

FEDERAL RESERVE BANK OF PHILADELPHIA

## Tax Cuts and Economic Activity: The Role of “Financing”

By Nariman Behravesh and Donald L. Raiff

The ideas of economists and political philosophers, both when they are right and when they are wrong, are more powerful than is commonly understood. Indeed the world is ruled by little else. Practical men, who believe themselves to be quite exempt from any intellectual influences, are usually the slaves of some defunct economist.

—John Maynard Keynes, *The General Theory of Employment, Interest and Money* (1936)

Keynes is a defunct economist, but his ideas have proved more durable than his person—as he indeed warned they might. One Keynesian notion, that government can combat an economic slowdown by cutting taxes, has become commonplace, even among noneconomists. If the government withholds fewer dollars for taxes, then consumers have more take-home pay to spend. More spending in turn means more production and more jobs, and an end to the business slowdown. What could be more obvious?

Few economists would deny that the initial effect of a tax cut is expansionary. But, beyond the initial effect the impact on the economy can be quite varied. It turns out that the overall effectiveness of a tax cut depends on how the government responds to the resulting loss in its revenue. In particular, it makes a great deal of difference whether the government “finances” a tax cut by trimming expenditures, by borrowing solely from the public, or by borrowing from the central bank as well as the public.

### BASIC ECONOMICS SUGGESTS A TAX CUT IS STIMULATIVE . . .

“Eighty-five cents for me and fifteen cents for Uncle Sam.” This saying represents the man-in-the-street’s view on taxation. The more an individual has to set aside to cover his tax bill, the less he has available to spend on goods and services. Herein lies the power of fiscal policy. By reducing the tax bite on each wage earner’s paycheck, the government increases after-tax or “dispos-

ble income."<sup>1</sup> Hence, workers retain a greater proportion of their gross income to spend. (Not all of the tax reduction will end up in more consumption spending; some of course will be saved.)

Business firms as well as individuals pay taxes on their income and a cut in business taxes is also likely to add to overall spending in the economy. The reasoning goes like this: If a business wants to buy a new machine or put up a new building, it must either dip into its earnings or borrow the necessary funds from private lenders. When the government cuts business taxes, after-tax earnings are increased. Then, business can use the cash freed up by the tax cut to pay higher dividends to their stockholders or to expand the scale of operations. Either of these activities will boost overall spending. A rise in dividends will augment personal income and increase consumption spending. Rising business expenditures on plant and equipment will also add to total spending by increasing what economists call "investment."

Following this logic, a cut either in personal or corporate income taxes increases overall spending in the economy. It does so by boosting disposable personal income and after-tax earnings retained for business expansion. This represents only the first chapter of the story, however. A tax cut may also have an impact on government spending or credit markets. In certain instances, these secondary effects can partially offset, and in the extreme, fully neutralize the initial impacts of a tax reduction.

#### ... BUT THE FINAL OUTCOME DEPENDS ON HOW THE GOVERNMENT "PAYS" FOR THE TAX CUT

Like the rest of us, the government must ultimately pay for what it buys. When its bills

<sup>1</sup>Some economists believe that consumption depends on one's expected lifetime income and are, therefore, doubtful that a one-time tax rebate will have any substantial effect. They argue that a rebate will have a

come due, if it doesn't have enough cash to meet its obligations, it has to borrow the difference. There is no escape from the economist's notion of a "budget constraint" which simply states that expenditures cannot exceed revenues. The major source of revenue for all governing bodies (including the Federal Government) is taxation. Hence, when taxes are cut, the loss in revenue must somehow be made up.

Two options are available: First, the government could reduce its expenditures by the amount of a tax cut so that revenues and expenditures remain in balance. Or second, the government can replenish revenues by borrowing.<sup>2</sup> If the government decides to borrow, there are two principal sources of loanable funds: the public (which includes foreign borrowers as well as individuals and businesses which reside in the U. S.) and the central bank (which in the U. S. is the Federal Reserve System). How the government chooses to "offset" the revenue loss from a tax cut alters the ultimate impact of the fiscal policy change on the economy's level of activity.

