Crowding Out: An Empirical Note

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Note

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The issue of the "crowding out" effect of fiscal policy has been debated for many years (see [1] for a recent survey article). The classical case of crowding out implies a demand for money function which is completely interest inelastic. The result, in terms of an IS-LM analytical framework, is a completely vertical LM curve. The effect of a deficit-financed increase in the level of government expenditures is a shift in the IS curve to the right. The equilibrium interest rate rises, but the level of income and velocity remain *unchanged.* In this case, the increase in the interest rate results in a reduction in private investment spending which precisely offsets the increase in government expenditures. Yet it is possible to have crowding out without a vertical LM curve. For example, if an increase in the level of government expenditures erodes confidence, resulting in an increase in liquidity preference, and reducing the marginal efficiency of investment (see [5, p. 120]), the LM curve would shift leftward and the IS curve would also shift to the left. The net increase in income resulting from the increase in government spending is therefore *reduced.* Still another explanation of crowding out involves the assumption of "ultra-rationality" on the part of households (see [2]). If households view the government sector as an extension of themselves, an increase in government spending displaces an equal amount of private investment expenditures, since households would view private investment and public investment as alternative ways of achieving an increased flow of future consumption benefits. A further explanation of crowding out involves price level and wealth effects. A deficit-financed increase in government expenditures results in an increase in liquid wealth. Although this increase in liquid wealth could result in an increase in consumption spending, it may also increase the demand for money. The increase in the price level that ensues from the increase in government spending results in a reduction of consumption, as well as in a reduction of real money balances. The net effect of these factors, together with an interest-rate-sensitive investment function, may lead to crowding out.

Much of the empirical evidence appears to be consistent with the crowding out phenomenon (see [4]). Although expenditure impact multipliers are positive, the long-term multipliers frequently become negative and perverse. One interpretation of this result is that initially an increase in government spending is expansionary, but ultimately crowding out sets in and creates perverse results.

One possible adverse effect of crowding out involves its inflationary potential. Whereas many studies which attempt to examine the inflationary impact of government policies are demand oriented, supply considerations may be extremely important also. In the case of a deficit-financed increase in government expenditures, the private investment spending that is crowded out may result in a diminished rate of growth of productive capacity. This "supply limiting" factor is potentially inflationary.

The objective of this empirical note is two-fold. First, it seeks to ascertain whether in fact investment spending is in any way crowded out by federal budget deficits. Second, if indeed such crowding out does occur, this note seeks to ascertain whether the crowding out has a significant impact on inflation.

AN A'NALYSIS OF CROWDING OUT

The first argument being examined here is essentially that deficit-financed fiscal policy displaces ("crowds out") private investment spending. To test this argument empirically, I estimate the following regression,

$$(1) \qquad It = \mathrm{ao} + a1\,Ut + a2\,\Pi rt\text{-}1 + a3\,\Pi NDt + a4,$$

where It = gross private domestic investment in nonresidential structures and producers' durable equipment during quarter t expressed in real terms (1967 dollars); Ut = capacity utilization rate in manufacturing, quarter t; $7rt$ = average profit rate in manufacturing in quarter t (as a percentage, namely, profits after taxes divided by stockholders' equity); ΔNDt = net change in the federal debt during quarter t) expressed in real terms (1967 dollars); a_4 = error term; and ao = constant. The data were computed and assembled for the period from 1950 through 1975.

It is now appropriate to explain the expected signs on the coefficients in Equation (1). First, I consider the variable U_t. Presumably, the greater the capacity utilization rate, the stronger the forces of demand for firms' outputs. Ceteris paribus, the stronger the demand for firms' outputs, the greater the incentive for firms to expand capacity, that is, to purchase new capital. Hence, I argue that $a_1 > 0$. Next, the higher the profit rate in a given period, the greater the ability (and probably the willingness) of firms to undertake investment in a subsequent period, ceteris paribus. Thus, it is argued that $a_2 > 0$. Finally, the greater the size of the federal budget deficit, the greater the degree to which private investment is crowded out, ceteris paribus. Thus, it is argued that $a_3 < 0$.

Estimating Equation (1) by OLS yields the following results:

$$(2) \quad It = +12.67043 + 2.31639\ Ut + 5.28806\ \Pi_{t-1} - 0.54022\ \Delta NDt$$
$$(+2.19) \qquad (+1.90) \qquad (-2.48)$$
$$DF = 100, \qquad R^2 = .60, \qquad D\text{-}W = 2.14,$$

where terms in parentheses are t-values.

The results in Equation (2) indicate that the level of private investment in new structures and capital equipment is significantly influenced by (1) the capacity utilization rate, (2) the previous period profit rate, and (3) the size of the federal budget deficit.[1] Given the structure of this model and given the number of observations, the D-W value of 2.14 implies no problem of serial correlation.[2] Apparently, the higher the capacity utilization rate, the higher the level of investment. Presumably this is because a high capacity utilization rate reflects strong demand, which in turn is an incentive for more investment commitments. Next, it appears that the higher the profit rate in a given period, the greater firms' willingness to undertake investment (capital expansion) in the following period.[3] Finally, and, from the viewpoint of this paper, most importantly, the level of investment during a given period seems to be profoundly affected by the size of the federal budget deficit in that period. Apparently the larger the size of the federal deficit, the greater the degree of crowding out of private investment. Thus, it appears that the crowding out phenomenon may be a very real and substantive issue.

