

Budget Deficits and Supply Side Economics: A Theoretical Discussion

By Dan M. Bechter

For many years, beginning in the 1930s with the influence of Keynes, the case for fiscal policy has been made primarily on the basis of its effect on aggregate demand. Tax cuts and budget deficits, for example, have been defended almost exclusively on the grounds that they raised the demand for goods and services, thereby stimulating economic activity. In more recent years, however, there has been a shift of emphasis to the supply side. While not necessarily challenging the principal tenets of the Keynesian theory insofar as short-run effects on demand are concerned, supply side arguments emphasize the importance of fiscal effects on aggregate supply. In particular, supply siders maintain that in the absence of encouragements to save, invest, and work harder, expansionary budgetary programs focusing solely on aggregate demand will produce no permanent increase in economic activity, but will result instead only in inflation.

Currently, the federal government is running a record deficit, and some projections show deficits climbing for the next several years.

Arising as they do from a combination of tax cuts and increases in government purchases, these deficits would appear to have all of the markings of a Keynesian stimulus to aggregate demand. Yet the fiscal program which is now in place was advocated and is still being supported as a stimulus to aggregate supply in order to promote economic recovery, growth, and reduced inflation. Another important feature of the current economic program, of course, is a monetary policy which aims at continued reductions in the growth of money and credit.

The purpose of this article is to present a theoretical economic framework that can be used to analyze the interactions of the effects of fiscal and monetary policies on the economy. As suggested above, such a framework will include both a demand side and a supply side. While definitive answers to the questions of the inflationary and growth implications of the current and projected deficits will not be given here, the key considerations upon which these answers depend will be analyzed and their net effect on the economy will be discussed.

FRAMEWORK FOR ANALYSIS

This section explains how aggregative concepts of supply and demand can be used to

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describe how inflation and economic growth are determined. The idea is to think of the economy as a market for the nation's output. The two determining relationships in this market are the demand for and supply of output, or aggregate demand and aggregate supply. The concept of aggregate demand is explained first, focusing on its determinants, its relationship to inflation, and how it changes. Aggregate supply is then discussed in a similar fashion. The section concludes with an examination of how the interaction of aggregate demand and aggregate supply determines short-run and long-run equilibrium rates of inflation and growth in this conceptualized framework of the economy.

Aggregate Demand

Aggregate demand expresses how much output consumers, businesses, and governments want to buy at a given level of prices. The combined quantity of their desired purchases depends on the values of several variables or determinants of aggregate demand. A listing of these determinants and a brief explanation of their assumed effects are given in the material which follows. Also discussed is the relationship between inflation and the growth in the demand for output and how this relationship changes when the determinants of aggregate demand take on new values.

Determinants. A number of variables have an impact on aggregate demand. Some of these, such as interest rates, income, and prices, are obviously important. As it turns out, however, these variables are not the ultimate determinants of aggregate demand. Rather, they are intermediate variables whose values are determined by the economic model that is assumed. In this analytic framework, aggregate demand is assumed to have five ultimate determinants: (1) the total amount of nominal wealth, which is defined as the sum of the nominal values of

three assets: money, government bonds, and equities; (2) the composition of nominal wealth, or its percentage distribution among these three assets; (3) a proportional tax on income; (4) a predetermined ratio of government purchases to output; and (5) states of business and consumer confidence and expectations.¹

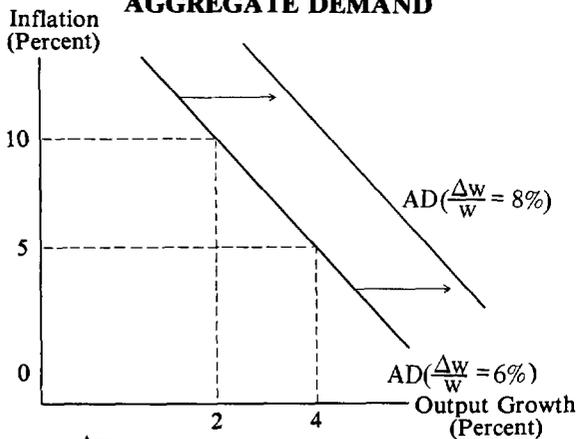
Relation to Inflation. To identify the relation of aggregate demand to inflation, the values or rates of growth of the five ultimate determinants are taken as given. Assumed constants are the rate of growth of nominal wealth, the composition of nominal wealth, the tax rate, the ratio of government purchases to output, and the states of business and consumer confidence and expectation.²

¹ Still other factors, such as the distribution of income, and the level of the population may qualify as ultimate determinants of aggregate demand, but they are ignored here and therefore assumed as given, or constant in their influence. The more technically minded reader will recognize the theory underlying this model: the aggregate demand curve is derived by solving a conventional IS-LM model for income as a function of the price level and differentiating with respect to time; the aggregate supply curve is derived similarly from a production function and a labor supply function.

The income tax rate is to be interpreted as net of transfers. It can be thought of, therefore, as government's net withdrawal rate from income. For an early example of this type of dynamic aggregative model, see Challis A. Hall, Jr., *Fiscal Policy for Stable Growth*, New York: Holt, Rinehart, and Winston, Inc., 1960. The analytic framework presented here is similar to that found in modern textbooks in intermediate macroeconomic theory. See, for example, Robert J. Gordon, *Macroeconomics*, 2nd ed., Boston: Little Brown, and Co., 1981, or Rudiger Dornbusch and Stanley Fischer, *Macroeconomics*, New York: McGraw-Hill, 1978.

