

CROWDING OUT AND THE EFFECTIVENESS OF FISCAL POLICY

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ABSTRACT

Crowding out of private economic activity by public economic activity is a multidimensional concept. A taxonomy is proposed. The degree of crowding out, the time horizon considered, direct and indirect crowding out constitute the four main categories. The latter two each have many sub-categories. With direct crowding out government economic activity directly enters as an argument into structural private behavioral relationships. Indirect crowding out refers to crowding out in the reduced form of the model without there being any direct crowding out at the level of the structural private behavioral relationships.

A small full employment model is used to analyze the implications of various forms of direct crowding out for the effectiveness of fiscal policy.

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Introduction

"Crowding out" refers to the displacement of private economic activity by public economic activity. Known as "diversion" to Keynes,¹ the subject has a long history in macroeconomic theory and policy debate. In recent years the dangers of public borrowing crowding out private borrowing and public spending crowding out private spending have again been emphasized in the financial press and by administration officials.² At the same time papers by Barro [3], David and Scadding [14], Kochin [28] and Peltzman [38] have analyzed some of the implications of "ultrarationality" in the relation between the private sector and the public sector.

This paper attempts to bring some order into this frequently confused debate by developing a comprehensive taxonomy. Crowding out is a multidimensional concept. Its different dimensions will be related to the existing literature and the implications for the effectiveness of fiscal policy will be evaluated using some simple familiar macroeconomic models.

A Taxonomy of Crowding Out:

Partial, Complete, Direct, Indirect, Short-Run and Long-Run Crowding Out

A perhaps obvious but nonetheless important point is that crowding out is not an all-or-nothing phenomenon. The degree of crowding out can be defined as the ratio of the induced change in the scale of some private economic activity to the change in the scale of the public economic activity that brought it about.

Two other important ways of classifying different forms of crowding out

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are "direct" versus "indirect" or "system-wide" crowding out³ and "short-run" or "impact" versus "long-run" crowding out. Recent writings on different forms of "ultrarationality" deal with direct crowding out.⁴ Most of the traditional neo-Keynesian multiplier analysis concerned indirect crowding out. Until fairly recently the literature dealt mainly with short-run crowding out. A number of more recent papers investigate various aspects of long-run crowding out.⁵ The slightly older crop of monetary growth models⁶ can also be considered to fall into the long-run crowding out category.

Short-Run and Long-Run Crowding Out

The short-run - long-run dichotomy contrasts the impact effect of changes in government activity--for given values of the short-run exogenous but long-run endogenous (or predetermined) variables such as asset stocks and expectations about the future--with the long-run, steady state effect of such changes when stocks and expectations adjust fully to the change in government policy.⁷ In addition to the theoretical references on this topic given above, some empirical work has been done in this area.⁸ The long-run - short-run distinction applies to both direct and indirect crowding out although research on long-run crowding out has been confined to indirect crowding out. Often neither the impact effect nor the long-run, steady-state effect corresponds to the "run" one is most interested in for policy purposes. For policy, the real (i.e. calendar) time effects of policy changes over a period of, say, a few years tend to be most pertinent. In principle this represents no great problems. The method of comparative dynamics--solving the dynamic system and comparing trajectories under different assumptions about initial conditions, other parameter values or the behavior of policy control variables--permits one to find the degree of crowding out for any time interval. In practice explicit analytical solutions

of non-linear dynamic economic systems tend to be difficult to obtain. Numerical solutions through computer simulations are required to derive the interim multipliers.⁹

It is important to realize that the degree of crowding out is not necessarily greater in the long run than in the short run. Tobin and Buiter [50] analyze the extreme case in which complete crowding out of private spending by public spending in the short run, because of full employment of resources and a fixed capital stock is contrasted with a positive long-run effect of government spending on real output because of capital deepening.

Indirect Crowding Out

Indirect or system-wide crowding out refers to the substitution of public economic activity for private economic activity (e.g., the substitution of public spending for private spending or of public saving for private saving) that comes out of the working of the entire model of the economy without there being any "ultrarationality" at the level of the individual structural relationships. There is indirect crowding out, in other words, when the reduced form derivatives (or multipliers) of the model show that increased government taxation reduces private saving or increased government spending reduces private spending¹⁰ even if the private and public consumption functions cannot be consolidated into a single "social" consumption function with government economic decision-making subsumed entirely under private economic activity.

