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## The macroeconomic implications of public sector deficits

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Working Paper No. 168

The Macroeconomic Implications of Public  
Sector Deficits

by

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## The Macroeconomic Implications of Public Sector Deficits

Public Sector deficits have increased substantially during the last decade both in Western Europe and in other parts of the world. As can be seen from chart 1 public sector deficits of Western European OECD countries measured as percentage of GDP were at a relatively modest level in the Sixties. The period average in the Sixties was about 0.3 per cent with some years (1960-62 and 1969) even showing financial surpluses. In the seventies the period average increased to about 2.3 with a rising trend. In the cyclical peak of 73 the deficit was already somewhat larger than in the preceding peak years of the Sixties. The main increase in the level of public deficits came with the recession of 74/75 when the ratio of the deficit to GDP reached 4.6 per cent. While the deficits were reduced in 1976/77 to 3 per cent of GDP they increased again to 3.8 per cent during the economic upswing at the end of the decade, reflecting a strong pro-cyclical course of fiscal policies in this period. While the rising public sector deficits have been criticised on various grounds (mainly relating to negative supply effects)<sup>1</sup> they have also been defended by arguing that without the additional deficit spending there would have been a lower level of aggregate demand and employment<sup>2</sup>.

The focus of this paper will be on the macroeconomic demand effects of public deficit spending. In part I we present a short survey of the main developments in the theory of fiscal demand management. The survey starts from the original Hicks-Hansen IS-LM model and covers the subsequent extensions of the analysis that have been made through the introduction of open economy considerations, wealth effects, price-wage repercussions, budget constraints and expectation effects. In part II we review the empirical estimates of the demand effects of public deficit spending which have been obtained from various econometric policy simulations for Germany. Part III contains a discussion of international policy issues on the conduct of fiscal policy

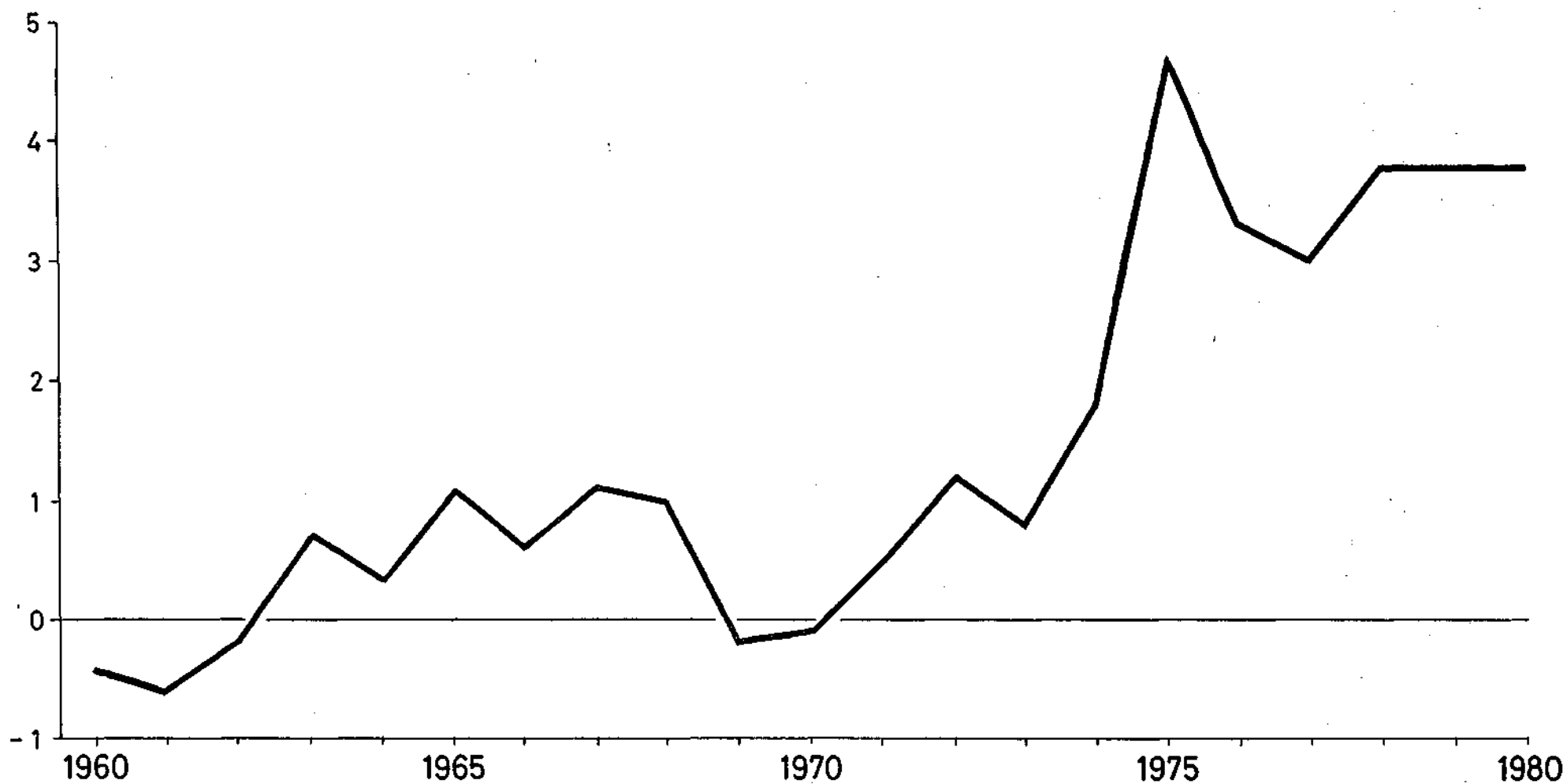
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<sup>1</sup> See e.g. German Council of Economic Experts (1978/79, p.145-147)

<sup>2</sup> Matthöfer (1980, p. 125)

Chart 1

Public sector deficits of Western European OECD countries as percentage of GDP<sup>a</sup>



<sup>a</sup>Calculated as the difference between total government outlays and current receipts of government; a negative sign indicates a financial surplus.

Source: OECD (1982), tables R8 and R9.

including the so-called locomotive approach, the recent trans-atlantic controversy on U.S. fiscal policy and its implications for Western Europe, and finally, the domestic and international implications of strategies that aim at a reduction of public sector deficits.