² A more rigorous treatment of this subject would require explicit recognition of the interdependencies among these assumptions. In particular, the assumption that nominal wealth grows at a constant rate with unchanged asset shares implies constant and equal growth rates of money, bonds, and equities. But the growth rates of money and bonds are not independent of government deficits which depend, in turn, on the income tax rate and the rate of government purchases. These complicating considerations are not crucial to a basic understanding of the analysis.

Figure 1
AGGREGATE DEMAND



Note: $\frac{\Delta w}{w}$ = assumed percentage change in nominal wealth.

Given these assumptions, when the rate of inflation is relatively high the demand for output will grow relatively slowly. Conversely, when the rate of inflation is relatively low the demand for output will be more rapid. The downward-sloping aggregate demand curve labeled AD in Figure 1 illustrates this negative relationship between the rate of inflation and the rate of change of output. For example, the hypothetical aggregate demand curve of Figure 1 shows that if nominal wealth is growing at 6 percent, then a 10 percent rate of inflation will be associated with a 2 percent rate of growth in the demand for output, while 5 percent inflation will be associated with 4 percent demand growth.

The reason for this inverse relationship between inflation and demand growth is that one of the intermediate variables affecting the growth in demand is the growth in real wealth. With nominal wealth assumed to be growing at a constant rate, a relatively low rate of inflation implies a relatively high rate of growth of real wealth and, therefore, faster demand growth.

Shifts in Aggregate Demand. An aggregate demand relationship of the type drawn in

Figure 1 is assumed to remain in place as long as its five ultimate determinants remain fixed. A change in one or more of its five ultimate determinants, however, will cause the aggregate demand curve to shift. For example, an increase in the rate of growth of nominal wealth shifts aggregate demand to the right. That is, in Figure 1, if the rate of increase in nominal wealth rises from 6 percent to 8 percent, the aggregate demand curve shifts as shown. The rightward shift in aggregate demand means that there is an increase in the rate of demand growth associated with any given rate of inflation. In Figure 1, for example, after the shift in the aggregate demand curve, 4 percent instead of 2 percent demand growth is associated with 10 percent inflation.

A change in the other determinants also will shift the aggregate demand curve. An increase in money's share of nominal wealth will shift aggregate demand to the right, but an increase in bond's share will shift aggregate demand to the left. When money grows faster than bonds, interest rates decline and this stimulates demand growth. On the other hand, a rise in interest rates occurs when bonds grow faster than money, and this slows demand growth. Finally, a decrease in the income tax rate or an increase in the ratio of government purchases to output results in a rightward shift in aggregate demand, as does an improvement in business or consumer confidence and expectations.³

Aggregate Supply

Aggregate supply expresses how much output producers want to sell at a given level of prices. Similar to the treatment of aggregate demand,

³ The impacts of changes in the income tax rate and in the ratio of government purchases to output are temporary except to the extent that they might impact wealth. These temporary fiscal effects are further discussed later in this article.

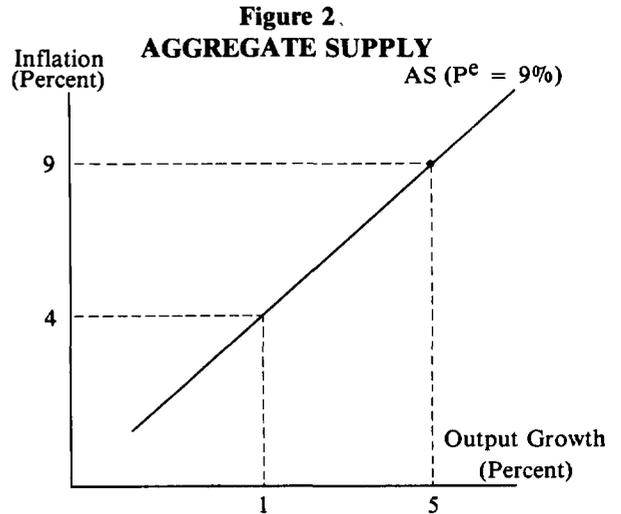
the following material examines the determinants of aggregate supply, the relationship of aggregate supply to inflation, and shifts in aggregate supply.

Determinants. Aggregate supply, like aggregate demand, depends on several variables. However, only five of the more important ultimate determinants are identified here: (1) the size of the population, (2) the size of the stock of productive capital, (3) the state of technology, (4) the income tax rate, and (5) the expected rate of inflation.

Relation to Inflation. To focus on the relationship of the growth in the supply of output to the rate of inflation, the five ultimate determinants are taken as given. In this regard, the income tax rate is assumed to be fixed, the population and the capital stock are assumed to be growing at constant rates, and the state of technology is assumed to be improving at a constant rate. Finally, workers are assumed to expect a particular rate of inflation in the period ahead, and to have contracted for a fixed rate of increase in nominal wages that reflects these expectations.

Given these assumptions, a direct or positive relationship between supply growth and inflation can be derived. That is, when the rate of inflation is relatively high, so too will be the rate of growth of output. This results from the fact that faster inflation means lower real wages, given the assumed fixed rate of increase of nominal wages. Since greater employment growth is associated with lower real wages, so is greater output growth. The upward-sloping aggregate supply curve labeled AS in Figure 2 summarizes the relationship just described. In the hypothetical numerical example shown in Figure 2, an inflation rate of 9 percent is paired with 5 percent supply growth, and 4 percent inflation is paired with 1 percent supply growth.