An example of 100% short-run indirect crowding out of private spending by public spending in the simple fixed price, closed economy, unemployment version of the IS/LM model is the absence of any effect on real income of changes in public spending when the LM curve is vertical or the IS curve is horizontal. In general, if the government spending multiplier is positive but less than unity,

there is partial short-run crowding out of private investment and/or consumption spending. The responsiveness of private consumption and investment to changes in income and the interest rate will determine the degree to which each of these components of private expenditure will be crowded out.

With a downward sloping IS curve and an upward sloping LM curve a rise in the interest rate will accompany an increase in real income due to a higher level of government spending. While this will reduce the magnitude of the equilibrium increase in real income below the magnitude of the rightward shift of the IS curve (which gives the multiplier at a given rate of interest), the equilibrium change in real income will nevertheless be positive. The multiplier is reduced by a scarcity not of real resources (labor and capital) but of funds, which pushes up interest rates when the economy begins to expand. This situation could therefore be better described as the crowding out of private spending by restrictive monetary policy than by public spending.

In the open economy version of the same model under a flexible exchange rate regime with perfect capital mobility, changes in government spending will have no (short-run) effect on real income.¹¹ Government spending crowds out export demand (and "crowds in" import demand) dollar for dollar.

In the closed economy, full employment version of the IS/LM model with a classical labor market there will be 100% crowding out of private spending by public spending in the short run. (Endogeneity of the capital stock in the long run insures the absence of complete long-run crowding out in the full employment model.) With real output fixed by the historically determined stock of capital, the state of technology and the full employment labor supply each unit of output appropriated by the government means one less unit of output available for private consumption and investment. The indirect short-run crowding out results again from competing demands for a scarce good. This

which the government sector can be subsumed under the private sector in specifying the structural behavioral relationships of the economy. Like indirect crowding out, direct crowding out is a multidimensional concept, the dimensions

being characterized by the government activities that are crowding out and the private activities that are being crowded out. If every action undertaken by the government is neutralized by a corresponding action in the opposite direction by the private sector, the government is but a veil, waiting to be removed by probing economists.¹⁴

Without attempting to be exhaustive, the most important dimensions can be characterized as follows:

Income. What is regarded as income by the private sector? Specifically, is government spending on final goods and services regarded as part of private income? Are government deficits excluded, i.e. are current deficits (surpluses) viewed as equivalent to current taxes (subsidies) and is government saving a perfect substitute for private saving?

Wealth. What is regarded as wealth by the private sector? This is the capital account counterpart of the current account question asked above. If the private sector regards current deficits as equivalent to current taxes because the financing of the deficit is regarded as equivalent to taxation--no matter what combination of high-powered money creation, new borrowing and taxation is actually used to finance the deficit--government interest-bearing debt will not be counted as part of private sector net worth.¹⁵

Consumption. What is regarded as consumption by the private sector, i.e. to what extent is public consumption a substitute for private consumption?

Investment. What is regarded as investment by the private sector, i.e. to what extent is public investment a substitute for private investment?

Borrowing. How close substitutes are government bonds for corporate bonds and other private bonds in private portfolios?

An alternative classification scheme would distinguish forms of direct crowding out that depend on the specific content of government spending programs from those that depend on the financing of government spending programs,

$$\frac{d}{dt} \left(\frac{M}{P} \right) = \frac{-\dot{P}}{P} \frac{M}{P} \quad (6)$$

$$\dot{x} = \beta \left(\frac{\dot{P}}{P} - x \right); \quad \beta > 0 \quad (7)$$

Equation 5 is derived from the government budget identity; if deficits are bond-financed, the change in the real value of private sector holdings of government bonds equals the real value of the current deficit plus capital gains on existing holdings of bonds. Equations 3 and 4 reflect the simplifying assumption that there are no sales of capital between the public and the private sectors.