## I. The Theory of Fiscal Demand Management

### Deficit Spending in the Hicks-Hansen Model

One of the cornerstones of the Keynesian revolution was the analytical demonstration that changes in government spending or taxation which are financed by corresponding changes in the stock of privately held government bonds can affect the level of aggregate demand. In the Hicks-Hansen IS-LM model which soon became a standard framework of analysis, the "normal" effects of a bond-financed increase in government spending (represented by a rightward shift of the IS-curve) are a rise in the rate of interest and an increase in aggregate nominal demand; moreover, since the Hicks-Hansen model includes the assumption of constant nominal wages and a price-elastic supply of goods - reflecting a situation of "Keynesian unemployment" (Malinvaud 1978) - the increase in aggregate spending leads to an expansion of real output. The positive effect of deficit spending on aggregate demand can be explained by the fact that the increase in the interest rate which results from the additional public borrowing does not only reduce investment demand but also reduces the demand for money balances. Thus, part of the additional public spending is brought about by a more intensive use of existing money balances (reflected in an increase of the velocity of money) rather than a crowding-out of private investors<sup>1</sup>.

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<sup>1</sup>There are two extreme cases in the IS-LM model in which deficit spending leads to a full crowding-out of private investment demand. The first is the case of a perfectly interest-elastic investment demand (represented by a horizontal IS-curve); the second is the case of a perfectly inelastic demand for money (represented by a vertical LM-curve).

The effect of a bond-financed increase in deficit spending on aggregate demand is influenced by the money supply strategy of the central bank. If the central bank aims at a target for a wide monetary aggregate like M3 which largely consists of interest bearing assets, or at a target for the monetary base where the reserve component includes reserves on interest bearing assets, the LM curve will be steeper (and the efficiency of fiscal demand policy be lower) than in the case of a target for a narrow monetary aggregate like M1<sup>1</sup>.

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At this point it may be worth noting that financial innovations such as the payment of variable interest on demand deposits (which has become a widespread practice in the United States during the recent years) reduce the interest elasticity of the demand for M1 and thereby lower the efficiency of fiscal demand management under an M1-oriented strategy of the central bank.



## Open Economy Considerations

The extension of the IS-LM model to the open economy by Fleming (1962) and Mundell (1968) had major implications for the efficiency of fiscal demand management. The Fleming-Mundell analysis showed that international capital mobility reduces the effect of deficit spending on domestic aggregate demand<sup>1</sup>. In the extreme case of a very small open economy with perfect capital mobility and flexible exchange rates it was shown that bond-financed increases in government spending have virtually no effect on aggregate demand for domestic goods. There are different ways to explain why international capital mobility reduces the efficiency of fiscal demand management. An explanation from the monetary perspective runs as follows: an inflow of capital reduces the effect of deficit spending on the domestic interest rate; as a result the velocity of money and, hence, aggregate demand rise less strongly than in the case of an isolated domestic capital market. From the goods market perspective the lower efficiency of fiscal demand management under international capital mobility is reflected by the worsening of the trade account which goes along with a capital inflow. In the case of a very small economy where the additional government spending is financed exclusively by a capital inflow the worsening of the trade account equals the increase in public expenditure so that aggregate demand does not respond at all to the fiscal expansion.

In this context it is worthwhile to note that international capital mobility substantially changes the way in which bond-financed government spending "crowds-out" private demand. In the open economy there are three mechanisms through which crowding-out may be brought about:

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<sup>1</sup> In the absence of capital mobility deficit spending has the same effect on aggregate demand and interest rates as in the closed economy. The depreciation of the domestic exchange rate which results from the fiscal expansion in the absence of capital mobility fully offsets the income-induced increase in import demand so that there is no leakage of demand effects to other countries.

- crowding-out via the domestic interest rate; this mechanism becomes less important under international capital mobility since an integrated international capital market reduces the effect of deficit spending on the domestic interest rate;
  - crowding-out via the foreign interest rate; under conditions of international capital mobility the increase in the interest rate which results from domestic deficit spending is transmitted to other countries where it leads to a crowding-out of foreign investment and, thereby, a reduction in export demand for domestic investment goods<sup>1</sup>;
  - crowding-out via the exchange rate; when capital is mobile internationally a bond-financed increase in government spending may lead to an appreciation of the domestic currency which reduces the demand for domestic tradables; an appreciation is the more likely to occur the closer is the degree of substitution between domestic and foreign bonds and the smaller is the size of the domestic economy relative to that of the other countries.
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<sup>1</sup>  
In the original Fleming-Mundell model which is based on the assumption of perfect capital mobility there is no distinction between domestic and foreign interest rates. The negative impact of the world interest rate on the demand for domestic goods implicitly includes the negative response of the foreign demand for domestic investment goods in case of a rising world interest rate. Once imperfect capital mobility is allowed for a distinction between domestic and foreign interest rates is required. The above consideration also suggest that export functions should include the level of foreign interest rates as an explanatory variable (Lehment 1982).

## Wealth effects

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The introduction of wealth effects into the IS-LM analysis showed that deficit spending may not only affect the position of the IS-curve but also that of the LM-curve (Christ 1968, Silber 1970). If government bonds are considered as private net wealth an increase in the stock of privately-held bonds via public deficit spending tends to raise the private demand for goods (shifting the IS-curve further to the right) but may also increase the demand for money balances (shifting the LM-curve to the left).

Whether the efficiency of fiscal demand management is raised or reduced by the existence of wealth effects depends on the relative strength with which the demand for goods and the demand for money react to changes in private wealth. On the basis of a theoretical analysis it may be possible that the leftward shift of the LM-curve compensates or even more than compensates the rightward shift of the IS-curve so that an increase in bond-financed government spending has no effect or even a negative effect on aggregate demand<sup>1</sup>.

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<sup>1</sup>Friedman (1978) has stressed the importance of the relative degree of substitution between bonds and capital for the analysis of wealth effects. In the standard IS-LM model bonds and capital are treated as perfect substitutes. If the degree of substitution between capital and bonds is less than perfect and lower than the degree of substitution between bonds and money the LM-curve may react to an increase in bond-financed government spending by shifting to the right rather than to the left.

### Price-Wage Repercussions

In the traditional IS-LM analysis a central role was played by the assumption that wages do not react to an increase in aggregate demand<sup>1</sup>. This assumption was challenged by Friedman's (1968) hypothesis of a **vertical** long-run Phillips-curve, which although first discussed in connection with monetary policy also **had** an important implication for the efficiency of fiscal demand management. The implication is that even if deficit spending has positive effects on aggregate nominal demand, its output and employment effect will only be transitory (see, e.g., Dornbusch and Fischer 1981, p. 452-54). In the long-run, when wages have fully caught up to the increase in aggregate demand, the effect of the fiscal expansion will fall exclusively on prices, raising the price level in proportion to the increase in aggregate nominal demand, while output and employment remain unaffected.

