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CAN AN INCREASED BUDGET DEFICIT
BE CONTRACTIONARY?

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ABSTRACT

The present paper shows how a negative fiscal multiplier is possible in a two-sector economy that is otherwise similar to the traditional one-sector Keynesian analysis. The key to this surprising possibility is that an increased budget deficit changes the sectoral balance of demand. A reduction of taxes or an increase in transfer payments raises the demand for consumer goods. At the same time, the rise in the interest rates that results from the deficit causes a fall in the demand for investment goods.

In the one-good economy assumed in both Keynesian and monetarist theories, the intersectoral shift of demand is of no consequence. But when consumer goods and investment goods are explicitly distinguished, the change in the sectoral pattern of demand causes separate changes in the prices of the two kinds of goods. As a result, the overall price level can rise even if the total real volume of output declines. The rise in the overall price level implies a reduction in the real value of the money stock. The contractionary effect of the decline in the real money stock can more than offset the direct expansionary effect of the increased deficit. The net effect of the increased deficit can therefore be to reduce real GNP. The paper analyzes the conditions which affect the likelihood that the fiscal multiplier is negative.

It is important to distinguish this demand composition reason for a negative multiplier from two other possibilities that have previously been discussed: (1) the adverse effect of budget deficits on business "confidence" and (2) the contraction of current demand that occurs if anticipated future budget deficits raise real long-term interest rates.

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The fiscal multiplier is the centerpiece of Keynesian economics. Ever since Keynes, students have learned, and governments have relied upon, the proposition that an increase in the government deficit causes a rise in real GNP and employment.

Monetarists have challenged the importance of the fiscal multiplier by noting that an increase in nominal GNP is possible only if there is an increase in the stock of money or in velocity. With the stock of money fixed and velocity quite unresponsive to the fiscal stimulus, an increase in the deficit will have little effect on nominal income and therefore on real income. In Keynesian terms, with a relatively inelastic LM curve and a relatively elastic IS curve, an increased deficit will raise the rate of interest thereby depressing investment and offsetting most of the direct stimulative effect of the deficit on real GNP. In the extreme case of a constant velocity of money (a vertical LM curve), the rise in the rate of interest completely offsets the fiscal stimulus and nominal GNP remains unchanged. It is important to note that although economists disagree about the relevant parameter values and therefore about the size of the fiscal multiplier, within this framework it is clear that the multiplier is non-negative; an increase in the budget deficit either increases real GNP or leaves it unchanged.

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The so-called Ricardian equivalence proposition (Bailey 1971 and Barro 1974) reinforces the monetarist conclusion that the fiscal multiplier is small or zero. If current individuals collectively act as if any deficit implies an equal increase in their personal liabilities (either directly or to offset the liabilities of their heirs), the stimulative effect of the deficit would be offset by increased personal saving. The empirical magnitude of this effect is questionable for a number of reasons (Feldstein, 1982, Feldstein and Pellechio, 1979). But, regardless of the importance of this effect, it remains true that the implied fiscal multiplier is non-negative.

In a slightly broader framework, however, a negative fiscal multiplier is possible. An increase in the budget deficit can reduce real GNP in an economy that produces more than one kind of product. The present paper shows how a negative fiscal multiplier is possible in a two-sector economy.

Before presenting this analysis and discussing its implications, it is useful to distinguish this source of a negative multiplier from two quite different reasons that have been adduced as possible causes of a "perverse" response to fiscal policy. In testimony (e.g., Feldstein 1983) and in the 1983 Economic Report of the President, I indicated how projected future budget deficits could reduce current economic activity by raising real long-term interest rates. The higher real long-term interest rates would depress current investment. Since the deficits would only occur in the future, their stimulating effects would also only occur in the future. The net result might well be an increase of future real GNP but a decline of near-term real GNP.¹

¹Blanchard (1983) provides a formal analysis of a alternative way in which future deficits can depress current GNP.

In this context, the "contemporaneous" fiscal multiplier is positive but the "expectational" fiscal multiplier may be negative.