Without direct crowding out of investment we assume private investment to be an increasing function of q , the ratio of the market value of claims to the existing stock of capital to the value of the stock of capital at current reproduction costs, or equivalently, the ratio of the rate of return obtainable by investing a dollar in the production of new capital goods to the rate of return obtainable by investing a dollar in existing capital goods.

$$q = \frac{f'(K)}{R - x}$$

Thus without direct crowding out along the investment dimension

$$I^P = I[f'(K) - R + x]; \quad I' > 0; \quad I(0) = 0. \quad (8)$$

If public investment is a substitute for private investment we can specify private investment as follows:

$$I^P = I^P(I^G, f'(K) - R + x); \quad -1 \leq I_1^P \leq 0. \quad (8')$$

Perfect substitutes would be characterised by $I_1^P = -1$. Another way of representing the perfect substitutes case would be to use equation 8:

$$I^P = I(f'(K) - R + x) - I^G \quad (8'')$$

If complementarity relations can exist between private and public investment the private investment function becomes

$$I^P = I^P(I^G, f'(K) - R + x) \quad I_1^P \begin{matrix} \geq \\ < \end{matrix} 0. \quad (8''')$$

The private consumption function without direct crowding out along the consumption dimension can be written as:

$$C^P = C(Y, W) \quad 0 < C_1 < 1, C_2 > 0. \quad (9)$$

Direct substitutability or complementarity relations between public and private consumption can be represented by:

$$C^P = C^P(C^G, Y, W) \quad C_1^P \begin{matrix} \geq \\ < \end{matrix} 0. \quad (9')$$

The perfect substitutes case is $C_1^P = -1$. Using equation 9 this could also be written as:

$$C^P = C(Y, W) - C^G. \quad (9'')$$

Two other forms of direct crowding out that can be conveniently analyzed in this simple model are direct crowding out along the income and wealth dimensions.¹⁷ Y and W are arguments in the private consumption function and the asset demand functions. We shall see how Y and W go through a sequence of transformations as different forms and degrees of direct crowding out are assumed.

In models that ignore all forms of direct crowding out, real private income (including expected capital gains) is given by:

$$Y = f(K) + \frac{RB}{P} - x \left\{ \frac{M+B}{P} \right\} - T - f'(K)K^G. \quad (10)$$

Let α denote the fraction of the private sector's holdings of public sector interest-bearing debt not offset by the present discounted value of the future taxes "required" to service the debt. If future taxes implied by current deficits are taken into account, only a fraction α of private sector holdings

of public sector bonds will be part of private sector net worth and therefore subject to capital gains or losses due to expected inflation. A fraction $(1 - \alpha)$ of the current deficit will be subtracted from the initial concept of real private income in 10:

$$Y' = f(K) + \frac{RB}{P} - x \frac{(M + \alpha B)}{P} - T - f'(K)K^G - (1 - \alpha) \left(C^G + I^G + \frac{RB}{P} - T - f'(K)K^G \right) \quad (10')$$

If in addition government spending is counted as an addition to private income to the extent indicated by fractions $0 \leq \epsilon^1, \epsilon^2 \leq 1$, multiplying C^G and I^G respectively, real private income becomes

$$Y'' = f(K) + \frac{RB}{P} - x \frac{(M + \alpha B)}{P} - T - f'(K)K^G - (1 - \alpha) \left(C^G + I^G + \frac{RB}{P} - T - f'(K)K^G \right) + \epsilon^1 C^G + \epsilon^2 I^G. \quad (10'')$$

Complete crowding along the income dimensions requires $\alpha = 0$ and $\epsilon^1 = \epsilon^2 = 1$.

The final private real income concept, perhaps better labelled real social income is

$$Y''' = f(K) - x \frac{M}{P}. \quad (10''')$$

It could be argued that with the consolidation of the private and the public sectors having gone this far, the distinction between inside and outside assets has become blurred. There appears to be little rationale left for counting expected capital gains or losses on the stock of outside money as part of social income or the real value of the stock of outside money as part of net worth. Carrying the consolidation to its logical conclusion would reduce real income to real output and net worth to the value of the stock of capital.