Shifts in Aggregate Supply. The aggregate supply curve shifts whenever there is a change in the assumed levels or rates of growth of one



Note: P^e = expected rate of inflation.

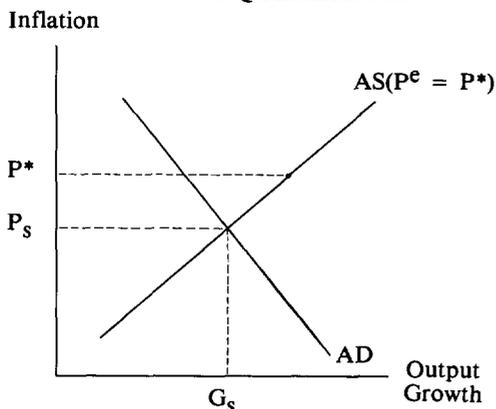
or more of the five ultimate determinants of aggregate supply.

An upward revision of inflation expectations shifts the aggregate supply curve to the left. When workers expect more inflation, they demand a faster rate of increase in nominal wages. This more rapid rate of increase in the nominal costs of production requires a higher rate of increase in output prices to maintain output growth at any level.

A faster rate of growth of the capital stock or a more rapid pace of technological advance would accelerate labor productivity and shift the aggregate supply curve to the right. Greater productivity gains mean reduced rates of escalation of labor costs associated with any rate of inflation. In addition, an increase in the rate of growth of the population, another ultimate determinant of aggregate supply, would shift the curve to the right because the resulting increase in the labor supply would depress real wages.

A decrease in the income tax rate also shifts aggregate supply to the right. A reduction in the income tax rate raises the take-home wage rate and therefore increases the labor force par-

Figure 3
SHORT-RUN EQUILIBRIUM



Notes: P^e = expected rate of inflation.
 P_S, G_S = short-run equilibrium rates of inflation and growth.

icipation rate—the percentage of people who want to work. Unless there are continuous decreases in the income tax rate, however, the shift in aggregate supply will be only temporary since a once-and-for-all change in the level of tax rates does not affect the rate of growth of the labor force except initially.

Equilibrium

A rate of inflation that gives rise to the same growth in output demand and output supply is called an equilibrium rate of inflation. Such a rate equates aggregate demand with aggregate supply. But since expectational shifts in aggregate supply are likely, it is necessary to distinguish between a short-run and a long-run equilibrium.

Short Run. A short-run equilibrium rate of economic growth and rate of inflation is illustrated in Figure 3 by the intersection of aggregate demand and aggregate supply. This equilibrium assumes that the five ultimate determinants of aggregate demand and the five ultimate determinants of aggregate supply are given. That is, it assumes constant rates of

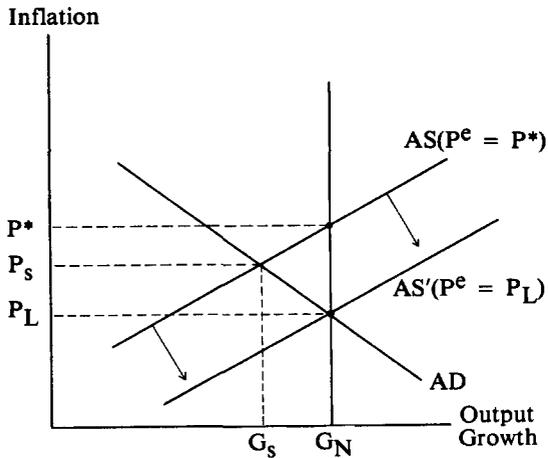
growth of nominal wealth, population, and technology, as well as fixed expectations, income tax rates, ratio of government purchases to output, and asset shares in nominal wealth.

As long as these determinants remain constrained as assumed, the economy will tend toward the rate of inflation and rate of economic growth identified as equilibrium. This equilibrium is short run, however, because the rate of inflation determined by this intersection of aggregate demand and aggregate supply may not be the expected rate of inflation. If the actual rate of inflation differs from the expected rate, then the equilibrium will not last, and both aggregate demand and aggregate supply will shift. Figure 3 illustrates a situation where the equilibrium rate of inflation, P_S , is lower than the expected rate, P^* . That is, the expected rate of inflation is higher than the actual rate determined by the intersection of aggregate demand and aggregate supply. Under such circumstances, it is reasonable to believe that workers and consumers would revise their inflation expectations downward. Such downwardly revised expectations would shift aggregate supply to the right, and perhaps cause a shift in aggregate demand as well. A new short-run equilibrium rate of inflation and rate of economic growth would result.

Long Run. All but one of the determinants of aggregate demand and aggregate supply that are assumed fixed in deriving short-run equilibrium are also assumed fixed in deriving long-run equilibrium. The exception is expectations, which are given time to adjust to reality. Specifically, the economy's rates of inflation and growth are said to be in long-run equilibrium when expected inflation and nominal wages have adjusted fully to the actual rate of inflation.⁴

⁴ Long-run equilibrium in dynamic macroeconomic models is an elusive concept that is usually defined in terms of

Figure 4
LONG-RUN EQUILIBRIUM



Notes: See Figure 3.

Also, G_N = natural rate of economic growth.

P_L = long-run equilibrium inflation rate for AD curve assumed.