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<sup>1</sup>Most of the traditional IS-LM analysis also assumed that an increase in aggregate demand has no effect on prices. The extension of the analysis to the case of a less than perfectly elastic supply of goods showed that some part of the increase in aggregate demand is soaked up by an increase in prices so that the output effect is reduced; however, as long as the assumption of unchanged nominal wages is maintained the output effect **remains** positive (Blinder and Solow, 1973, p. 324).

The government budget constraint and its implication  
for a long-run analysis

The original IS-LM model was constructed for a short-run analysis. The introduction of the government budget constraint (Ott and Ott 1965, Christ 1968) directed the attention towards the longer-run effects of deficit spending. A central question was whether the initial deficit of a bond-financed fiscal expansion would be removed over time by an endogenous increase in tax receipts. The extension of the IS-LM model to a long-run analysis (Blinder and Solow 1973, Tobin and Buiter 1976, Brunner and Meltzer 1976, Dornbusch 1976, Siebke, Knoll and Schmidtberger 1981) showed that the answer to this question depends on a number of factors including the properties of the tax system and the effect of changes in wealth on the demand for money. There are circumstances in which bond-financed deficit spending may result in a continuous increase of government deficits if it is not stopped by future discretionary reductions in public spending or increases in tax rates. In such a case a full account of the demand effects of a fiscal expansion makes it necessary to consider also the effects of the future fiscal restriction which is required in order to prevent an explosive increase in budget deficits.

### The role of expectations

The impact which expectations have for the success of economic policy actions has received increasing attention in recent years. Several arguments have been advanced in favour of the hypothesis that the efficiency of fiscal demand management may be destroyed or at least reduced by the effect which deficit spending has on the expectations of private market participants:<sup>1</sup>

- additional government investment, e.g. in the housing sector, tends to lower the expected rate of return on competing private projects and, hence, tends to reduce private investment demand; this case is referred to in the literature under the name of "direct" or "ultrarational" crowding-out (Bailey 1971, David and Scadding 1974);
- private market participants may expect an increase in future taxes in order to service and repay the additional public debt and react to the expected loss in future disposable income by a reduction in current spending and an increase in saving (Barro 1974); in the IS-LM diagram this "Ricardian" effect is reflected - like the "direct" crowding-out effect - by a reduction in the rightward shift of the IS curve;
- an increase in public sector deficits may lead to additional economic uncertainty. If private market participants react to the additional uncertainty by increasing their demand for liquid assets-including money - the efficiency of deficit spending on aggregate demand is reduced through a leftward shift of the LM curve; moreover, the increase in uncertainty may also be reflected in a smaller rightward shift of the IS-curve because of a negative impact of uncertainty on private investment demand (Keynes, 1936, p. 120, Cebula 1973).

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<sup>1</sup>For a graphical and an algebraic analysis of expectation effects in the IS-LM model see Carlson and Spencer (1974) and Dieckheuer (1980).

- the anticipation of the demand and price effects of fiscal policy reduces the wage and price lag so that the effect of deficit spending on the level of output and employment becomes more shortlived (Giersch 1976, p. 54-55).<sup>1</sup>

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<sup>1</sup>It should be noted, however, that expectation effects of public deficit spending may in some cases also have a positive impact on aggregate demand as, e.g., in the case of a public infra-structure project which improves the expected return on related private investment projects.

## II. Deficit Spending and Aggregate Demand: The Results of Investigations for Germany

### Evidence from Large Macroeconometric Models

In the recent years there have been various attempts to quantify the effects of government deficit spending on aggregate demand and output through policy simulation in the context of large macroeconometric models for Germany (Krelle et al. 1979, Conrad and Kohnert 1980, Westphal 1981, DIW 1981, Pohl 1981, Vesper and Zwiener 1982, Tewes 1982, Deutsche Bundesbank 1982).

One common result of the studies is that an increase in government spending leads to a higher level of nominal demand both in the short run and in the longer run. Another common result is that an increase in government spending positively affects real output in the first two years after it has been initiated. Those of the simulations which cover a period of more than two years have arrived at mixed results about the long-run real effects of an increase in government spending. While Conrad and Kohnert (1980) find that the long-run real effect is relatively low but still positive, the study by the Bundesbank (1982) arrives at the result that after approximately 2 1/2 years the initial positive effects on output are followed by an induced decline in real GNP which completely offsets the initial gains in output and employment. This result is attributed largely to the price-wage feedbacks operating in the model and is consistent with the hypothesis of a vertical long-run Phillips curve.

If one considers the implications of these results for the crowding-out debate two points should be noted.



First, the simulations are based on the implicit or explicit assumption that an increase in government spending causes an additional expansion of central bank money (and other monetary aggregates)<sup>1</sup>. The reason is that the Bundesbank is assumed to either directly fix short-run market interest rates or to fix its own lending rates (discount rate, lombard rate) and, thereby, to dampen the increase in market interest rates which results from additional government borrowing<sup>2</sup>. The result, however, that a fiscal cum monetary expansion leads to an increase in aggregate nominal demand has never been a controversial issue of the crowding-out debate. Moreover, it is doubtful whether the assumption of an accommodating monetary policy reflects the actual behaviour of the Bundesbank. Central bank money is used since 1973 as an intermediate target for the Bundesbank's policy and the Bundesbank has never considered an increase in government spending as a reason to pursue a more expansionary monetary policy<sup>3</sup>. Thus,

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<sup>1</sup> An exception is the investigation by Krelle et al. (1979) on the basis of the Bonn-model (Version 8.2) where additional government spending even causes a slight reduction in the monetary base and M1. It should be noted, however, that monetary aggregates do not play an important role in the underlying model. This is shown by the fact that a simulated 20 per cent reduction of minimum reserves and the resulting increase in the money supply have practically no effect on interest rates, exchange rates and GNP. The velocity of money is, thus, regarded as highly unstable and largely independent from changes in interest rates - a view which is not compatible with the results of empirical studies on the velocity of money (Langfeldt and Lehment 1980). This objection applies in a similar way also to the simulations by Conrad and Kohnert (1980) on the basis of Version 10 of the Bonn-model.

<sup>2</sup> In the second case the increase in market interest rates will lead to an additional demand for central bank money which is assumed to be accommodated at least to the extent of existing lines of credit opened up by the Bundesbank.