#### REVENUE "OFFSETS" AND THE EFFECT OF A TAX CUT

**Cutting Expenditures.** If the Federal Government cuts spending to make up for the revenue loss from a tax cut, it will counteract the stimulus to the economy from the tax reduction. A tax cut represents an injection of spending power into the stream of economic activity; but a drop in government spending serves to offset that stimulus. While consumers and businesses are spending more, the government is spending less.

relatively small effect on lifetime average income and hence will have little effect on consumption (see Appendix).

<sup>2</sup>Another alternative for "offsetting" the revenue loss from a tax cut would be for the government to sell some of its assets or increase the fees it charges for certain services it provides to the public. However, this alternative is not considered in the text.

In fact, if taxes and government spending are cut by the same amount, the overall level of economic activity may actually decline. Why? Because *all* the proceeds of a tax cut are typically not spent by consumers and businessmen. Rather a portion will be saved. Hence, only part of a tax cut finds its way into the spending stream, but the full amount of the matching drop in government spending is removed from the flow of spending. Thus, the net effect of a given tax cut matched by a like reduction in government spending may be a lower level of economic activity than would have occurred without the tax cut, other things being equal.

**Borrowing from the Public.** If the government wishes to maintain its level of spending when taxes are reduced, it can compensate for the revenue shortfall by borrowing from the public. This process may also serve to offset some of the stimulative impact of the tax cut on economic activity. Unless there is a simultaneous decline in the demand for loans by private borrowers, attempts by the government to tap the credit markets to offset a drop in tax revenues will increase interest rates beyond what they would have been. Any increases in the cost of borrowing will tend to discourage expansion in the private sector. Thus, the higher interest rates will serve to “crowd out” some private borrowers who will reduce their spending as a result. If the increase in interest rates is sufficiently large, the decline in spending it produces will completely offset the stimulus stemming from the tax cut. However, if the government can borrow with only moderate effects on interest rates or with no effect at all, then there will be no “crowding out” to speak of. The net impact of a tax cut “financed” through borrowing from the public in such a case would be a rise in economic activity.<sup>3</sup>

<sup>3</sup>It can be argued that the tax cut stimulus will be further weakened if the public perceives that the in-

**Borrowing from the Central Bank.** When the Treasury borrows money to replace depleted revenues, this increases the total demand for credit, other things being equal. Hence, interest rates will tend to rise *unless the supply of credit is likewise increased*. One way for credit to expand is for the Federal Reserve to step up its purchases of government securities.

There are legal limits on the amount the Treasury can borrow *directly* from the Fed (the current limit set by Congress is \$5 billion). However, there are no limits on the amount of Treasury IOUs the Fed can buy in the market for government securities. These purchases increase the supply of money and credit,<sup>4</sup> thus allowing the Fed to indirectly finance the tax cut. If the increase in the supply of credit equals the increase in demand for credit, then the government can borrow with no upward pressure on interest rates. Indeed, rates may actually fall if credit supplies expand by more than demand.

When the Fed allows some portion of the rise in government debt to be financed by increases in the supplies of money and credit, it is usually said that the Fed has “monetized” a portion of the debt. Since debt monetization moderates or lessens interest-rate pressures<sup>5</sup> and since lower rates

creased government debt will have to be paid for by future increases in taxes. With some foresight, individuals may see that if the current tax cut is financed by future tax increases, then they may not be better off in the long run. If this is the case, the public may not wish to spend the money it receives from the tax cut, but will save it to pay for those future tax increases!

<sup>4</sup>The process works like this: the Fed pays for government securities with a check drawn on itself which eventually gets deposited in a bank. This means banks have more funds available for lending, which increases the supply of credit. And since the loans they make represent additions to borrowers’ checking accounts, the money stock is also increased.

<sup>5</sup>Interest rates cannot remain perpetually lower as a result of a tax cut financed by debt monetization. As economic activity expands, upward pressure on rates will result. And if the accompanying expansion generates expectations of future inflation, interest rates could

induce additional private spending, a tax cut financed through the purchase of securities by the central bank as well as the public has the potential to yield more stimulus than any of the other cases.