In Figure 4, a vertical line is drawn through a rate of economic growth that is assumed to be the natural rate. A vertical line through the natural rate of economic growth implies that the rate of inflation has no long-run influence on economic growth. Whenever aggregate demand and aggregate supply intersect along this vertical line, the economy is in long-run as well as short-run equilibrium. If, as noted above, aggregate demand and aggregate supply intersect at some rate of economic growth above or below the natural rate, the actual and expected rates of inflation are not equal. That is, the short-run equilibrium rate of economic growth may be different from the natural rate. Aggregate supply will shift, reflecting revised inflation expectations, until long-run equilibrium is achieved. In Figure 4, the ag-

steady-state rates of growth extending to the indefinite future. In this article, however, the phrase "long run" is to be interpreted somewhat less restrictively as a time in the not-too-distant future when the economy has adjusted to changes in economic policy and expectations.

gregate supply curve is shown shifting to the right as workers revise their expectations of inflation downward from P^* to P_L . Only when the expected inflation rate equals the short-run equilibrium rate is long-run equilibrium achieved. In Figure 4, this long-run equilibrium occurs at inflation rate P_L and economic growth rate G_N .

The long-run equilibrium rate of economic growth is not immutable. It will change if one of the four ultimate determinants changes. For example, it can accelerate if growth in the capital stock rises, or if labor productivity begins to make faster gains for other reasons, such as more rapid technological advances. These reasons for change in the natural rate of economic growth, it may be observed, are the same reasons given for increases in aggregate supply. In fact, the only difference between aggregate supply and the natural rate of growth is that aggregate supply is a short-run supply relationship, while the natural rate of growth is a long-run supply relationship. An increase in the natural rate of economic growth is represented by a shift to the right of the vertical long-run equilibrium line in Figure 4, and such a shift would be accompanied by rightward shifts in aggregate supply.

EFFECTS OF BUDGET DEFICITS

This section makes use of the analytic framework developed in the previous section to examine the impact of budget deficits on the rate of inflation and the rate of economic growth. From the previous analysis, it is clear that this impact will depend on how the ultimate determinants of aggregate demand and aggregate supply are affected by a budget deficit.

Assumptions about the cause of the deficit and its financing serve to identify changes in some of the ultimate determinants of aggregate demand and aggregate supply. It will be assumed that the deficit arises from a perma-

ment cut in the income tax rate. As time passes, the ratio of government purchases to output is assumed to be declining until the deficit disappears and a balanced budget is achieved. Since deficits must be financed somehow, it is assumed the deficit is financed exclusively by the sale of new issues of government securities to the private sector. That is, the deficit is assumed to be funded.

In addition, it will be assumed that the rate of monetary growth is constant. The rate of population growth, too, is assumed given. Finally, some initial long-run equilibrium position of the economy is assumed.

With all of these assumptions in mind, attention can be turned to the various ways that budget deficits, through their impact on the ultimate determinants of aggregate demand and aggregate supply, can affect economic growth and inflation. Four types of effects can be identified: (1) direct effects, (2) incentive effects, (3) funding effects, and (4) expectation effects. The short- and long-run consequences of these four types of effects are discussed below within the framework of aggregate demand, aggregate supply, and economic equilibrium.

Effects on Aggregate Demand

Aggregate demand is affected by each of the four types of effects of budget deficits.

Direct Effects. The direct effects of budget deficits are those commonly associated with the fiscal stimulus to aggregate demand that comes from a change in either of two ultimate determinants of aggregate demand: the income tax rate and the ratio of government purchases to output. Although dissenters can be found, it is generally agreed that an increase in the ratio of government purchases to output adds directly to the level of aggregate demand. Similarly, a cut in the income tax rate adds to aggregate demand by stimulating consumer demand. The fiscal program that is assumed provides direct and immediate stimulus, therefore, through the

cut in income taxes. Over time, however, this stimulus is offset by the assumed reduction in the ratio of government purchases to output. In the long run, the tradeoff between inflation and demand growth is unaffected. In Figure 5, demand shifts to the right initially, but then settles back to its original position.

A very important implication of the assumed fiscal program, however, is its effect on investment. Since the ratio of government purchases to output is assumed to decline in the long run, it follows that the output share of either consumption or investment, or both, must rise. If investment's share rises, then the fiscal program does have a permanent expansionary effect on aggregate demand. More investment each period means a faster rate of growth of the capital stock, and since equities or ownership in capital are part of real wealth, consumer demand will grow faster too. The question of the impact on investment is therefore crucial in assessing the net effect to aggregate demand.

Funding Effects. A funded deficit affects aggregate demand by affecting two of its ultimate determinants: the level and the composition of nominal wealth. By increasing the nominal value of government debt outstanding, a funded deficit raises the level of real wealth of the private sector, given a rate of inflation. Aggregate demand shifts to the right due to the level-of-wealth effect. But this shift is only temporary, since a return to a balanced budget, and therefore an end to growth in the bond component of nominal wealth, is assumed. The effects arising from a change in the composition of wealth, however, are more far reaching.

