interest rates, the fact remains that these higher real rates have tended to offset the stimulatory effect of the tax incentives for business investment.

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To provide a perspective on the net impact that the Reagan Administration's fiscal policy is actually having, this article measures the permanent effect of fiscal policy on investment and consumption by simulating its effects with an econometric model. The simulation results indicate that current fiscal policy is actually "pro-consumption" rather than "pro-investment." Because the private saving rate is estimated to be only modestly affected by the tax cuts, the net effect of the tax cuts has been to stimulate consumption. The expansion in consumption is being financed largely by borrowing from abroad, with the counterpart of this being a decline in net exports. The effect on business investment in plant and equipment is about neutral, as increases in real interest rates almost exactly offset the stimulus to investment. Current fiscal policy, however, is not neutral in its effects on other types of investment as it is tending to reduce residential and inventory investment.

The article is organized as follows. Section I describes a procedure for estimating the permanent effect of fiscal policy on the consumption-investment mix. In Section II, the change in fiscal policy occurring since 1981 is measured in terms of changes in average tax rates, marginal tax rates, and expenditures of the federal government. In Section III, we provide a thumbnail sketch of the econometric model that is used for simulating the effect of this change in fiscal policy. This description stresses the responses of various sectors to real after-tax interest rates. A more detailed description of the model can be found in the Appendix. Although this model is relatively small, its key relationships are similar to those embodied in most large-scale structural econometric models. In Section IV, we perform two experiments in counterfactual history, corresponding to two alternative fiscal policies that might have been followed. The first of these shows the effect on the consumption-investment mix of a continuation of fiscal policy as it existed at the beginning of 1981. In addition, we consider the consumption-investment mix resulting from the same tax cuts for business, but with no change in the aspects of fiscal policy that affect federal spending on goods and services and personal taxes and transfer payments. Lastly, in Section V we present a summary of the results and some policy conclusions.

I. Theoretical Analysis of the Effect of Fiscal Policy

When analyzing the effects of fiscal policy on the consumption-investment mix of the economy, it is important to distinguish between possible temporary impacts and permanent ones. The temporary effects of an increase in the fiscal deficit depend upon the policy response of the Federal Reserve. Increased demands for credit flowing from a larger fiscal deficit put upward pressure on real interest rates. The Federal Reserve can temporarily alleviate this pressure by supplying more funds to the credit markets through the creation of a larger stock of money. At some point, however, the expansion of aggregate demand resulting from the monetary accommodation of fiscal deficits generates a higher level of prices, which then reduces the real stock of money and pushes real interest rates back up. Given the economy's capacity to produce, the level of real activity will ultimately be no different, but real interest rates will be permanently higher. Alternatively, the inflationary effects of the fiscal deficit can be avoided if the Federal Reserve immediately reduces the stock of money by enough to move real interest rates to their equilibrium level.

Over a longer span of time, the economy's capacity to produce will be altered by the effect of fiscal policy on supplies of capital and labor. Of particular importance is the supply of capital per worker, and hence real income per capita. To enhance growth in the stock of capital per worker, fiscal policy must raise investment relative to consumption.

The problem can be analyzed more precisely within the context of an explicit macroeconomic model. For this purpose, we utilize the well-known IS-LM framework. The IS curve defines the equilibrium conditions that deter-

Box 1
Origins of the Current Budget Deficit

In early 1981, the newly elected Reagan Administration made public its "Program for Economic Recovery" for dealing with the twin problems of rising inflation and a stagnant economy. The four major planks of this program were: 1) reductions in personal tax rates and business taxes; 2) spending cuts to reduce the budget deficit; 3) reductions in the burden and the intrusion of federal regulations; and 4) a new commitment to a stable monetary policy. The implications of this program for the federal budget were spelled out in considerable detail by the Administration.[2]

Despite a commitment to increased spending for defense, this program called for a reduction in total federal outlays as a share of GNP from 23.0 to 19.3 percent between 1981 and 1984. Very substantial reductions in non-defense spending were implied. The planned reduction in total federal spending as a share of GNP was large enough that a balanced budget was projected for 1984, even with large reductions in personal and business taxes. Total federal tax receipts as a share of GNP were to decline from 21.1 to 19.3 percent between fiscal 1981 and 1984, falling to the same percentage of GNP as outlays.

As shown in the table, the size of the reduction in tax receipts turned out to be about in line with what was originally projected. However, total federal outlays as a share of GNP, rather than declining, actually increased substantially. The Council of Economic Advisers estimated that these outlays rose to 24.0 percent of GNP by fiscal 1984 from 22.8 percent in fiscal 1981, resulting in a deficit equal to 5.3 percent of GNP.

The Administration got most of the increase in defense spending that it wanted. However, the Congress resisted proposed cuts in non-defense spending. Public sentiment generally supported the President's position on taxes, but opposed cutting back on entitlement programs where the largest part of the growth of non-defense spending had occurred. Some significant cuts in federal non-defense spending were achieved in areas other than interest costs, agricultural programs, Social Security, Medicare, and civil service and military retirement systems, but these were simply not large enough to offset the growth of spending in other areas. The resulting increase in the federal budget deficit is exerting a major influence on the composition of economic activity through its impact on real interest rates and the real exchange value of the dollar.

Planned vs. Actual Federal Outlays and Receipts (as a Percent of GNP)

	1981	1982	1983	1984
Expenditures				
Planned	23.0	21.8	20.4	19.3
Actual	22.8	23.8	24.7	24.0
Receipts				
Planned	21.1	20.4	19.7	19.3
Actual	20.8	20.2	18.6	18.7
Deficit				
Planned	1.9	1.4	0.7	0.0
Actual	2.0	3.6	6.1	5.3

Sources: **America's New Beginning: A Program for Economic Recovery**, Executive Office of the President, February 18, 1981 and **Annual Report** of the Council of Economic Advisers, February 1984.

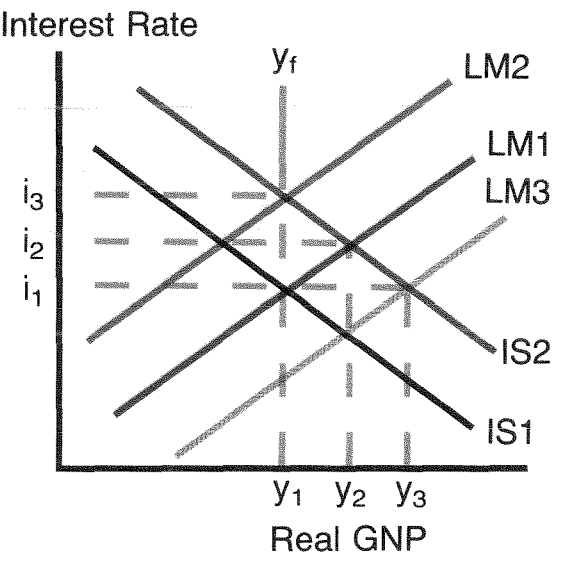
mine the demand for goods, and the LM curve shows the conditions corresponding to equilibrium between the supply and demand for money. By Walras' law, equilibrium in the markets for goods and money implies equilibrium in the market for credit. Although inflation is allowed to vary in this analysis, for simplicity and without loss of generality we abstract from the effects of changing inflationary expectations and, hence, changing inflation premiums in interest rates.[3]

Real rather than nominal interest rates drive real aggregate spending. But since movements in real and nominal interest rates are assumed to be the same in this analysis, the equilibrium level of real GNP depicted by the IS curve depends only upon the nominal interest rate. Also, the IS curve includes the adverse effect of higher interest rates on net exports, and hence aggregate spending, that operates indirectly through an appreciation of the exchange rate.

With respect to the LM curve, the demand for real money balances depends upon the nominal interest rate and real GNP. Given the nominal stock of money determined by the monetary authority, the real stock of money varies inversely with the price level. The LM curve assumes a given stock of real money balances and shows combinations of the nominal interest rate and real GNP that generate an equilibrium between the supply and demand for real money balances.

The permanent effect of fiscal policy depends upon what happens to the consumption-investment mix at the full employment level of real GNP. In Figure 1, we focus on an economy initially operating at a full employment level of GNP, denoted by y_f. Suppose that cuts in personal and business taxes similar to those undertaken by the Reagan Administration result in a larger budget deficit. The higher level of consumption and investment spending at any interest rate shifts the IS curve to the right, from IS1 to IS2. If the nominal stock of money is unchanged, the economy will move to a higher interest rate and real GNP at i_2 and y_2. But that is only a temporary adjustment. Because the economy is operating beyond full em-

Figure 1



ployment, an excess demand for labor drives up wages and prices until the excess demand is eliminated. As wages and prices rise, the real stock of money declines, and the LM curve shifts to the left, from LM1 to LM2. Thus, the permanent equilibrium generated by the new fiscal policy is at the same level of real GNP and a higher interest rate, or y_1 and i_3.[4] In this equilibrium, the decrease in expenditures produced by higher interest rates exactly offsets the original stimulus to expenditures from the tax cuts.[5]

The net effect on the composition of aggregate demand depends upon the interest-sensitivity of various types of expenditures in comparison to the size of the stimulus that they received from the tax cuts. For example, if consumption benefits from the tax cuts but is not at all sensitive to interest rates, various types of investment would have to contract even if they had been stimulated by the tax cuts. Or if only one type of investment spending benefited, the major burden of rising interest rates would have to fall on other types of investment.