#### WHAT HAVE COMPUTER MODELS TO SAY ABOUT ALL THIS?

The previous discussion had little to say about the size of the effects of a tax cut under different assumptions about how the government offsets the revenue loss. One way to try to get a handle on this is to use a computer ("econometric") model of the economy to estimate the impacts of different kinds of policy changes (see Box). The re-

end up higher than their initial levels as lenders build "inflation premiums" into interest rates to compensate for future erosion of their purchasing power.

sults of some experiments of this kind are reported below. Several caveats should be noted in interpreting these results, however. First, the results are specific to the computer model employed; a different model may give different results. Second, the computer model is only an approximation to the way the economy works. And third, the results depend on the economic environment existing at the beginning of the time period examined in these experiments. If the economy had been in a more (or less) rosy state than at present the results of the experiments would be different. The results reported in the various experiments show the *change* in economic activity expected as a result of shifts in policy. We focus on six key variables—"real" GNP (GNP adjusted for inflation), disposable income (in current dollars), the unemployment rate, the infla-

#### BOX

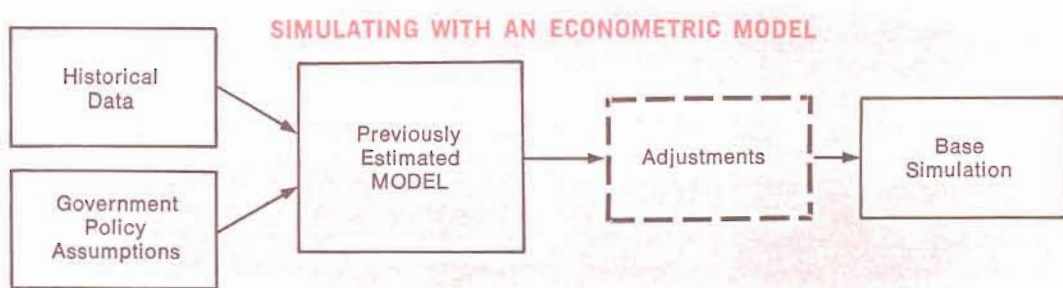
### USING ECONOMETRIC MODELS TO DETERMINE THE EFFECT OF ALTERNATIVE POLICIES

An econometric model is a set of interrelated mathematical equations. These relationships are based on economic theory and, subsequently, are estimated (quantified), using the available economic data. The combination of theory and data can provide an approximation to the structure of the economy.

The variables of interest to the forecaster may be called the internal variables of the model. To a large extent the main internal variables are dependent on each other. But these internal variables are also influenced by policy variables (government spending, taxes and the money supply) and their own past values.

If the model is to be used for predictions, the forecaster must supply the historical data and the likely policy changes for every period being predicted. The model can then be solved for the values of the internal variables. Often the forecaster may want to make adjustments to the model to correct for the past errors of the model and to account for changes in the economy that the model cannot pick up.\* The final product of this fine tuning may be called a *base simulation*.

\*See Nariman Behraves, "Forecasting the Economy with Mathematical Models: Is It Worth the Effort?" *Business Review* of the Federal Reserve Bank of Philadelphia, July/August 1975, pp. 15-25.



To determine the effects of policy changes on the economy, the model user can change the policy assumptions in the model and allow these new assumptions to feed through the system. A comparison of these "alternative solutions" with "base simulation" provides an approximation of the effects of policy changes.\*\* Although these forecasts may be subject to error, the models do provide reasonable estimates of the overall impacts of policy shifts.

The computer model used in this article is a modified version of the MIT-Penn-Social Science Research Council model. It was used to generate a "base simulation" of economic events over eight quarters (two years)\*\*\* under the assumption that taxes are unchanged and the money stock is growing at a moderate rate. We are only concerned with six of the variables predicted by the model: real GNP (GNP adjusted for changes in inflation), disposable personal income (in current dollars), the unemployment rate, the inflation rate (percent change in the implicit deflator for GNP), and interest rates. The 90-day Treasury-bill rate and the Moody's AAA corporate-bond rate are used as measures for short- and long-term interest rates. After obtaining the base simulation values for these variables, the assumptions about economic policy were changed in a manner designed to reflect each of the cases discussed in the text. For example, we assumed that taxes were cut and that government spending dropped to "offset" the revenue loss. We then allowed the computer model to grind out values for all six variables mentioned above in the new policy environment. This allows us to compare the new predicted value of real GNP, say, with the anticipated value before the policy change (the base simulation result). We also go through the same procedure for the other two kinds of policy: a tax cut financed by borrowing from the public and a tax cut financed (at least in part) by borrowing from the Fed, as well as the public.

