BUDGET DEFICIT CUTS
AND THE IRRELEVANCE OF
CROWDING OUT AS A GUIDE FOR
POLICY EVALUATION

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I. INTRODUCTION

Over the last few years, cutting the government budget deficit has been an important political issue in several industrialized countries. In most of them, the attainment of this goal was elusive. This paper relates the deficit cutting experience in the USA and in Germany to the "crowding out" debate in economics.

The development of the German economy over the last six years, when the cutting of the federal budget deficit had paramount priority, gives rise to considerable doubts concerning the validity of the concept of "crowding out" in the present economic political setting. Several aspects of this concept will be briefly reviewed in the following section II. Problems in the modeling of "crowding out" are discussed in section III thereafter. Based on this discussion, in section IV we will then provide an outline of a model for the evaluation of deficit cutting policies. The details of this model are presented in section V. Against this background we will then inspect the deficit cutting experience in the US and in Germany in section VI. In the final section VII we will conclude that the comparative success of the American Administration supports the validity of the model presented here as a guide for policy evaluation.

A comparison of countries so different in many respects as the US and Germany has severe limitations. Our selection of them is in part motivated by the fact that we intend to reconsider previous comparisons of their respective successes and failures in attempts at fiscal consolidation (1). Such comparisons are of interest because of considerable similarities in political intentions along with remarkable
differences between the economic outcomes in the two countries. In both of them the administration and the majority of the legislative bodies were firmly committed to the goal of cutting the federal government deficit, but in both cases the outcome of attempts at fiscal consolidation were considered unsatisfactory, albeit for quite different reasons. In the rest of this introduction we will briefly substantiate this characterization.

In the United States, Congress passed a specific law aimed at cutting the federal government budget deficit—the Gramm-Rudman Act of 1985. The original version of this act intended to produce balanced budgets by 1991. Recently, Congress postponed this goal by two years (2). There are gloomy predictions that in the USA balanced budgets will be elusive for a long time to come unless something drastic happens. The President called for an amendment of the constitution in order to ensure balanced budgets (3). The main problem in this context seems to be that federal expenditures were not cut sufficiently. Later on in this paper, when the US statistics are compared with those of Germany, this seeming failure will be judged positively because it had beneficial effects on both the deficit and employment.

In the Federal Republic of Germany, there was an emotional public debate in the early 1980s about the size of the government debt. Political commentators in Germany foresaw the impending bankruptcy of their federal finances (4). A new government took over in 1982 proclaiming to be determined to reduce the federal debt it had inherited. Funds for social services were cut; recruitment of state officials was virtually halted; tax incentives were given to high income groups in order to "stimulate efforts" and to increase investment. The present situation is, however, that, in spite of very restrained growth in federal expenditures, a record deficit is expected for the year 1988. Further attempts to follow this type of policy are being met by mounting opposition, not least from West Germany's allies, in particular from the USA
where there is considerable concern about the
deficient effective demand generated by Germany's
recent economic decisions (5).

II. THE CROWDING OUT DEBATE

A. The inadequacy of the accounting
approach to budget deficits.

Looking at the accounts of the govern-
ment, cutting the budget deficit should be an
extremely simple matter in principle. A deficit
results from spending being higher than the
income from taxes and revenues, the latter
including the "inflation tax" resulting from
monetary expansion. Cutting the deficit there-
fore simply should mean to reduce spending,
increase revenues, or better even, to do both.
Most people will be aware, however, that such an
accountancy-oriented argumentation is inaccept-
able because any of these actions will have
repercussions on economic activity, which in turn
will affect government finances and the political
acceptability of the government in office.

An acceptable argument about government
deficit cuts will have to take into account the
repercussions which government activity has on
the rest of the economy. There are, however,
widely differing views about the mechanisms
involved.