The Federal Reserve can do nothing to change the permanent effect of fiscal policy on the real economy. If it tries to peg the interest rate at i_1 to prevent a decline in interest-sensi-

tive expenditures, it only generates a greater amount of inflation. At LM3, the nominal stock of money would initially be higher than it was at LM1. The process of inflation would then proceed until the real stock of money falls to its long-run equilibrium level corresponding to LM2. Although the increase in the price level would be greater than before, the permanent level and composition of GNP would be unaffected. Alternatively, inflation can be avoided altogether if the Fed reduces the nominal stock of money to shift the LM curve to LM2 immediately. Whatever the monetary action, the permanent effect of a change in fiscal policy on the composition of GNP is found at the level of interest rates that generates the same level of real GNP as before.

This analysis points the way to a procedure for measuring the permanent effect of fiscal policy on the economy. The permanent effect of a larger fiscal deficit is to raise the level of real interest rates and impact upon interest-sensitive components of aggregate expenditure at the full employment level of real GNP. This permanent effect of a change in fiscal policy is associated with the impact on expenditures of the difference in real interest rates between the IS1 and IS2 curves. The resulting change in the composition of expenditures at full employment is approximately the same as that which would occur at neighboring values of GNP.

To simulate the permanent effects of alternative fiscal policies that might have been followed in the 1981–84 period, we therefore allowed changes in fiscal policy to alter the composition, but not the level, of real GNP at each point in time. Real interest rates and the exchange rate are allowed to adjust to generate unchanged levels of total real spending and real GNP. The resulting changes in the consumption-investment mix, at historical levels of real GNP, then become an approximate measure of the permanent effect of fiscal policy on the economy.

II. Measuring the Permanent Effect of a Change in Fiscal Policy

This article looks at fiscal policy in terms of its effects, as opposed to the specific instruments of policy in the form of laws. Fiscal policy defined in terms of its effects may be altered even when there are no legislated changes. The increase in taxes as a proportion of GNP that occurs as a result of normal economic growth, and also from inflation in the absence of tax indexing, are examples. Conversely, legislative changes may be required just to keep the effects of fiscal policy from changing as, for example, when taxes have to be cut in order to keep revenues from rising as a fraction of GNP. In this context, an unchanged policy is one with an unchanged impact on the composition of economic activity at a high level of employment. From a macroeconomic point of view, an unchanged fiscal policy has two dimensions.

First, there should be no change in *effective* marginal tax rates that would alter economic incentives. In the structural model of aggregate demand that we use for the policy simulations, the average marginal tax rate for households is a component of their real after-tax interest rates and, therefore, affects expenditures on consumer durables and housing. Similarly, corporate taxes influence the real cost of capital in the business sector and, hence, expenditures on inventories and nonresidential fixed investment. An unchanged fiscal policy would not alter the marginal tax rates that affect these expenditures, and would not shift the IS curve for this reason.

Second, an unchanged fiscal policy requires federal outlays and receipts not to change as a fraction of GNP at a high level of employment. With unchanged government receipts and expenditures, as well as unchanged effective marginal tax rates, there would be no shift in the IS curve. Thus, the composition of aggregate demand and output would not be affected by fiscal policy.

It might appear that there could be inconsistencies in this dual criteria for an unchanged fiscal policy. For example, if marginal tax rates are higher than average rates, as in fact they

generally are, normal growth in the economy with fixed marginal rates would tend to raise tax receipts as a proportion of GNP. However, an unchanged fiscal policy—one with a neutral effect on the composition of GNP over time—could be maintained by reducing average tax rates without changing marginal rates. In the case of personal income taxes, this could be done by increasing the standard deduction. The extent of progressivity in the tax structure is much less for corporations, but here too, the average tax rate could be reduced without changing the marginal tax rate on the cost of new investment.

Marginal Tax Rates

The first dimension of fiscal policy that we consider is changes in marginal tax rates. As shown in Table 1, rising nominal incomes combined with a progressive tax system raised the average marginal personal tax rate from 21.2 percent to 30.4 percent between 1965 and 1980. The Economic Recovery Tax Act of 1981 reduced personal income tax rates by a cumulative 23 percent over three years. In addition, top marginal individual income tax rate was reduced from 70 percent to 50 percent. However, the resulting change in the average marginal tax rate for individuals was smaller because of the bracket creep caused by rising nominal incomes over the three-year period. The tax cuts and bracket creep combined to reduce the average marginal tax rate for individuals from 30.4 percent to 27.1 percent by 1984.[6] In the experiments in counter-factual history described in Section III, an unchanged fiscal policy is simulated by holding the average marginal tax rate for households at the 30.4-percent level from 1981 through 1984.

The Tax Act of 1981 also contained substantial reductions in effective tax rates on the cost of business fixed investment without, however, changing the corporate tax rate on net income. These tax cuts applied not only to business plant and equipment, but also to rental housing. First, the Accelerated Cost Recovery System (ACRS) was introduced, which replaced the previous system of basing tax lives on expected useful lives.[7] For most assets, the new tax lives are considerably shorter than their

TABLE 1
First Dimension of Fiscal Policy

	Average Marginal Tax Rate for the Individual Income Tax	Effective Corporate Tax Rate on Cost of Equity Financed Investment[1]		
		Equipment	Structures	Rental Housing
1955	.228	.238	.358	.301
1960	.234	.287	.420	.346
1965	.212	.099	.353	.290
1970	.243	.307	.531	.384
1975	.263	.116	.522	.380
1980	.304	.126	.577	.443
1981	.304	.071	.483	.415
1982	.292	.065	.449	.409
1983	.278	.062	.398	.372
1984	.271	.064	.384	.386

[1]This effective tax rate equals $\frac{1-uz-k}{1-u} - 1$, as discussed in Box 2.

Sources: Barro and Shahasakul (1983), Board of Governors of the Federal Reserve System, and Data Resouces, Inc.

Box 2
Effective Tax Rate on the Cost of Capital Investment

The combined effect of taxes, real interest rates, and other factors on the cost of business investment are summarized in a measure known as the "rental," or "user" cost of capital. This is simply the required payment per period for the use of a capital good, analogous to the wage rate for labor. The formula for the rental cost of business fixed capital is:[10]

$$c = q \frac{(1 - k - u\,z)}{(1 - u)} \; x[b\,(1 - u)\,i + (1 - b)\,e - \dot{p} + d]$$

where:

c = rental cost;
q = price of the capital good:
k = investment tax credit;
u = corporate tax rate;
z = present value of one dollar's worth of depreciation allowance;
b = proportion of debt finance;
i = nominal bond rate;
1 − b = proportion of equity finance;
e = required nominal return to equity;
$\dot{p}$ = expected long-term inflation rate;
d = exponential rate at which the capital good decays.

As is evident from this formula, the rental cost of business fixed capital is equal to some fraction of the price of the capital good. This fraction is determined by the real cost of debt and equity capital and, central to our inquiry, a multiplicative factor that depends upon the corporate tax rate, the present value of depreciation, and the investment tax credit. (The investment tax credit has a positive value for equipment but is zero for commercial and industrial structures and rental housing.) This multiplicative factor equals one plus the effective tax rate on the cost of equity-financed investment.[11] The Reagan program reduced the cost of business fixed investment by increasing the present value of depreciation (z) and the investment tax credit (k), and thereby reducing this multiplicative factor.

economic lives. Second, the 1981 Tax Act increased tax credits on investment in equipment.[8] The Tax Equity and Fiscal Responsibility Act of 1982 took back part, but by no means all, of these tax cuts for business as part of a package to reduce the size of the federal budget deficit.

The extent of the changes in the effective tax rate on the cost of business fixed investment before and after the Reagan tax cuts are shown in Table 1 for equipment, commercial and industrial structures, and rental housing.[9] In the 1950s, the effective tax rates on different types of business fixed investment were fairly similar. However, in the 1960s and 1970s, large disparities developed. The effective tax rate on investment in equipment dropped as a result of legislated changes, while tax rates on investment in commercial and industrial structures and rental housing went up due to reductions in the present value of depreciation caused by the higher nominal interest rates accompanying higher inflation. The Tax Act of 1981 reduced effective tax rates on the cost of equity-financed capital investments by 6 to 20 percentage points, though it did little to remove the large disparities between rates on different classes. In Section III, an unchanged fiscal policy for the 1981–84 period is simulated by keeping effective tax rates on the various classes of business fixed investment the same as they were at the end of 1980.

Government Spending and Disposable Income

When simulating the effects of fiscal policy changes, it is necessary to consider that observed movements in federal outlays and receipts are partly due to changes in the level of economic activity and partly due to other factors. The federal budget measured on a high employment basis removes the cyclical varia-

tions in outlays and receipts caused by deviations from a specified high employment rate of unemployment.[12] The changes in outlays and receipts that are left are attributable to normal growth in the economy, inflation, or legislated changes. The changes in high employment outlays and receipts that deviate from those required to maintain a constant proportion to high employment GNP constitute the second dimension of fiscal policy.