Since we want to emphasize the effect of policy *changes* rather than the base simulation itself, we do not report the values for each variable before the change in policy occurred. Rather we present the *change* in the value of each variable relative to the base simulation—the simulation with no change in fiscal policy or monetary policy. However, the first part of the base simulation used is roughly similar to what we have observed in 1975.

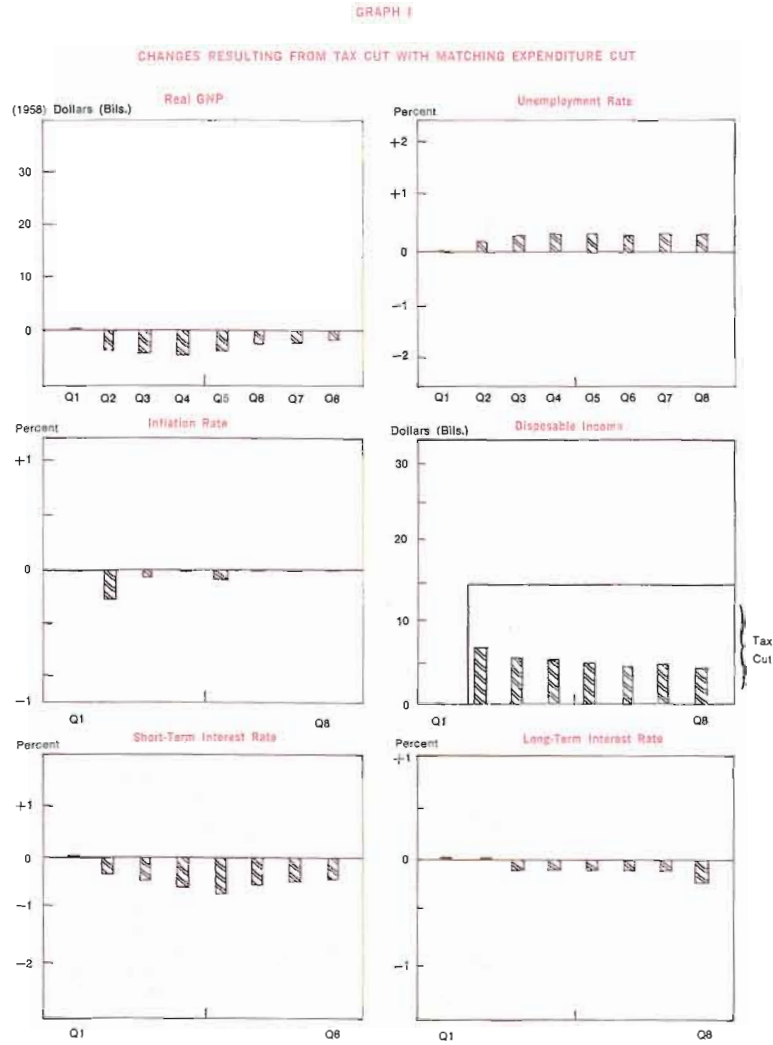
\*\*If, however, the structure of the economy is altered by such policy changes, the comparison of base and alternate simulations of a given, unchanging model will not yield good estimates of the effects of those policy changes.

\*\*\*To study the full impact of any policy change, it is desirable to simulate the model for longer periods. However, there are some difficulties associated with longer-run simulations which limit the information gained from such exercises.

tion rate, and short-term and long-term interest rates.

