

# Crowding Out and Its Critics\*

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DOES Government spending displace a near-equal amount of private spending? This notion, popularly known as the "crowding-out" effect of Government expenditures, has recently gained wide-spread attention at two levels. First, at the policy level, public officials have expressed concern that massive current and projected Federal deficits will have a deleterious effect on private capital expenditures for some time to come. Second, at the academic level, "crowding out" is at least one of the issues which helps to distinguish between followers of the two major macroeconomic schools of thought — Keynesians and monetarists.

This article focuses on "crowding out" from more of an academic than a practical policy point of view. Policy implications can be drawn from this discussion, but, for the most part, the abstract economic models used in academic circles are not easily adaptable to observable phenomena. Yet the origins of the recent crowding-out controversy at the academic level are traceable to certain empirical results based on U.S. experience.

New research has been conducted in this area and some old arguments have been revived.<sup>1</sup> Many of the developments in the crowding-out controversy

<sup>\*</sup>The authors acknowledge the helpful comments of James Barth, William Dewald, Dean Dutton, Thomas Havrilesky, Robert Rasche, Paul Smith, Frank Steindl, and William Yohe, none of whom should be held responsible for remaining errors.

<sup>1</sup>For a survey that includes a discussion of the views of the classical economists on crowding out, see Roger W. Spencer and William P. Yohe, "The 'Crowding Out' of Private Expenditures by Fiscal Policy Actions," this *Review* (October 1970), pp. 12-24.

can be described in the context of the standard IS-LM analytic framework. In this framework, which is the cornerstone of most macroeconomics courses taught throughout the western world, the IS curve represents the locus of points (pairs of interest rates and real income) in which the real sector of the economy is in equilibrium, and the LM curve represents a similar locus of points for which the demand for money equals the supply. The IS-LM apparatus has distinct limitations, but because of its widespread use as a pedagogical device, it serves a useful function in highlighting the issues in the crowding-out controversy.<sup>2</sup>

The subject of crowding out is approached by first investigating a number of separate "cases" which provide various explanations of how crowding out might occur. Next, the role of stability considerations in the controversy is assessed. Finally, several econometric models are examined to determine what empirical implications they have for the crowding-out issue.

## SOME PRELIMINARIES

To set the stage for the discussion, two matters of a preliminary nature are taken up in this section. First, crowding out is defined for the purposes at hand. Much of the recent discussion of crowding out has been confusing simply because the term has not been carefully defined. Second, since the controversy

<sup>2</sup>For discussion of the limitations of the IS-LM framework, see Karl Brunner and Allan H. Meltzer, "Monetarism: The Principal Issues, Areas of Agreement and the Work Remaining," *Monetarism*, ed. Jerome L. Stein, (Amsterdam: North Holland Publishing Co., forthcoming), and "Mr. Hicks and the Monetarists," *Economica* (February 1973), pp. 44-59.

has moved through several stages in recent years and has oftentimes involved complex and subtle arguments, an overview is provided as a guide to the reader.

### *What Is Crowding Out?*

Crowding out generally refers to the economic effects of expansionary fiscal actions. If an increase in Government demand, financed by either taxes or debt issuance to the public, fails to stimulate total economic activity, the private sector is said to have been "crowded out" by the Government action. The presumption of a constant money supply insures that the policy action accompanying the increase in Government demand is fiscal and not monetary.

The analysis may be conducted in either real or nominal terms. The crowding-out hypothesis maintains that if prices are held constant, as in typical IS-LM fashion, an increase in real Government demand financed by real taxes or debt has no lasting effect on real income. Alternatively, crowding out implies that an increase in Government spending, given flexible prices and a constant money supply, has no lasting effect on nominal income. In other words, the steady state Government spending multiplier, under the above conditions, is approximately zero.<sup>3</sup>

By approximately zero, we mean that increased Government demand may crowd out exactly the same amount of private demand, slightly less, or slightly more. There is complete crowding out if \$1 of Government demand displaces \$1 of private demand, partial crowding out if \$1 of Government demand displaces less than \$1 of private demand, and over crowding out if \$1 of Government demand displaces more than \$1 of private demand. The increased Government demand may increase aggregate demand temporarily, permanently, or not at all, as will be explained below.

### *Overview*

The origins of the recent controversy are traceable primarily to the empirical results published by Andersen and Jordan in 1968 and supporting studies by Keran in 1969 and 1970.<sup>4</sup> These results indicated

<sup>3</sup>These definitional issues are explored in more detail in the appendix.

<sup>4</sup>Leonall C. Andersen and Jerry L. Jordan, "Monetary and Fiscal Actions: A Test of Their Relative Importance in Economic Stabilization," this *Review* (November 1968), pp. 11-24; Michael W. Keran, "Monetary and Fiscal Influences

that nominal crowding out occurs; that is, a change in Federal spending financed by either borrowing or taxes has only a negligible effect on GNP over a period of about a year. These studies did not suggest that expansionary fiscal actions have no effect, but showed instead that the initial effect, which is positive, is followed in later quarters by an approximately off-setting negative effect.

The response to these empirical results took place at two levels — statistical and theoretical. At the statistical level, the validity of the results was questioned. Were proper statistical procedures followed in their derivation?<sup>5</sup> On the theoretical level the question was whether or not the results were consistent with what seemed to be the accumulated evidence on certain theoretical propositions.<sup>6</sup>

Although all the returns regarding the validity of the Andersen-Jordan empirical procedures are not yet in, this article focuses on the theoretical arguments that have since evolved. The first theoretical argument offered in response to the crowding out concept was an alleged inconsistency between such results and the prevailing estimates of the interest elasticity of the demand for money.<sup>7</sup> The critics charged, on the basis of the IS-LM framework, that in order for crowding out to occur, the proponents of these results must be assuming that the demand for money is nearly perfectly interest-inelastic. This allegation meant acceptance of the proposition that the LM curve is essentially vertical. According to the critics, most empirical estimates do not support a zero interest elasticity of money demand.

In answer to this charge of inconsistency, Milton Friedman and others argued that the slope of the LM curve was largely irrelevant to the crowding out

on Economic Activity — The Historical Evidence," this *Review* (November 1969), pp. 5-24, and "Monetary and Fiscal Influences on Economic Activity: The Foreign Experience," this *Review* (February 1970), pp. 16-28.

<sup>5</sup>See E. Gerald Corrigan, "The Measurement and Importance of Fiscal Policy Changes," Federal Reserve Bank of New York *Monthly Review* (June 1970), pp. 133-45; Richard G. Davis, "How Much Does Money Matter? A Look at Some Recent Evidence," Federal Reserve Bank of New York *Monthly Review* (June 1969), pp. 119-31; and Edward M. Gramlich, "The Usefulness of Monetary and Fiscal Policy as Discretionary Stabilization Tools," *Journal of Money, Credit and Banking* (May 1971), pp. 506-32.

<sup>6</sup>James Tobin, "Friedman's Theoretical Framework," *Journal of Political Economy* (September/October 1972), pp. 852-63; Warren L. Smith, "A Neo-Keynesian View of Monetary Policy," Federal Reserve Bank of Boston, *Controlling Monetary Aggregates* (June 1969), pp. 105-26; and Ronald L. Teigen, "A Critical Look at Monetarist Economics," this *Review* (January 1972), pp. 10-25.

<sup>7</sup>Tobin, "Friedman's Theoretical Framework."

discussion.<sup>8</sup> In particular, Friedman pointed out the necessity of distinguishing between initial and subsequent effects of fiscal actions. According to Friedman, an "expansionary" fiscal action might first be reflected in a rise in output, but the financing of the deficit would set in motion contractionary forces which could eventually offset the initial stimulative effect.<sup>9</sup>

In response to the Friedman explanation, the critics developed still another argument, again pointing out an alleged inconsistency. This time the critics attempted to demonstrate that the Friedman argument, which stemmed from explicit consideration of the Government's financing requirements, is not consistent with generally accepted assumptions concerning stability of the economic system (as represented by the IS-LM apparatus).<sup>10</sup> In particular, a debt-financed increase in Government spending in a world where crowding out occurs does not set in motion a set of forces that will drive the IS-LM model to a new equilibrium once it is disturbed from an initial equilibrium.

All of these arguments are reviewed in some detail in this article. Several alternative explanations are offered as to how crowding out might occur regardless of the slope of the LM curve. A number of shortcomings of the recently advanced arguments based on stability analysis are discussed. Finally, returning to the empirical level, the results of some well-known econometric models are examined to see what light they shed on the crowding-out controversy.

### CROWDING OUT AND THE SLOPE OF THE LM CURVE

Until recently, it was suggested by a number of analysts that contemporary monetarists view the

<sup>8</sup>Milton Friedman, "Comments on the Critics," *Journal of Political Economy* (September/October 1972), pp. 906-50; and Karl Brunner and Allan H. Meltzer, "Money, Debt, and Economic Activity," *Journal of Political Economy* (September/October 1972), pp. 951-77.