<sup>3</sup> Central bank money is defined as the sum of currency held by non-banks and bank's minimum reserve held against residents deposits calculated at constant reserve ratios. Central bank money targets do not constitute "base control". The Bundesbank controls central bank money through changes in interest rates which affect credit expansion, the growth of bank deposits and - via the induced effects on minimum reserves and currency holdings - central bank money (Bockelmann 1979).

at least for an analysis that goes beyond the very short-run it seems more appropriate to base simulations of a fiscal expansion on the assumption that the Bundesbank reacts to an additional increase in the demand for central bank money by raising its interest rates (or lowering them not as fast as ~~she~~ would have done otherwise) in order to keep the expansion of central bank money on its preannounced course. In this case the demand effect of a fiscal expansion would most likely be lower than in the simulations which are based on the assumption of an accommodating monetary policy.

A second point is that the structural macroeconometric models on which the simulations are based incorporate only a part of the potential channels for a crowding out of private demand.

- Domestic interest rates have a negative effect on domestic investment demand in all models and in some models also on the demand for consumer goods; the role of crowding-out via a rise in domestic interest rates is, however, strongly reduced by the assumption of an accommodating monetary policy which completely or largely neutralises the effect of deficit spending on domestic interest rates.
- Foreign interest rates do not enter into any of the models as an endogenous variable so that a crowding-out of foreign demand for domestic products via the effect of deficit spending on foreign interest rates is not considered.
- Exchange-rates are endogenous in some of the models; it is, however, doubtful whether the effect of a fiscal expansion on the exchange rate is correctly grasped by the equations; Dornbusch (1982, p.10) in reviewing the empirical evidence on exchange rate determination arrives at the conclusion that "claims for empirically successful exchange-rate equations are disappearing rapidly..... This is the case

whether a monetary approach is adopted, a Mundell-Fleming-Frankel model or models that include, in addition, current account or relative wealth variables".

- Wealth effects are considered explicitly only by Westphal (1981). He finds that the introduction of a wealth variable reduces the effect of a fiscal expansion on demand but only to a very small extent.
- Expectations usually represent one of the major problems of econometric research (Lucas 1976); expectation-induced crowding-out via direct substitution effects, the discounting of future tax payments or risk effects are not accounted for in any of the simulations.
- Long-run effects on the budget are neglected in most of the investigations. Conrad and Kohnert (1980, Table A4 and A 9) arrive at the result that an increase in government spending reduces the budget deficit already in the first year (and in all of the following years). In contrast to this result Tewes (1982) finds that in the first two years (which is the time horizon of his simulation) budget deficits increase by about 50 p.c. of the rise in government spending.

Evidence from Small Econometric Models and Reduced Form Estimates

Dewald and Marchon (1979) have presented a reduced form estimate of aggregate nominal spending for Germany on the basis of the St. Louis model. They find that the elasticity of aggregate nominal demand with respect to changes in government spending is about 0.05. This value is substantially lower than the estimates from the structural macroeconometric models for Germany. A general critique that has been advanced against reduced form estimates is that the fiscal policy coefficient may underestimate the actual fiscal impact in cases where government spending systematically neutralises the effect of exogenous shocks (Blinder and Goldfeld 1972). At least in the German case, however, it appears doubtful whether such a systematic fiscal policy has been pursued in the past.

Neumann (1981) uses a small macroeconomic model with rational expectations to test for the effects of unexpected changes in the money supply and government spending. He finds that an unexpected change in public expenditure on consumption and investment goods has no significant effect on private sector output (being defined as real GNP minus salaries of public employees at constant prices). Neumann explicitly mentions the empirical difficulties in separating the unexpected changes from the expected changes. Since the simulations are not run also for the overall changes in government spending the results of this study are not directly comparable to those of the other investigations.

The OECD (1982) has constructed a small macro model for the purpose of estimating the effects of an increase in government spending both under an "accommodating" and under a "non-accommodating" monetary policy. The real sector of the model essentially follows that used for the OECD inter-link model; the monetary sector covers the supply and demand for money (M3 in the case for Germany) using parameter estimates from Boughton (1979).

In the OECD Study an "accommodating" monetary policy is taken to imply that the central bank fixes the interest rate. A "non-accommodating" monetary policy is taken to imply that the central bank fixes the money supply. The study arrives at the result that the effect of fiscal policy on income under a non-accommodating monetary policy is 3 to 9 times lower than in the case of monetary accommodation but still positive for all the countries under consideration<sup>1</sup>. For Germany the assumption that the Bundesbank controls M3 under a "non-accommodating" strategy comes close to the actual policy since deviations in the movement of M3 and the movement of central bank money are usually relatively small. In order to check to which extent the results are changed if it is assumed that a "non-accommodating" monetary policy involves holding the supply of central bank money constant I have estimated a demand function for central bank money of a similar structure as the M3 function used in the OECD simulations. The regression which is based on annual data for the period 1961 - 79 has yielded the following result<sup>2</sup>:

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<sup>1</sup>For Germany the nominal income multipliers are 3.11 in the case of an accommodating monetary policy and 0.67 in the case of a non-accommodating monetary policy. The substantial difference between the two figures implies that changes in the money supply have a powerful effect on aggregate demand.

<sup>2</sup>The underlying nominal adjustment hypothesis performs better in the estimations than the real adjustment hypothesis which implies a lag term of the form  $\ln(CBM_1/P_1)$ ; as has been shown by Goldfeld (1976) the nominal adjustment hypothesis assumes that nominal money balances are adjusted only gradually to price changes whereas the real adjustment hypothesis assumes an immediate proportional reaction of nominal balances to price changes. The introduction of real public debt into the equation did not lead to a significant improvement of the estimate; this means that we have found no support for the hypothesis that changes in the stock of government bonds cause a shift of the LM curve.

$$\ln (CBM/P) = -0.79 + 0.45 \ln GNP^r - 0.08 \ln R^1 + 0.60 \ln (CBM_{-1}/P)$$

(4.64)   (5.68)                      (4.39)                      (8.23)

$$\bar{R}^2 = 0.998 \quad S.E. = 0.010 \quad D.W. = 2.03$$

with      CBM    =      central bank money  
             P        =      GNP deflator  
             GNP<sup>r</sup>    =      real GNP  
             R<sup>1</sup>       =      long-term government bond yield;  
             t-values are shown in the parentheses .