Even temporary budget deficits permanently affect the composition of nominal wealth by raising the quantity of government securities above what it otherwise would be. An increase in such securities' share of nominal wealth decreases aggregate demand and the demand curve shifts to the left. More bonds as a proportion of nominal wealth require higher interest

EFFECTS OF BUDGET DEFICITS ON AGGREGATE DEMAND

Figure 5
DIRECT EFFECTS

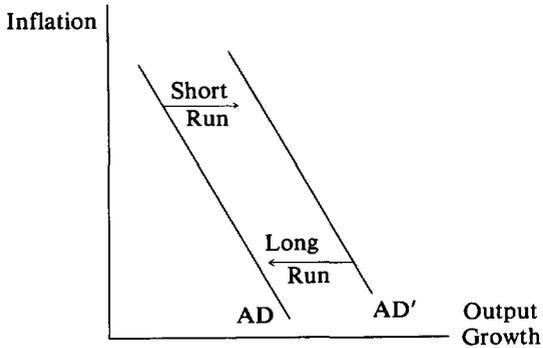


Figure 6
FUNDING EFFECTS

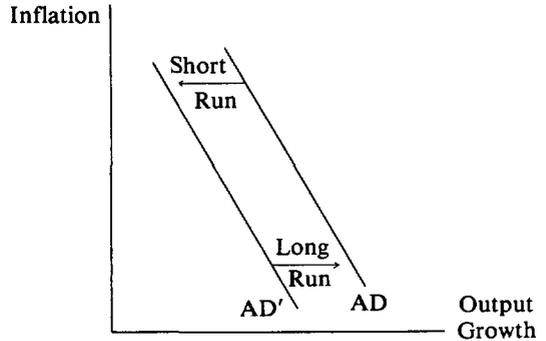


Figure 7
EXPECTATIONS EFFECTS

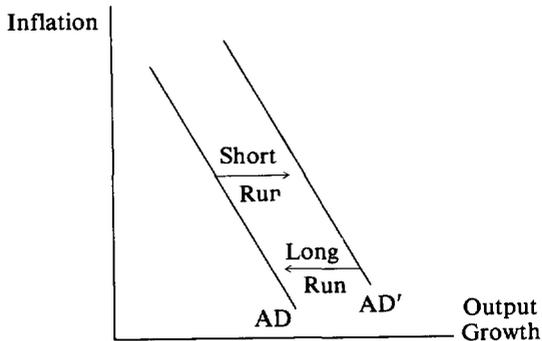
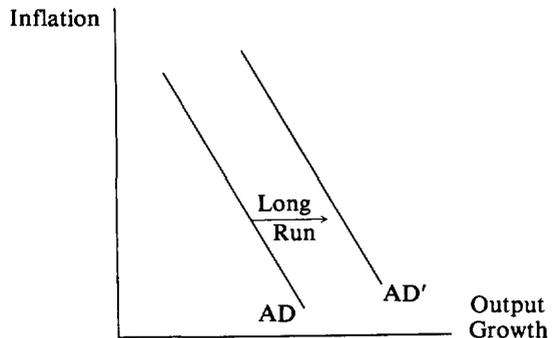


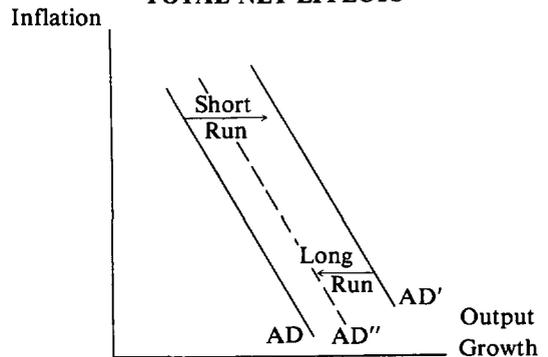
Figure 8
INCENTIVE EFFECTS



rates to maintain balance in private sector portfolios. These higher interest rates depress investment and aggregate demand.⁵

Depressed investment means slower growth in the capital stock. The increase in wealth that accompanies debt expansion is offset by a decline in wealth that accompanies reduced

Figure 9
TOTAL NET EFFECTS



⁵ For a discussion of the various views on this issue, see V. Vance Roiley's article in the July-August 1981 issue of this Review, "The Financing of Federal Deficits: An Analysis of Crowding Out," pp. 16-29. Also see Martin Feldstein, "Government Deficits and Aggregate Demand," *Journal of Monetary Economics* 9 (1982), pp. 1-20.

equity expansion. Implicit in the adverse effect on investment and aggregate demand arising from the funded deficit's effect on the composition of wealth, therefore, is an additional adverse effect on aggregate demand that operates indirectly through interest rates on the level of wealth.

The net impact of the funding effects of a temporary budget deficit is by no means clear. A bias toward a contractionary influence would seem to exist in the short run. That is, aggregate demand will shift to the left. In the long run, however, this depressing effect on aggregate demand declines as the proportion of bonds in nominal wealth goes down, given constant money growth and balanced budgets. According to this line of reasoning, the funding effects of budget deficits initially set aggregate demand backward, but the contractionary effects die out over time. In Figure 6, these shifts in the aggregate demand curve are identified with arrows indicating short-run and long-run adjustments.

Expectation Effects. The expectation effects of budget deficits affect aggregate demand through the ultimate determinant identified with the same name. Expectation effects are temporary and can shift aggregate demand in either direction. An improvement in consumer or business confidence, for example, raises aggregate demand temporarily through its effects on consumption and investment. But this expansionary effect is erased when confidence returns to normal levels. Similarly, a drop in consumer or business confidence temporarily depresses aggregate demand.

It is not obvious just how the prospect of a funded deficit arising primarily from a tax cut will affect expectations. In this article, the expectation effects of budget deficits are assumed to raise aggregate demand temporarily, as shown in Figure 7.

Incentive Effects. The distinction between incentive effects and direct effects is sometimes

difficult to draw. Perhaps the easiest way to describe incentive effects is that they operate through prices, including interest rates and wages. In the case of incentive effects on aggregate demand, the transmitting variable is in all cases the rate of interest.

A reduction in the tax rate on income raises the after-tax rate of return on assets. For consumers, saving becomes more attractive.⁶ For businesses, investment is enhanced. The net result of these two incentive effects arising from a budget deficit produced by a tax cut is to expand investment. As a consequence, for reasons explained earlier, aggregate demand shifts upward permanently, as shown in Figure 8.