<sup>9</sup>For further discussion of the role of the Government financing constraint, see Spencer and Yohe, "The 'Crowding Out' of Private Expenditures;" Carl F. Christ, "A Short-Run Aggregate-Demand Model of the Interdependence and Effects of Monetary and Fiscal Policies with Keynesian and Classical Interest Elasticities," *The American Economic Review* (May 1967), pp. 434-43, and "A Simple Macroeconomic Model with a Government Budget Restraint," *Journal of Political Economy* (January/February 1968), pp. 53-67; and William L. Silber, "Fiscal Policy in IS-LM Analysis: A Correction," *Journal of Money, Credit and Banking* (November 1970), pp. 461-72.

<sup>10</sup>Alan S. Blinder and Robert M. Solow, "Does Fiscal Policy Matter?" *Journal of Public Economics* (November 1973), pp. 319-37; and James Tobin and Willem Buiter, "Long

vertical LM curve as a requirement for the existence of crowding out. James Tobin, for example, observed that a vertical LM curve leads to the "characteristic monetarist" proposition that "a shift of the IS locus, whether due to fiscal policy or to exogenous change in consumption and investment behavior, cannot alter Y".<sup>11</sup> William Branson, in his popular macroeconomics textbook, noted that

The monetarist position is that the interest elasticities of the demand for and supply of money are zero, so that the LM curve is vertical. In this case fiscal policy changes the composition, but not the level of national output, while monetary policy, shifting a vertical LM curve, can change the level of output.<sup>12</sup>

Similar statements can be found in other texts.

This classical case of crowding out is examined in some detail because of its presumed importance in the crowding-out discussion. Following discussion of this classical case, several alternative explanations are offered as to how crowding out can occur in the IS-LM framework, even if the interest elasticity of money demand is not zero.

### *The Classical Case: A Vertical LM Curve*

In order for Government spending to stimulate economic activity, it must either foster increases in the money stock (however defined) or increases in the rate at which the existing money stock turns over. Because the former possibility does not involve net debt purchases by the private sector or increases in taxes, there is no reason to think that private spending would be crowded out. However, if the money stock does not increase, Government spending must be financed by debt issuance or increased tax revenue, either of which could result in a reduction in private spending. If private spending is not curbed by such actions, total spending rises, which implies a rise in velocity — the rate at which the money stock turns over.

Run Effects of Fiscal and Monetary Policy on Aggregate Demand," Cowles Foundation Discussion Paper No. 384 (December 13, 1974).

<sup>11</sup>Tobin, "Friedman's Theoretical Framework," p. 853.

<sup>12</sup>William H. Branson, *Macroeconomic Theory and Policy* (New York: Harper & Row, Publishers, 1972), p. 281. It is of interest to note that Tobin labels the case in which only monetary policy can affect income as characteristically monetarist and the situation in which both monetary and fiscal policies can alter income as characteristically neo-Keynesian. Branson symmetrically views the vertical LM case as "extreme" monetarist, and the vertical IS case as "extreme" neo-Keynesian (or "fiscalist").

It is an axiom of classical economics that velocity is virtually constant and cannot be increased by Government actions. In particular, the rise in interest rates, which is associated with the issuance of Government debt, does not induce the private sector to attempt to hold less money balances because the demand for money is not sensitive to interest rate changes. This idea can be illustrated graphically with the Hicksian IS-LM apparatus in Figure 1.

The LM curve is vertical (drawn for a given price level,  $P_0$ ) in the classical case, reflecting a zero interest elasticity of the demand for (and supply of) money. Thus, an increase in Government spending which shifts the IS curve to the right can only increase the interest rate, but does not stimulate velocity. Consequently, aggregate demand, as shown in the bottom half of Figure 1, does not shift.<sup>13</sup> One or more components of private spending are crowded out by an amount equal to the amount of the Government spending increase. As a result, with aggregate demand failing to shift in response to the increase in Government spending, crowding out occurs in both real and nominal terms.

*Alternative Cases: Crowding Out Without a Vertical LM Curve*

Five cases are presented which represent economic situations conducive to Government displacement of private spending *without* the requirement of a vertical LM curve. The architects of these frameworks range from such disparate figures as the Chicago economists, Frank Knight and Milton Friedman, to John Maynard Keynes.

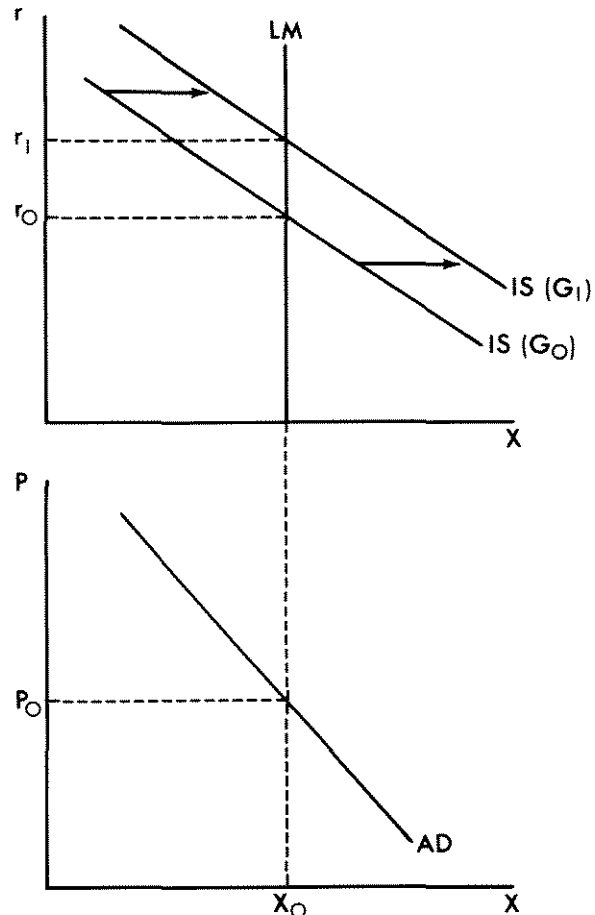
*The Keynes Case: Expectations Effects* — John Maynard Keynes in 1936 provided the thrust for the proposition that Government spending does *not* crowd out private spending in his landmark book, *The General Theory of Employment, Interest and Money*.<sup>14</sup> It is ironic that certain passages in that book provide strong support for the opposite contention.

Keynes, throughout his *General Theory*, was much concerned with expectations and confidence. He did not overlook the possibility, even in those times of relatively small budget deficits, that Government

<sup>13</sup>Although shown as a straight line, the true spirit of the classical case would be better preserved if aggregate demand were drawn as a rectangular hyperbola.

<sup>14</sup>John Maynard Keynes, *The General Theory of Employment, Interest and Money* (New York: Harcourt, Brace and Company, 1936), pp. 119-20.

Figure 1  
Classical Case

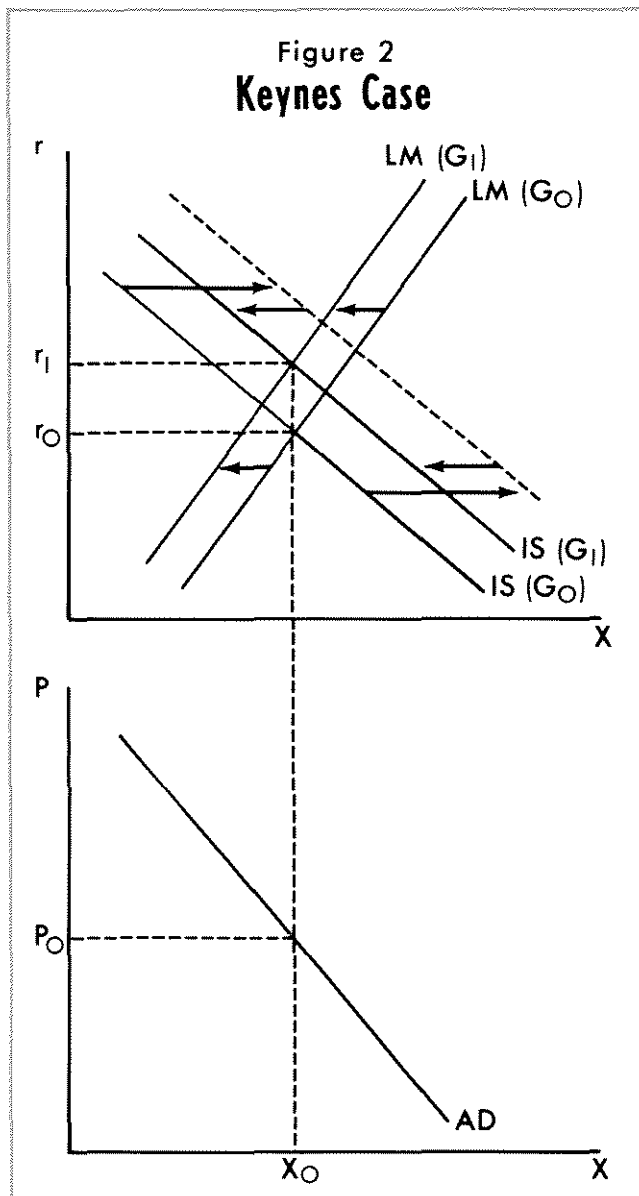


spending could adversely affect the confidence of the private sector in its economic future.