The estimate implies a long-run income elasticity of 1.1 and a long-term interest elasticity of 0.20. If the estimated function for central bank money is substituted for the M3 equation in the OECD model the income multiplier for the "non-accommodation" case is reduced from 0.67 to about 0.40<sup>1</sup>. The multiplier which is, thus, derived from the OECD model under the assumption of non-accommodation in respect to the expansion of central bank money is about twice as high as the multiplier in the St. Louis model<sup>2</sup>, but it is also about eight times lower than the multiplier for the "accommodation" case in the OECD-model under the assumption of flexible exchange rates and about three times lower than the multiplier of 1.2 which has been derived in the OECD-model under the assumption of an accommodating monetary policy which fixes not only interest

<sup>1</sup>This result is derived by substituting the parameter values of the CBM equation for the parameters of the M3 equation in the formula for the income multiplier which is given in table H of the OECD study. The lower value of the multiplier is largely due to the fact that the interest elasticity in the M3 equation which has been estimated by Boughton is 0.40 and, hence, above the estimate for the interest elasticity in the CBM equation. The relatively high interest elasticity in the M3 equation is largely due to the underlying real adjustment hypothesis in Boughton's study. I have run a regression on the demand for M3 analogous to the CBM regression (i.e. incorporating the nominal adjustment hypothesis) and found that in this case the long-run interest elasticity is about 0.20 and, hence, similar to the result for the CBM estimate. Moreover, I found that the nominal adjustment hypothesis performs better than the real adjustment hypothesis also in the case of the M3 equation. It should be noted that the small OECD-model also covers only part of the crowding-out mechanisms which have been discussed in the literature so that the multiplier may actually still be lower than the estimates from this model.

<sup>2</sup>The share of public consumption and investment is about 25 per cent of GNP in Germany so that the elasticity of 0.05 which has been found by Dewald and Marchon implies a multiplier of about 0.20.

rates but also the exchange rate<sup>1</sup>.

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<sup>1</sup>The experience of the Bretton-Woods system casts substantial doubts on the ability of a central bank to simultaneously control both interest rates and exchange rates. Economic theory suggests that in order to keep both variables constant in case of a domestic fiscal expansion the home central bank must pursue (1) an expansionary open-market policy to stabilise the interest rate and (2) sell foreign currency against domestic currency in order to prevent the depreciation which would otherwise result (Lehment 1980, Ch. III). In order to be successful such a policy requires that the domestic central bank has a sufficient stock of foreign currency and that the increase in the foreign money supply which results from the intervention in the exchange market is accepted by the monetary authorities of the other countries concerned. If a central bank does not sell foreign money but foreign securities (which is the general rule since central banks usually do not hold foreign currency) the effect on the exchange-rate will be smaller and require an even larger amount of foreign assets. Moreover, the sale of foreign securities will tend to raise the domestic interest rate and, hence, have an adverse effect on the interest-rate target. If domestic and foreign securities are imperfect substitutes the effect will, however, not be fully offset - provided again that the foreign monetary authorities do not react despite the fact that the sale of foreign securities tends to raise foreign interest rates and the velocity of money abroad. With imperfect substitutability it can, however, no longer be assumed that an "accommodating" monetary policy implies constant interest rates, since the operations by the central bank that are required to keep the exchange-rate constant cause a divergence between foreign and domestic interest rates so that at last one of the two rates has to change.

### III. International Economic Policy Issues

#### The Locomotive Approach

The issue of an international coordination of economic policy including the course of national fiscal policies emerged soon after the breakdown of the Bretton Woods system in 1973. The discussions intensified in 1976/77 when it became evident that the recovery from the 74/75 recession was faltering. Moreover, the different reactions to the oil-price hike of 1973 had led to a division of industrial countries into so-called "strong" countries including the United States, Germany and Japan which had managed to keep their inflation rates on a relatively low level and so-called "weak" countries like the United Kingdom, Italy and - to a lesser degree - France which had reacted to the removal of the exchange-rate constraint by pursuing strongly expansionary monetary and fiscal policies and in 1976 found themselves in a position with high inflation rates, a strong devaluation of their currencies vis-à-vis those of the "strong" countries and high current account deficits.

To the background of this international economic setting a "locomotive" approach was suggested by various economists and international economic organisations<sup>1</sup>.

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<sup>1</sup>Cooper (1976, p. 47), Tripartite Group (1976, McCracken et al. (1977, pp. 30-31, pp. 236-37); OECD (1976), BIS (1976, p.7), EC (1977, p.4).



The core of the locomotive strategy was that "strong" countries should stimulate their internal demand and thereby help to pull the "weaker" countries out of the prevailing stagnation<sup>1</sup>. The main elements of this demand-oriented version of the locomotive approach, which was supported especially by the OECD, may be outlined as follows (Gebert and Scheide 1980, Whitman 1978)<sup>2</sup>.

First, a main reason for the slowdown of the recovery was seen in an insufficient level of aggregate nominal demand<sup>3</sup>.

Second, it was argued that the "weak" countries had no room to pursue an expansionary policy on their own since this would lead to a "vicious circle" of a further (real) depreciation of their currencies, additional increases in import prices, and higher wage claims. For the "strong" countries, it was argued, a vicious circle was less likely to occur so that they should go ahead with expansionary measures<sup>4</sup>.

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<sup>1</sup> The locomotive approach was not formulated in a unified theoretical framework and has been subject to substantial differences in interpretation.

<sup>2</sup> Apart from the demand-oriented interpretation there was also a supply-oriented interpretation stressing the importance of structural adjustment and innovation in advanced countries as an instrument to improve economic conditions in "weaker" countries including the LDC's (Giersch 1978).

<sup>3</sup> The alternative view that the stagnation had its main source on the supply side and especially in wage increases which exceeded the (adequate) increase in aggregate nominal demand received comparatively little attention in the international economic policy discussion.

<sup>4</sup> For a critical assessment of the vicious circle hypothesis see Haberler (1977). Moreover, the suggestion to stimulate demand in weaker countries through an expansionary policy in the strong countries stood in apparent contradiction to the recommendation that restrictive demand policies should be pursued by the weaker countries in order to reduce inflation (OECD 1976).

Third, in the proposals for an expansion of demand large weight was given to fiscal deficit spending. The OECD (1977, p. 10) explicitly encouraged governments in "strong" countries to increase their budget deficits and to remove political, legal and administrative barriers against a further increase in budget deficits. There may be several reasons why fiscal rather than monetary measures were regarded as the main instrument of the locomotive strategy.