Summary of Effects on Aggregate Demand. This evaluation of the effects of budget deficits leads to the conclusion that the assumed fiscal and monetary program associated with the deficit will have an expansionary effect on aggregate demand in both the short run and the long run, with the long-run effect being less expansionary than the short-run effect. In Figure 9, the assumed net effects are illustrated by a short-run upward shift in the tradeoff between inflation and demand growth, followed by a drifting downward of that relationship over time to a new long-run aggregate demand curve that is above the old.⁷

⁶ Higher rates of return on assets could conceivably lead to decreased saving because less wealth is necessary to provide a given amount of interest income. This income effect is assumed to be dominated, however, by the substitution effect, which encourages a shift away from present consumption because higher interest rates raise the cost of current goods relative to future goods.

⁷ Actually, under the fiscal program described, aggregate demand would ultimately begin to drift slowly to the right over time as the constant rate of increase in the money stock continually changes the composition of nominal wealth in an expansionary way. What matters here, however, is not so much the stability of the aggregate demand curve over long periods of time as its position relative to where it would have been in the absence of a deficit in the short run and the fairly near long run.

Effects on Aggregate Supply

The same four categories used to describe the effects of budget deficits on aggregate demand can also be used to describe the effects on aggregate supply.

Direct Effects. Budget deficits arising from tax cuts and increases in government purchases are usually assumed to have direct effects only on the demand side, not the supply side. However, government purchases that end up reducing production costs can have definite effects on aggregate supply. In this category, for example, are government expenditures on productive capital which, like private investment, adds to the rate of growth of the capital stock and, therefore, to supply growth. Similarly, government expenditures on research and development and job training can at least temporarily expand aggregate supply, or decrease the rate of inflation associated with growth in the supply of output, by raising labor productivity. In this analysis, however, direct effects of budget deficits on aggregate supply will be assumed to be neutral or nonexistent.

Funding Effects. The ultimate determinant of aggregate supply that is affected by funding a deficit is the size of the capital stock. Since debt expansion reduces investment by raising interest rates, it also reduces growth in the capital stock. A lower rate of growth in the capital stock means a reduced rate of gain in labor productivity, and a slower natural rate of growth in the economy. Aggregate supply shifts to the left in the short run. In the long run, however, the supply curve drifts back to the right as growth in money and capital dilutes the initial impact of the influx of bonds on interest rates, slowly bringing investment and capital growth back to their original levels. These short-run and long-run changes in the tradeoff between supply growth and inflation are illustrated in Figure 10.

Expectation Effects. Inflation expectations

are one of the ultimate determinants of aggregate supply and figure importantly in short-run adjustments in the supply curve. If the combination of a deficit together with a reduction in the income tax rate is perceived to add to inflationary pressures, workers can be expected to factor these perceptions into their demands for nominal wage increases. If deficit spending leads to aroused inflation fears, therefore, aggregate supply shifts to the left as shown in Figure 11 by the movement from AS to AS'.

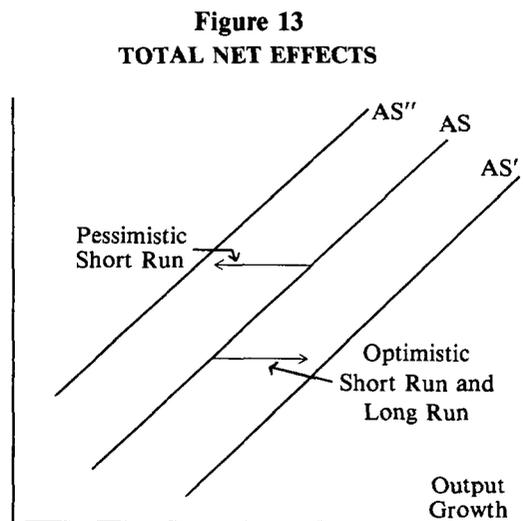
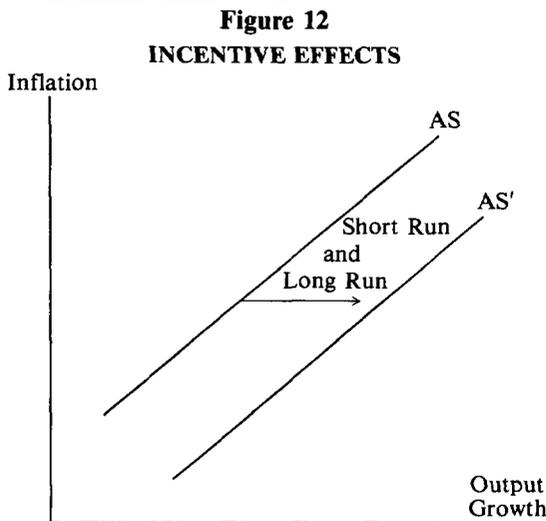
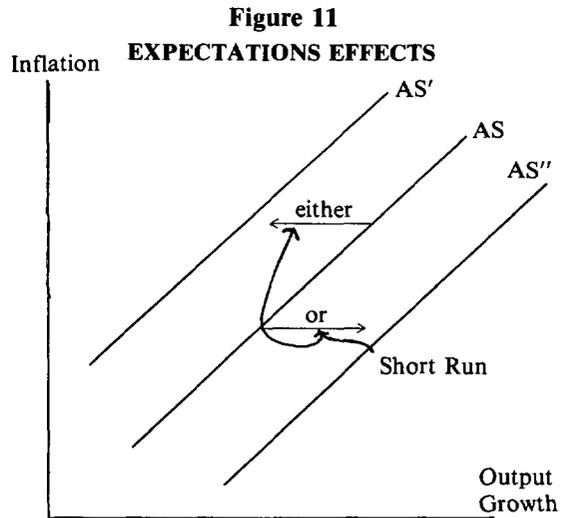
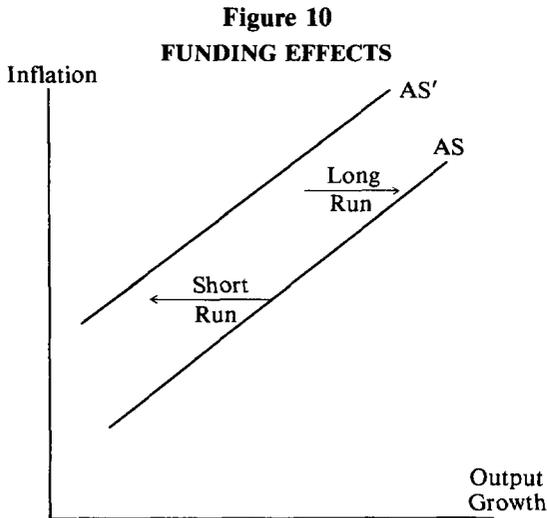
On the other hand, the prospects of large funded deficits may lead to expectations of economic stagnation and reduced inflation. Such expectations might also be associated with the assumed constant rate of monetary growth, if that rate is below the amount which would validate continued inflation at existing levels given the change in fiscal policy. If the deficit and assumed economic program lead to reduced inflation expectations, therefore, aggregate supply shifts temporarily to the right, from AS to AS'' in Figure 11, because workers temper their demands for nominal wage increases.