A second possible source of a negative fiscal multiplier is that an increase in the budget deficit may undermine "business confidence" and therefore reduce the willingness of businesses to invest. Even if there is no increase in real interest rates, this fall in investment could more than offset the fiscal stimulus. Proponents of this argument rarely offer any explanation of the reason for the decline in business confidence.² Presumably, businessmen might fear that prolonged deficits could lead to a cycle of inflationary expansion followed by deflationary contraction or to subsequent increases in business taxes. Similarly, measures to reduce the budget deficit could stimulate confidence by showing that the government was prepared to take politically unpopular steps in order to improve future economic prospects. It is also possible, however, that an increased deficit could strengthen business confidence if businessmen believe that there is a positive fiscal multiplier and that the fiscal stimulus will help to achieve economic recovery. In short, if business expectations are correct, it is difficult to attribute a predictable and independent effect to the impact of the change in the deficit on business confidence or expectations.

²See Stein (1983) for a skeptical summary of the repeated uses of this argument during the past 50 years.

The Fiscal Multiplier in a Two-Sector Economy

An increased budget deficit changes the sectoral balance of demand. A reduction of taxes or an increase in transfer payments raises the demand for consumer goods. At the same time, the rise in the the interest rates that results from the deficit causes a fall in the demand for investment goods.

In the one-good economy assumed in both Keynesian and monetarist theories, the intersectoral shift of demand is of no consequence. But when consumer goods and investment goods are explicitly distinguished, the change in the sectoral pattern of demand causes separate changes in the prices of the two kinds of goods. As a result, the overall price level can rise even if the total real volume of output declines. The rise in the overall price level implies a reduction in the real value of the money stock. The contractionary effect of the decline in the real money stock can more than offset the direct expansionary effect of the increased deficit. The net effect of the increased deficit can therefore be to reduce real GNP.

A simple special case can explicitly demonstrate this possibility of a negative fiscal multiplier. Assume first that the increased deficit raises real consumption and the price of consumer goods. Assume next that, because of downward price rigidity, the price of investment goods does not fall even if the demand for investment goods declines. This assumption is unnecessarily restrictive and will be relaxed in the analysis that follows. These two assumptions together imply that the increase in the budget deficit raises the overall price level. As a final assumption, assume that the change in the deficit does not alter velocity. With a fixed stock of money, nominal GNP is

therefore unaffected by the increase in the deficit. Since the price level has increased, real GNP must therefore decline. In this case, the fiscal multiplier is inevitably negative.

It is clear from the example that two assumptions assured the negative multiplier: first the downward price rigidity implies that the overall price level must rise when the demand for consumer goods expands and, second, the extreme monetarist assumption of constant velocity converts the rise in the price level into a decline in real GNP. The following more general analysis shows that neither of these extreme assumptions is a necessary condition for a negative fiscal multiplier.

Consider a two sector extension of the simplest traditional Keynesian model of the economy in which total real purchases of consumer goods (C) is the sum of household consumption (C_H) and government purchases of consumer goods (C_G):

$$(1) \quad C = C_H + C_G.$$

Real purchases of investment goods (I) is the sum of business investment (I_B) and government investment (I_G):

$$(2) \quad I = I_B + I_G.$$

It will be convenient to choose units of measurement so that the initial prices of consumption goods and investment goods are both equal to one. With this convention, total real output (or real GNP) in the economy can be defined as:

$$(3) \quad X = C + I.$$

Household consumption is a function of real disposable income, the difference between real GNP and the net taxes (T) collected by the government:

$$(4) \quad C_H = \phi(X-T).$$

Business investment is a function of the real rate of interest (r):

$$(5) \quad I_B = \psi(r).$$

If p_C is the price of consumer goods and p_I is the price of investment goods, nominal GNP is:

$$(6) \quad Y = p_C C + p_I I.$$

The equality of the demand for money with the exogenously fixed supply of money is given by:

$$(7) \quad p_C C + p_I I = v(r+i) \cdot M$$

where i is the expected rate of inflation and $v(r+i)$ indicates that velocity is a function of the nominal rate of interest. The analysis that follows assumes that the expected rate of inflation remains unchanged even when a fiscal stimulus causes a one-time change in the price level.

The price of each type of good is a nondecreasing function of the demand for (and output of) that type of good:

$$(8) \quad p_C = \Pi_C(C), \quad \Pi_C' > 0$$

and

$$(9) \quad p_I = \Pi_I(I), \quad \Pi_I' > 0.$$

Allowing a more general price response in which each price is a function of both demands would complicate the algebra without altering the fundamental results of the analysis.