One consideration is the result of a theoretical analysis of economic policy effects in the context of a Fleming-Mundell model with flexible exchange rates and international capital mobility. In this model a monetary expansion in one country has a negative effect on income in other countries whereas a non-accommodated fiscal expansion has a positive effect both on domestic and foreign income and, hence, a comparative advantage as an instrument of a locomotive strategy (Dornbusch and Krugman 1976). A non-accommodated fiscal expansion was, however, considered to be insufficient under quantitative aspects since much of the impact would be offset by the induced increase in interest rates (Solomon 1978)<sup>1</sup>. However, an accommodated fiscal policy will be less efficient as a locomotive for other countries since the additional monetary expansion will strengthen the demand effect for the domestic country but weaken the demand effect that falls on other countries. If the monetary policy completely offsets all interest-rate effects of the fiscal expansion there will be no leakage of demand effects to other countries.

A monetary-fiscal expansion in one country - while having no or only small direct effects on the demand for foreign goods - may, however, indirectly contribute to an expansion in foreign demand since it tends to have a positive effect on the external value of foreign currencies and, hence, removes the exchange-rate constraint to an expansionary demand policy in other countries. In

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<sup>1</sup>The results of the OECD study (1982) which show relatively low multipliers for non-accommodated fiscal expansion support this view.

fact this second aspect soon became a major point in international policy discussions of 1977/78 where the original locomotive strategy was replaced by the suggestion for a concerted expansion in the OECD-era (the so-called convoy-strategy) according to which "impetus would come from expansion not only by the stronger-currency countries but also from the intermediate countries taking advantage of their increased "elbow-room"(OECD 1978, p. XIII).

If the role of "strong" countries, however, is reduced to a removal of the exchange-rate constraint for "weaker" countries a fiscal expansion has no comparative advantage over a purely monetary expansion which - in contrast to a fiscal stimulus - has a clear-cut effect on the exchange rate in standard open-economy macromodels.

A second and very important reason for the weight which was put on fiscal measures must be seen in the use of macroeconomic models which did not allow for a separate analysis of money supply effects. In the simulations with the OECD interlink model which provided the empirical basis for a large part of the discussion on the locomotive and convoy strategies the only instrument of demand management considered was an accommodated fiscal expansion (OECD 1979)<sup>1</sup>.

A third reason for the dominating position of fiscal measures in the locomotive/convoy discussions (and a reason that became specially important for the transformation of the suggestions into actual policy decisions) has to be seen in the institution of economic summit meetings of heads of state and government. Since in several of the leading industrial countries monetary policy is not in the hands of the government resolutions or decisions at summit meetings which aim at stimulating demand (as at the Bonn Summit of 1978) tend to show an inherent bias towards fiscal measures.

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<sup>1</sup> For a critical review of OECD interlink model and the policy simulations based on this model see Gebert and Scheide (1980, ch. 4). It may be of interest that for Germany a fiscal multiplier of 1.5 has been assumed in the interlink simulation; this value is about four times higher than the value which we have derived for a "non-accommodated" fiscal expansion in the OECD (1982) model.

A critical re-assessment of the locomotive and convoy strategies will have to focus especially on two points.

First, the underlying view that an expansion of demand would not create bottlenecks problems<sup>1</sup> and would have only a rather small effect on prices<sup>2</sup> is not supported by the experience of the years 1978-80. Bottlenecks appeared already in 1979, e.g. in the construction sector in Germany. Consumer price inflation in Western European OECD countries which had run at 9.9. p.c. in 1978 increased to 15.6 in 1980. The increase in hourly wage rates rose from 12.2 in 1978 to 14.7 in 1980 in Western European OECD-countries exhibiting a substantial domestic element in the reacceleration of inflation.

The second point concerns the weight that was put on government deficit spending as an instrument of demand expansion and the neglect of monetary policy - which - if considered at all - was given only the auxiliary function of accommodating the fiscal stimulus<sup>3</sup>. If we look at evidence that has been presented up to now on the relative efficiency of monetary and fiscal policy we do not find support for the view that fiscal expansion deserves priority when considering measures that affect aggregate demand. As is shown, e.g., by the OECD (1982) study the effect of an "accommodated" fiscal expansion for the countries listed is between 3 to 9 times longer than in the case of "non-accommodation" (p. 45), indicating the dominating role of money supply changes in the context of a monetary-fiscal expansion.

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<sup>1</sup>"Concern about possible supply constraints may be more relevant from the point of view of medium-term problems than from those of the next 12 to 18 months. The fear of bottlenecks, even for fairly narrowly-defined sectors, seems, at the moment, unjustified" (OECD 1978, p. X).

<sup>2</sup>"Although there would probably be some resulting upward pressure on prices it could be kept small, particularly if the fiscal stimulus consists of measures calculated to reduce cost and price pressures in the first place"(OECD 1978 p.X).

<sup>3</sup>In its discussion of possible different ways of implementing the convoy strategy the OECD (1978, p. XIV) considered various different forms of fiscal stimuli; monetary policy is not even mentioned.

At this point one may speculate about the way in which a stronger consideration of monetary factors in the international policy discussions of the years 1976-78 might have affected economic events. First, it is likely that with less weight being put on fiscal expansion budget deficits would have not increased as strongly as they did. Second, the strong monetary expansion in several "locomotive" countries including Germany which could be observed since the autumn 1977 would have implied a more cautious view on the need for a further monetary-fiscal expansion and might have contributed to avoiding the economic overheating of 1979/80 (which in turn can be regarded as a major factor for the sharpness of the subsequent recession).

## The 1982 Transatlantic Controversy on US-Budget Deficits

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The plans of the U.S.-government to cut taxes substantially without proportionate reductions in government spending led to a controversy between policymakers in the US and Europe. On the European side there was concern that the increase in U.S.-budget deficits would raise interest rates not only in the United States but also in Western Europe and, thereby, contribute to a lengthening of the worldwide recession<sup>1</sup>.

The underlying view that a country should pursue a less expansionary fiscal policy in order to stimulate the economy of other countries stands in obvious contrast to the locomotive approach and, hence, invites a more detailed discussion.

An analysis in the context of a Fleming-Mundell model shows that a bond-financed increase in U.S. government spending has a negative effect on aggregate demand for European products via the induced increase in world interest rates; at the same time, however, there are positive demand effects for Europe which result from the increase in US income and - possibly - from a real appreciation of the U.S.-currency. On balance the positive demand effects are stronger (although their quantitative impact may be rather small under a non-accommodating policy). These considerations suggest that a fiscal restriction in the U.S. will not contribute directly to an economic recovery in Europe<sup>2</sup>.

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<sup>1</sup>It should be stressed that concern about large U.S.-budget deficits was expressed also by economists and political representatives within the United States. The tax increases which were adopted in summer 1982 in order to reduce part of the revenue shortfalls of the cut in income taxes and the subsequent decline in U.S.-interest rates seem to have largely settled the transatlantic dispute about U.S.-budget deficits - at least for the moment.