Incentive Effects. The income tax rate, one of the ultimate determinants of both aggregate supply and aggregate demand, affects supply through its incentive effects on capital accumulation and work effort. For example, a cut in the income tax rate raises the after-tax rate of return on assets, thereby stimulating investment and adding to the growth in the capital stock. With the rise in capital growth, aggregate supply shifts to the right, as does the economy's natural rate of growth.

Reduced tax rates on income also provide an added incentive to work.⁸ Higher after-tax

⁸ An increase in the after-tax wage rate will encourage more work effort and labor force participation if, as assumed, the substitution effect which favors additional work dominates the income effect which favors additional leisure.

EFFECTS OF BUDGET DEFICITS ON AGGREGATE SUPPLY



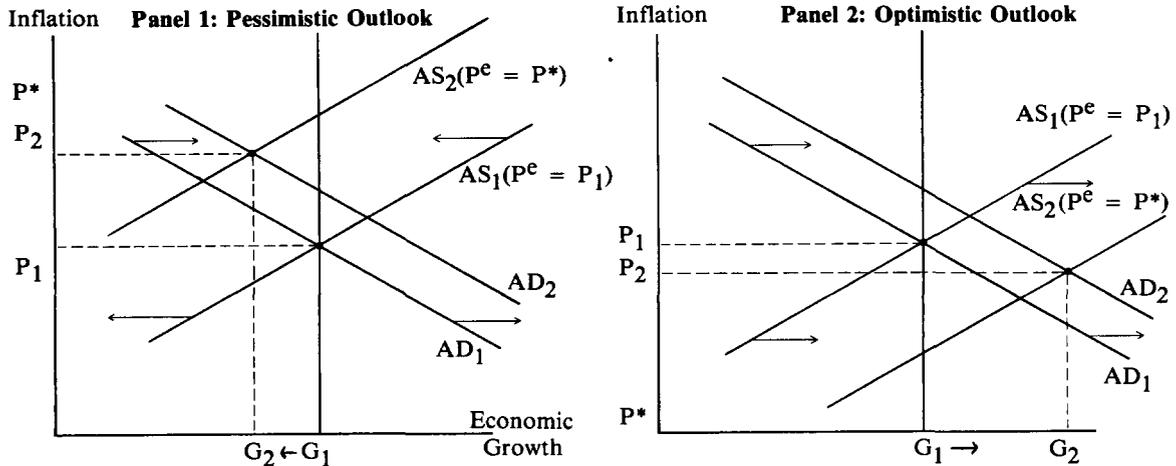
wage rates are assumed to increase labor force participation. This impact on aggregate supply, as expressed in terms of rates of change, is not permanent, however, since a once-and-for-all increase in the ratio of the size of the labor force to the size of the population does not increase the rate of growth of the labor force. In the short run, however, this incentive effect

shifts aggregate supply to the right.

The combined incentive effects shift aggregate supply to the right in both the short run and the long run, as shown in Figure 12.

Summary of Effects on Aggregate Supply. Long-run effects of the budget deficit and the related economic program on aggregate supply are clearly expansionary, but the short-run ef-

Figure 14
SHORT-RUN EFFECTS



fects can work in either direction. In the short run, the funding effects and expectations of accelerating inflation and higher interest rates may dominate the incentive effects which work in the opposite direction, and aggregate supply may shift to the left, as shown by the pessimistic version of aggregate supply in Figure 13. On the other hand, confidence in a long-run trend toward reduced inflation may calm inflation fears, and shift aggregate supply to its optimistic position in Figure 13. In the long run, increases in the rate of growth of the capital stock guarantee an outward shift in aggregate supply for each and every level of inflation expectations.