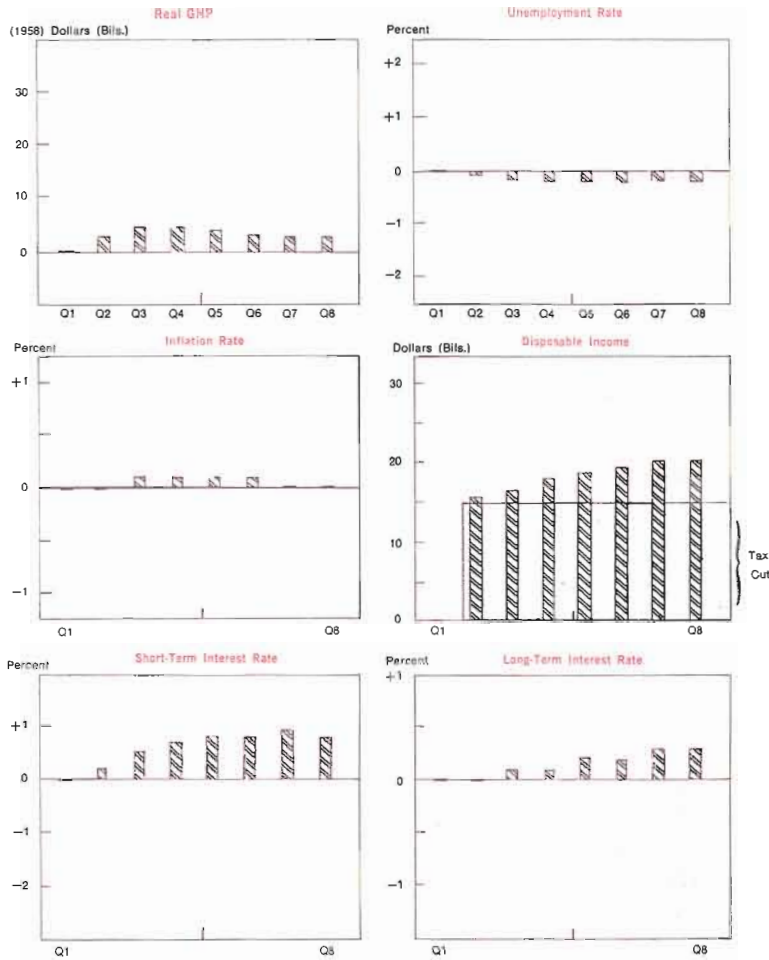
**A Tax Cut With A Spending Cut.** In this case, the government does not allow the tax cut to increase the size of the budget deficit, but rather cuts its spending in line with the drop in revenues. The size of the assumed tax and spending cuts is \$15 billion. The results of this policy *relative* to how we might expect

things to turn out with no change in fiscal policy are shown in Graph I. It shows that the level of economic activity is reduced by such a policy. Real GNP is *lower* for this case than when there were no tax or expenditure cuts. And as a result of the fall in real GNP, the unemployment rate is higher. The price level is reduced, however, as demand is dampened. Interest rates are also lower. The model suggests, then, that the restrictive



GRAPH II

CHANGES RESULTING FROM TAX CUT WITH GOVERNMENT BORROWING FROM THE PUBLIC



effect of a cut in government spending more than offsets the stimulative effect of a reduction in taxes.

**A Tax Cut Financed by Government Borrowing from the Public.** In this experiment, taxes are again reduced by \$15 billion. Rather than reduce spending, however, the government allows its budget deficit to grow, financing ex-

penditures by borrowing solely from the public. The results are shown in Graph II.

This kind of fiscal policy change results in an increase in real GNP, but its impact reaches a peak several quarters after the tax cut. The impact on real GNP then tends to wane over succeeding quarters. The unemployment rate remains slightly lower throughout the two-year period, but the inflation rate is higher during the four quarters

following the tax cut. Disposable income rises by more than the decrease in taxes as a result of the cumulative increase in the level of economic activity.

Why does the impact of the tax cut on the level of GNP tend to diminish over time? The change in interest rates shown in Graph II provides the answer. Unless there is considerable slack in financial markets, the increase in government borrowing in the credit market will push up interest rates.<sup>6</sup> The increase in borrowing costs will reduce private spending. The fall in interest-sensitive spending begins to offset the initial increases in consumption resulting from the tax cut. Over the two-year horizon of the experiment we do not observe a complete offset, however. Private borrowers are only partially "crowded out" of credit markets by the government borrowing. If the resulting trend observed in real GNP were to continue, however, the decline in private spending produced by rising interest rates, in turn, would completely offset the increase in consumption spending.