The federal government's high employment deficit rose from 0.9 percent of high employment GNP in 1981 to 1.7 percent in 1982, and to 2.5 and 3.0 percent in 1983 and the first half of 1984, respectively. However, for an unchanged fiscal policy, federal spending on goods and services, transfer payments, and taxes should be kept at unchanged proportions of GNP measured on a high employment basis. Thus, in simulating an unchanged fiscal policy for 1981–84, federal spending on goods and services was reduced by the difference between actual spending and what spending would have been if its ratio to high employment GNP at the beginning of 1981 had been maintained. As shown in Table 2 the required adjustment is small—less than $5 billion, in 1972 dollars, in all but one quarter.[13]

A similar procedure was used for adjusting the level of personal taxes and transfer payments, and consequently disposable personal income. Items in the federal budget that affect the difference between personal disposable income and GNP are separated into two com-

TABLE 2
Second Dimension of Fiscal Policy

	Adjustments for Unchanged Fiscal Policy and Tax Cuts for Business Only				Adjustment for Unchanged Fiscal Policy		Adjustment for Tax Cuts For Business Only	
	Federal Government Spending on Goods and Services		State and Local Spending on Goods and Services		Disposable Personal Income		Disposable Personal Income	
	1972$	Percent of High Employment GNP	1972$	Percent of High Employment GNP	1972$	Percent of High Employment GNP	1972$	Percent of High Employment GNP
1981/Q1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Q2	0.0	0.0	0.7	0.0	3.9	0.3	6.1	0.4
Q3	−2.6	−0.2	2.5	0.2	−2.6	−0.2	−0.8	−0.1
Q4	−3.9	−0.2	5.3	0.3	−5.8	−0.4	−2.8	−0.2
1982/Q1	−4.0	−0.3	6.2	0.4	0.5	0.0	5.3	0.3
Q2	0.7	0.0	6.2	0.4	−1.4	−0.1	3.7	0.2
Q3	−4.7	−0.3	7.2	0.4	−15.8	−1.0	−10.5	−0.6
Q4	−11.4	−0.7	8.1	0.5	−25.8	−1.6	−18.6	−1.1
1983/Q1	−4.7	−0.3	8.3	0.5	−20.6	−1.3	−14.5	−0.9
Q2	−2.0	−0.1	8.6	0.5	−22.6	−1.4	−18.4	−1.1
Q3	0.5	0.0	9.1	0.5	−38.4	−2.8	−35.0	−2.1
Q4	4.0	0.2	9.6	0.6	−45.1	−2.7	−41.1	−2.4
1984/Q1	5.6	0.3	9.3	0.5	−45.0	−2.6	−41.2	−2.4
Q2	−4.7	−0.3	8.7	0.5	−39.1	−2.3	−35.0	−2.0

ponents—corporate profits taxes and everything else. Corporate profits taxes must be treated separately because of the interaction between them and dividend payments, which feed back to personal income. Lower corporate profits taxes increase disposable personal income dollar-for-dollar if the resulting increase in after-tax corporate profits is all paid out in dividends, but have no impact on disposable personal income if it all goes into retained earnings.

In recent years, dividends have averaged one-half of after-tax corporate profits. Ordinarily, an increase in profits must be sustained for several years for this 50-percent payout ratio to be fully realized. However, if firms believe an increase in profits is permanent because it has been caused by a change in the tax law, then the speed of adjustment would be quicker. Statistical analysis reveals that the Reagan tax cuts have, in fact, operated in this way. The ratio of dividends to after-tax profits was not significantly depressed in the 1981–84 period even though profits soared.

As one component of an unchanged fiscal policy, the ratio of corporate profits taxes to GNP on a high employment basis should remain the same. To simulate this part of an unchanged fiscal policy, we reduced the historical series for disposable personal income by 50 percent of the difference between historical corporate profits taxes and what they would have been if their ratio to GNP in 1981 had been maintained on a high employment basis. This procedure is consistent with the observation that the payment of dividends actually adjusted fairly quickly to maintain the desired long-run payout ratio.

The remaining items in the federal budget that contribute to the difference between disposable personal income and GNP tend to alter disposable income dollar-for-dollar. These aggregate to the sum of personal income taxes, contributions to social security, and federal indirect business taxes less federal government transfer payments to persons (including interest payments) and net subsidies to federal government enterprises. To simulate an unchanged fiscal policy, the historical series on disposable personal income is, therefore, reduced further by the difference between this aggregate and what it would have been if its ratio to GNP at the beginning of 1981 had been maintained on a high employment basis.

As shown in Table 2, the adjustment to disposable personal income becomes very large by 1984. In fact, except for the earlier part of the 1981-84 period, the entire stimulus to aggregate demand from the Reagan economic program has come from its impact on taxes and transfer payments, as opposed to federal spending on goods and services. With an unchanged fiscal policy, disposable personal income would have been $39.1 billion lower, in 1972 dollars, by the second quarter of 1984; this difference equals 2.3 percent of GNP.

An additional adjustment is required for federal grants-in-aid to state and local governments. Whereas, for an unchanged fiscal policy they would stay at the same ratio to GNP as at the beginning of 1981, by the second quarter of 1984 actual grants-in-aid were $11.2 billion, in 1972 dollars, less than this measure. About 20 percent of this reduction took the form of a decline in payments to persons, while the remainder was for spending on goods and services. It is assumed that during the time period studied, other spending and taxes at the state and local level were not affected. Therefore, for stimulation of an unchanged fiscal policy the portion of the adjustment for grants-in-aid going to persons is added back into personal disposable income, and the remaining portion is added to state and local spending on goods and services. Table 2 shows this adjustment to state and local government spending on goods and services and also includes the effect of federal grants-in-aid in the adjustment to disposable personal income.

III. A Structural Model of Real Aggregate Demand

In this section, we provide a thumbnail sketch of the econometric model that is used for simulating the permanent effects of fiscal policy, stressing responses of the various sectors to real interest rates. A more detailed presentation is provided in the Appendix.[14] The theory underlying the model follows the mainline neo-Keynesian view embodied in most large-scale structural econometric models, with particular attention being paid to the way that real interest rates enter into the cost of capital for specific types of investment. In the short run, the slow speed of adjustment of wages and prices allows monetary policy to influence real interest rates, which, in turn, are a prime mover of aggregate demand through their impact on various types of investment expenditures. Further effects on demand occur through changes in consumption spending induced by changes in income and accelerator effects on investment expenditure. However, in the long-run real interest rates are determined by the balance between saving and investment.

The model can be solved for an equilibrium level of real aggregate demand and output, given the level of real interest rates and other exogenous variables. Used in this way, it can forecast real GNP and its components on the basis of a projected path for real interest rates. Alternatively, it can be used with a separate aggregative forecast of real GNP and prices to make forecasts of sectoral activity and the level of real and nominal interest rates.[16] For this second purpose, one solves for the path of nominal and real interest rates that produces the projected path of real GNP. Our exercises in counterfactual fiscal history employ the latter approach. We assume the path of real GNP to be unaffected by alternative fiscal policies since we are interested only in permanent effects.

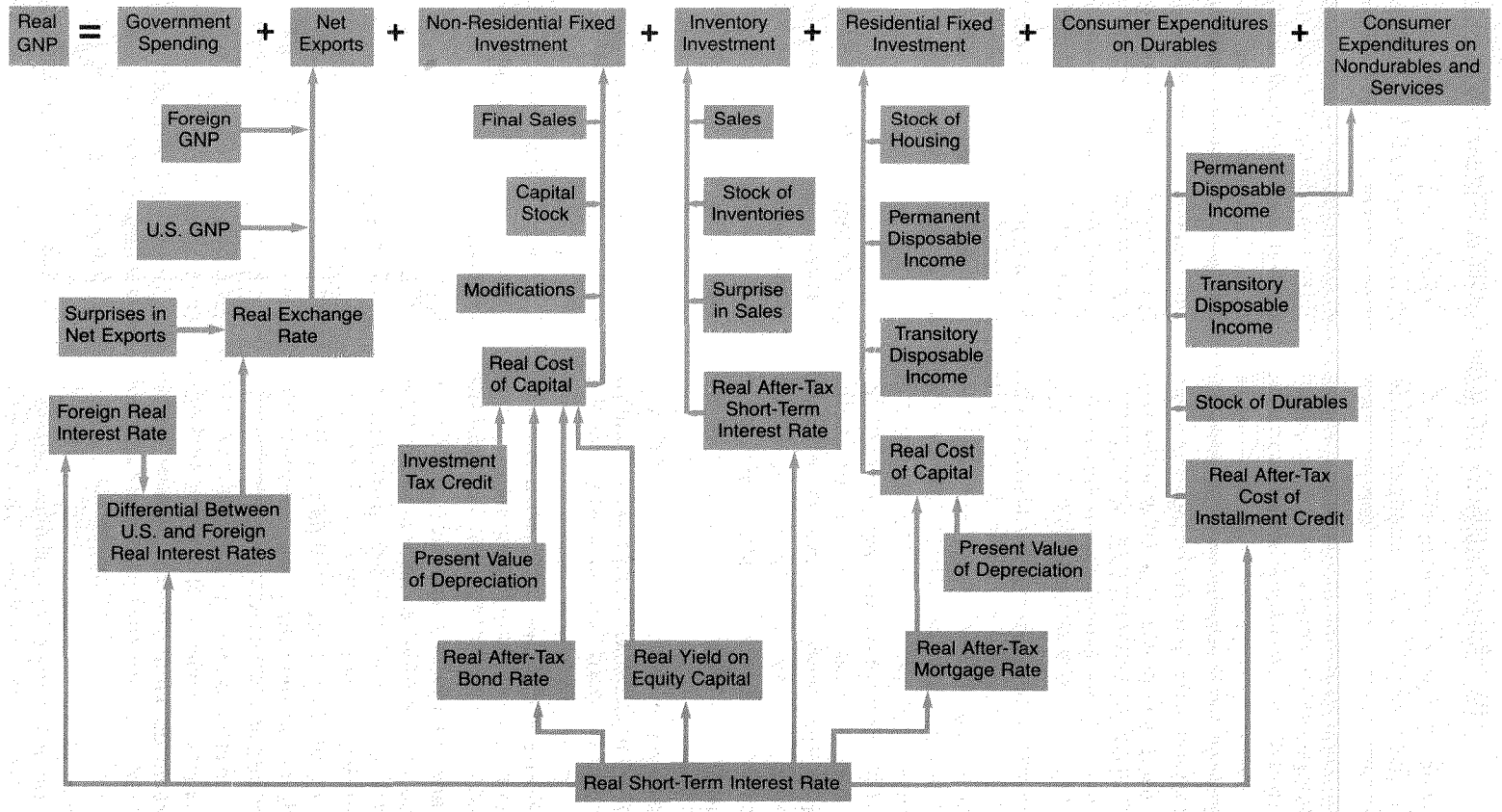
A schematic overview of the structural model of aggregate demand is provided in Figure 2. The components of expenditure that are affected directly by real interest rates include inventory investment, consumer expenditures on durable goods, residential construction, and nonresidential fixed investment. Net exports are influenced indirectly through the impact of the differential between U.S. and foreign real interest rates on the real exchange rate. The components of expenditure that are not affected by real interest rates are government spending on goods and services and consumer expenditures on nondurables and services. The latter depends only on permanent disposable income, and the former is an exogenous policy variable.