Private sector non-human marketable wealth, W goes through an analogous sequence of transformations. In order of increasing ultrarationality we get

$$W = \frac{M + B}{P} + qK^P \quad (11)$$

$$W' = \frac{M + \alpha B}{P} + qK^P \quad (11')$$

$$W'' = \frac{M + \alpha B}{P} + qK^P + q\epsilon^2 K^G \quad (11'')$$

$$W''' = \frac{M}{P} + qK \quad (11''')$$

The ultrarational version of the IS/LM model (complete direct crowding out along the investment, consumption, income and net worth dimensions, given by equations 1, 2, 3, 4, 5, 6, 7, 8'', 9'', 10''' and 11''') can be summarised as follows:

$$C\left(f(K) - x \frac{M}{P}, \frac{f'(K)}{R-x} K + \frac{M}{P} \right) + I(f'(K) - R + x) = f(K) \quad (IS) \quad (12a)$$

$$L\left(R, f(K) + x \frac{M}{P}, \frac{f'(K)}{R-x} K + \frac{M}{P} \right) = \frac{M}{P} \quad (LM) \quad (12b)$$

$$\dot{K} = I(f'(K) - R + x) \quad (12c)$$

$$\frac{d}{dt} \left(\frac{M}{P} \right) = \frac{-\dot{P}}{P} \frac{M}{P} \quad (12d)$$

$$\dot{x} = \beta \left(\frac{\dot{P}}{P} - x \right) \quad (12e)$$

The distinction between publicly owned capital and privately owned capital has disappeared. Government deficits and surpluses are bond-financed but the bond debt of the public sector has effectively disappeared from the model. It is irrelevant whether or not the budget balances, since neither private income nor private portfolios are affected by the government's financing policy. The equation giving the change in the real value of the stock of bonds is irrelevant for the rest of the model and has been omitted. The private sector is indifferent about the amount of bonds the government wishes to issue, because with every bond that is issued a perfectly equivalent tax liability is imposed. The net effect is equivalent to the complete absence of government bonds from the economy.¹⁸ The government as an independent spending and revenue-raising agent has been consolidated out of the model. In this model there is, trivially, complete crowding out of private spending by government spending and of private saving by lump-sum taxation both in the

short run, given by the IS and LM curves for given values of stocks and expectations and in the long run, given by the IS and LM curves and the values of K , $\frac{M}{P}$ and x obtained by setting $\dot{K} = \frac{d}{dt} \left(\frac{M}{P} \right) = \dot{x} = 0$. The government can influence neither real nor nominal magnitudes by operating on C^G , I^G and T .

Two points should be made about this result. First, it depends on the tax being a lump-sum tax. If there were, say, a tax at a rate θ on factor incomes and debt service, $R(1-\theta)$ rather than R would be an argument in the money demand function and the government could influence the real economy by varying the tax rate. Second, 100% direct crowding out of private investment by public investment (or of private consumption by public consumption) is not sufficient to guarantee the absence of long-run effects of changes in I^G (or C^G). In addition, government bonds should not appear in any private sector behavioral relationship. If e.g. government bonds constituted private net worth to any extent ($\alpha \neq 0$), there would only be complete short-run crowding out in the short run after an increase in I^G or C^G . (Even without direct crowding out of I^P and C^P , the full employment assumption would rule out any short-run effect on real output; with complete direct crowding out, the price level is also unaffected in the short run.) Financing the deficit or surplus by issuing or retiring bonds, however, would change private sector net worth in the long run. Equation 5 (and the balanced budget condition in long-run equilibrium) become part of the model again when government bonds affect private behavior in any way-- not necessarily through an effect on net worth.¹⁹

If the government deficit or surplus is exclusively money-financed, the model becomes

$$C \left(f(K) - x \frac{M}{P}, \frac{f'(K)}{R - x} K + \frac{M}{P} \right) + I(f'(K) - R + x) = f(K) \quad (\text{IS}) \quad (12a)$$

$$L\left(R, f(K) + x \frac{M}{P}, \frac{f'(K)}{R - x} K + \frac{M}{P}\right) = \frac{M}{P} \quad (\text{LM}) \quad (12b)$$

$$\dot{K} = I(f'(K) - R + x) \quad (12c)$$

$$\frac{d}{dt} \left(\frac{B}{P} \right) = -\frac{\dot{P}}{P} \frac{B}{P} \quad (13d)$$

$$\frac{d}{dt} \left(\frac{M}{P} \right) = C^G + I^G + \frac{RB}{P} - T - \frac{\dot{P}}{P} \frac{M}{P} \quad (13e)$$

$$\dot{x} = \beta \left(\frac{\dot{P}}{P} - x \right) \quad (13f)$$

Even though bonds are not part of private sector net worth, the volume of bonds affects the size of the government deficit and therefore the rate of change of M. Equation 13d can therefore not be ignored.