**A Tax Cut Financed by the Fed.** Another possibility is for the Federal Reserve to finance the tax cut by stepping up the supply of new money and credit. Several options would be open to the Fed. For instance, the Fed could try to increase the supply of credit enough to maintain interest rates at the

levels that would have occurred if the government had not decided to cut taxes and borrow from the public. (This of course assumes the Fed can predict what those interest rates would have been.) Alternately, the Fed could simply peg interest rates at the time of the tax cut—supply enough credit to keep interest rates unchanged.

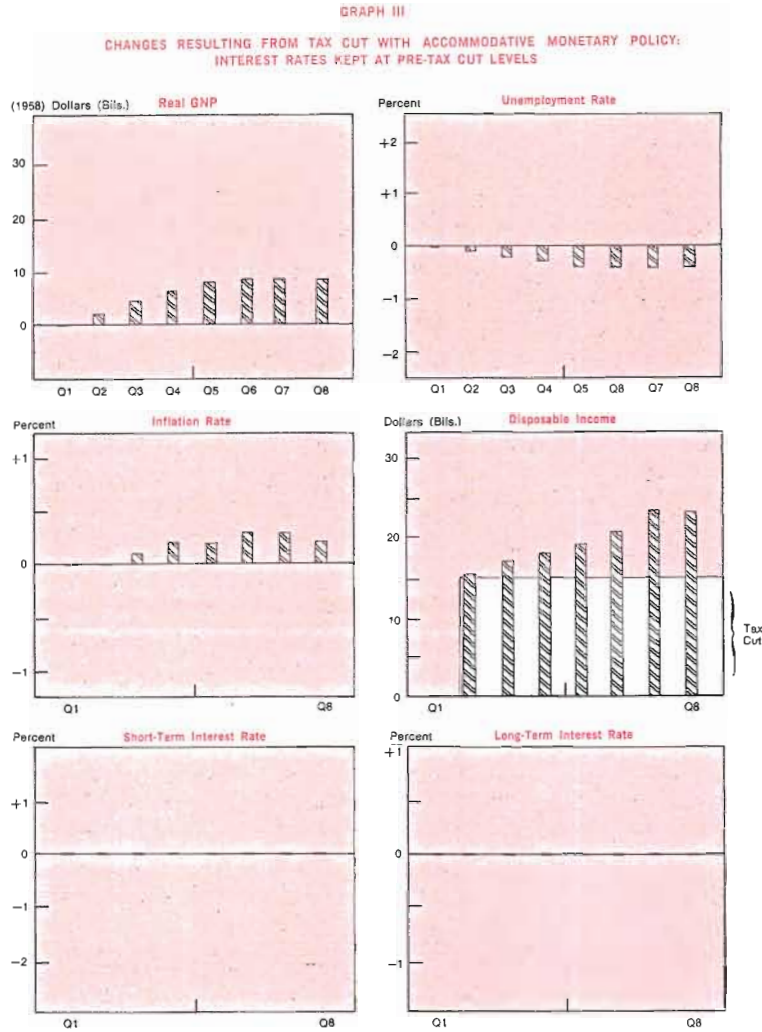
In the first case we assume that the Fed knows what interest rates would prevail in the absence of a tax cut. It then attempts to keep short-term rates in line with this pattern by buying government securities. The stepped-up purchase of government IOUs increases the supply of money and credit. If interest rates are the same as they would have been without the tax cut, then the "crowding out" effect which resulted in the previous case would be eliminated. The net result is a stronger stimulus to real GNP and a lower unemployment rate than would result if the tax cut were "financed" by borrowing solely from the public (compare Graph III with Graph II). This is not a costless gain, however, for the increased growth in money also means a higher inflation rate than would have otherwise occurred.