An increase in the fiscal deficit is associated with increases in government spending, consumption (through personal tax cuts), or investment (through business tax cuts), or some combination of these. With a given level of real GNP, an amount of interest-sensitive private spending equal to the spending generated by the increase in the fiscal deficit must be "crowded out" by a rise in interest rates. Interest rates rise because of the government's extra borrowing in the credit market. The sectors of domestic investment that get "crowded out" the most by a fiscal deficit are those that are most sensitive to interest rates. And whether crowding out falls more heavily on domestic investment or foreign investment depends upon the response of the international value of the dollar to real interest differentials between the United States and other countries.

In the Appendix, we discuss the estimated responses of the various sectors of aggregate demand to real interest rates and the real exchange value of the dollar. An understanding of the model will help in following the results of alternative fiscal policy simulations. However, those who are not interested in further details at this point can skip the Appendix.

Figure 2

Overview of Structural Model of Real Aggregate Demand



IV. Simulations of Alternative Fiscal Policies

Simulations of the permanent effects of alternative fiscal policies are summarized in graphical form in this section. The historical errors in each equation of the econometric model of aggregate demand were first added back in to allow a simulation of the model to replicate history exactly. Then, simulations of two alternative fiscal policies were performed, allowing interest rates and the foreign exchange value of the dollar to adjust in such a way that real GNP would be unaffected in each period.[17]

The first of these simulations is for an unchanged fiscal policy. It holds marginal tax rates constant at their values at the end of 1980, corresponding to the data in Table 1, and also makes the adjustments to government spending on goods and services and disposable personal income shown in Table 2. Spending of state and local governments on goods and services increases about $9 billion, in 1972 dollars, by the first half of 1984 because of increased federal grants-in-aid. But there is virtually no change in federal spending on goods and services. Disposable personal income is reduced by over $40 billion, in 1972 dollars.

The second of the simulations considers the degree to which investment spending on plant and equipment would have been stimulated if the 1981 tax cuts had been limited to the business sector only. For this simulation, the marginal tax rate for households is held constant at its value for the end of 1980, but marginal tax rates on investment in equipment, structures, and rental housing take on their actual values. The adjustment to government spending on goods and services is the same as in the first simulation; and, as in that simulation, disposable personal income is adjusted downward by the amount of the tax cut that households otherwise would have received. However, the downward adjustment to disposable personal income is less than in the first simulation because business tax cuts raise after-tax corporate profits, and hence dividend payments.

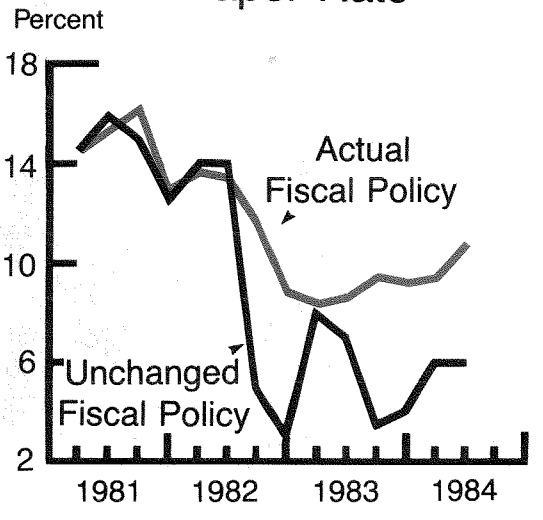
We focus particularly on the effects of these changes on four financial variables and four real variables in the economy. The financial variables are the 6-month commercial paper rate, the average yield on newly issued AA corporate bonds, the S&P earnings to price ratio on common stocks, and the real exchange value of the U.S. dollar. The real variables of interest include total personal consumption expenditures, residential fixed investment, nonresidential fixed investment, and net exports. These real variables are all measured in 1972 dollars. The 6-month commercial paper rate directly affects spending on consumer durables and residential construction, and indirectly affects nonresidential fixed investment through the yield on bonds and the return to equity. In addition, the real short-term interest differential between U.S. and foreign markets drives the real exchange value of the dollar, which, in turn, affects net exports.

An Unchanged Fiscal Policy

During 1981, there was little difference between the effects of the Reagan Administration's fiscal policy and those of an unchanged fiscal policy. The 5-percent cut in personal taxes

Chart 1A

6-Month Commercial Paper Rate



in October was largely offset by bracket creep, and the business tax cuts had not yet begun to stimulate business investment spending. Consequently, as shown in Chart 1A, the commercial paper rate corresponding to an unchanged fiscal policy is little different from the actual rate during the initial period. After the middle of 1982, however, the effects of the Reagan Administration's fiscal policy became more evident. Personal income tax rates were cut by 10 percent in July of 1982 and again in July of 1983. And the liberalization of depreciation rules and the investment tax credit began to affect business investment. With an unchanged fiscal policy, the 6-month commercial paper rate in the simulation falls 6½ percentage points below its historical value by the third quarter of 1982. The effects of interest rates on expenditure build over time, however, so that the difference between the simulated commercial paper rate and its actual value then shrinks. By the first half of 1984, the simulated commercial paper rate corresponding to an unchanged fiscal policy averages about 4 percentage points less than the actual—at around 6 percent instead of 10 percent (on a discount basis).

Chart 1B
Yield on Corporate Bonds (AA)

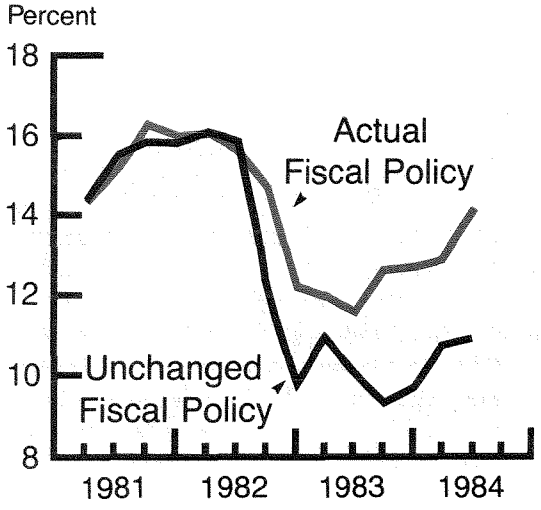
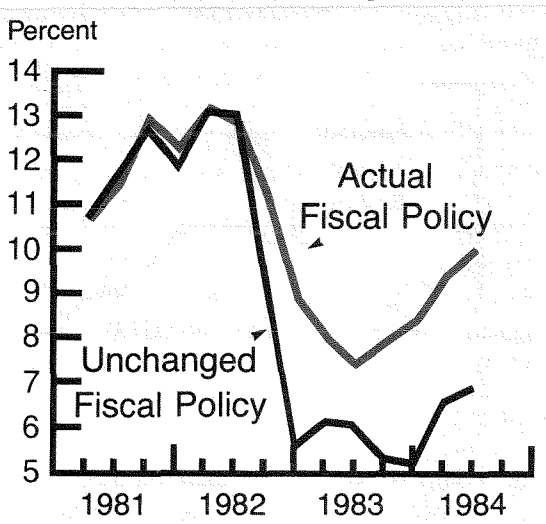


Chart 1C
Earnings-Price Ratio on Common Stock



In this simulation, real after-tax interest rates are reduced to about the same level as in earlier business cycle expansions. For example, using the real after-tax 6-month commercial paper rate as a gauge, its nominal level on a discount basis would be 6 percent rather than 10 percent by the first-half of 1984. On an annual yield basis, and after taking into account the deductibility of interest costs from personal income taxes, its nominal level would be 4.5 percent instead of 8.1 percent. Subtracting an expected inflation of around 4.5 percent gives a real after-tax commercial paper rate close to zero instead of its actual value of 3.6 percent. A year into prior postwar business cycle expansions, the real after-tax 6-month commercial paper rate was also near zero, averaging 0.1 percent.