The long-run equilibrium (given by the IS and LM curves and

$\dot{K} = \frac{d}{dt} \left(\frac{B}{P} \right) = \frac{d}{dt} \left(\frac{M}{P} \right) = \dot{x} = 0$) is again a zero rate of inflation equilibrium if $B \neq 0$. Changes in C^G , I^G and T will have no short-run effect on either real or nominal magnitudes. In the long run increases in C^G and I^G or a decrease in T will cause equiproportionate increases in the nominal stock of money and the price level. If there were no bonds in the model ($B = 0$) the (actual and expected) rate of inflation could be non-zero in long-run equilibrium. Changes in C^G , I^G and T will cause changes in the steady state rate of inflation.

There would be long-run real effects of such fiscal policy changes because the nominal rate of return on money balances is institutionally fixed. The real rate of return differential between money and capital would therefore be altered. If the government were to adjust the nominal rate of return on money balances in such a way as to maintain a constant real rate of return on money balances in long-run equilibrium irrespective of the proportional rate of change of the money stock (and the resulting steady state rate of inflation),

there would be no long-run real effects of changes in I^G , C^G or T under money financing.

There is considerable scope for further analysis of alternative combinations of forms and degrees of direct crowding out using the general framework established here. More useful, at this stage, would be careful empirical analysis of the existence and importance of the many forms of direct crowding out. The analysis has been conducted using a full employment model--a setting favoring a large degree of crowding out. With indirect crowding out the degree of "diversion" varies inversely with the degree of underutilization of resources. One would want to know whether similar results hold for direct crowding out.

The foregoing argument is subject to three major qualifications that apply to all dimensions of direct crowding out.

Three Caveats

Corners

Consider the case of complete crowding out of private consumption of some commodity by public consumption--a change in the level of public consumption of the commodity causing merely a change in the composition of total (private + public) consumption of that commodity without changing its level. For this crowding out of private spending to be possible, it has to be assumed that no individual consumer is "at a corner" beyond which consumption cannot be reduced for technical or physiological reasons. As an example, with the consumption of private education constrained to lie in the non-negative orthant, no dollar-for-dollar offset of an increase in public spending on education is possible with private spending already at the origin. Mutatis mutandis the same applies to the other forms of direct crowding out. As

another example, private portfolio reshuffles and changes in borrowing and lending behavior can only negate an increase in the volume of public debt if private agents hold sufficient amounts of government bonds to begin with.²⁰

In an overlapping generations model changes in the volume of public debt will have no real effect only if current generations are connected to future generations by a chain of operative intergenerational transfers. An increase in forced intergenerational transfers can only be offset by a reduction in voluntary intergenerational transfers, if voluntary intergenerational transfers are not zero initially.²¹

The importance of corner solutions for economic activities in which crowding out is potentially important is an empirical issue on which little hard evidence is available.

Substitutes and Complements

A specific commodity or service supplied (competitively or otherwise) by the government may be a substitute for a privately supplied good or service: in addition to competing with the private sector in factor markets, the public sector may compete with the private sector in product markets. This was considered under indirect crowding out: the government activities concerned do not directly enter as arguments into private agents' utility functions or opportunity sets. Direct crowding out refers to the fact that certain types of public consumption expenditure are directly competitive with private consumption spending. Public education, law and order, health care and care for the elderly are examples. Certain forms of public expenditure on goods and services constitute private income in kind. Free school milk, school lunches, housing subsidies and food stamps are examples. Certain kinds of taxes are directly competitive with private saving. Social security contributions and state-run compulsory retirement or health insurance schemes are substitutes for voluntary private saving for old

age and sickness.²²

At the level of theoretical possibilities with some empirical plausibility, complementarity relations between certain categories of public and private spending also ought to be considered. Public investment, for example, may be competitive with private investment in certain instances (as in public housing construction) but complementarity relations between certain categories of investment in social overhead capital and private investment are certainly possible. Public investment in projects with increasing returns or massive overheads such as the construction of a dam come to mind.