These 9 equations are sufficient to define the equilibrium values for the 9 endogenous variables: $C, C_H, I, I_B, X, Y, r, p_C$ and p_I . Our interest is in the value of the fiscal multiplier; for the sake of concreteness, the system will be solved for dX/dT , the multiplier with respect to a change in tax revenue. For this purpose the 9 equation system can be reduced to two equations in just X and r . First, from equations 1 through 5:

$$(10) \quad X = C_G + I_G + \phi(X-T) + \psi(r)$$

Equations 7 through 9 then imply:

$$(11) \quad \Pi_C(C_G + \phi(X-T)) \cdot (C_G + \phi(X-T)) + \Pi_I(I_G + \psi(r)) \cdot (I_G + \psi(r)) = v(r+i) \cdot M.$$

Totally differentiating these two equations yields:

$$(12) \quad (1-\phi')dX - \psi'dr = -\phi'dT$$

and

$$(13) \quad (C\Pi_C' + p_C)\phi'dX + ((I\Pi_I' + p_I)\psi' - Mv')dr = uA - (C\Pi_C' + p_C)\phi'dT.$$

It will simplify interpretation to write the price response elasticities as $\eta_C = \Pi'_C/p_C$ and $\eta_I = \Pi'_I/p_I$. With this notation and with the choice of units to make the initial values of p_C and p_I equal to one, equations 12 and 13 can be solved for the fiscal multiplier with respect to a tax change:

$$(14) \quad \frac{dX}{dT} = \frac{\phi'[\psi'(\eta_C - \eta_I) + M \cdot v']}{\psi'[\phi'(1+\eta_C) + (1-\phi')(1+\eta_I)] - (1-\phi')M \cdot v'}$$

Before commenting on this general expression, it may be helpful to return to the special case discussed above in which the price of investment goods is constant ($\eta_I = 0$) and velocity is completely inelastic ($v' = 0$). In this case 14 becomes

$$(15) \quad \frac{dX}{dT} = \frac{\phi' \eta_C}{\phi'(1+\eta_C) + (1-\phi')} > 0$$

since $0 < \phi' < 1$ is the marginal propensity to consume. In this case an increase in taxation raises real GNP, an unambiguously negative fiscal multiplier. The reason for this, as explained before, is that the tax reduction raises consumption and consumer prices, thereby raising the price level. Since velocity is constant, nominal GNP remains unchanged and real GNP must fall.

This explanation suggests that the fiscal multiplier will be negative if nominal GNP is constant (that is, $v' = 0$) even if the price of investment goods falls as long as the relative increase in the price of consumption goods exceeds the corresponding decline in the price of investment goods. From equation 14 it follows directly that, with $v' = 0$,

$$(16) \quad \frac{dX}{dT} = \frac{\phi' \cdot (\eta_C - \eta_I)}{\phi'(1+\eta_C) + (1-\phi')(1+\eta_I)} > 0.$$

More specifically, the fiscal multiplier is negative if the elasticity of consumption goods price function exceeds the elasticity of the investment goods price function.³ This price response condition is likely to be satisfied whenever prices (or inflation) is sticky in a downward direction. It is also likely to be satisfied if the consumption goods industry is operating close to capacity while there is substantial slack in the investment goods industry. It is clear that a sufficiently large and sustained tax reduction will eventually produce the kind of unbalanced recovery in which this elasticity condition is satisfied.

It is now time to return to the general fiscal multiplier presented in equation 14. I will now assume as "normal" conditions that $v' < 0$ and $\psi' < 0$, i.e., that both money demand and real investment are inversely related to the rate of interest. What are the further conditions that imply a negative fiscal multiplier, $dX/dT > 0$? It is clear that if the price response condition $\eta_C > \eta_I$ holds, the numerator in equation 14 is negative. Since both of the terms in the denominator are negative, the difference between them can be either positive or negative. The denominator as a whole is more likely to be negative (and therefore the fiscal multiplier also negative) under three conditions:

³Recall that, prices and quantities have been normalized by choosing units so that prices of both goods are initially equal to one.

(1) A low interest sensitivity of the demand for money. In the traditional analysis, this reduces the positive effect of fiscal expansion. In the current two-sector analysis, it also implies that the price rise induced by fiscal expansion will cause a greater rise in the interest rate and therefore a greater contraction of investment demand. If the rise in the interest rate is enough, total demand will decline.