With the confused psychology which often prevails, the Government programme may, through its effect on 'confidence', increase liquidity preference or diminish the marginal efficiency of capital, which, again, may retard other investment unless measures are taken to offset it.<sup>15</sup>

An induced increase in liquidity preference, subsequent to an increase in Government spending from  $G_0$  to  $G_1$ , is depicted in the IS-LM framework (see Figure 2) by a leftward shift of the LM curve, and a diminished marginal efficiency of investment schedule is reflected by the subsequent backward shift of the

<sup>15</sup>Ibid., p. 120. For an algebraic analysis that takes into account some of the relevant aspects of this Keynes case, see Richard J. Cebula, "Deficit Spending, Expectations, and Fiscal Policy Effectiveness," *Public Finance* (3-4/1973), pp. 362-70.



IS curve to the position denoted as  $IS(G_1)$ . If these shifts in the IS and LM curves result in no change in aggregate demand at the given price level  $P_0$ , both nominal and real crowding out will occur. However, the actual shift in aggregate demand could be positive, negative, or negligible, depending on the relative shifts of the IS and LM curves.

A number of analysts have recently invoked the Keynes case to explain the sluggishness of capital expenditures in recent years. They, however, are not the first since Keynes to attribute lackluster investment plans to stepped-up Government spending. Describing a situation with some similarities to the present, Daniel Throop Smith observed (in 1939) that:

A continued experience with deficits which do not produce sustained recovery, as in this country, or a recent inflation and collapse, as in continental European countries, is likely to make a deficit a matter for concern and anxiety. And, if there is disbelief in the benefits of a deficit, then the new money spent by the government may well be more than offset by additional withdrawals of private money which would otherwise be spent. Likewise, if consumer incomes do increase immediately as a result of the deficit, business may anticipate that the increase is temporary and refrain from long-term commitments.<sup>16</sup>

*The Knight Case: A Horizontal IS Curve* — This case is constructed on the basis of the writings of Frank Knight.<sup>17</sup> The analysis does not do justice to the complex theories of Knight, but is offered as being roughly consistent with the spirit of his theory of capital and interest.<sup>18</sup> Though Knight certainly did not conduct his analysis within an IS-LM framework, an attempt is made to translate his ideas into such terms.

According to Knight, we should expect no diminishing returns from investment. One reason for a nearly perfectly interest-elastic investment function is that the quantity of capital is so large relative to the additions to it that these additions should not be expected to have much of an effect on the yield of capital.<sup>19</sup> Another reason, according to Knight, is

<sup>16</sup>Daniel Throop Smith, "Is Deficit Spending Practical?" *Harvard Business Review* (Autumn 1939), p. 38.

<sup>17</sup>No attempt is made to cite all of Knight's articles on interest and capital, but a summary is contained in Frank H. Knight, "Capital and Interest," in *Readings in the Theory of Income Distribution*, The American Economic Association (Philadelphia: The Blakiston Company, 1949), pp. 384-417. The Knight case was suggested to the authors by William Dewald of Ohio State University, but he is absolved of any responsibility for the particular analysis here.

<sup>18</sup>The difficulty of interpreting Knight's writing is illustrated by Friedrich A. Lutz, *The Theory of Interest* (Chicago: Aldine Publishing Co., 1968), p. 104, where he introduces his chapter on Knight as follows:

It is not easy to give an exposition of Knight's theory of capital and interest. Over a number of years Knight devoted many papers to the subject; and, as anyone who ever attempted to work his way through Knight's theory knows, these writings have passages which are very difficult to understand and also, either apparently or really, contradictory.

<sup>19</sup>For a discussion of the relationship between stocks and flows in the market for capital goods, see James G. Witte, Jr., "The Microfoundations of the Social Investment Function," *The Journal of Political Economy* (October 1963), pp. 441-56.

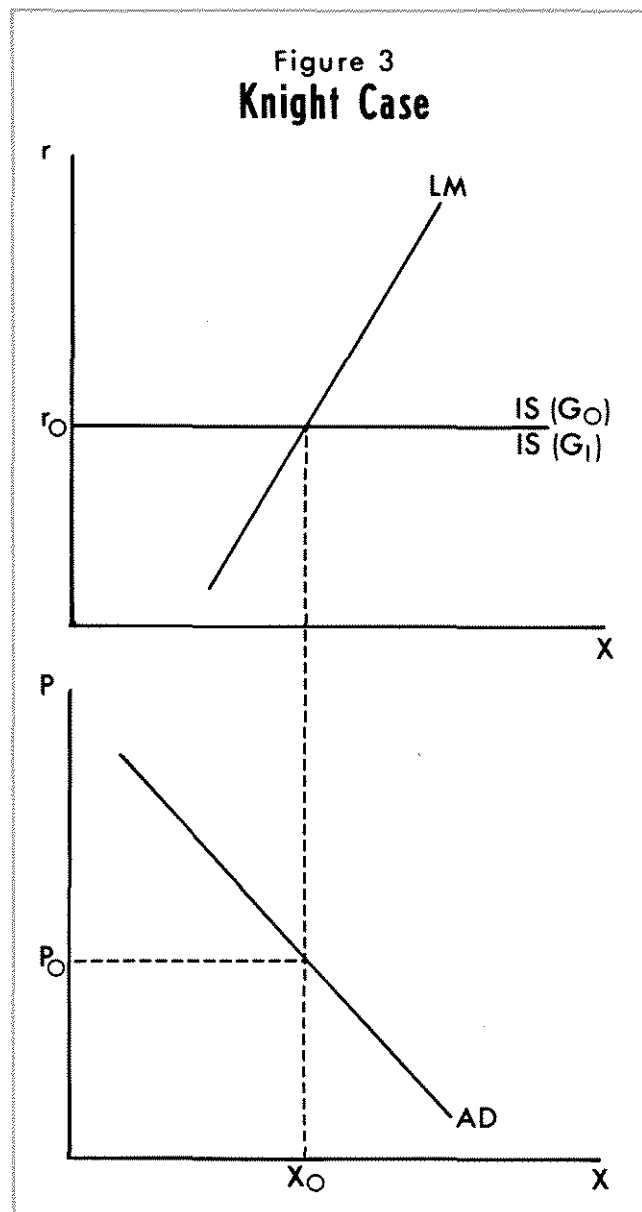
To add to the confusion relating to the interpretation of Knight's writings, it should be noted that Knight did not accept the three-part division of resources into land, labor and capital. His interpretation, rather, was that anyone who has control over productive capacity will employ any or all sources in such a way as to maximize the return for their use. For an analysis that preserves this broad interpretation of capital, see Milton Friedman, *Price Theory: A Provisional Text* (Chicago: Aldine Publishing Company, 1962), pp. 244-63.

that investment carries with it an investment in knowledge, including research and development. As a result, a declining marginal product of capital is approximately offset by technological advances so that an aggregate investment curve is drawn as nearly horizontal with respect to the yield on capital.

When translated into an IS-LM frame of reference, the Knight case introduces an interesting element to the crowding-out controversy. A perfectly flat IS curve (see Figure 3) means that fiscal actions are incapable of shifting the IS curve. An increase in Government spending, for example, absorbs saving and reduces the amount available for private investment (any increase in Government spending shows up as a one-for-one displacement of private investment). Combining the flat IS curve with the LM curve provides a case where monetary policy dominates the determination of output. Fiscal actions have no effect on either output or the interest rate.<sup>20</sup> It is of interest to note that monetary policy has no effect on the interest rate either, an implication which runs counter to some statements by Knight.<sup>21</sup> But because fiscal actions do not shift aggregate demand for this so-called Knight case, the implication is that both nominal and real crowding out occur.<sup>22</sup>

*The Ultrarational Case: Direct Substitution Effects*

—Recently, Professors Paul David and John Scadding developed some arguments for crowding out that are derived from an assumption of ultrarationality on the part of households.<sup>23</sup> The notion of ultrarationality is based on the assumption that households regard the corporate and Government sectors as extensions of themselves — as instruments of their private interests. This fundamental behavioral assumption is offered as an explanation for Denison's Law — the



observed stability of the ratio of gross private saving to GNP in the United States.<sup>24</sup>

The David-Scadding article is of relevance to the crowding-out controversy because of its fiscal policy implications. The assumption of ultrarationality implies displacement effects of Government spending which the authors call "ex ante crowding out." They argue that stability of the gross private saving ratio

<sup>20</sup>It is surprising that this case has not received more attention in the literature, because it is every bit as monetarist as the vertical LM case. For an example of one writer who does mention this case, see Martin Bronfenbrenner, *Income Distribution Theory* (Chicago: Aldine-Atherton, 1971), pp. 339-40. However, Bronfenbrenner dismisses it as a long-run case with little short-run significance.