CROWDING OUT AND INFLATION

The foregoing section has found that the larger the size of the federal budget deficit, the greater the degree to which private investment is crowded out. This section of the note analyzes the possible implications of such crowding out for inflation.

If, as the previous section indicates, crowding out of private investment does in fact occur, we should expect there to be inflationary consequences. The reasoning is quite simple. The larger the degree of crowding out of private investment, the slower the rate of growth of productive capacity over time. In turn, the slower the growth in productive capacity, the greater the rate of inflation, ceteris paribus.

In order to examine the inflationary impact of crowding out, the following equation is to be estimated:

$$(3) \qquad P_t = b_0 + b_1 I_{t-4} + b_2 I_{t-8} + b_3 U_t + b_4,$$

where Pt = the percentage change in the consumer price index (CPI) in quarter t; b_4 = error term; b_0 = constant; and U,I = as already defined. The price data were obtained for the period from 1950 through 1975.

In this equation, I would expect that $b1 < 0$. Clearly, the smaller (greater)

the degree to which crowding out occurs, the greater (smaller) the volume of investment, and hence the smaller (greater) the amount of future inflation. A time lag between the level of investment and the rate of inflation of four quarters is hypothesized. Similarly, the coefficient *b2* is argued to be negative: ceteris paribus, the larger the level of investment (in quarter $t - 8$), the greater the growth in productive capacity and hence the lower the rate of *future* inflation. Finally, the greater the capacity utilization rate, the greater the demand pressure in the economy and hence the greater the inflation rate, ceteris paribus. Hence, I argue that $b3 > 0$.

Estimating Equation (3) by OLS yields

$$(4) \quad Pt = -0.21406 - 0.00238\,It\text{-}4 - 0.00145\,It\text{-}B + 1.19503\,Ut,$$
$$(-2.69) \qquad (-1.98) \qquad (+2.21)$$
$$DF = 100, \qquad R^2 = .54, \qquad D\text{-}W = 2.07,$$

where terms in parentheses are t-values.

Once again, the D-W value of 2.07 implies no problem of serial correlation within this estimation. Next, as the results indicate, the inflation rate is significantly influenced by each of the variables considered. Specifically, the larger the volume of investment in a given quarter, the less the inflation rate four quarters later. Next, inflation in a given quarter is also diminished by a greater level of investment two years (eight quarters) earlier. Finally, it appears (as already argued) that the higher the capacity utilization rate, the greater the demand pressure in the economy and hence the greater the inflation rate.[4]

As an alternative to using the percentage change in the consumer price index, I also have considered the variable, *mPt,* which is defined as the "annual percentage change in industrial prices." Estimating Equation (3) by OLS but using mP_t in lieu of *Pt,* I obtain:

$$(5) \quad mPt = -0.22045 - 0.00209\,It\text{-}4 - 0.00149\,It\text{-}s + 1.00563\,Ut,$$
$$(-2.62) \qquad (-1.99) \qquad (+2.19)$$
$$DF = 100, \qquad R^2 = .53, \qquad D\text{-}W = 2.04,$$

where terms in parentheses once again are t-values.

This estimation yields results which are very similar to those found in Equation (4). Although inflation is in this case measured by a different index, nevertheless, I once again find all of the coefficients statistically significant at the .05 level or better with the expected signs. The most relevant of these results (from the viewpoint of this paper) reaffirms the apparent inflationary impact of crowding out.

CONCLUSIONS

This paper has found that private investment is apparently crowded out as a result of federal budget deficits. In addition, it has been found here that this

Crowding out phenomenon has an important inflationary impact on the economy. This inflationary impact is presumably caused through an alteration in the rate at which productive capacity expands.

Traditionally, the inflationary potential of monetary and fiscal policies has been examined in terms of the impact of such policies on *demand.* Relatively little formal attention has been given to an examination of the inflationary potential of these policies that derives from *supply* considerations. As this paper indicates, however, such supply considerations may be extremely important, especially over the long run. In view of their relevance and policy importance, the issues at hand clearly warrant further attention.

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NOTES

1. Several variations on the model in Equation (1) were considered. A number of these examined the impact on investment of various measures of the interest rate (such as the prime rate, Moody's Aaa Corporate bond rate, the three-month Treasury bill rate, and the rate on three to five year US government security issues). In all such cases, significant multicollinearity problems arose. Moreover, the coefficient for each of the various interest rate measures was in no case significant at the .05 level.

It might also be noted that I have experimented with Equation (1) by adding I_{t-i} to the regression. This creates problems of multicollinearity, however, since I_{t-1} is very highly correlated with r_{t-i}.

2. In Equation (2), D-W = 2.14. Given the sample size here, the upper critical value for testing for serial correlation, *du* is 1.67.

3. Alternative lags on the profit rate of up to four quarters produced reasonably similar results. The one-period lag nevertheless provided the best overall fit.

4. It is to be noted that I experimented with several alternative lag structures, including I_{t-1}, I_{t-2}, I_{t-3}, I_{t-5}, I_{t-6}, and I_{t-7}. Although most of these results *were* reasonably similar to those reported in Note (3), the lag structure in Note (3) pro- vided by far the best overall fit.

* Mr. Cebula is associate professor of economics at Emory University. He gratefully acknowledges helpful comments from an anonymous *referee* and thanks Steve Riney and Daisy Liu for data assembly and computation.

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