Effective Demand versus Notional Demand

Even when there is complete direct crowding out of, say, private consumption by public consumption in terms of notional private consumption demand, there are no compelling theoretical or empirical reasons for there to be complete crowding out of effective private consumption demand.²³ With households constrained in the labor market and unable to execute their notional consumption plans, an increase in public consumption can be expected to cause a smaller reduction in effective private consumption demand than in notional private consumption demand.

It is useful to remember how this debate started in the Great Depression and what the current economic situation is in which the crowding out debate is being revived. The main issue, then and now, is the ability of the government to increase the volume of real output and employment by increasing public spending or reducing taxation in a situation characterized by widespread involuntary unemployment of labor and idle capital equipment. The reason for the dead-weight loss of real income represented by these idle resources is lack of effective demand at current prices and interest rates and with the current state of expectations. This dead-weight loss of real income represented by

households' inability to sell their entire notional supply of labor and firms' unwillingness to hire every worker who is willing to work at the going wage rate can be reduced or eliminated by increased government spending. Even if private individuals fully take into account the future taxes "required" to service the bonds issued by the government to finance the increased expenditure (or the "inflation tax" if money financing of the deficit is opted for), there will still be a net gain: the elimination of the dead-weight loss, i.e. the movement from the interior of society's production possibility set to the boundary. Government spending in this situation alleviates or eliminates a case of "market failure". The market failure is due not to the usual micro-economic externalities or monopolistic sectors, but to the failure of markets (the labor markets and the commodity markets) to generate market clearing prices and to provide the correct signals and information to producers and other potential transactors. In such a disequilibrium situation the government, as the "spender of last resort"--not subject to the same budget constraints as private economic transactors because of its monopoly in the production of legal tender and its ability to tax and in other ways coerce private economic agents--can supply the effective demand that brings the economic system towards its full employment capacity. We do not have to assume that the government has access to information superior to that available to the private sector. All we must do is recognize that the government is subject to a different budget constraint.

Whatever the merits of the crowding out arguments in the full employment case, the ability of the government to initiate and stimulate recovery from a slump caused by deficient effective demand is beyond doubt.²⁴ For policy purposes, that simple statement may well be the most important conclusion of the crowding out debate. Its significance is in no way diminished by the fact that it was reached by Keynes some forty years ago. The Treasury did not accept it then and today's "Treasuries" still seem reluctant to accept it and act upon it.²⁵

Conclusion

The apparent weakness of the 100% direct crowding out case should not lead to the dismissal of the likelihood of a limited degree of direct crowding out along some of the dimensions mentioned above. A number of instances in which partial direct crowding out is likely to occur were given. Others can undoubtedly be thought of.

Some degree of direct and indirect crowding out is definitely a theoretical and a practical possibility--along each of the many dimensions. The degree of crowding out along each dimension is an empirical matter that will have to be settled if accurate policy-oriented models are to be constructed. It is important to beware of jumping from accepting the plausibility of some degree of direct (or indirect) crowding out to presenting the on a priori and empirical grounds implausible case of 100% crowding out as the only relevant one. The important Keynesian results with regards to the effectiveness of fiscal policy only require the absence of complete crowding out, not the absence of any degree of crowding out.

Footnotes

1. Keynes and Henderson [26].
2. See e.g. the Economic Report of the President [15], pp. 4, 25.
3. Alternative descriptions would be "structural" or "ex-ante" crowding out for direct crowding out and "reduced form" or "ex-post" crowding out for indirect crowding out. The "ex-ante" - "ex-post" nomenclature is found in David and Scadding [13].
4. See David and Scadding [13], Kochin [27], and Peltzman [37].
5. See e.g. Blinder and Solow [4], Branson [6], Tobin and Buiter [49], Buiter [8], McKinnon [30], and Mundell [35].
6. See e.g. Tobin [46] and [47], Johnson [21], Sidrauski [40] and [41], Foley and Sidrauski [17] and [18], Stein [43], Rose [39], and Levhari and Patinkin [29].
7. For a detailed analysis of short-run and long-run models of the economy see Buiter [9].
8. See e.g. Spencer and Yohe [42] and Blinder and Solow [5].
9. See e.g. Chow [11].
10. It is possible to disaggregate the crowding out of private spending by public spending by types of public and private spending. Note that government spending is real exhaustive spending. Transfers are not included.
11. See e.g. Mundell [33] and [34], and Fleming [16].
12. See e.g. Ott, Korb and others [36].
13. The best single reference on direct crowding out is the "textbook" by Bailey [1] especially Ch. 9, pp. 152-64. Another recent textbook that deals with some aspects of ultrarationality is by Miller and Upton [32].