<sup>21</sup>See Knight, "Capital and Interest," p. 406.

<sup>22</sup>Though the Knight case has not been empirically tested, it has implications which are consistent with the results of a number of empirical studies. The Andersen-Jordan results relating changes in GNP to monetary and fiscal actions are consistent with such a case. The inability to find a stable relationship between interest rates and various measures of fiscal action is also consistent. And finally, the stability of real interest rates over time — at least to the extent real rates have been measured — provides indirect evidence in support of the Knight model.

<sup>23</sup>Paul A. David and John L. Scadding, "Private Savings: Ultrarationality, Aggregation, and 'Denison's Law,'" *Journal of Political Economy* (March/April 1974), pp. 225-49.

<sup>24</sup>Edward F. Denison, "A Note on Private Saving," *The Review of Economics and Statistics* (August 1958), pp. 261-67. David and Scadding suggest that if Government and corporate activity simply substitute for, rather than augment, household activity, there should be virtually no change in such broad aggregates as the ratio of gross private saving to GNP.

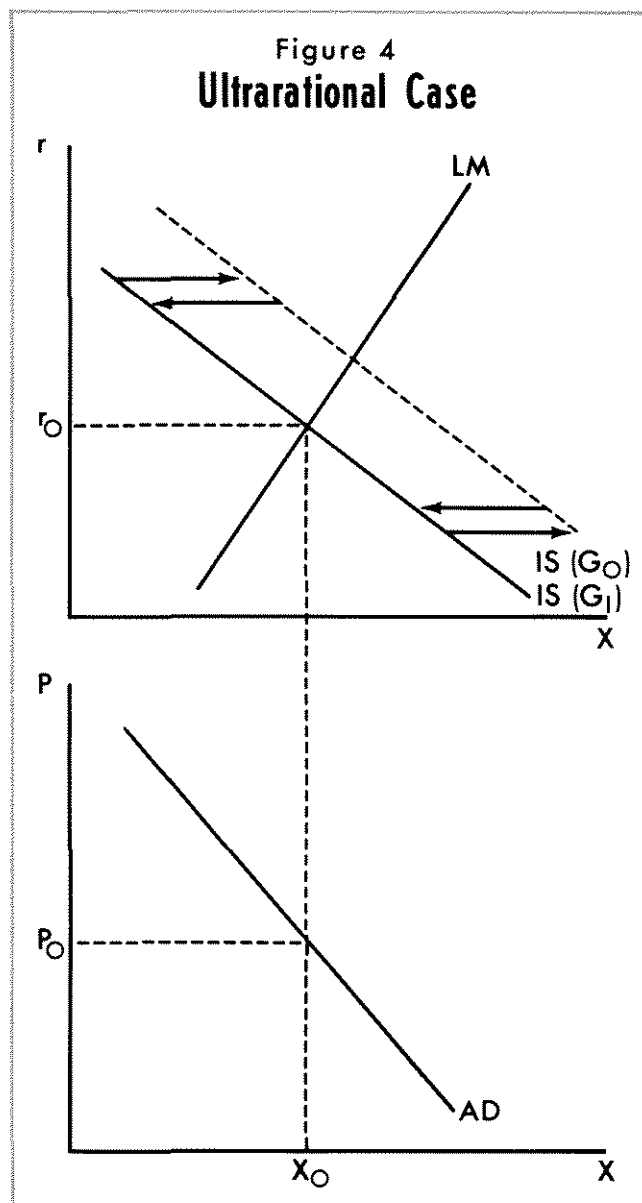
in the face of substantial variation in the Government deficit suggests that private debt and public debt are close substitutes. An extra dollar of Government deficit displaces a dollar of private investment expenditure because deficit financing is viewed as public investment and substitutes for private investment in that households tend to classify both in terms of future consumption benefits. This case is shown in Figure 4, where an increase in Government spending financed by borrowing induces an offsetting change in private investment so that the IS curve does not shift on balance.

Similarly, tax-financed expenditures have a displacement effect on private consumption since they are viewed in terms of their present consumption benefits and substitute perfectly for private consumption. With an increase in Government spending for consumption financed by increased taxes, the increase in taxes reduces private consumption with no effect on private saving. As a result, there is a shift in the composition of output from the private sector to the Government, but there is no shift in aggregate demand.

Consequently, with tax-financed Government expenditures displacing private consumption and Government bond issues (deficit financing) displacing private debt issues dollar for dollar, there is no way that fiscal actions can affect total demand for goods and services. In the parlance of the IS-LM framework, fiscal actions (defined as either tax- or debt-financed Government expenditures) have no net effect on the IS curve or on aggregate demand, which implies both nominal and real crowding out. Also, for this case, fiscal actions have no influence on interest rates.

Whether the David-Scadding ultrarational case is to be taken as a serious explanation of crowding out is an open question. Yet it is important to note the implications of this model, because it represents a departure from the severe restrictions implicit in the IS-LM model. In particular, the IS-LM model allows for no substitution between private spending and public spending; David-Scadding have shown that moving away from these restrictive assumptions acts in the direction of reducing the fiscal policy multipliers. Furthermore, by way of Denison's Law, they conclude that the evidence leans more toward the extreme of ultrarationality than the extreme of the IS-LM model.

*The Extended IS-LM Case: Price Flexibility* — All cases discussed thus far have not presented any conflicts with respect to the nominal versus real crowding



out issue, because aggregate demand typically does not shift. There is, however, another way in which crowding out might occur, reflecting a response of the price level to a step-up in Government spending. This case argues that crowding out is possible even without the assumption that aggregate demand does not shift. The implication for nominal versus real crowding out is ambiguous for this case, however.

Robert Rasche constructed a sophisticated version of the IS-LM apparatus which was based primarily on the textbook presentation of Robert Crouch.<sup>25</sup>

<sup>25</sup>Robert H. Rasche, "A Comparative Static Analysis of Some Monetarist Propositions," this *Review* (December 1973), pp. 15-23; and Robert L. Crouch, *Macroeconomics* (New York: Harcourt Brace Jovanovich, Inc., 1972).

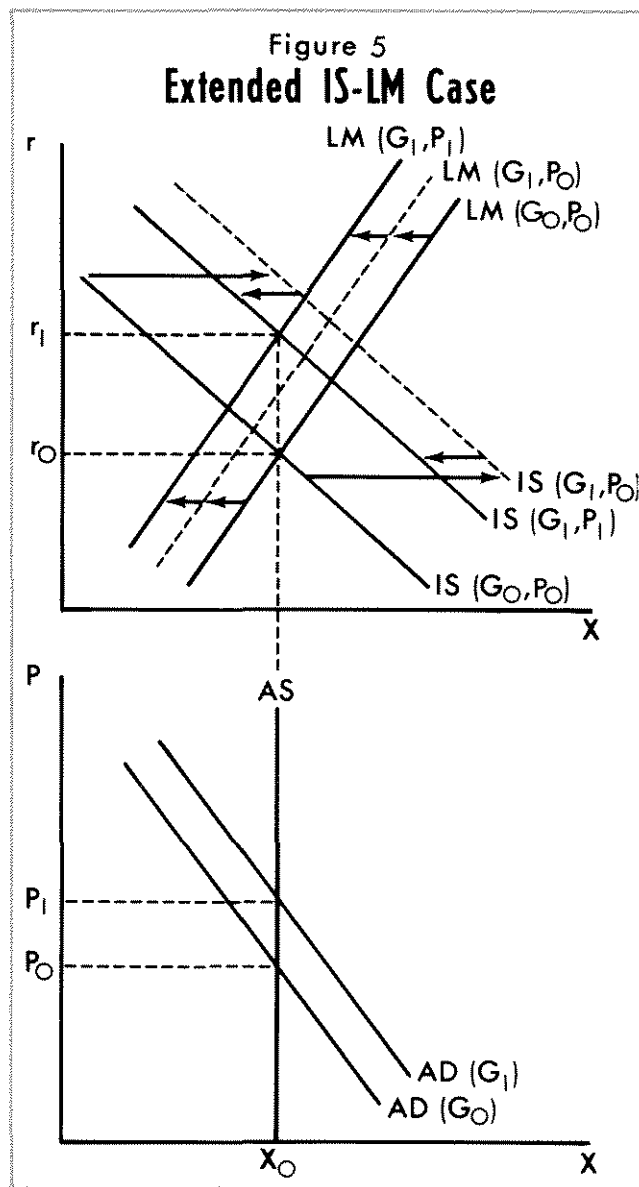
The model included wealth in the consumption and money demand functions, a Government budget constraint, and a labor sector, as well as an endogenous price level. According to Rasche's analysis, an increase in real Government purchases, financed either by taxes or debt issuance, increases aggregate demand, and, consequently, the commodity price level. Although there may also be a rise in consumption owing to a presumed positive effect of debt issuance on wealth, there is an offsetting increase in the demand for money associated with such wealth gains (see Figure 5). The rise in the price level reduces private consumption as well as the real supply of money. Together with a decline in the amount of private investment owing to an increase in interest rates, these factors tend to crowd out an amount of real private expenditures equivalent to the increase in Government purchases. Crowding out occurs in this model in real terms, but with a higher price level, crowding out is not likely to occur in nominal terms.