Thus, current fiscal policy is having a marked effect upon real after-tax interest rates. Furthermore, if fiscal policy had not been changed in 1981, the permanent effect of this would have been to reduce real interest rates to historically normal levels. This fact sugggests that the Federal Reserve has not allowed the fiscal stimulus to generate much more of an increase in real GNP than would otherwise have occurred, consistent with a policy of offsetting the

Chart 1D

Real Exchange Value of U.S. Dollar

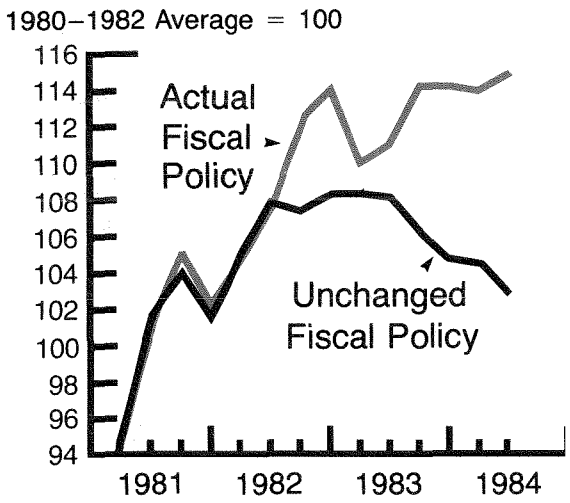
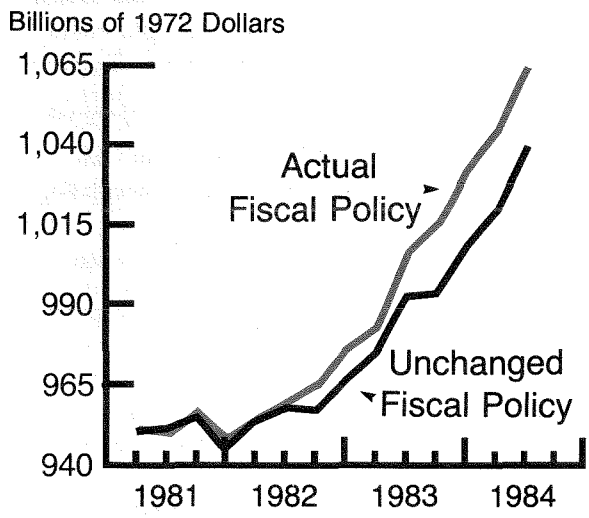


Chart 2A

Personal Consumption Expenditures



inflationary effects of the fiscal stimulus.[18]

In the model, arbitrage in financial markets transmits the reduction in the commercial paper rate to the yield on corporate bonds and the required return on equity. By the first half of 1984, an unchanged fiscal policy would have reduced the AA corporate bond rate by 2.7 percentage points (Chart 1B) and the earnings-to-price ratio on common stocks by 3 percentage points (Chart 1C). Because prices are unchanged, the reduction in short- and long-term interest rates corresponds to a decline in the differential between U.S. and foreign real interest rates. This produces a substantial reduction in the real exchange value of the dollar, even though the effect on the interest differential is diminished by the tendency, included in the simulation, of foreign central banks to match part of the movement in U.S. real interest rates. By the first half of 1984, with an unchanged fiscal policy, the real exchange value of the dollar in the simulation would be nearly 15 percent lower than it otherwise would have been, bringing it back to the levels of late 1981 (Chart 1D).

The effects of these changes in financial variables on the real variables of interest are shown in Chart 2A-D. According to the simulation, an unchanged fiscal policy reduces personal consumption expenditures by about $24 billion by the first half of 1984 (Chart 2A).[19] This result is due to the effect of lower disposable income under an unchanged fiscal policy, which strongly dominates the effect of lower interest rates on spending for consumer durables.

By far, the largest offset to the reduction in total consumption expenditures with unchanged fiscal policy is net exports; they are about $14 billion higher by 1984 (Chart 2B). The higher net exports are produced by the effect of lower interest rates in depreciating the exchange value of the dollar. It is important to recognize, however, that for reasons unrelated to fiscal policy (for instance, expectations by foreign investors of greater monetary stability in the U.S.), the dollar appreciated by twice as much between 1980 and 1981 as it did from 1981 and 1984. The lagged effects of this earlier appreciation plus other factors, such as the cyclical position of the U.S. and the effect of LDC debt burdens in reducing the demand for U.S.

exports, also depressed net exports. As a result, even with an unchanged fiscal policy, net exports would have fallen by $40 billion—or nearly 3 percent of GNP from the beginning of 1981 to the first half of 1984. Thus, although fiscal policy has had a significant effect on net exports, we estimate that it accounts for only one-third of the decline in this sector since the beginning of 1981.

We turn next to residential fixed investment (Chart 2C). The increase in personal tax rates associated with an unchanged fiscal policy directly reduces the real after-tax interest cost of mortgage finance, but at the same time, also reduces personal disposable incomes. Besides these direct effects, an unchanged fiscal policy lowers the cost of mortgage credit still further through its indirect effect in lowering interest rates in general. The initial effects of an unchanged fiscal policy on interest rates are larger than the ultimate effects because of the lagged response of investment spending and net exports to interest rates. The relatively large initial reductions in interest rates stimulate residential investment to the extent of $5 billion at first—about a 12-percent increase. However, tending to offset this interest rate effect is the reduction in disposable income associated with an unchanged fiscal policy. Over time, the reduction in disposable income grows, and the impact on interest rates weakens. By the first half of 1984, the stimulus to residential investment from an unchanged fiscal policy is only $2 billion.

Offsetting forces are also at work in the case of nonresidential fixed investment (Chart 2D). The real cost of capital investment in this sector is equal to a weighted average of real debt and equity costs plus the physical rate of depreciation, all multiplied by one plus the effective tax rate. The average effective tax rate on the cost of capital for nonresidential fixed investment was reduced from 27 to 16 percent by the 1981 Tax Act. An unchanged fiscal policy would have rescinded this tax cut. But offsetting the effect of higher business taxes is a lower yield on corporate bonds and a lower required return to equity due to the generally lower levels of interest rates. This offset is nearly complete throughout the simulation period. By the first

Chart 2B
Net Exports

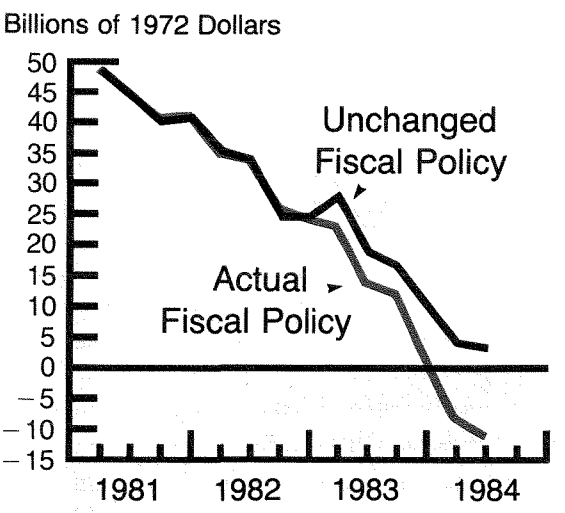


Chart 2C
Residential
Fixed Investment

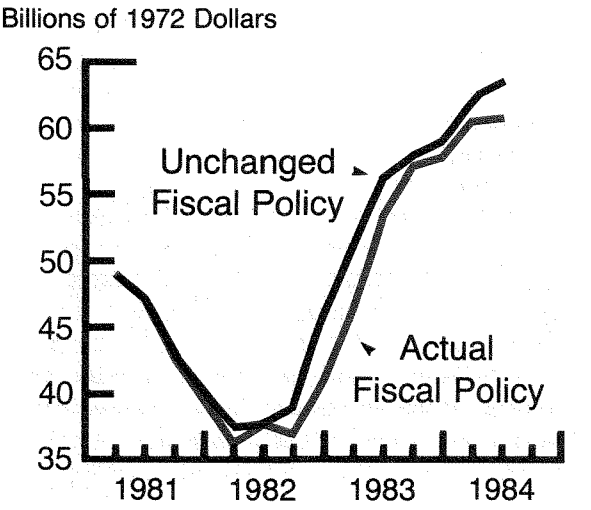
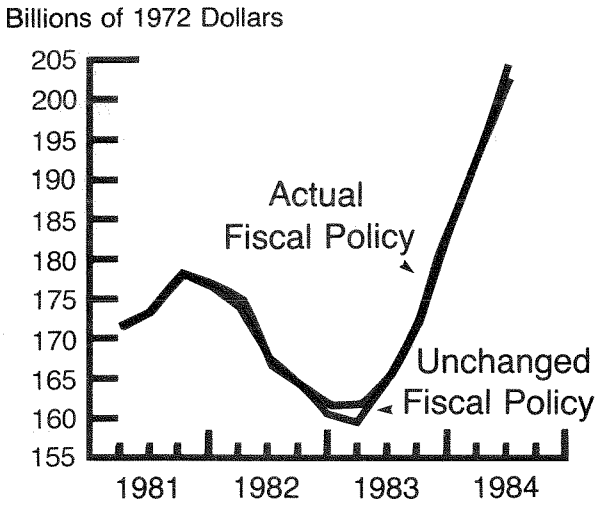


Chart 2D
Nonresidential Fixed Investment



half of 1984, nonresidential fixed investment is actually very slightly higher, by $0.6 billion, with an unchanged fiscal policy compared to the current fiscal policy, a major objective of which was to promote higher capital formation and growth in productivity.