B. Budget deficits and macroeconomic
activity.

The most important current notion
concerning macroeconomic consequences of
government deficits is the concept of "crowding
out". This was not always so. For a long time
after World War II, the economists' catch-word in
this context was the Keynesian multiplier and the
idea of "pump-priming". According to these
concepts a deficit financed injection of demand
by the government would stimulate the economy to
higher activity. Out of the increased incomes
the private sector of the economy would then be
able to pay for the initial stimulus supplied by
the government.
These mechanisms were claimed to work, of course, only when there was an initial underutilization of capacities of men and machines. Under full employment an additional demand for goods and services by the government would have to replace previous private demand, the net effect on economic activity being zero, at best. The occurrence of "real crowding out" in such a situation is generally not disputed. But then, many economists seem to agree that in most western countries where "crowding out" is discussed there is no full employment. In West Germany, for example, the rate of unemployment was around 9% during the last years, whereas in the "Keynesian" years of the seventies it was around 1.5% for several years (6). But the crowding out argument goes further. It is not restricted to the full employment case.

C. The concept of portfolio crowding out.

According to the doctrine of "financial" or "portfolio" crowding out, the following mechanism may be seen to be working when one is worried about the increase in the government debt: If the government incurs a deficit and money supply is fixed, this might have an initial expansionary effect as claimed by the multiplier doctrine. But higher incomes mean a higher transactions demand for money. In order to satisfy this demand, people will sell financial assets, thus driving down the price of these assets. This implies that the market rate of interest increases. Private investors will be less willing to incur debts at those higher interest rates and eventually there will be less private debt around, less private investment will be financed by bonds, and there will be more government spending. The net effect on economic activity might be in doubt, especially if the argument is carried further to include changes in private wealth due to government action. The multiplier mechanism might then not be working even if there was less than full employment. In any case, the weight of government in economic activity would have increased and this might have—or certainly will have, according to some
schools—a negative effect on an efficient allocation of economic resources.

D. The concept of psychological crowding out.

In the recent German context there was a further variant of this argument, namely, a doctrine of "psychological crowding out" propagated by the influential West German Council of Economic Experts. According to this concept, it was thought that the impact of increased budget deficits on total demand was negative because of a very strong crowding out of private demand due to a depreciation of the currency occurring simultaneously with comparatively high interest rates (7). In an interesting controversy about this concept, the British economist Marcus Miller (1987) pointed out that this supposedly novel argument is nothing else but the old British "Treasury View" of the pre-Keynesian era of the 1930s (8). But Miller (ibid., p. 203) observed that in Britain the ration of public debt to national income which caused the Treasury's concern was then four times that value which Germany experienced in 1981. He concluded that the recent German preoccupation with cutting the budget deficit was "surely overdone". This judgement is particularly plausible if the doctrine of psychological crowding out is considered to be based on irrational beliefs to begin with (9). Whether this criticism is accepted depends, of course, on the acceptance of the implied concept of economic political rationality. This question may be discussed in the context of problems to find a plausible model of the postulated economic phenomena.

III. APPROACHES TO THE MODELING OF CROWDING OUT

A. Problems in the modeling of crowding out.

The most widely used model in macroeconomics is still the IS-LM model of income determination. This model easily generates the "portfolio crowding out" just mentioned. It cannot generate a negative multiplier effect in
its standard formulation. The IS-LM scheme can be adapted to incorporate wealth effects, however; and then it is indeed possible to claim in the context of such a model that "absolute crowding out" occurs so that increasing the budget deficit will have an impact effect of decreasing national income. But the modeling of such a chain of events depends crucially on the mathematical formulation of the passage of time in those models (10). If they are formulated in "continuous time", negative multipliers may occur—but that occurrence crucially depends on the fulfillment of certain order conditions the relevance of which being difficult to assess. Not even in these models is there any necessity for such results. This is not the decisive argument against their crowding out conclusions, however. The severest objection against this type of argument flows from its lack of robustness with regard to changes in the formal treatment of the time period. If the mathematical formulation of the passage of time in a "crowding out" model is changed from a continuous version to a discrete one, it can be shown that any logical basis for a negative impact effect of deficit financed budget expansion disappears.

B. The implausibility of absolute crowding out in a short period setting.

The dependence of economic model predictions on the arbitrary formulation of the passage of time is unsatisfactory and has provoked a lengthy debate (11). Following Tobin (1980; p.83) we propose to side with those economists who claim that the discrete passage of time is the plausible approach to macroeconomics. Negative impact effects of deficit financed government expenditure can then be ruled out as inconceivable outcomes in the context of a large class of models of national income determination.