These results lead Rasche to conclude that nominal crowding out requires "extreme" assumptions about the interest elasticity and the wealth elasticity of the demand for real cash balances. It should be pointed out, however, that Rasche, in his manipulation of the model, did not allow for a Keynes expectation effect, an ultrarational direct substitution effect, or a Knight effect, all of which may leave the aggregate demand curve unmoved in response to an initial increase in Government spending.

*The Friedman Case: Initial vs. Subsequent Effects*

—Milton Friedman's role in the crowding-out controversy was established in a series of articles published in the *Journal of Political Economy* over the period 1970 to 1972.<sup>26</sup> Friedman did not rely solely on the IS-LM model as a framework for his analysis, but most of his ideas can be summarized in such a context. Friedman denied emphatically that the monetarist propositions rested on the shape of the LM locus. Instead, Friedman stressed the continuing effects of deficit finance, and a fundamental distinction between stocks and flows.

Friedman dealt with a large number of complex issues in his reply to the critics, and it is difficult to determine to what extent he supported the notion of fiscal crowding out. His chief point seems to have



been that the power of monetary actions far surpasses that of fiscal actions, which is similar to but not quite the same as declaring a belief in crowding out. Nevertheless, he concluded that the expansionary effect of an increase in Government spending by borrowing is likely to be minor.

To illustrate the Friedman case, consider Figure 6. The IS curve is drawn quite flat, reflecting Friedman's statement that "saving" and "investment" have to be interpreted much more broadly than neo-Keynesians tend to interpret it, . . ."<sup>27</sup> Though Friedman does not emphasize it, this interpretation puts him close to the Knight case, because the implication of more

<sup>26</sup>Friedman, "Comments on the Critics"; "A Theoretical Framework for Monetary Analysis," *Journal of Political Economy* (March/April 1970), pp. 193-238; and "A Monetary Theory of Nominal Income," *Journal of Political Economy* (March/April 1971), pp. 323-37.

<sup>27</sup>Friedman, "Comments on the Critics," pp. 915.



inclusive investment tends to flatten the IS curve and dampen the power of fiscal actions.<sup>28</sup> In addition, Friedman indicates that the wealth effects of increased bond holdings on spending will be minimal, because increases in debt would tend to be offset by an increase in expected tax liabilities.

Perhaps an even more important reason to doubt the long-run expansive capacity of increased Government spending is its effect on the future production of goods and services. Friedman notes that debt-supported Government spending leads to a "reduction in the physical volume of assets created because of lowered private productive investment."<sup>29</sup> In other words, potential output in the future will be lowered relative to what it would otherwise be with the transfer of resources from private investment (which generates the future capital stock) to Government spending (which absorbs the capital stock).

Apart from these objections to the idea of stimulative Government actions, an initial shift of the IS curve (see Figure 6) may still be consistent with crowding out over the longer term. For a given LM curve, the relatively flat IS curve, which Friedman apparently envisions, yields a shift of aggregate demand which is very small. In addition, Friedman notes that "the evidences of Government debt are largely in place of evidences of private debt — people hold Treasury bills instead of bills issued by, for example, U.S. Steel."<sup>30</sup> If this statement is given the ultrarational interpretation discussed earlier, private expenditure is cut back, thereby offsetting the initial increase in Government spending. Whether such an effect is a partial or complete offset is not made clear, but if it exists, the IS and aggregate demand curves move back toward their original positions.

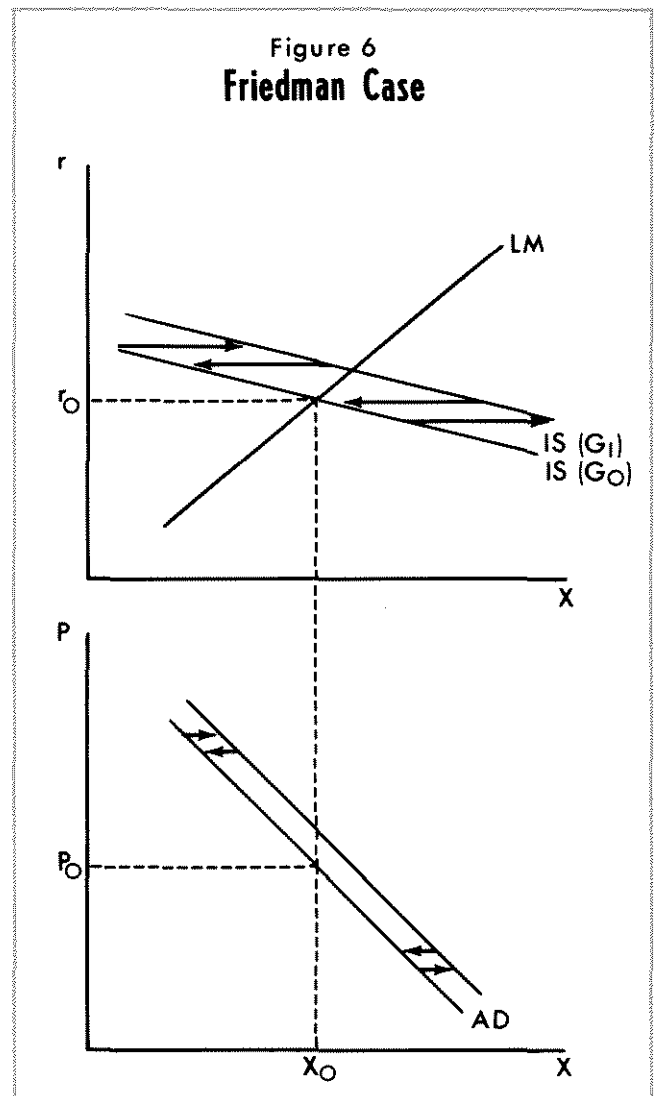
These are the initial effects of a debt-financed increase in Government spending, but Friedman goes on to emphasize that subsequent effects will continue as long as a deficit exists. In later periods, the IS curve will continue shifting back to the left because private expenditures continue to be cut back

<sup>28</sup>T. Norman Van Cott and Gary Santoni, "Friedman versus Tobin: A Comment," *Journal of Political Economy* (July/August 1974), pp. 883-85. In this article the authors show that the effect of broadening the interpretation of saving and investment is to make the IS schedule flatter. They demonstrate this by adding the interest rate as an argument in the consumption function, and then showing that the extent to which the IS curve is shifted is unaffected by fiscal actions; only the slope is changed.

<sup>29</sup>Friedman, "Comments on the Critics," p. 917.

<sup>30</sup>*Ibid.*

Figure 6  
Friedman Case



as Government debt is substituted for private debt. Eventually, the stock of private wealth will be reduced relative to what it otherwise would be because of reduced investment, thereby reinforcing the leftward movement of the IS curve.<sup>31</sup>

Because Friedman is not clear with regard to the role of commodity prices in his analysis, it is difficult to assess his view of real versus nominal crowding out. It is perhaps best simply to conclude that the impact of an increase in debt-financed Government spending is very small, and that there is little difference between the effects of debt- versus tax-financed expenditure. A relatively flat IS curve yields these

<sup>31</sup>For a recent paper that works out a numerical example of the first round and subsequent effects of a fiscal action in an IS-LM framework, see Laurence H. Meyer, "The Balance Sheet Identity, The Government Financing Constraint, and the Crowding-Out Effect," *Journal of Monetary Economics* (January 1975), pp. 65-78.

results, and any ultrarational effects would reinforce them.

### CROWDING OUT AND STABILITY CONSIDERATIONS

The Friedman emphasis on the longer-run effects of monetary and fiscal actions prompted two major papers (one by Alan Blinder and Robert Solow and the other by James Tobin and Willem Buiter) that attempted to demonstrate that the crowding-out effect of fiscal actions is not consistent with the assumption of stability of the economic system, as represented by the IS-LM model.<sup>32</sup> Both of these papers are discussed in this section along with a third — by Karl Brunner and Allan Meltzer — which actually antedates the other two.<sup>33</sup> All three models essentially employ comparative static tools to examine a dynamic phenomenon.