To summarize, the overall longer term effect of current fiscal policy, compared to an unchanged one, has been to stimulate consumption rather than investment. At a given level of real GNP, nearly two-thirds of the current stimulus to consumption is being offset by a decline in net exports, and, consequently, a corresponding decline in net foreign investment. The remaining offset to higher consumption takes the form of declines in residential investment, inventory investment, and government spending on goods and services. Most strikingly, despite the tax advantages for plant and equipment investment in the 1981 Tax Act, nonresidential fixed investment actually has tended to be somewhat lower, rather than higher, as a result of higher real interest rates. In all respects, then, current fiscal policy has been pro-consumption rather than pro-investment.

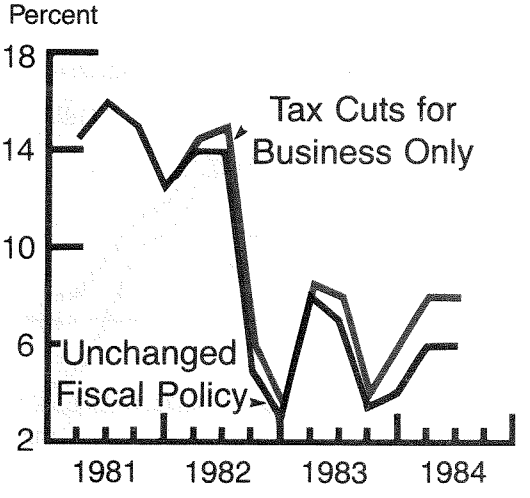
Tax Cuts for Business Only

As the first simulation clearly shows, the effects of reductions in taxes and increases in transfer payments for households have overwhelmed the tax incentives provided to business. Personal income tax cuts have increased the federal government's demands for credit by more than they raised private saving, thus putting upward pressure on interest rates. The result is that real debt and equity costs have risen by enough to offset the reduction in the cost of capital investment in plant and equipment that would otherwise have occurred.

Since a major objective of current fiscal policy was to promote capital formation and productivity growth, it is interesting to examine the extent to which business investment would have been stimulated if current fiscal policy had not included any net tax benefits for households. This is the purpose of the second simulation, which mirrors an unchanged fiscal policy except that effective tax rates on the cost of business investment are reduced and corporate profits are allowed to increase correspondingly.

The results of this policy of tax cuts for business only on the commercial paper rate is contrasted with the results of an unchanged fiscal

Chart 3A
6-Month Commercial Paper Rate

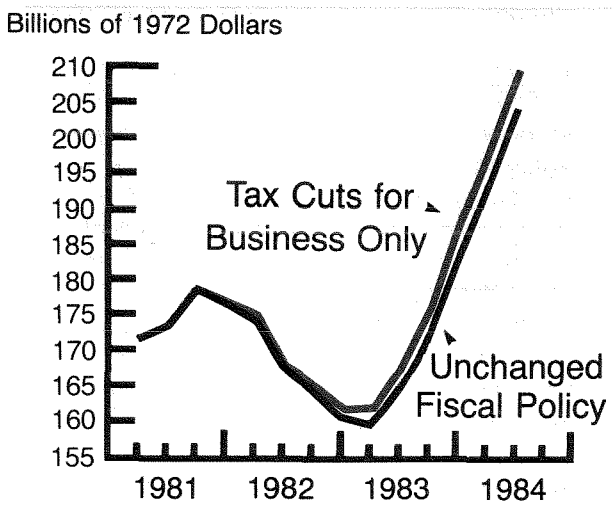


policy in Chart 3A. Compared to an unchanged fiscal policy, the 6-month commercial paper rate would be at 8 percent instead of 6 percent by the first half of 1984. Thus, compared with an unchanged fiscal policy, tax cuts for business raise the commercial paper rate, but not to its actual value of 10.1 percent. The effects on the corporate bond rate and the return on equity are similar. The AA corporate bond rises to 12.0 percent from 10.9 percent by the first half of 1984, but remains below its historical value of 13.6 percent. The earnings-to-price ratio on common stocks rises from 6.8 percent to 8 percent, but not to its historical value of 9.8 percent for that period. These higher interest rates in comparison to an unchanged fiscal policy, push up the real exchange value of the dollar about 4 percent, or by about a third of the difference between its actual value and that corresponding to an unchanged fiscal policy.

Personal consumption is initially stimulated by the impact of the business tax cuts on corporate dividends. But, as the effect on interest rates builds, expenditures on consumer durables are depressed to such an extent that by the first half of 1984 total personal consumption expenditures are almost exactly the same as in the case of an unchanged fiscal policy. Therefore, any stimulus to spending for plant and equipment must come at the expense of other types of investment.

As shown in Chart 3B, although nonresidential fixed investment rises, compared to an unchanged fiscal policy in this simulation, its increase is limited by the increase in interest rates. By the first half of 1984, nonresidential fixed investment is $6 billion, or 3 percent higher. But this expansion occurs only because other types of investment are crowded out. Net exports (and therefore net foreign investment)

Chart 3B
Nonresidential Fixed Investment



are displaced the most, followed by residential investment and inventory investment.

This simulation illustrates the point that more saving is required in order to have more investment. Business tax cuts by themselves are able to increase investment in plant and equipment partly because foreign saving inflows increase by more than government saving is reduced, but also because the increase in plant and equipment investment comes partly at the expense of other domestic capital formation. If we wanted to increase investment in plant and equipment without contracting other kinds of capital formation, business tax incentives alone are not enough. They have to be combined with reductions in government expenditures and/or tax increases that boost national saving through an increase in government saving.

V. Summary and Conclusions

A major objective of the Economic Recovery and Tax Act of 1981 was to stimulate greater capital formation and productivity growth. The Reagan Administration's original program called for large tax reductions and even greater spending reductions to achieve a balanced budget by 1984. Federal spending on goods and services actually didn't rise relative to high employment GNP because cuts in non-defense spending offset the defense build-up. But the growth of transfer payments to individuals and the cuts in personal taxes greatly increased the credit demands of the federal government.

The result has been a fiscal policy that has been internally inconsistent for the purpose of promoting capital formation. On the one hand, investment in plant and equipment has been promoted by accelerated depreciation allowances and liberalized investment tax credits that have reduced effective tax rates on the cost of capital for this type of investment. On the other, the cost of capital is being raised by the effect of large federal demands for credit on interest rates.

This article has measured the permanent net impact of these opposing forces by simulating the effects of alternative fiscal policies on consumption and investment at unchanged levels of real GNP. Higher capital formation would eventually boost real GNP at any level of employment by raising labor productivity. But, for this to happen, the ratio of investment to GNP must first be increased. Simulations of this kind tell us whether fiscal policy is working in the desired direction.

Our simulation indicates that current fiscal policy is actually promoting consumption rather than investment. We estimate that the shift in fiscal policy that has occurred since the beginning of 1981 is having no effect on nonresidential fixed investment. The reason is that the permanent effect of current fiscal policy on real interest rates is just about equal to the size of the stimulus from the tax cuts for business investment. In contrast, the permanent effect of current fiscal policy on consumption has been very substantial because of its large boost to personal disposable incomes and the relative insensitivity of consumption to interest rates.

By far the largest offset to the increase in personal consumption is a decline in net exports. This decline occurs because the real foreign exchange value of the dollar is quite sensitive to the difference between U.S. and foreign real interest rates. As the fiscal deficit drives up domestic real interest rates the U.S. dollar appreciates, which in turn reduces the volume of net exports. The simulation thus clearly demonstrates that, in an open economy with floating exchange rates, the crowding out of investment by a fiscal deficit primarily takes the form of a reduction in net foreign investment or, equivalently, in net exports. Without this response, we estimate that short-term interest rates would have increased approximately 3 percentage points more, and the required return to equity, about 2 percentage points more. As a result, investment in plant and equipment actually would have been lower than with an unchanged fiscal policy.

Since a major objective of current fiscal policy has been to promote capital formation and productivity growth, we also examined the extent to which business investment would have been stimulated if the current fiscal policy had not included any net tax benefits for households. In this simulation, the rise in interest rates is by more than half. Although these higher interest rates reduce expenditures on consumer durables, the increase in disposable personal incomes due to higher dividend payments out of larger corporate profits boosts consumption to the point of leaving total consumption expenditures unchanged. Nonresidential fixed investment does rise under this policy, but mainly at the expense of net foreign investment. If we desire an increase in plant and equipment investment without a contraction in other kinds of capital formation, business tax incentives alone are not enough. They must be combined with reductions in government expenditures and/or tax increases that boost national saving through an increase in government saving.

Although our simulation estimates only the permanent, or longer term, effect of current fiscal policy on real interest rates and the composition of GNP, these effects can show up in the short-run as well if the Federal Reserve is successful in pursuing an anti-inflationary monetary policy. In such a case, the potential inflationary effects of the fiscal stimulus would be quickly offset by monetary restraint; and real interest rates would rise fairly immediately to their equilibrium level. The current high level of real interest rates and real exchange value of the dollar bear a strong resemblance to the simulated, longer term, effects of current fiscal policy. In fact, we estimate that real interest rates would now be close to historically normal levels, at current levels of real GNP, if fiscal policy had been unchanged since 1981. This suggests that the Federal Reserve has not allowed the fiscal stimulus to generate much more of an increase in real GNP than would otherwise have occurred, consistent with a policy of offsetting the inflationary effects of the fiscal stimulus.

Appendix

This Appendix describes the structural model of real aggregate demand in greater detail, and explains the estimated reponses of the various sectors of aggregate demand to real interest rates and the real exchange value of the dollar. Table A.1 brings these estimates together. Each of the main sectors of aggregate demand is considered in turn.