From the standpoint of the propagators of the "psychological crowding out" argument, the objection might be raised that the analytical context referred to so far is one of a closed economy, whereas they argued in the context of an
open one. But if their argument depended on the depreciation of the domestic currency initiated by rising government deficits (see above, footnote 7), then this argument should also reflect the rising effective demand generated by an increased surplus on the current account of the balance of payments of that economy—a development particularly relevant in the context of the recent German experience. Lacking a consistent model which supports the "psychological crowding out" argument, we are left with doubts concerning its plausibility.

C. Crowding out and long period analysis.

It might be argued that although positive effects on national income through increased effective demand cannot be seriously denied, the analysis of crowding out should not stop at the short period level. What can be said about the long-term effects of deficit financed government expenditure? There are three important contexts in which the recent literature attempts an answer to this question:

(i) the "rock bottom" model of Blinder and Solow (1973) and many later authors;

(ii) the standard growth equilibrium models which were used recently (12) in order to give a theoretical foundation to the doctrine of capital shortage;

(iii) the intergenerations models as adopted in Barro's (1974) discussion of the Ricardian theorem that tax financing and debt financing of government activity are equivalent.

A thorough evaluation of these long-period analyses is not possible here. The problem with all of them is that in order to reach a fairly simple definite answer they must postulate specific dynamic equilibrium conditions which have no clear relation to actual economic situations. The debate about the old Harrod growth model showed already that within the framework of one given growth model there is a plethora of
stable or unstable dynamical models of income determination which could be plugged into the growth model (13). A selection of any of them revealed more about the predilections of the theorist making the selection than about the future dynamics of an actual economy. A systematic utilization of these models for a realistic assessment of the possibility of the occurrence of crowding out in a long period setting does not seem to be feasible.

IV. AN OUTLINE OF A MODEL FOR POLICY EVALUATION

A. Falsification and plausibility in economic modeling.

In discussions as the preceding one it would be desirable to have clear econometric evidence about the predictive powers of competing macroeconomic models. But in spite of decades of econometric research, econometrics as such still cannot be the arbiter in most controversies about economic policy (14). Economists still must work to a considerable extent with stylized facts and must try to take these into account in formulating their macroeconomic policy advice. Thus, considerations of what is to be regarded as plausible in a macroeconomic context cannot be excluded in formulating a model for policy evaluation.

B. The income-expenditure approach to macroeconomic modeling.

An interesting framework for such attempts seems to be possible by welding elements of the old income-expenditure approach, as exemplified by the well-known IS-LM framework, if account is taken of the newer critical debates surrounding this old workhorse of macroeconomic analysis. The "crowding out" debate demonstrated that the IS-LM scheme is flexible. It can take account of the government budget equation and of wealth effects in a fairly simple way. A further advantage of this model is that it may easily incorporate a number of readily available macroeconomic data, such as group specific propensities to consume, taxation arrangements,
and the distribution of income.

The IS-LM scheme has been heavily criticised, not least in the Cambridge (UK) school where it is claimed that this "Bastard Keynesian" model is unauthentic as a representation of Keynes' original ideas. But it should be remembered in this context that for Keynes the money rate of interest must be seen in connection with the workings of the money market. This aspect is indeed preserved in the basic structure of the orthodox macroeconomic model. Until a new macroeconomic school comes up with a convincing monetary theory of the money rate of interest—which the post-Keynesian Cantabrigians have failed to do, so far (15)—variants of the orthodox model continue to have an advantage which commends them even under the perspective of Keynesian authenticity.

C. Endogenous money and the income-expenditure approach.

Moreover, the model structure favoured in the present context is not simply antagonistic to the criticism of the Cambridge Keynesians. It is "encompassing" in the sense that it can take up at least part of the position of the Cambridge School. We will see that the income-expenditure model could be easily modified in order to escape the old assumption that the money supply in an economy must always be treated as a political datum. Thereby it is possible to take account of an important criticism of the Cambridge School against conventional macroeconomics. It was particularly Nicholas Kaldor (1983) who insisted that in spite of the teachings of the monetarists—and of Keynes, for that matter—money supply in fact cannot be considered as being capable of being fixed as an exogenous variable for the rest of the economy by the actions of the monetary authorities. It rather appears to be often endogenous to economic policy. The recent abandonment in the US and the UK of previous monetarist attempts at fixing the growth of money supply gives fresh empirical support for Kaldor's view.
D. The propositions of the irrelevance of crowding out.