<sup>2</sup>The reduction in interest rates, however, tends to affect the composition of spending and - by favouring investment relative to consumption - may have a positive effect on long-term growth.

It has also been suggested that U.S.-fiscal policy exerts a negative impact on world demand by causing U.S.-monetary policy to be more restrictive than it would otherwise be (Bergsten 1982). If we consider a combination of an expansionary fiscal policy and a restrictive monetary policy which fully neutralises the effect of deficit spending on U.S.-income in the Fleming-Mundell model<sup>1</sup> we find that such a policy mix does not have a negative but rather a positive effect on aggregate demand for European goods, as long as flexible exchange rates are assumed; the reason is that the negative demand effect of the U.S. monetary policy via the induced increase in interest rates is more than offset by the positive demand effect that results from the induced real depreciation of European currencies.

In order to arrive at a negative effect on aggregate demand for European goods one has to make the assumption that the fiscal expansion in the U.S. (possibly combined with a U.S. monetary restriction) leads to a tighter monetary policy (and/or a fiscal policy) in European countries).

A tightening of European monetary policies may occur if (1) the US-fiscal expansion raises the external value of the US-dollar and (2) the European monetary authorities wish to prevent or at least dampen the depreciation of their currencies in order to counteract imported inflation. There is, however, a substantial degree of uncertainty both about the effect of deficit spending on the exchange-rate and about the reaction of central banks to exchange-market pressure. The uncertainty about the exchange-rate effect of an increase in public sector deficits is illustrated by the observation that the depreciation of European currencies in the recent years has to some part be attributed to the negative confidence

<sup>1</sup> Bergsten (1982) assumes that the negative demand effect of the induced monetary restriction is even stronger than the positive demand effect of the fiscal expansion; a reason for this assumption is not given.

effect of the increase in European public sector deficits, while the increase in US-budget deficits has at least for some time been taken as a reason for the strength of the US-dollar in the exchange market<sup>1</sup>. There are questionmarks also in respect to the reaction of central banks to exchange rate changes. If we look at monetary policy in Germany (which because of the important role of the German currency in the EMS is of interest also for the other EMS members) we find that despite the substantial increase in US-budget deficits and despite a further appreciation of the dollar vis-à-vis the D-Mark since the beginning of this year the increase in central bank money in 1982 is close to the upper limit of the target range of 4 - 7 per cent, and it may be doubtful whether the monetary expansion would have been significantly larger had the dollar been less strong in the exchange market.

One may therefore conclude that the positive effect of reduced U.S. fiscal deficits for Western Europe should be seen in the longer-run allocative effects of lower interest rates rather than in a short-run stimulating effect on aggregate demand.

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<sup>1</sup>The observation that the recent increase in US-taxes and the resulting reduction in the interest differential between the United States and European countries has gone along with a further appreciation of the dollar makes the argument appear doubtful



## The Domestic and International Implications of Strategies to Reduce Public Sector Deficits

Several arguments have been advanced in favour of a reduction of the present structural budget deficits.

First, as a result of the growth of public sector deficits in the last decade government interest payments as a ratio of GNP have increased substantially in Western Europe and have contributed to the overall government sector expansion (Cassel 1982, Table 5). A reduction in public borrowing would contribute to slow down or even reverse public sector expansion which frequently is regarded as a main impediment to economic growth. Second, a reduction in public sector deficits tends to reduce real interest rates and, thus, has a positive effect on investment and long-term growth prospects; moreover, lower interest rates contribute to a reduction of public sector interest payments and to a solution of the debt service problems which presently are regarded as a major threat to the stability of the international financial system. Third, a reduction of structural budget deficits has a positive effect on long-term economic planning in the private sector by removing the uncertainty which may otherwise exist in respect to the long-term financing of government expenditures. Fourth, large current account deficits which often serve as an excuse for the introduction of trade restrictions usually reflect large government deficits (Emerson 1982, Graph 5). A reduction of budget deficits would reduce the scope for concern about the current account and, thus, help to prevent and remove protectionist policies<sup>1</sup>.

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<sup>1</sup>"The current-account deficit of a country is the sum of the private financial deficit (excess of investment over savings) and the public deficit. If the current-account deficit increases this may be because the private deficit has risen - which is not a matter for public-policy concern - or because the public deficit has risen - which may indeed be a matter for concern. But the balance-of-payments figures in themselves will not tell one whether there is a problem. One must get directly to the public-sector (including central-bank) figures, so making the balance-of-payments figures redundant" (Corden, 1977, p.51). Once current account problems are identified to be, in fact, government budget problems there is little reason to resort to trade restriction which is a most inappropriate instrument for the removal of excessive budget deficits.

The major argument against a reduction in budget deficits concerns the negative aggregate demand effect that is expected to result from a fiscal restriction<sup>1</sup>. The weight of this argument depends on several factors including the size of the deficit cut, the quantitative impact of a deficit cut on aggregate spending, and the ability of the central bank to neutralise a negative fiscal impact on aggregate spending through a compensatory adjustment of the money supply. As an example for the effects of a deficit cut on nominal demand and its implication for monetary policy we may consider the case of Germany. The German Council of Economic Experts (1981) has suggested to reduce the structural component of the budget deficit (which according to its estimates amounts to about 2 per cent of GNP) over a period of 4 years. With a fiscal multiplier of 0.4 derived from the OECD (1982) study under the assumption of a given expansion of central bank money an annual cut of public sector deficits by 0.5 per cent of GNP reduces aggregate nominal spending by 0.2 per cent<sup>2</sup>.

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<sup>1</sup> The argument that a reduction in present deficits would be sub-optimal from the perspective of intertemporal burden-sharing has played no role in the recent policy discussion. Negative incentive effects may be brought forward as an argument against a reduction of public sector deficits through tax increases but can hardly serve as an argument against a reduction of deficits through a cut in government consumption and transfers. For a discussion of the pros and cons of various possible measures to reduce public sector deficits see Lehment (1981).

<sup>2</sup> <sup>the</sup> If multiplier of 0.20 which has been found in the context of the St. Louis model (Dewald and Marchon 1979) is used, the effect on nominal GNP amounts to only 0.1 per cent. Moreover, it should be noted that the multipliers are derived for a change in fiscal expenditure on investment and consumption. To the extent that the deficit cut takes the form of a reduction in transfer payments or an increase in taxes standard analysis suggests that the fiscal multiplier and the effect on aggregate demand should even be lower.