Nonresidential Fixed Investment

The equations for nonresidential fixed investment follow the neoclassical theory of investment, as developed by Jorgenson.[20] In the neoclassical theory, capital is viewed as being substitutable for other factors of production, so that firms respond to the relative price of capital in making their decisions to invest in capital goods. The per period payment for the use of a capital good is its "rental," or "user," cost, which was discussed in Box 2. Firms invest in fixed capital to bring their actual stock of capital into alignment with their desired stock, which, in turn, depends upon final sales and capital's rental cost.

Firms finance about one-third of fixed investment with debt and two-thirds with equity capital. In the model, a permanent increase of one percentage point in the weighted average of the real after-tax bond rate and the return to equity would currently depress real investment in equipment by $3.8 billion in 1972 dollars, or 2.8 percent, and reduce investment in structures by $1.5 billion in 1972 dollars, or also by 2.8 percent after 11 quarters. Both the real after-tax bond rate and the return to equity respond strongly to movements in the real short-term interest rate. A one percentage point change in the real short-term interest rate moves the real after-tax corporate bond rate by 47 basis points after 11 quarters, and the return to equity by 63 basis points.

Inventory Investment

Inventory investment in the model follows a stock adjustment process, modified by the effects of surprises in sales.[21] Such surprises result in unintended investment or disinvestment. The desired stock of inventories relative to sales depends upon the real after-tax short-term interest rate. However, the speed of adjustment is much faster than for business fixed investment. One-half of the adjustment is estimated to occur within one-quarter, and over 90 percent of it within a year. A one-percentage point increase in the real after-tax short-term interest rate is estimated to reduce inventory investment by $2.1 million in 1972 dollars at current values of sales, or by 11 percent, within the current quarter.

Personal Consumption Expenditures

Consumption functions in this model are based upon Friedman's (1957) permanent income hypotheses. Permanent income is an anticipated long-run measure of income. The difference between permanent and current

income is called transitory income. Permanent disposable income is calculated as a 16-quarter distributed lag on current disposable income, with geometrically declining weights. According to the permanent income hypotheses, the flow of consumption is simply a function of permanent disposable income. In the case of the consumption of nondurables and services, expenditures are approximately the same as the flow of consumption, and so depend only upon permanent income. However, for durables, consumption expenditures and the flow of consumption are quite different.

TABLE A.1
Estimated Response to a One Percentage Point Change in a Real Interest Rate or the Real Exchange Rate

Variable	Type of Rate	Response	Length of Lag in Quarters
Nonresidential Fixed Investment			
a) Equipment	Real After-Tax Bond Rate or Return to Equity	−2.8 percent	11
b) Structures	Real After-Tax Bond Rate or Return to Equity	−2.8 percent	11
Inventory Investment	Real After-Tax 6-Month Commercial Paper Rate	−11.0 percent	0
Consumer Durables	Real After-Tax 6-Month Commercial Paper Rate	−1.4 percent	2
Residential Fixed Investment	Real After-Tax 6-Month Commercial Paper Rate	−5.4 percent	3
Exports	Real Exchange Value of U.S. Dollar	−1.2 percent	7
Imports	Real Exchange Value of U.S. Dollar	0.5 percent	4
Real After-Tax Bond Rate	Real After-Tax 6-Month Commercial Paper Rate	47 basis points	11
Return to Equity	Real 6-Month Commercial Paper Rate	63 basis points	3
Real Exchange Value of U.S. Dollar	Real 6-Month Commercial Paper Rate less Foreign Real Short-Term Interest Rate	8 percent	11
Foreign Real Short-Term Interest Rate	Real 6-Month Commercial Paper Rate	40 basis points	2

Expenditures on consumer durables are viewed as following a stock-adjustment process, in which the desired stock of durables depends upon permanent income and the relative price of durables. The most volatile part of the relative price of durables is the real after-tax rate of interest. Also, any windfall of transitory income acts to speed up the stock-adjustment process.[22] The normal elimination of a discrepancy between the desired and actual stock of durables requires a reduction in financial saving, which may be limited by the fact that much financial saving is contractual. In contrast, a windfall of transitory income can be spent relatively rapidly on desired durables without decreasing the accumulation of financial assets.

According to estimates of the model, about 60 percent of transitory income ends up being spent on consumer durables after 3 quarters. Thus, movements in current income can significantly alter expenditures on consumer durables through the allocation of transitory income, even though permanent income is affected very little. The proportional effect of the real after-tax short-term interest rate on expenditures for consumer durables is weaker than in other sectors. A one-percentage point increase in this rate, if sustained for 3 quarters, depresses spending on consumer durables by $2.4 billion in 1972 dollars at current levels of income, or by 1.4 percent.

Residential Fixed Investment

Residential investment is also assumed to follow a stock adjustment process in the context of the permanent income hypothesis. The desired stock of housing depends upon the size of permanent income and the rental cost of capital for housing. Because the tax treatments of owner-occupied housing and rental housing differ, a weighted average of the rental cost of capital for the two types of housing units is employed.[23] The real after-tax, short-term interest rate affects the terms of mortgage credit, which, in turn, enter into the rental cost of capital. We estimate that a sustained 1-percentage point increase in the real, after-tax short-term interest rate reduces residential construction by $3.2 billion in 1972 dollars at current levels of income, or by 5.4 percent, after 3 quarters. Also, the model suggests that nearly all of the transitory disposable income that is not spent on consumer durables is spent on housing.

The equation for residential construction uses dummy variables to capture the impact of periods of disintermediation at financial institutions that were caused by Regulation Q ceilings on the interest paid on deposits. As deposits dropped off when market interest rates rose above Regulation Q ceilings, the availability of credit to housing was restricted to a greater extent than indicated by the market level of real interest rates.[24] However, by the end of 1983, deposits subject to Regulation Q interest rate ceilings constituted only 21 percent of all small time and savings deposits at banks and thrifts. Consequently, at the present time, the effect of tighter credit conditions on residential construction works almost exclusively through movements in market levels of real interest rates.

Wojnilower (1980) and some other financial market analysts have argued that monetary policy's ability to control spending is greatly weakened by the reduced effectiveness of Regulation Q. This view holds that the demand for credit is highly inelastic with respect to interest rates, and that it is subject to volatile expectations. Extraordinary and unacceptable increases in interest rates that are damaging to the health of financial institutions are needed to slow credit demands. However, our estimates indicate that, even in the absence of effective Regulation Q ceilings, the response of residential construction as well as other types of activity to changes in real interest rates is very substantial.

Net Exports and the Real Exchange Rate

Since the shift in 1973 to the managed floating of exchange rates, real interest rates have had an additional channel of influence on aggregate demand. An increase in real interest rates generates capital inflows that cause the real value of the dollar to appreciate. This, in turn, reduces the contribution of net exports to the level of aggregate demand.[25]

Exports are modeled as a function of the rest of the world's GNP and the real exchange value of the dollar, on a trade-weighted basis. Imports are related in a similar fashion to U.S. GNP and the real exchange value of the dollar. The influences of GNP on exports and imports are mostly contemporaneous. However, the responses of exports and imports to changes in the real exchange value of the dollar take much longer, with significant effects lasting for 7 quarters. As earlier studies have found, the response of exports is greater than that for imports.[26] A sustained one-percentage point increase in the real value of the dollar at current levels of income is estimated to reduce exports by 1.7 billion in 1972 dollars, or by 1.2 percent, and to increase imports by .7 billion in 1972 dollars, or by 0.5 percent.

The approach to modeling the real exchange value of the dollar follows the asset of view of the exchange market. In this view, asset prices adjust quickly to clear the foreign exchange market, and expectations play a central role in the determination of the short-run equilibrium exchange rate. Trade flows help mainly to tie down long-run expectations and also may influence demands for assets in some degree.[27] The basic equilibrium condition in this view is that the expected percentage change in the exchange rate over any period equals the difference between nominal returns on securities at home and those abroad with maturities of the same period. If this condition does not hold, investors will bid the value of the exchange rate to the point where it does. It is easily shown that a similar relationship would hold between the expected change in the real exchange rate and the difference between the real returns on securities. Thus, an increase in real interest rates in the United States raises the real value of the dollar to the point where its expected depreciation in the future is equal to the differential between U.S. and foreign real interest rates.

According to our estimated model, a 1-percentage point change in the real short-term interest rate differential in favor of the United States, sustained over a period of 11 quarters, raises the real exchange value of the dollar by a full 8 percentage points. Also, at current levels of income, an unanticipated increase in net exports of 1 billion in 1972 dollars appreciates the dollar by 0.4 percent by causing the expected value of the real exchange rate to be revised upward to that degree.

Finally, the model takes into account the responses of foreign central banks to movements in U.S. real interest rates. In the period of managed floating, it is estimated that foreign central banks have tended to respond to each 1-percentage point change in the U.S. real short-term interest rate with a 40-basis point change of their own. Moreover, we estimate about the same response during the 1981–84 period. This kind of partial response tends to minimize the impact of changes in U.S. real interest rates on foreign GNP. If, for example, a fiscal deficit in the U.S. produces higher real interest rates and therefore leads to an appreciation of the U.S. dollar, net exports from foreign countries would increase, creating inflationary pressures abroad. However, if foreign real interest rates rise to partially match the change in U.S. rates, foreign investment expenditures would be reduced; and this would tend to stabilize real aggregate demand and GNP abroad.

FOOTNOTES

1. Existing research on the relation between the saving rate and tax incentives is well summarized in Chapter 3 of Bosworth (1984). The stability of the private saving rate since 1981 is discussed in Bisignano (1984).