#### *The Long-Run Balanced Budget Models*

*Blinder and Solow* — Recently, Blinder and Solow developed a rigorous theoretical attack on the crowding-out thesis.<sup>34</sup> They envisioned three possible levels of crowding out:

1) The Government undertakes activities which would otherwise be provided, on a one-for-one basis, by the private sector. They point out that this sort of crowding out (to the extent it exists) would occur regardless of how the Government spending was financed;

2) Debt issues floated by the Government to finance its spending drive up interest rates and crowd out private borrowing;

3) Increases in wealth, derived from the issuance of Government bonds, increase money demand, that is, shift the LM curve leftward sufficiently to negate the rightward shifts of the IS curve.

Blinder-Solow constructed an extended version of the IS-LM framework which incorporated consump-

tion and money demand as functions of wealth, and a Government budget constraint providing for Government debt interest payments. They adhered to the usual IS-LM customs of treating the price level as fixed and of ignoring the existence of a banking system.

Blinder-Solow then attempted to discern the likelihood of crowding-out phenomena occurring by investigating the stability properties of the model. They derived the following theoretical conclusions:

1) if Government spending financed by bond issuance is contractionary, as (according to Blinder-Solow) monetarists claim, the IS-LM model is unstable;

2) if Government spending financed by bond issuance is expansive, as neo-Keynesians claim, but *less* expansive than Government spending financed by money creation, the model is unstable;

3) if Government spending financed by bond issuance is *more* expansive than Government spending financed by money creation, the model is stable.

The unusual result that theoretical stability conditions imply that bond-financed Government spending is more stimulative than money-financed Government spending comes about because of the inclusion of interest payments on outstanding debt in the Government budget constraint. For the model to be stable, the budget must be in balance in the long run to ensure unchanging stocks of money and debt. In order for the budget gap to close after the initial shock of fiscal stimulus, income must rise by a larger amount in the bond-financed case than in the money-financed case. This result follows because higher tax receipts must be induced to offset the increased interest payments on the Government debt.

*Tobin and Buiter* — Recently Tobin and Buiter also formulated an IS-LM model for the purpose of examining the crowding-out thesis. Although some of the equations differ from those employed by Blinder-Solow, the basic assumptions, such as a constant price level, and the methodology, which is marked by the stability requirement of a balanced budget process, are virtually the same.<sup>35</sup> Like Blinder-Solow, Tobin-Buiter utilized more than one variation of the basic IS-LM model, and like Blinder-Solow, they arrived at the conclusion that the stability considerations inherent in the balanced budget requirement generate a

<sup>32</sup>Blinder and Solow, "Does Fiscal Policy Matter?" and Tobin and Buiter, "Long Run Effects."

<sup>33</sup>Brunner and Meltzer, "Money, Debt, and Economic Activity."

<sup>34</sup>For papers criticizing the Blinder-Solow analysis, see Albert Ando, "Some Aspects of Stabilization Policies, The Monetarist Controversy, and the MPS Model," *International Economic Review* (October 1974), pp. 541-71; Paul E. Smith, "The Government Budget Constraint, Crowding Out, and Stability of Equilibrium," unpublished (May 1975); and James R. Barth, James T. Bennett, and Richard H. Sines, "Fiscal Policy and Macroeconomic Activity," (Paper presented at the Meetings of the Southern Economic Association, New Orleans, Louisiana, November 14, 1975).

<sup>35</sup>Although the bulk of their analysis assumes a constant price level, as does an earlier model on which their paper was based, Tobin-Buiter present one version of the model which employs a variable price level.

positive Government spending multiplier. Tobin-Buiter emphasized that the analysis is conducted for periods in which the economy is less than fully employed. Furthermore, that crowding out occurs at full employment is, for them, not a foregone conclusion, in view of a positive fiscal multiplier in their full-employment model.

*Brunner and Meltzer* — Another model has recently been developed which is adaptable to analysis of the crowding-out question. Brunner and Meltzer constructed a model of the economy which differs significantly in orientation from the standard IS-LM model. The Brunner-Meltzer model contains markets for real assets, financial assets, and current output, and permits wealth owners to choose among money, bonds, real capital and current expenditures. In contrast with the Blinder-Solow and basic Tobin-Buiter models, the Brunner-Meltzer model permits the price level to be determined endogenously and includes a banking sector. The analysis also features, as do the other models, stability considerations and a Government sector which issues interest-bearing debt.

Apparently, these common elements of the models are the elements which lead to the unusual results already noted in the Blinder-Solow model, and which also emerge in the Brunner-Meltzer model. In particular, Brunner-Meltzer find that Government spending financed by debt issuance is more stimulative than Government spending accompanied by expansionary monetary actions. Such a result is again dictated by the requirement of a balanced budget for long-run equilibrium. Once disturbed by, say, an increase in Government spending, the budget is required to return to balance, and the presence of interest payments in the budget constraint means that a larger increase in income is required for bond-financing than for money financing.

Brunner-Meltzer recognized this obvious discrepancy between their model results and the historical evidence, particularly as interpreted by monetarists. They note, that their model results imply "that inflation or deflation can occur without any change in B [the monetary base, which is the prime determinant of the money supply]."<sup>36</sup> Brunner and Meltzer take a markedly different view of the causes of inflation *outside* their model construct and in the context of observable phenomena: "Our analysis of inflation, presented at the Universities-National Bureau Conference on Secular Inflation, analyzes the issue in more

detail and explains why most inflations or deflations have resulted from changes in money."<sup>37</sup>

One must bear in mind that the results of the Brunner-Meltzer model are predicated on: (1) the absence of money illusion (in the usual sense), but the existence of a possible wealth illusion by way of incomplete discounting of future tax liabilities; (2) the requirement of a balanced budget; (3) a fixed capital stock (Blinder-Solow, in contrast, present a variation of their model in which the capital stock is permitted to grow); (4) no labor sector (to facilitate changes in output in lieu of the absence of a changing capital stock); and (5) the presumption that asset prices respond more strongly to an increase in Government debt than to an increase in the monetary base.<sup>38</sup>

### *Shortcomings of the Balanced-Budget Models*

The recent attack on the crowding-out thesis by way of stability analysis introduces a new element into the controversy. There are several reasons to question the implications of these models of the economy which indicate that crowding out is not consistent with model stability.

*Treatment of Price Level Changes* — The Blinder-Solow model and the basic Tobin-Buiter model, which are somewhat sophisticated versions of the standard IS-LM apparatus, permit no role for price level changes.<sup>39</sup> Considering world-wide economic developments over the past decade, one must question the relevance of so-called "structural" models which omit the existence of inflationary pressures and inflationary expectations. Moreover, an important channel through which crowding out might occur is closed off when price level changes are forbidden to emerge.

Blinder-Solow recognized this deficiency of their model to some extent, as indicated by their acknowledgement that the fiscal policy multiplier would be lowered in several ways by the inclusion of an endogenously-determined price level: (1) higher prices lower the real value of the money stock and shift the

<sup>37</sup>Ibid.

<sup>38</sup>The last-mentioned item is particularly critical for the Brunner-Meltzer results. Whereas asset prices can be expected to respond in a positive manner to increases in the monetary base, there is ambiguity in the response of asset prices to the issuance of Government debt. A positive wealth effect (given incomplete discounting of future tax liabilities) must outweigh a negative substitution effect (caused by Government debt competing in asset markets with private debt) for the Brunner-Meltzer results to hold.

<sup>39</sup>The Brunner-Meltzer model permits price level flexibility, but excludes a labor sector, which presumably plays an important part in realistic attempts to capture the economic structure.

<sup>36</sup>Brunner and Meltzer, "Money, Debt, and Economic Activity," p. 973 (bracketed words supplied).

LM curve to the left; (2) higher prices reduce real wealth, and thus consumption, shifting the IS curve to the left; (3) progressive taxes combined with inflation increase the real yield of the tax system, which also tends to shift the IS curve leftward; (4) a rising price level depresses exports and induces imports in an open economy, which again pushes the IS curve to the left.<sup>40</sup>

Blinder-Solow maintained that although the fiscal multiplier will be less than before with the inclusion of price level changes, the sign of the multiplier will remain positive. Because it is their view that the crowding-out hypothesis requires the fiscal multiplier to be negative, the authors considered only the sign of the coefficient to be at issue. This, however, is a gross exaggeration. To our knowledge, there have been no claims that the crowding-out hypothesis requires that a dollar of Government spending, unsupported by monetary expansion, *must* reduce private spending by *more* than a dollar, which is the implication of a negative fiscal policy multiplier.<sup>41</sup> Crowding out of the private sector occurs not only when \$1 of Government spending reduces private spending by \$1 (a multiplier of zero), but when \$1 of Government spending reduces private spending by 50 cents (a multiplier of 0.50). Crowding out, then, is a matter of degree rather than of absolute magnitudes. A negative multiplier is not a necessary condition for crowding out. And the omission of changing price levels in various IS-LM models contributes to the likelihood that crowding out tendencies will not emerge.