Since the elasticity of nominal GNP to changes in central bank money is close to 1 a neutralisation of the negative fiscal demand effect would require an additional increase in central bank money by 0.2 per cent. Time-lags of monetary policy have to be considered but they should not provide too large a problem since the effect of a fiscal restriction on aggregate demand also tends to operate with some time lag (especially if the deficit cuts are brought about by a cut in transfer payments or an increase in taxes) and since the fiscal measures can be announced in advance so that corrective monetary measures can be taken at an early stage<sup>1</sup>.

A fiscal restriction combined with a monetary expansion that offsets the negative fiscal impact on domestic aggregate demand tends to have a negative demand effect for other countries to the extent that it leads to a reduction of foreign interest rates and, hence, a lower velocity of money. In the case under consideration this reduction in velocity should, however, be relatively small and could be offset by a somewhat more expansionary monetary policy in the other countries. With respect to the other EMS countries such a monetary response may at least to some extent be induced automatically since a German policy package of fiscal restriction and monetary expansion which is neutral in respect to domestic nominal GNP should reduce the upward pressure on the external value of the D-Mark in the EMS<sup>2</sup>.

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<sup>1</sup> In the context of the present policy of the Bundesbank a reduction in public sector deficits could be included among the factors which the Bundesbank regards as justifying a monetary expansion in the upper part of the announced target range.

<sup>2</sup> The argument is analogous to the consideration that a corresponding policy mix in the United States would reduce the upward pressure on the external value of the dollar.

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### Deutsche Kurzfassung

Wie in anderen Ländern so stieg auch in der Bundesrepublik das strukturelle staatliche Haushaltsdefizit in den siebziger Jahren kräftig an. Ein Hauptgrund für diese Entwicklung ist darin zu sehen, daß die Regierung versuchte, die gesamtwirtschaftliche Aktivität durch kreditfinanzierte Konjunkturprogramme anzuregen. Stützen konnte sie sich bei diesen Versuchen auf die Ergebnisse verschiedener Simulationsanalysen auf der Basis umfangreicher gesamtwirtschaftlicher Modelle, aus denen hervorgeht, daß derartige Programme zu mehr Produktion und Beschäftigung führen. Gegen diese Simulationen lassen sich jedoch verschiedene Vorbehalte geltend machen. Zwei Einwände haben dabei besonderes Gewicht.

Erstens werden die Mechanismen, über die ein staatliches Deficit Spending private Nachfrage verdrängen kann, in den zugrundeliegenden Modellen nur unvollständig erfaßt. Dies gilt insbesondere für die Erwartungseffekte zusätzlicher kreditfinanzierter Staatsausgaben, aber auch für die Wechselkurs-, Vermögens-, Preis- und Lohneffekte. Die Deutsche Bundesbank hat in einer neueren ökonometrischen Untersuchung insbesondere die Bedeutung der Preis-Lohn-Effekte hervorgehoben. Nach dieser Untersuchung hat ein staatliches Deficit Spending - selbst wenn es gelingt, dadurch die monetäre Gesamtnachfrage nachhaltig zu erhöhen - auf die reale wirtschaftliche Aktivität nur vorübergehend einen positiven Einfluß, da die Zunahme der öffentlichen Ausgaben nach einiger Zeit einen zusätzlichen Anstieg von Preisen und Löhnen hervorruft, der den anfänglichen Produktions- und Beschäftigungszuwachs am Ende völlig aufzehrt.

Zweitens wird bei den Simulationen durchweg angenommen, daß die Bundesbank die Wirkung der zusätzlichen staatlichen Kreditaufnahme auf das Zinsniveau neutralisiert oder zumindest dämpft, indem sie zusätzliches Geld zur Verfügung stellt. Ein Verdrängen privater Nachfrage über höhere Zinsen wird somit bereits durch die Annahmen, die den Simulationen zugrundeliegen, vollständig oder zumindest teilweise ausgeschlossen. Zudem steht die Annahme über das Verhalten der Notenbank im Widerspruch zu der tatsächlich von der Bundesbank betriebenen Politik. Die Bundesbank hat wiederholt deutlich gemacht, daß ein zusätzliches staatliches Deficit Spending für sie kein Grund ist, die Geldmenge stärker zunehmen zu lassen, als sie es sonst getan hätte.

Dies gilt auch umgekehrt. Ergreift die Regierung Maßnahmen zum Abbau des staatlichen Defizits, so bedeutet dies nicht, daß die Geldmengenzunahme geringer ausfällt, als es sonst der Fall wäre. Simulationen, bei denen implizit unterstellt wird, daß geringere Staatsausgaben auch eine knappere Geldversorgung bedeuten, tendieren somit dazu, die Nachfragewirkung eines staatlichen Defizitabbaus zu überschätzen. Wie erheblich die sich daraus ergebende Fehlschätzung sein kann, zeigt eine neuere Studie der OECD. Danach fällt der Nachfrageeffekt kreditfinanzierter Staatsausgaben in den größeren westlichen Industriestaaten um das drei- bis neunfache geringer aus, wenn die Annahme, daß die Notenbank den Zins konstant hält, durch die Annahme ersetzt wird, daß die Notenbank den gegebenen Geldmengenkurs beibehält.

In einer Simulation auf der Basis dieses OECD-Modells wird versucht, den mittelfristigen Nachfrageeffekt des vom Sachverständigenrat für die Bundesrepublik markierten Konsolidierungspfads zu quantifizieren, und zwar unter der Annahme, daß die Geldpolitik auf potentialorientiertem Kurs bleibt (die Konsolidierung also nicht zu einer restriktiveren Entwicklung der Zentralbankgeldmenge führt). Das Ergebnis der Simulation ist,

daß der vom Sachverständigenrat vorgeschlagene Abbau des strukturellen Haushaltsdefizits um etwa 9 Mrd. DM je Jahr (0,5 vH des nominalen Bruttosozialprodukts) nur minimale restriktive Wirkungen auf die gesamtwirtschaftliche Nachfrage hat. Der geringe restriktive Effekt (von maximal 0,2 vH des Sozialprodukts) kommt im wesentlichen dadurch zustande, daß der Zinsrückgang, der eintritt, nicht nur die private Güternachfrage anregt, sondern auch zu einer erhöhten Kassenhaltung führt, die sich in einer mehr als nur vorübergehende Verminderung der Umlaufgeschwindigkeit des Geldes niederschlägt. Der geringe Rückgang der Umlaufgeschwindigkeit könnte gegebenenfalls dadurch ausgeglichen werden, daß die Bundesbank im gleichen Ausmaß - also maximal 0,2 vH - mehr Zentralbankgeld zur Verfügung stellt.