We propose, therefore, to discuss the issue of budget deficits in the context of a macroeconomic model which takes account of and neutralizes the crowding out debate by the following modification of the orthodox macroeconomics set up: Take money as endogenous and model the passage of time in discrete steps. The rate of interest \( r \) is then determined through political decisions and the volume of money \( M \) in the economy is an endogenous magnitude, as was argued by Kaldor (1983). Since the rate of interest is fixed exogenously, there will be no interest-induced crowding out when deficit financed government expenditures are stepped up. In addition, since the passage of time is conceived in discrete steps, as was suggested by Tobin (1980), it will be remembered from our previous remarks that in this case there is no basis to reckon with direct wealth effects due to changes in the current amount of government debt even if we went along with that strand of macroeconomic modeling practice which postulates the demand for consumption and for money to depend on private wealth.

Thus, if we adopt as plausible the arguments of Tobin (1980) and of Kaldor (1983), we are on a firm analytical basis in stating that worries about crowding out effects of deficit financed government spending are unfounded.

V. THE MODEL IN DETAIL

A. The structure of the model.

The model just outlined, in referring to the crowding out debate, is based on the "rock bottom" model of that debate as set out in Blinder and Solow (1973). Most of the models of this type depict government debts as eternal "bonds". This is unrealistic, however, and overemphasizes capital value problems associated with interest-induced changes in the price of those bonds. We therefore propose to favor Takayama's (1980; p.607) variant of these models
where the interest rate is variable, i.e. where the maturity of the existing government debt $B_0$ is not postponed eternally but occurs after the unit time period. Taking private capital $K$ as being financed totally by debts of the same maturity status, this gives the beginning-of-period wealth of the community as

"WEALTH" 

$$W_0 = M_0 + B_0 + K_0.$$ 

In a discrete-time formulation the government budget equation is then

"GVT" 

$$G + r_0B_0 = T + M - M_0 + B - B_0$$

(Gvt. purchase + interest payments = Taxes + money flow + debt flow).

The taxes $T$ in this equation may be taken as income taxes. In order to reflect the income tax rates structure we discern between the tax rate $\ell$ on wages $(wN)$ and the rate on non-wages $t$ so that total taxes are given by

"TAXES" 

$$T = \ell wN + t[P + r_0B_0]; \quad \ell < t$$

Where $P$ are profits.

If income shares are given, the wages and profits may be related to national income $(Y)$ via

"DISTR" 

$$wN = \lambda Y; \quad P = (1-\lambda)Y$$

so that the tax equation eventually reads

"TAXES" $T = \ell \lambda Y + t[(1-\lambda)Y + r_0B_0]$ with $T_Y = \ell \lambda + t(1-\lambda) > 0$

where $T_y$ signifies the marginal tax revenue $$(\partial T/\partial Y).$$

Concerning savings $(S)$ we continue to discern between workers and non-workers. For simplicity it is assumed that workers do not save, whereas non-workers' marginal prosperity to save out of disposable income is $s \equiv 1-c$ so that savings are given by

"SAVE" with $S_Y = s(1-t)(1-\lambda)$: $S = s(1-t)/[(1-\lambda)Y + r_0B_0] - cW_0$
where $S_Y$ gives the marginal savings ($\partial S/\partial Y$) with respect to changes in national income. It should be noted that this formulation of the savings function—in accordance with one of the main tenets of "rock bottom" extensions of conventional macroeconomics—contains a negative wealth effect on savings via the $cw_o$ term.

Savings have to meet current expenditures on investment given by the function

$$\text{INVEST}' I = I(r, K_o) \quad \text{with} \quad I_r < 0, I_{K_o} < 0;$$

$r$ = current interest rate. In addition, savings have to meet those government outlays which are not paid by taxes so that the IS-curve of the present model is given by the first of the following three equations:

"IS" $s(1-t)[(1-\lambda)Y + r_oB_o] - cW_o = I(r, K_o) + M - M_o + B - B_o$

"LM" $M = L(Y, r, W_o) \quad \text{with} \quad L_Y > 0, L_r < 0, L_{W_o} < 0$

"GVT" $G + r_oB_o = \ell\lambda Y + t[(1-\lambda)Y + r_oB_o] + M - M_o + B - B_o$

The second of these, the "LM" equation, represents the money market along orthodox lines with the above mentioned Kaldorian variation in mind that the money market does not determine the current rate of interest $r$ but the current volume of money holdings $M$.