Effects on Economic Equilibrium

The effects of budget deficits on aggregate demand can now be put together with the effects on aggregate supply to determine the short- and long-run equilibrium rates of growth and inflation in the economy. In tracing shifts in equilibrium, it will be assumed for convenience that the economy is initially in long-run equilibrium and growing at its natural rate.⁹

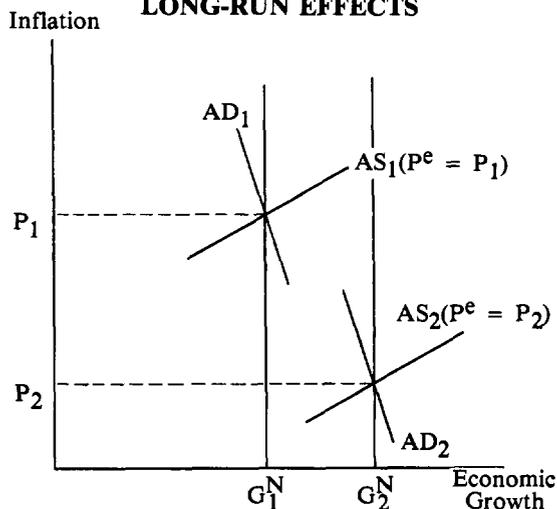
Short Run. In the short run, a budget deficit

can have either favorable or unfavorable effects on inflation and output growth. Aggregate demand, it was concluded earlier, will expand when the deficit is incurred. But aggregate supply may either expand or contract, depending primarily on whether inflation expectations turn optimistic or pessimistic. These two outcome extremes are illustrated in the two panels of Figure 14.

The left panel of Figure 14 shows a decline or backward shift in aggregate supply, a change consistent with upwardly revised inflation expectations. In panel 1 of Figure 14, the economy is shown to be initially in long-run equilibrium, with the actual and expected rates of inflation to be equal to P_1 , and the economic growth rate to be G_1^N . When expectations of

⁹ As suggested in footnotes 2 and 7, the assumptions made do not exclude drift in the long-run equilibrium rates of growth and inflation in the economy. In particular, the assumption of an initially and ultimately balanced budget, interrupted temporarily by deficit spending, implies a constantly changing composition of nominal wealth into the indefinite future, which has implications for aggregate demand. This article focuses on the displacement from the drift which results from the temporary deficit.

Figure 15
LONG-RUN EFFECTS



inflation rise from P_1 to P^* , aggregate supply shifts to the left. This leftward shift in aggregate supply together with the rightward shift in aggregate demand produces a higher equilibrium level of inflation than initially, and a lower equilibrium rate of growth. In the short run, therefore, a budget deficit may cause inflation to accelerate and output to grow more slowly or even decline.

The right panel of Figure 14 shows a rise or rightward shift in aggregate supply due to downwardly revised inflation expectations, from $P^e = P_1$ to $P^e = P^*$. Aggregate demand is drawn to show the same shift to the right as in the left panel. The intersection of these new aggregate demand and aggregate supply curves in the right panel occurs at a lower inflation rate and higher economic growth rate than initially. Under this short-run scenario, the budget deficit improves the economic outlook.

Long Run. In the long run, the permanent effects of the budget deficit and the associated economic program are what matter. The permanent effects on both aggregate demand and aggregate supply, as observed earlier, are expansionary. On Figure 15, both curves are

shown shifting outward to intersect at the new, higher, natural rate of economic growth. The shift in aggregate demand is somewhat incidental; as long as the supply side effects are permanently expansionary, long-run equilibrium must necessarily be at a higher rate of economic growth.¹⁰

Unfortunately, economic theory provides no guide to how long it will take for the economy to achieve its new long-run equilibrium position. This question is of special interest, of course, if the short-run outlook is the pessimistic one. If the economy is first set back by a budget deficit, it could take several years for it to recover its previous rate of growth, and several more years to move on to its new long-run equilibrium rate.

SUMMARY AND CONCLUSIONS

This article has presented a theoretical framework designed to analyze the effects of economic policy on inflation and economic growth. When applied to a particular policy mix that includes a constant rate of money growth and a temporary budget deficit, the analysis indicates that the long-run consequences of such a program are favorable, but that the short-run effects may be either favorable or unfavorable. Of course, the many assumptions made here to simplify the analysis mean that the conclusions can be considered as only suggestive.

¹⁰ Again, it is important to emphasize that these conclusions are no better than the assumptions made in deriving them. Carried to an extreme, for example, these results imply a faster rate of growth for an economy the lower the level of taxation.

Finally, it should be noted that in most economic growth models, the rate of growth in the economy in the far-distant long run is determined by the rate of population growth. The higher rate of growth of the capital stock in the interim, however, does permanently raise the level of per capita income for the indefinite future.

On the one hand, supply side arguments are supported by the analysis in this article. That is, fiscal encouragements to saving, investing, and working do tend to reduce the rate of inflation and increase the rate of economic growth, in the long run. On the other hand, the analysis casts doubt on the more extreme supply side view that such a fiscal program can quickly bring about more rapid economic growth and less inflation.

The principal barrier to beneficial short-run adjustments from a temporary budget deficit

lies in the expectation effects. If budget deficits give rise to expectations of accelerating inflation and high interest rates, the economy may suffer both stagnation and higher inflation in the short run. The implied better path to the long run is one which preserves the incentives to save, invest, and work, but which also calms inflation expectations. In this regard, smaller deficits are to be preferred to larger ones, and taxes on consumption are to be preferred to taxes that discourage saving, investment, and work effort.