(2) A high elasticity of investment demand with respect to the real interest rate. For any given increase in the interest rate, this causes a greater reduction in investment and therefore in total demand. Again, the same factor that reduces the positive effect of fiscal expansion also increases the likelihood of a negative fiscal multiplier.

(3) A high elasticity of price, especially the price of consumer goods, with respect to an increase in product demand. The high price elasticity implies a greater rise in the overall price level and therefore a greater reduction in real money balances and in real economic activity.

It is worth emphasizing that the three conditions that increase the likelihood of a negative fiscal multiplier are the same conditions that reduce the value of the positive fiscal multiplier in the traditional one-sector model. They correspond to an inelastic LM function, an elastic IS function, and a responsiveness of the price level to the fiscal stimulus. Of course, in the one-sector model it is not possible to obtain a negative fiscal multiplier. In a one-sector model, all prices are equal and therefore $\eta_C = \eta_I$.

With this restriction, equation 14 becomes:

$$(17) \quad \frac{dX}{dT} = \frac{-\phi'}{(1-\phi') + \frac{\psi'(1+\eta)}{M \cdot v'}} < 0.$$

This is exactly the basic positive fiscal multiplier that can be derived in the one-sector LM-IS model with the price level an increasing function of total output.

Even in the two-sector model, the extreme conditions of the simplest Keynesian analysis -- a liquidity trap or completely inelastic investment demand -- can preclude a negative fiscal multiplier. As $|v'|$ tends to infinity, we obtain the Keynesian liquidity trap case in which equation 14 implies $dX/dT = -\phi'/(1-\phi')$, the simplest textbook multiplier for a tax increase. Similarly, when investment demand is completely inelastic $\psi' = 0$ and dX/dT again equals $-\phi'/1-\phi'$.

Some General Implications

The long-term adverse consequences of sustained budget deficits are well known: an increased national debt that must be serviced by distortionary taxes and a reduced volume of capital accumulation. Moreover, when budget deficits raise the level of real interest rates, they thereby increase political and bureaucratic pressures for a more inflationary monetary policy. In addition to these long-run and cumulative disadvantages, discretionary fiscal policies may be destabilizing because of the unpredictable timing of the economy's response to fiscal and monetary policies.

Despite these disadvantages, policy officials are tempted to use

"temporary" increases in budget deficits to try to stimulate economic activity whenever the economy is operating at less than full capacity. The analysis of the present paper demonstrates a new, and I believe significant, risk in using an increased budget deficit to stimulate economic activity: a fiscal expansion that produces a lopsided recovery may raise the overall price level and reduce real activity and employment.

The risk of a negative fiscal multiplier is a reason for caution in using fiscal policy but does not imply that there is never a role for discretionary fiscal policy. The present analysis shows that the multiplier is most likely to be positive, and therefore a fiscal expansion useful, when a very low initial level of capacity utilization implies that prices are likely to be less sensitive to increased demand. Conversely, the fiscal stimulus of reduced taxation or increased government spending is most likely to be counterproductive when there is a high initial level of capacity utilization in the industries that produce goods and services purchased by consumers and the government.

More generally, the results of the present paper show that a two-sector framework for analyzing the effects of monetary and fiscal policies may yield insights that are obscured by the traditional one-sector macroeconomic models. Further analysis in such an expanded framework seems to be clearly warranted.

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Bibliography

- Bailey, M.J. (1971), National Income and the Price Level, New York: McGraw Hill.
- Barro, R. (1974), "Are Government Bonds Nets Wealth?," Journal of Political Economy 82, 6, 1095-1117.
- Blanchard, O.J. (1983), "Current and Anticipated Deficits, Interest Rates and Economic Activity," NBER Working Paper No. 1265, Cambridge: National Bureau of Economic Research.
- Economic Report of the President (1983), Washington: U.S. Government Printing Office.
- Feldstein, M. (1983), "Budget Deficits, Economic Activity and Net Capital Formation," Testimony before the Joint Economic Committee of the U.S. Congress, November 8, 1983.
- Feldstein, M. (1982), "Government Deficits and Aggregate Demand," Journal of Monetary Economics, 9, 1-20.
- Feldstein, M. and A. Pellechio (1979), "Social Security and Household Wealth Accumulation: New Microeconomic Evidence," Review of Economics and Statistics.
- Stein, H. (1983), Presidential Economics, New York: Simon and Schuster.