The "GVT" equation is a restatement of the above "GVT" equation reflecting the stylized-fact parameters concerning the tax and income structure.

This completes the discussion of the structure of the present model. Several extensions are possible but would clutter the further discussion. Thus, the price level could be made endogenous, social security payments and unemployment benefits could be made to depend on economic activity, and foreign trade balances could be incorporated. The latter will be discussed less formally later on.
B. The workings of the model.

This model could be divided into two resolution levels depending on the variation of the wealth variable. If wealth is taken as given, the time perspective is supposed to be fixed on the short period. For an evaluation of every-day economic policy decisions this should be the relevant resolution level. It will be selected in the following discussion of the model.

Nevertheless, a second resolution level where wealth is treated as variable should be briefly considered. In actual economic dynamics this type of analysis necessarily builds on processes discussed in the context of the former resolution level. A longer run dynamic model should therefore not simply separate but it should simultaneously consider these two analytical levels. We mentioned already that most growth theoretic models do not satisfy this desideratum and that model predictions generated in the context of postulated equilibria are of doubtful relevance for economic policy evaluation.

A variant of the longer run perspective could concern the comparative statics of alternative levels and compositions of the wealth variable. Such an investigation would imply a cet. par. comparison between separate economic "islands". Whether the implied constancy conditions may be sensibly assumed to be fulfilled in such a study might be open to doubt. But even if such doubts were set aside, few definite statements concerning the public debt could be generated, because if wealth changes, there are opposing forces working on public debt.

On the one hand, increased wealth means increased demand for consumption and for money. These effects imply that the private sector expands and is prepared to take up more of government money so that debt-financed deficits should decrease with accumulation. On the other hand, increased wealth as represented by M and B means that there is cet. par. a decreased flow in money and bonds going to government in the
current period as follows immediately from inspecting the above "GVT" equation. A possible compensation for such a decrease could lie in an increase of the current government debt as given by B. Thus, past accumulation of money and government debt may either decrease or increase current government debt in such a longer run analysis, the net outcome being a priori not clear (16).

Turning now to the short-period aspects of this model, the endogenous variables national income (y), volume of money (M), and government debt (B) are affected by the structural and political variables given at the head of the following table. The short-term comparative static results listed in the body of this table will be discussed in the following section.

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<tr>
<th>Influences on the budget deficit</th>
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<td>endogenous variables</td>
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C. The discussion of the model.

The general inference to be drawn from this table is that policies which are contractionary for national income tend to raise the budget deficit. Cases in point are increases in the propensity to save and increases in the rate of interest as may be gathered from looking at the s-column or the r-column. A particularly interesting case in the present context is contained in the G-column, because cutting government expenditure G, according to the principles of accounting, should decrease the budget deficit. But this measure also has a contractionary influence on income. Therefore there will be fewer tax revenues and the public will absorb less money. If the money demand effect is sufficiently strong, i.e. if $S_Y < L_Y$.
holds, then cutting government expenditure will be counterproductive for a deficit cut. Put positively, a debt financed increase in government spending might result not in higher but, ironically, in lower public debt. Conversely, restraining government expenditure with the intention to cut public debt could well result in higher borrowing requirements, as actually is the case in Germany.

A similarly ironical result could also be generated on the revenues side of the government budget. Raising revenues through tax increases cannot be counted upon for cutting deficit because of its contractionary side effects (17). These side effects are particularly strong in the case of tax rates on wages ($\ell$) because of the comparatively high propensity of workers to consume. If the above condition holds, the advice to governments bent on cutting the deficit would be not to raise these tax rates. This advice does not necessarily carry over to tax rates for non-workers. If the marginal tax revenue $T_Y$ is so high that

$$S_Y < L_Y < \frac{1}{1-s}(S_Y + sT_Y)$$

holds, raising the tax rate for non-workers might indeed lead to decreased government borrowing requirements as shown in the bracketed entry in the t-column of the table.