*Balanced Budget Equilibrium* — The three models under consideration show that in order for the budget to be balanced, and for the model to be in long-run equilibrium, the fiscal policy multiplier must be positive. A full equilibrium requires that the levels of stocks and flows be unchanging. But the question remains, how does such a formal analysis contribute to an explanation of the empirical results that imply crowding out occurs?

Tobin-Butter made two significant points in this connection. First, they questioned the ability of economic analysis — presumably, as incorporated in abstract models — to track changing economic variables to some logical end. "The trouble with such discus-

sions, including this one, is that a long run constructed to track the ultimate consequences of anything is a never-never land. For that abstraction we apologize in advance."<sup>42</sup> If one is really interested in tracking changes in economic variables over time, the better approach would be to construct dynamic models rather than comparative static models.

Second, Tobin-Butter questioned the stability requirements (including a balanced budget) associated with the IS-LM investigations into the crowding-out controversy. Their concluding remarks were:

Finally, we observe again that it is disturbing that the qualitative properties of models — the signs of important system-wide multipliers, the stability of equilibria — can turn on relatively small changes of specification or on small differences in values of coefficients. We do not feel entitled to use the 'correspondence principle' assumption of stability to derive restrictions on structural equations and parameters. *There is no divine guarantee that the economic system is stable.*<sup>43</sup>

The economic system may be stable in the sense that the U.S. economy has not exploded, but it is a long jump from that sort of stability to one which requires stock-flow equilibrium including a balanced budget. Indeed, the budget of the U.S. Government has been in deficit in eleven of the past fifteen years.

The stock-flow equilibrium models discussed here, then, are basically empty of empirical content. Although there may have been periods in which some of the relevant flows were approximately in balance, one would be hard pressed to uncover data points corresponding to periods of unchanging stocks. Without the necessary data and a translation of the abstract models in a form which is testable, it is impossible to confirm or refute the hypotheses associated with these stock-flow equilibrium models.

*Fiscal vs. Monetary Stimulus* — The underlying assumptions and stability requirements of the models in question combine to produce a most curious result: Government spending financed by debt issuance is more expansionary than Government spending accompanied by money creation. The expansionary effect is summarized in terms of real output in the Blinder-Solow model and prices in the Brunner-Meltzer model.

These theoretical implications run contrary to virtually every investigation conducted into the impacts of fiscal and monetary policy actions on economic

<sup>40</sup>Blinder-Solow added this final price effect in "Analytical Foundations of Fiscal Policy," in Alan S. Blinder, Robert M. Solow, et al., *The Economics of Public Finance* (Washington, D.C.: The Brookings Institution, 1974), p. 47.

<sup>41</sup>It should be pointed out that various econometric models indeed have uncovered negative fiscal multipliers (see p.14 of this article).

<sup>42</sup>Tobin and Butter, "Long Run Effects," p. 1.

<sup>43</sup>Ibid., p. 42 (italics supplied).

activity. None of the architects of these models attempted to reconcile the model implications with the mass of empirical studies contradicting them.

Brunner and Meltzer acknowledged this discrepancy. However, they offered no explanation for the fact that even though their model implies that bond-financed Government spending is more inflationary than money-financed spending, their own empirical studies indicate just the opposite.<sup>44</sup> One is led to conclude that manipulation of these theoretical models constitutes an interesting academic exercise, but contributes little of practical significance to the crowding out controversy. With empirical considerations coming to the fore, the discussion now turns to the econometric literature to determine what evidence that approach has brought to bear on the issue of crowding out.

### ECONOMETRIC MODELS AND CROWDING OUT

In a recent study of a number of econometric models, Gary Fromm and Lawrence Klein published simulation results showing the implied Government expenditure and tax multipliers for these models.<sup>45</sup> The results showed long-run Government spending multipliers ranging from about 1 to 5 when measured in terms of impact on current dollar GNP.<sup>46</sup> However, the majority of the large models surveyed revealed that crowding out did occur in real terms over time. Some indicated \$1 of Government spending for goods and services crowded out even more than \$1 of private spending.

For example, the Wharton Mark III Model yielded a multiplier of minus 3 after forty quarters, and the Bureau of Economic Analysis (U.S. Department of Commerce) Model gave a real Government spending

multiplier over the same time period of minus 23. These results go well beyond monetarists' contentions that complete crowding out gives a multiplier of approximately zero, though these results are less than clear on the issue of nominal crowding out.

The Fromm-Klein survey of the empirical results suggested that crowding out typically occurred because of a rising price level, capacity constraints, and rising nominal interest rates. These results are consistent with those implied by the extended IS-LM case described above, and do not necessarily corroborate crowding out of the nonshifting aggregate demand variety, that is, those cases which imply that crowding out occurs because fiscal actions are offset by other components of aggregate demand.

However, Fromm-Klein recognized that the model simulations produced evidence not in accord with the usual standard Keynesian presumption of positive Government spending multipliers:

Conventional textbook expositions generally depict real expenditure multipliers approaching positive asymptotes. In fact, most of the models here show such multipliers reaching a peak in two or three years and then declining thereafter in fluctuating paths. At the end of five to ten years, some of the models show that continued sustained fiscal stimulus has ever-increasing *perverse* impacts.<sup>47</sup>

Klein suggested elsewhere that perhaps these new estimates of the fiscal multiplier are not as damaging to the Keynesian position as they initially appear.<sup>48</sup> After all, it takes a considerable length of time in some of the models for the Government spending multiplier to approach zero or turn negative, and policymakers historically have shown little concern for the long run. We would only add that this argument reflects the progression of the debate on crowding out from "Does it exist?" to "What is the time period?"

As far as small models are concerned, the monetarist model of the Federal Reserve Bank of St. Louis set off much of the current controversy. Fiscal crowding out emerges in the reduced form equations published in the *St. Louis Review* only after a period of time, even though it is a much shorter period of time than that of the large income-expenditure models, and it occurs in nominal terms rather than in just real terms. Government spending, as measured by high-employment expenditures, exercises a relatively strong in-

<sup>44</sup>Karl Brunner, Michele Fratianni, Jerry L. Jordan, Allan H. Meltzer, and Manfred J. Neumann, "Fiscal and Monetary Policies in Moderate Inflation: Case Studies of Three Countries," *Journal of Money, Credit and Banking* (February 1973), pp. 313-53.

<sup>45</sup>Gary Fromm and Lawrence R. Klein, "A Comparison of Eleven Econometric Models of the United States," *The American Economic Review* (May 1973), pp. 385-93. These models, unlike the IS-LM abstractions discussed earlier, were not forced to a full stock-flow equilibrium.

<sup>46</sup>Blinder-Solow cited these results as attesting to the absence of crowding out in large income-expenditure models. Acknowledging the nonexistence of Government budget constraints in the models, they added that despite this deficiency, "All we can do now is render a verdict on the basis of the evidence already in." They ignored the real crowding-out results implied by the econometric models, which is surprising, in that their own model emphasized the crowding-out issue in real terms. See Blinder and Solow, "Analytical Foundations," p. 78.

<sup>47</sup>Fromm and Klein, "A Comparison," p. 393 (italics supplied).

<sup>48</sup>See Lawrence R. Klein, "Commentary on 'The State of the Monetarist Debate,'" this *Review* (September 1973), pp. 9-12.

fluence on GNP (assuming a constant change in the money supply) in the current quarter and the next quarter, but is approximately offset within a year's time.

These results, which are confirmed by regression analysis employing data through mid-1975, should not be interpreted to suggest that "Government spending doesn't matter"; it matters very much over a certain period. Moreover, if Government spending were to accelerate or decelerate rapidly rather than be held to a steady rate of change, the impact on GNP would be considerable.

The chief reason that these reduced form results are of interest is that they do not follow from a structural model that constrains the channels of transmission from fiscal actions to economic activity. Government expenditures cover a wide range of activities, some of which substitute for private consumption and investment, and others which serve as substitutes or complements to private factors of production.<sup>49</sup> With such diverse effects, any model which restricts the transmission of fiscal actions to income and/or interest rate channels, runs the risk of missing the full effects of Government interaction with the private sector.<sup>50</sup> The St. Louis results certainly do not do justice to the measurement of the effects of the complexities of the Government spending process, but they serve the function of questioning the results from models which restrict the operation of fiscal actions via fixed channels.