Footnotes (cont.)

14. An analogous issue within the private sector is the relationship between households and corporations. Is the corporation merely an extension of the households that own it, i.e. can its actions be entirely subsumed under household decision-making or is the corporate veil not quite as easily removed?
15. See e.g. Barro [3] pp. 1095-1117, Meyer [31], Patinkin [38], and Tobin [45]. It is insufficiently emphasised in these papers that with imperfect capital markets and binding cash flow or liquidity constraints on spending and borrowing for some private economic agents, the composition of income flows and wealth portfolios will matter greatly and the mix of financing instruments chosen by the government will affect real economic activity.
16. Some (inconclusive) empirical evidence is available on various aspects of "ultrarationality." See e.g. Denison [14], David and Scadding [13], Kochin [27], and Peltzman [37]. Kochin runs a number of regressions of consumption on disposable income and the federal deficit and finds a significant and negative coefficient of the federal deficit, whose numerical value is, however, less than that of disposable income. "Consumers seem, on the basis of the evidence presented here, to have taken some account of the future taxes implied by current deficit spending, . . . they have tended to spend less and save more, all other things being equal, whenever the Federal Government was in deficit." (p. 393) The partial nature of the private sector's reaction to federal deficits is as important as its existence. The traditional neo-Keynesian conclusions about the effectiveness of fiscal policy hinge on the absence of 100% direct crowding out of private spending or saving by public spending or saving. While some of the simple Keynesian conclusions may need to be qualified, it seems that only

Footnotes (cont.)

- the magnitude of fiscal effects, not their existence or sign is at stake. Since maximum "bang-per-buck" is not usually a very important criterion in deciding which combination of government controls to operate on, there appears to be no reason for fiscal policy pessimism on this account.
- Tobin [48]. Such constraints apply to firms as well as to households.
17. The direct crowding out of private borrowing by public borrowing would require the introduction of an additional financial claim into the model. In the interest of simplicity this is not done here.
 18. It is unfortunate that there is no convenient analytical way of differentiating between the effect of financial intermediation in saving real resources and facilitating saving and accumulation and the effect of increasing the quantity of some financial claim, given a financial system of a given degree of sophistication.
 19. Such a model is analysed in Tobin and Buiter [49] and Buiter [7].
 20. See Barro [3].
 21. See Barro [3]. (This argument ignores the different risk properties of private bonds and public bonds.)
 22. A certain amount of empirical evidence is available on these issues: See Cagan [10], Friend and Jones [20], Juster and Shay [22], Juster and Lipsey [23], Katona [24] and [25], Taylor [44].
 23. See Clower [12], Barro and Grossman [2], and Leijonhufvud [28].
 24. I am not arguing that, from an initial position of general Keynesian unemployment of resources, any trajectory with a higher level of public spending will dominate any trajectory with a lower level of public spending. The government may very well overshoot the full employment target creating excess demand and causing a net dead-weight loss of real income.

Footnotes (cont.)

25. I have emphasised the employment (or current income) constraint on consumption demand by households and the sales-constrained demand for labor by firms. Liquidity and cash flow constraints on private spending also have important implications for direct crowding out. The choice between financing a budget deficit by additional current taxes or by borrowing (with the additional debt to be serviced by future taxes), will have important consequences for the real trajectory of the economy when/ some of the tax-payers are liquidity constrained ^{the degree to which} varies over the trade cycle. Borrowing during a slump means that the current "burden" is carried entirely by private agents who are not liquidity constrained. Expected future taxes "required" to service the additional debt will not eliminate a net effect on current consumption if these tax liabilities are postponed until after the date at which the liquidity constraint ceases to be binding. See Tobin [48].

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