In fact, the share of workers' income after taxes declined considerably during the deficit cutting exercises in Germany over the last years. This might have given an additional impetus for borrowing requirements at a time when the administration pursued the policy of cutting public debt. The distribution effect proper is depicted in the $\lambda$-column: Lowering this magnitude, i.e. lowering the share of wages, clearly has a contractionary influence on national income $Y$ and increases the budget deficit.

With this model in the back of our minds, we may now return to some empirical data about attempts to cut government deficits.
VI. DEFICIT CUTTING PERFORMANCE IN THE USA AND GERMANY

A number of West German economists look with complacency at the deficit cutting performance in their country. Thus Fels and Froehlich (1987; p. 178), the former once associated with the influential German Council of Economic Experts, recently characterized that performance in the following way (18):

The 1980's have witnessed a profound change in economic policy, marked by a shift towards less government interference. Interestingly enough, this shift has produced sharply different outcomes: while in the United States the federal budget deficit has reached record levels, West Germany has embarked upon a course of fiscal consolidation.

The recent statistics of the German Ministry of Finance speak a different language, however. Some of them are represented in the following charts. Chart 1 shows that it is true that in Germany, since the new government came into office in 1982, federal expenditures consistently rose less than in the USA. But comparing the G-curve and the US-curve in chart 2 shows that the latter country reduced the debt financed part of federal expenditure since that time to at least the same percentage. In this regard, the US performance is by now better than the German one according to several statistics.

How is this comparative success of the US to be explained in face of Congress's notoriously slack discipline on the side of expenditures? Both countries experienced considerable reductions in tax rates so that no significant difference could be seen in this regard. In terms of the model just discussed, the comparatively favourable experience in the US must be related to the effective demand differences in the two countries, the US benefiting from a comparatively low propensity to save and a larger
Source: Finanzbericht 1988 and DIW. The author gratefully acknowledges kind assistance by Dieter Vesper and Eirik Svindland of the DIW institute, Berlin.
increase in government expenditure.

The Germans might argue that currently their performance is unfairly represented since their deficits are influenced by changing incomes of their Central Bank which were strongly affected by the recent depreciation of the dollar. This objection is taken account of by constructing the G curve in chart 2 which disregards Central Bank incomes. Considering this curve does not improve the general picture of the German deficit cutting policy. For the next year, the level of unemployment is expected to break the record of that of the past third of the century.

The comparatively positive record concerning employment and fiscal consolidation in the US is even more remarkable if account is taken of the foreign trade situation. By and large, there seems to be agreement among economists that current account deficits are contractionary and surpluses are expansionary. The former characterize the US economy, the latter the German one. This suggests that the high US effective demand paid not only for their own fiscal consolidation but also for demand and employment in a number of other countries, the Federal Republic of Germany being among them. A detailed treatment of the associated economic analysis would lead beyond the scope of the present paper, however.

VII. SUMMARY AND CONCLUSION

We started out with noting the political intention in several industrialized countries to cut government deficits. Superficially regarded, cutting the budget deficit simply calls for curbing spending and for raising revenues. In the face of recent macroeconomic controversies, we then selected a macroeconomic model which suggested that there could be a number of fiscal measures which seem to adjust the government's accounts towards balancing the budget but which in fact might easily prove to be counter-productive for that purpose. The recent experience with the German economy indicates that the cases modeled are not mere logical possibilities.
Effective demand and the revenues flowing from it to the government are an important source for balancing the budget. Whether by accident or by intention, the American political system seems to have heeded this point far better than the German one.
1. See the extensive discussion in the 1987 volume of *Economic Policy* and below, section VI.

2. For a documentation of these developments see, e.g., *The Economist*, October 3, 1987.


5. For a documentation of the position of U.S. Ambassador Richard Burt with regard to the counterproductive deficit cutting policies of the West German government see the report of Jonathan Lynn of Reuter's news agency, Frankfurt, West Germany, January 13, 1988: "Burt...indicated he was not impressed with Finance Minister Gerhard Stoltenberg's plan to raise some taxes next year in order to pay for a record 40-billion mark (24.5 billion dollar) budget deficit. Burt said an economic recession now would seriously impair NATO's ability to deal with security and defence issues... A sluggish economy would result in lower tax revenues and higher social spending, pushing the government even more into the red." The following paper supports particularly this last sentence.