A second scenario considers the possibility that the Fed may not be able to predict what rates would have occurred in the absence of a tax cut. Hence, it simply pegs short-term interest rates at whatever level was prevailing at the time of the change in fiscal policy. In an economy with expanding activity, interest rates will normally rise to reflect increasing demands for money and credit. Hence, the Fed can only succeed in restraining rising interest rates by speeding up the growth of the supply of money and credit. Therefore, this "pegged-rate" approach generates the fastest growth in the money supply of all the options.<sup>7</sup>

<sup>6</sup>In the model used this effect comes about as the demand for money increases more rapidly than the supply of money. The demand for money increases as GNP rises. However, not all computer models of the economy yield this result. In some models, the impact on interest rates of government borrowing depends on whether the government issues short-term or long-term securities. In particular, if it sells mainly short-term issues, then long-term rates may fall and investment (which depends on *long-term* rates) may increase rather than fall. For an example of a model of this kind, see Patric Hendershott, "The Impact of a Tax Cut: Crowding Out, Pulling In and All That," Salomon Brothers Center for the Study of Financial Institutions, Working Paper No 59, New York University, November 1975.

<sup>7</sup>The differential impact on interest rates from the two types of accommodative monetary policy (compare Graphs III and IV) is in part due to the rising interest rates in the base simulation. Thus a policy that attempts to peg interest rates at first quarter levels must offset the initial pattern of rising interest rates plus the



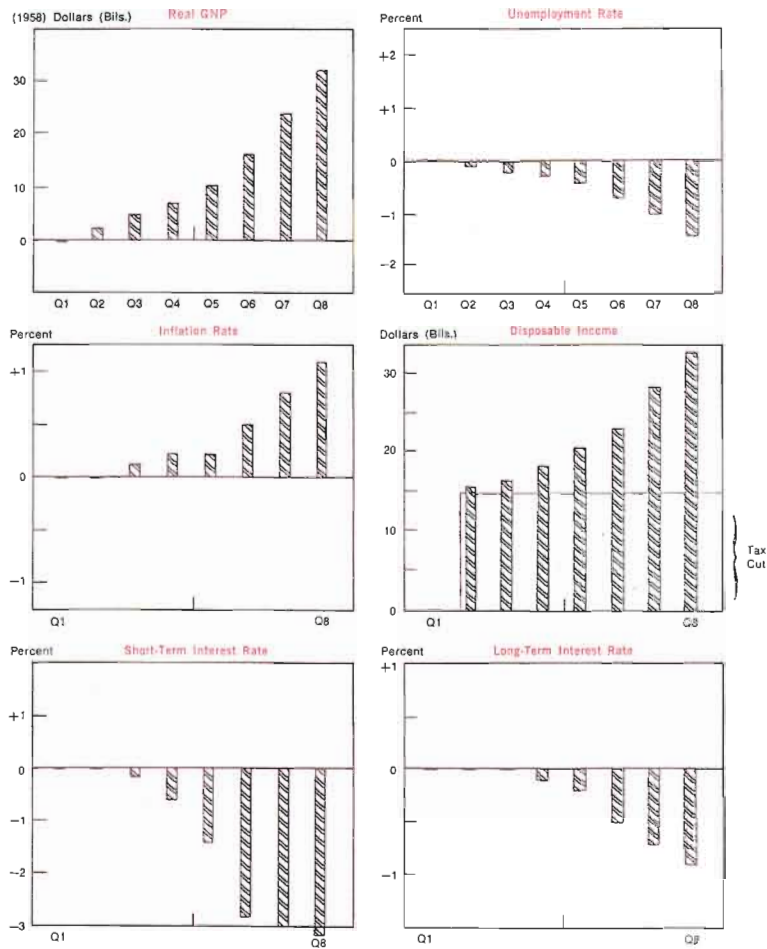


The results are shown in Graph IV. Real GNP is higher in this experiment than in all the others and the unemployment rate is substantially below the no-tax-cut case by the end of two years. At the same time, the inflation rate is higher than results from any

increase in rates due to the tax cut. This is accomplished by expanding the supply of money much faster in the "pegged rate" experiment than the experiment which holds interest rates at the base simulation levels.

other policy. Interest rates are lower than in any of the other alternatives, but may eventually rise to levels *higher* than in previous cases. The higher level of economic activity and *expectations* of still higher prices could push rates higher in the period beyond the end of the computer experiment. A policy designed to hold interest rates down yields some early gains in terms of increased activity and lower unemployment but it involves

GRAPH IV  
 CHANGES RESULTING FROM TAX CUT WITH ACCOMMODATIVE MONETARY POLICY;  
 INTEREST RATES PEGGED AT FIRST QUARTER LEVELS



substantial costs down the road when society has to pay the inflation price.