2. Initial budget cut proposals prepared by the Office of Management and Budget, a report on the proposed tax reductions issued by the Treasury, and the White House paper discussing the four major elements of the program are contained in a paper issued by the Executive Office of the President (1981).

3. Inflation premiums in interest rates have actually been highly variable in recent years. For a way of incorporating variable inflation premiums into the standard IS-LM framework, see Keran (1984).

4. Estimates differ as to the time required for the full adjustment of prices and complete "crowding out" of interest-sensitive expenditures by fiscal policy in the absence of any change in nominal money. According to the St. Louis reduced-form model of Anderson and Carlson (1970), such full crowding out takes place within 4 quarters.However, in the different reduced-form model of McElhattan (1982) it takes 5 or 6 years before real GNP returns to its original level. Similar differences also exist in estimates from large structural models. In the FMP model used by the staff of the Board of Governors of the Federal Reserve, the length of time required for full crowding out, given nominal money, is 2 to 4 years; but for some other structural models it is much longer. See Ando and Modigliani in Stein (1976) and Fromm and Klein (1973).

5. Presumably the Administration's plan was to increase the proportion of investment relative to consumption to secure more growth over time. Even if the fiscal deficit is accompanied by lower marginal tax rates that stimulate work effort and thereby increase the level of full employment GNP, the effect on the consumption and investment mix of the economy would be similar although total economic activity would be increased. In terms of Figure 1, the leftward shift of the LM curve resulting from either monetary policy or price adjustments would be less if full employment GNP were raised compared to the case where full employment output is unchanged.

6. Estimates of the average marginal tax rate for individuals are from Barro and Shahasokul (1983). Updates for 1981–83 were obtained from the Economic Research Group of Goldman Sachs. The figure for 1984 was estimated by the author.

7. Under ACRS, any depreciable asset falls into one of four classes and is given a tax life of 3, 5, 10, or 15 years. These shorter tax lives were effective immediately, and depreciation schedules were to become more accelerated during a five yar phase-in period. But the latter change was rescinded in 1982.

8. Before 1981, 10 percent of the value of investment in equipment could be deducted from corporate taxes for equipment with a life of 7 years or more. A 3-to-6 percent deduction could be taken on equipment with lives of between 3 and 7 years, and no investment tax credit was allowed on equipment with a life of less than 3 years. The 1981 Tax Act gave equipment with a recovery period of up to 3 years a 6 percent investment tax credit and all other equipment a 10 percent credit. However, in 1982 allowable depreciation on all equipment was reduced by 50 percent of the investment tax credits taken.

9. The underlying values of u, z, and k were estimated by Data Resources, Inc. and the staff of the Board of Governors of the Federal Reserve System.

10. For the derivation, see Jorgenson (1963) or Hall and Jorgenson (1967).

11. The effective tax rate on equity financed investment is *not* the same as the effective rate of taxation on all investment because a portion is financed by debt and nominal interest costs on debt are deductible from the corporation's taxable income. Thus, for example, while the current effective tax rate on equity-financed nonresidential fixed investment averages about 14 percent (derived from a weighted average of Table 2), the effective rate of taxation on all such investments is near zero. See Auerbach (1983).

12. For the empirical analysis, we use the high employment budget estimates, based on a 6 percent unemployment rate, that are maintained by the Bureau of Economic Analysis of the Department of Commerce. Recently, the Bureau has developed a cyclically adjusted budget based on the realized trend in real GNP, rather than an estimate of potential output at a specified unemployment rate. This has the advantage of automatically allowing for demographic and other changes that may affect the unemployment rate associated with full employment. However, use of this approach for relatively recent years requires a forecast of future real GNP to generate the trend, which introduces a different kind of uncertainty. Since the full employment rate of unemployment probably has not changed much over the 1981–84 period, the high employment budget based on a 6 percent unemployment rate was chosen. For descriptions and estimates of these two versions of the high employment budget, see de Leeuw, et al (1980) and de Leeuw and Holloway (1982, 1983).

13. The detailed breakdown of the high employment budget at a 6 percent unemployment rate that is used to derive this and other elements of Table 2 is provided in Holloway (June 1984, September 1984).

14. For a complete description, see Throop (1984).

15. Examples of such large scale neo-Keynesian models include Eckstein (1983), Evans (1969), and Federal Reserve Board (1983).

16. Reduced-form models capable of making such forecasts of real GNP and the price level include Anderson and Carlson (1970) and McElhattan (1981).

17. Actual values of real GNP could not be reproduced exactly in each period due to the dynamics of the model. Real interest rates and the exchange rate affect aggregate demand with distributed lags. Thus, only a fraction of the total effect of these variables on aggregate demand occurs in the first period. To offset a large change in fiscal policy exactly, as for example in 1982.3 and 1983.3, a very large change in real interest rates would be needed. However, in subsequent periods, the lagged effects of the initially large change in interest rates would have to be offset, re-

quiring further large movements of interest rates in the opposite direction. To reproduce real GNP in each period could require larger and larger changes in interest rates over time.

This is an example of the general problem of instrument instability. See, for example, Holbrook (1972). The resulting cycles could imply negative values for interest rates and, in any case, would make it difficult to compare the longer term impacts of different fiscal policies. A degree of smoothing of interest rates was therefore required. Still, the average deviation of simulated GNP from historical GNP for the entire 1981–84 period is less than $3 billion, in 1972 dollars; by the first half of 1984, the average deviation is less than $1 billion.

18. This point can be demonstrated by referring to Figure 1. Starting from a historically normal level of interest rates at i_1 and y_1 and considering the shift in the IS function from IS1 to IS2 due to the tax cuts, suppose that real GNP is allowed to increase, say along LM1 with a given (real) money supply, to y_2. Then the interest rate corresponding to an unchanged fiscal policy of IS1 at y_2 would be below the normal level at i_1. But if the Federal Reserve prevented higher inflation in the short-run by a policy action to shift the LM curve from LM1 to LM2, then the interest rate corresponding to an unchanged fiscal policy would be the same as the normal level i_1, as actually observed.

19. Since the simulated change in consumption, and consequent impact on interest rates, is the single most important effect of the change in fiscal policy, the results are sensitive to the form of the consumption function. As explained in the Appendix, consumption in the model is a function of permanent disposable personal income and real after-tax short-term interest rates. Permanent disposable income is measured by a 16-quarter distributed lag on actual disposable income. This is a fairly standard formulation, but other approaches are possible. Most of these alternatives would make the impact of the change in fiscal policy on consumption and interest rates even greater than indicated in the present simulation.

First, if households anticipate their tax changes to be permanent, their perceived permanent income may change more quickly than the adaptive construction based on a 16-quarter distributed lag. Second, if the public includes corporate earnings in its notion of permanent income, whether paid out in dividends or not, the effect of the tax cuts for business and households on consumption and interest rates would be somewhat greater than indicated here because of the additional effect of retained earnings on permanent income. Third, and extending household rationality somewhat further, households may perceive that the inflation premiums in interest payments on the federal debt are in reality the repayment of principal in real terms, and so should be saved. Thus, changes in disposable income due to changes in these inflation premiums would not affect consumption.

This last hypothesis has as its counterpart the notion of the inflation-adjusted high employment budget, which reduces the high employment deficit by the rate of inflation multiplied by the privately held stock of federal debt. See, for example, Cagan (1981) and Eisner and Pieper (1984). The increase in the inflation-adjusted high employment budget deficit between 1981 and 1984 was even larger than the change in the unadjusted high employment budget because of the decline in inflation, implying a greater effect on consumption. It shifted from a surplus equal to 1.3 percent of GNP to a deficit of 1.6 percent, compared to a change in the unadjusted deficit from 0.9 percent of GNP to 3 percent. However, the stability of the private saving rate contrasts with the behavior of saving that would be consistent with this inflation adjustment to the budget. As inflation and inflation premiums on government debt rose in the 1970s, the private saving rate should have increased. More recently, as inflation has declined, the private saving rate should have fallen. In practice, however, the private saving rate appears to have been relatively impervious to these influences. See Bisignano (1984).

In yet another alternative view of the consumption function, personal tax cuts would have little or no effect on consumption and interest rates. This is the ultrarationality hypothesis recently argued by Barro (1974), in which a tax cut causes households to raise their saving rate in order to pay the higher taxes that will be required for servicing the government debt in the future. In this case, all of a tax cut would be saved so that there would be no effect whatsoever on consumption. However, empirical studies of short-run consumer spending do not generally support this view. See Buiter and Tobin (1979) and Feldstein (1982).

20. The basic theory and its application are described in Jorgenson (1963) and Hall Jorgenson (1967, 1971).

21. The classic papers on this type of investory model are Metzler (1941), Lowell (1961), and Darling (1959).

22. On the role of permanent and transitory income in the stock adjustment process for consumer durables, see Juster and Wachtel (1972) and Darby (1975).

23. For a useful discussion of the application of the neoclassical theory of investment to owner-occupied and rental housing, including the specific taxes applicable to these sectors see Ott, Ott, and Yoo (1975).

24. For a theoretical demonstration of this point, see Lombra (1984).

25. The classic works emphasizing this link are Fleming (1962) and Mundell (1963).

26. See, for example, Feldman (1982) and Warner and Kreinin (1983).

27. The approach used is basically a simplification of Hooper and Morton's (1982) extension of the sticky price monetary model of exchange rate determination developed by Dornbusch (1976) and Frankel (1979). For a general survey of the asset view of exchange rates, see Shafer and Loopesko (1983).

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