6. For a table of selected economic indicators for West Germany see Hellwig and Neumann (1987), p. 106.

7. See Fels and Froehlich (1987), p.181f: "...the rapidly growing government deficit and the accompanying current account deficit undermined international confidence in the mark: the inflationary impact of the depreciation absorbed much of any initial increase in private purchasing power, while the rise in interest rates necessary to halt the fall of the mark reduced private investment spending. The Council's judgement of
the deficit. The impact of increased budget deficits on demand was then thought to be negative."

8. For a detailed investigation into the "Treasury View" see Middleton (1985; ch. 8). It involved a strong objection to public works and a fear, based on psychological considerations, that government deficits might have deflationary consequences.


10. For two simplified models illustrating this statement see Appendix A below.

11. For a discussion of the issue of continuous time vs. discrete time see, e.g. Benavie (1981).

12. In this context see Carlberg's (1986) attempt at supplying a macroeconomic theory of capital shortage.

13. Hahn and Matthews (1965; p. 31) commented already in this context that "so far from there being a difficulty in devising models that reconcile growth and fluctuations, there is an embarrassment de richesse."

14. If this statement appears to be inappropriately apodictic, it might be interesting to note that a similar view emerged from the discussion of Hellwig and Neumann (1987), the latter co-author being a well known expert on econometric studies in Germany. It is reported (op. cit. p. 144) that against criticism about lacking econometric evidence concerning postulated wage-setting processes "Martin Hellwig...was to argue that he did not believe that one learned much from econometric exercises...".

15. See Kregel (1985) for an elaboration of this point.
16. It could be shown, however, that

\[(dB/dM_0) < (dB/dB_0) < (dB/dK_0)\]

holds. This result states that past accumulation in money and public debt has always a rather small influence on current public debt in comparison to an accumulation of capital. Thus, if it were possible to crowd out accumulation in capital as measure by \(dK_0\) in favor of a corresponding value of increased holdings in the stock of accumulated money or bonds, then there will be a lower level of current government debts in this longer run analysis. We will not enlarge on this point, however, since we do not intend to defend this type of comparative static longer run analysis as a sensible approach to problems of policy evaluation.

17. Thus our model supports the view expressed in footnote five above that raising taxes might be counterproductive for deficit cuts.

18. Similarly, Hellwig and Neumann (1987; p. 134f) assert that the present German federal government "has largely achieved its main macroeconomic task of consolidating public sector finance... The main approach to effecting the consolidation was a programmed slowing down of expenditure growth."
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APPENDIX A

The ‘orthodox’ economics of discrete-time and continuous-time deficit spending

1. Discrete-time analysis

Consider the following simplified model based on the one given in the text:

\[
\begin{align*}
\text{IS} & \quad s(Y + r_0B_0 - T) - cW_0 = I(r) + M - M_0 + B - B_0 \\
\text{LM} & \quad M = L(Y, r, W) \\
\text{GVT} & \quad G + r_0B_0 = T + M - M_0 + B - B_0
\end{align*}
\]

The simplification consists in taking taxes \( T \) as lump-sum tax and in dropping capital so that wealth is now given by \( W_0 = M_0 + B_0 \).

In orthodox macroeconomics money is treated as exogenous so that the comparative statics of an increase in debt financed government spending follow from

\[
\begin{bmatrix}
\frac{dy}{dG} \\
\frac{dr}{dG} \\
\frac{dB}{dG}
\end{bmatrix} = \begin{bmatrix}
0 \\
0 \\
1
end{bmatrix}
\]

with \( \frac{dy}{dG} = \frac{1}{s + (I_r/L_r)L_Y} > 0 \); \( \frac{dB}{dG} = 1 \)

where small-size indices represent partial derivatives and where \( (I_r/L_r)L_Y \) measures the diminution of the multiplier through ‘portfolio crowding out’. This ‘crowding out’ not withstanding, debt financed government expenditures have an incontrovertible expansionary effect in this type of analysis.