### SUMMARY AND CONCLUSIONS

This article has surveyed the recent literature on the subject of the crowding-out effect of fiscal actions. Crowding out was defined as a steady state Government spending multiplier of near zero, a definition which was extended to differentiate the terms "nominal" and "real" crowding out.

<sup>49</sup>We, like most other analysts, have had little to say about the effect of fiscal actions on aggregate supply. For an attempt to enrich standard macroeconomic analysis with such considerations, see Kenneth J. Arrow and Mordecai Kurz, *Public Investment, the Rate of Return, and Optimal Fiscal Policy* (Baltimore: The Johns Hopkins Press, 1970); and Lowell E. Galloway and Paul E. Smith, "The Government Budget Constraint and Aggregate Supply," (Paper presented at the Meetings of the Southern Economic Association, New Orleans, Louisiana, November 14, 1975).

<sup>50</sup>See R. L. Basmann, "Remarks Concerning the Application of Exact Finite Sample Distribution Functions for GCL Estimators in Econometric Statistical Inference," *Journal of the American Statistical Association* (December 1963), p. 944, where he says:

... the entire burden of statistical inference in econometric simultaneous equations models falls on the un-

This survey indicates that the controversy has taken place on two fronts — theoretical and empirical. First, the theoretical literature has developed primarily with reference to the IS-LM model or modifications thereof. Several cases were examined which serve as candidates providing theoretical support for the crowding-out hypothesis. In addition, the role of stability conditions in the crowding-out controversy was examined. In general, the conclusion was that stability considerations are of limited relevance with respect to the acceptance or rejection of the crowding-out hypothesis.

The empirical literature, on the other hand, has taken the form of simulations of Government actions and has yielded results that show signs of being consistent with the crowding-out hypothesis. This crowding out tends to be very slow in developing, however, and occurs in real rather than nominal terms. The St. Louis results still stand out relative to the large econometric models in that crowding out occurs more quickly and also in nominal terms.

As a result of this survey, it is clear that the crowding-out controversy continues to exist. Apparently these issues will not approach resolution until additional structural models are developed and tested. The Keynesians have developed many models, but these models have not been tested as interdependent units.<sup>51</sup> Monetarists, on the other hand, have not offered structural models to go along with their reduced form results.<sup>52</sup> Such a turn toward hypothesis testing could lead toward a resolution of the issues in the crowding-out controversy. Although the controversy has been explored in this article primarily on a theoretical level, the implications of these issues for practical matters of stabilization policy are of great significance.

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constrained estimates and test statistics associated with the reduced-form, at least, if empirical confirmation of the underlying economic postulates is the goal aimed at. Whenever the unconstrained reduced-form statistics are judged to be in good agreement with the propositions (theorems) deduced from the underlying economic postulates, then do the structural estimates emerge as sound and convenient summaries of that part of the sample statistical information which is relevant to the numerical values of structural parameters, but generally not otherwise.

<sup>51</sup>See Keith M. Carlson, "Monetary and Fiscal Actions in Macroeconomic Models," this *Review* (January 1974), pp. 8-18. A suggested testing of models as interdependent units requires that the model be specified in structural form, but the testing of the model should focus on the reduced form. For further discussion of this approach, see James L. Murphy, *Introductory Econometrics* (Homewood, Illinois: Richard D. Irwin, Inc., 1973).

<sup>52</sup>For recent efforts in this direction, however, see Leonall C. Andersen, "A Monetary Model of Nominal Income Determination," this *Review* (June 1975), pp. 9-19.

## APPENDIX

For purposes of definition consider the accompanying Figure, panel (A), which is a representation of the market for total output of goods and services. The intersection of aggregate supply ( $AS_0$ ) and demand ( $AD_0$ ) determine the equilibrium level of output,  $X_0$ , and the price,  $P_0$ , at which it will be sold. Label this intersection as point A and interpret it as an initial equilibrium. Now, introduce an expansionary fiscal action like increased Government demand for goods and services financed by sales of Government debt to the public.

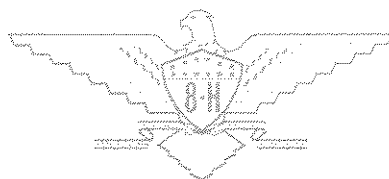
Assume that the net effect of increased Government demand and the issuance of debt is an increased demand for goods and services, as indicated by the shift of the demand curve to  $AD_1$ . Further, suppose that the expanded Government sector adversely affects efficiency and productive capacity, resulting in a shift of the supply curve to  $AS_1$ . If the new equilibrium occurs anywhere on the vertical line through point A, say at point B, we say that *real* crowding out has occurred. That is, increased real Government spending has been completely offset by a decline in real private spending.

Consider now Panel (B) in the Figure. The curved line drawn through point A is a rectangular hyperbola indicating that  $P$  times  $X$ , which is defined as the nominal value of total output (that is, GNP), is constant and equal to  $P_0 X_0$ . In other words, there is an infinite number of combinations of  $P$  and  $X$ , besides  $P_0$  and  $X_0$ , which would give the same dollar value of total output as at point A. Suppose that in response to an expansionary fiscal action, aggregate demand and aggregate supply shift in various directions (depending on the assumptions made) and the new equilibrium settles on the curved line, say at point B or C. Under these conditions, *nominal* crowding out is said to occur. That is, an increase in Government spending has been offset by a decline in the dollar amount of spending by the private sector.

This distinction between nominal and real crowding out is important because clearly one does not imply the other. This is shown in Panel (C) which combines the definitions of real and nominal crowding out from Panel (A) and (B). The solid lines are not demand and supply curves, but are the loci of points defining real and nominal crowding out.

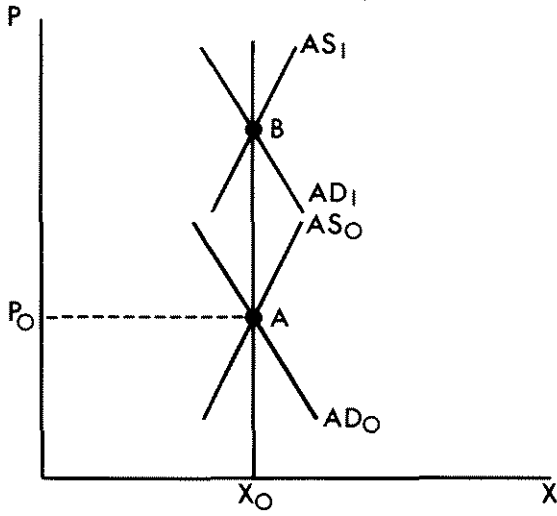
Note that the lines are now drawn as the midpoint of a shaded band. This is done to reflect the crowding-out hypothesis; that is, an increase in Government demand, not supported by monetary expansion, results in a steady state income multiplier of *approximately* zero. The middle of these bands represents those points at which \$1 of Government spending crowds out exactly \$1 of private spending. The shading to the right of either line describes that area in which partial crowding out (a multiplier between 0 and +1) occurs; the shading to the left of either line describes that area in which over crowding out (a multiplier between 0 and -1) occurs. Of course, it is possible that a dollar of Government spending might crowd out more than two dollars of private spending, resulting in a multiplier of less than -1 and an equilibrium point to the left of either of the bands.

Various combinations of real and nominal crowding out are possible, given an expansionary fiscal action. For example, at point A, there is partial nominal and partial real crowding out. At point B, there is partial nominal, but over real crowding out and so on for other combinations around the intersection of the two bands. At some point outside this area, such as point E, there is partial real crowding out, but a complete absence of any sort of nominal crowding out. It is clear that a complete analysis of the fiscal process requires an assessment of both the demand and supply factors involved in order to describe accurately the extent to which nominal and real crowding out might occur.

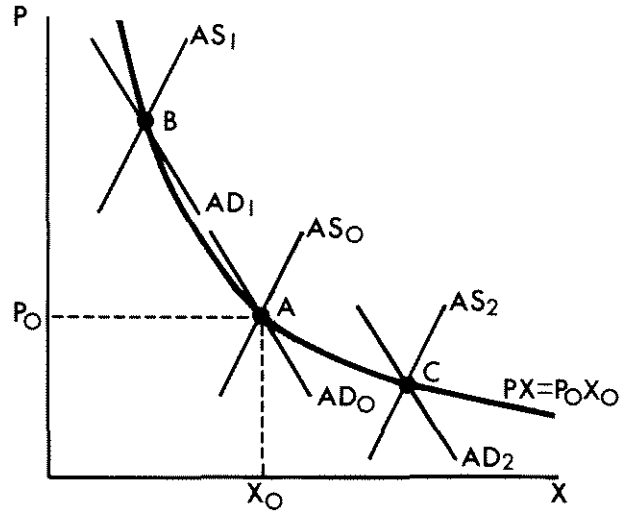


### Definitions of Crowding Out

(A) Real Crowding Out



(B) Nominal Crowding Out



(C) Summary