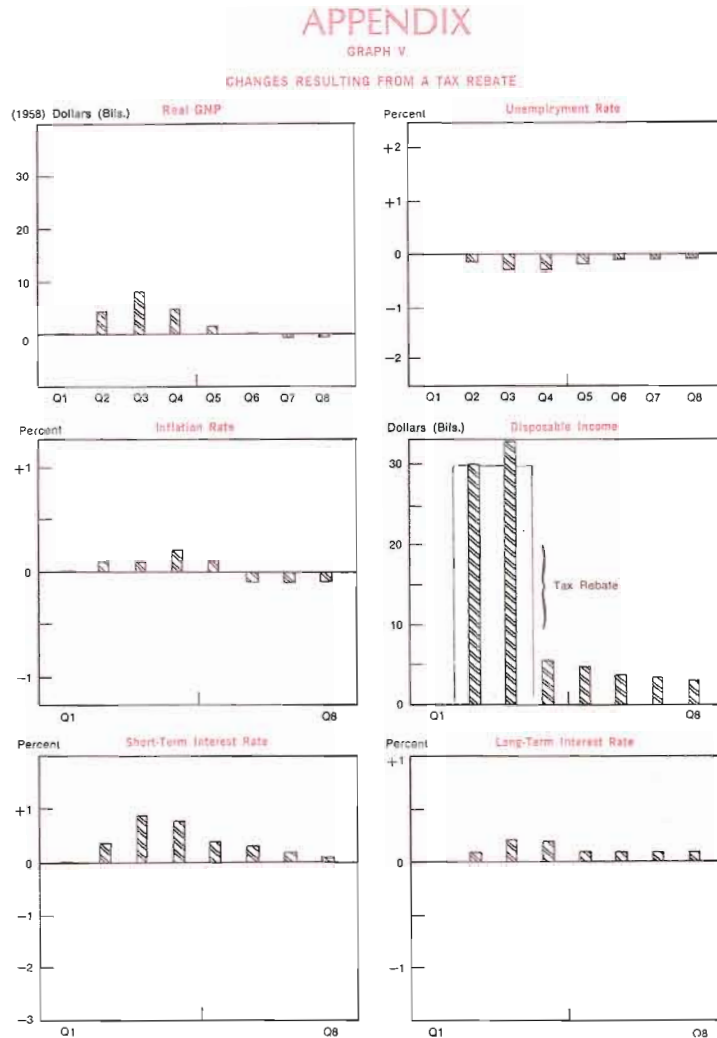
**SO WHAT ABOUT A TAX CUT?**

The moral of the story is simple. There is very little one can say about the effects of a tax cut unless we know how the government will respond to the loss in revenue that results. Hence, policymakers must consider

the costs and benefits of the various financing alternatives along with the merits of the tax cut itself. Policywatchers must also consider the total picture when assessing the likely outcome of a tax cut. When the tax cut is "financed" by a more generous monetary policy (whichever version), overall stimulus to economic activity will likely be greater than when the loss in government revenues is covered entirely by borrowing from the

public. Borrowing from the public (initially at least) involves higher interest rates than borrowing from the central bank. Finally, when the government cuts its spending as taxes are reduced, the net effect is probably a con-

traction in economic activity. Thus, despite conventional wisdom to the contrary, it is a mistake to view a tax cut as an expansionary policy without considering how the government will respond to the drop in revenues.



A prevalent feeling among economists today is that tax rebates and temporary tax cuts have no long-term impact on the economy. A two-year projection of the economy with such a tax cut bears out these beliefs. The stimulative effects of a \$15 billion tax rebate spread over the second and third quarters of the forecast wash out within six quarters (a year and a half), and leave the economy close to where it was before the tax cut by the end of two years (assumes borrowing from the public). 