2. Continuous-time analysis

Consider next the following continuous-time variant of the preceding model

\[
\begin{align*}
\langle \text{IS} \rangle & \quad s(Y + \tilde{r} \tilde{B} - T) - c\tilde{W} = I(\tilde{r}) + \tilde{M} + \tilde{B} \\
\langle \text{LM} \rangle & \quad \tilde{M} = L(Y, \tilde{r}, \tilde{W}) \\
\langle \text{GVT} \rangle & \quad G + \tilde{r} \tilde{B} = T + \tilde{M} + \tilde{B}
\end{align*}
\]

where the symbol ‘\( - \)' reminds us that the stock variables \( \tilde{W} = \tilde{M} + \tilde{B} \) and the associated rate of interest now pertain to continuous-time analysis and where the symbol ‘\( \cdot \)' signifies derivatives with respect to time. A similar model is to be found in Takayama(1980; p.607ff) where the relation to other ‘rock bottom’ models is discussed in detail.
The customary continuous-time analysis now asks for changes in $Y$ and $\bar{r}$ when government spending and the relevant stock variables change. For the present purpose, skip the customary distinction of 'impact effects' and 'deficit effects' (for further details concerning this distinction see e.g. Takayama's deficit function $\psi(.)$, op. cit. p. 610, equ. 43). Instead, we proceed immediately to the discussion of the complete model as set out above. From

$$ \begin{bmatrix} s & s\bar{B} - I_{\bar{r}} & s\bar{r} - c \\ L_y & L_{\bar{r}} & L_{\bar{w}} - c \end{bmatrix} \begin{bmatrix} dY \\ d\bar{r} \\ d\bar{B} \end{bmatrix} = \begin{bmatrix} 0 \\ 0 \end{bmatrix} \quad \frac{dY}{dG} = \frac{s(\bar{B}L_{\bar{w}} - (1+\bar{r})L_{\bar{r}}) + cL_{\bar{r}}}{D} \leq 0 \quad \frac{d\bar{B}}{dG} = \frac{sL_{\bar{r}} - L_{\bar{w}}(I_{\bar{r}} - s\bar{B})}{D} < 0 $$

where

$$ D = \bar{B}L_y(1-s) + s\bar{B}L_{\bar{w}} - \bar{r}(sL_{\bar{r}} + I_{\bar{r}}L_y) > 0 $$

it follows now that because of the possibility of $dY/dG$ being negative that there could be cases of 'absolute crowding out' in this framework.

3. Comments

In stating that $(d\bar{B}/dG)$ is definitely negative, sect.2 produces a very unorthodox result although the basic structure and the choice of variables in this appendix are not. The explanation for this result follows from comparing the GVT equations in the two sections. In discrete-time analysis $B_o$ represents past accumulated stocks which it is plausible to treat as exogenous, the endogenous variable being $B$. This distinction is not made in the continuous-time model. It just states that with increased government spending on $G$, the volume of its interest payments must *ceteris paribus* be less. Thus, what really happens in the transition from discrete-time analysis to this type of continuous-time analysis is not just a shortening of the analytical time period but also an important change of the conception of endogenous variables. In the text we stated that we side with that branch of economic literature which considers the latter setup as implausible. For a fuller treatment of this question a thorough choice-theoretic analysis is required which cannot be discussed here, however.

**APPENDIX B**

The comparative static results of the table in the text follow from the derivatives

$$ \begin{bmatrix} \frac{\delta \bar{B}}{\delta Y} & -1 & -1 \\ \frac{\delta L_{\bar{w}}}{\delta Y} & 1 & 0 \\ \frac{\delta L_{\bar{r}}}{\delta Y} & 1 & 1 \end{bmatrix} \begin{bmatrix} dY \\ dM \\ dB \end{bmatrix} = \begin{bmatrix} -(1-t)[.|] \\ -\bar{w}_o \\ 0 \end{bmatrix} \begin{bmatrix} s[.|] \\ 0 \\ 0 \end{bmatrix} \begin{bmatrix} I_{\bar{r}} \\ 0 \\ L_{\bar{r}} \end{bmatrix} \begin{bmatrix} s(1-t)Y \\ 0 \\ 0 \end{bmatrix} \begin{bmatrix} ds \\ dt \\ d\lambda \end{bmatrix} $$

where $[.|]$ stands for the corresponding brackets in the "IS" and "GVT" equations of the text.