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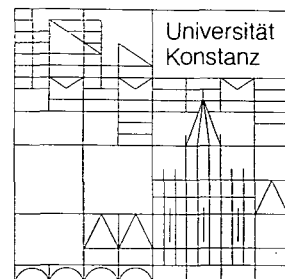
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Sonderforschungsbereich 178
„Internationalisierung der Wirtschaft“

Diskussionsbeiträge



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in the Federal Republic of Germany

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FISCAL POLICY IN THE FEDERAL REPUBLIC OF GERMANY

Wolfgang Franz

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Abstract

The main purpose of this paper is at least twofold. Firstly, the paper gives a record of fiscal policy in the Federal Republic of Germany by describing various phases of its design during the past twenty years. This is done on the background of changing economic conditions and different monetary regimes. As a second purpose, the paper attempts to evaluate the performance of fiscal policy in the Federal Republic of Germany both by taking stock of some empirical results obtained in other studies and by own econometric investigations. The goal of the econometric analysis is to estimate fiscal and monetary policy rules by taking into account explicitly the possibility that these policies have to be treated as at least partly endogenous variables. As a major outcome of the first purpose, three phases of fiscal policy may be distinguished. While the first phase is characterized by a short-term oriented global demand management prevailing until the mid-seventies, fiscal policy was more in favor of a steadily oriented growth and structural policy afterwards. This phase was succeeded by an embarkment upon a cause of fiscal consolidation since the beginnings of the eighties. With respect to the effectiveness of fiscal policy actions, our own econometric analysis is based on a four equations model. Basically it consists of a conventional IS-LM model with a very simple Phillips curve. In addition, fiscal and monetary reaction functions are estimated in order to avoid biased coefficients associated with the impact of fiscal and monetary impulses on employment. It is shown, how important it is (econometrically) to treat policies as endogenous variables. Moreover, our results point to the well-known experience that only a combination of expansive fiscal and monetary measures is suitable to fight against unemployment.

Fiscal Policy in the Federal Republic of Germany

Wolfgang Franz, Konstanz *)

Macroeconomic expansion is the key to progress against unemployment. It will not solve all the problems, to be sure.

J. Tobin (1984)

Policy options must remain within the realm of the feasible, and the interests of political agents must be recognized as constraints on the possible.

J.M. Buchanan (1987)

I. Introduction

A first purpose of this paper is to review main fiscal policy measures of the past twenty years on the background of changing economic conditions of these years including the reactions of monetary authorities. This anatomy of fiscal policy in the FRG is provided in section II. We then take stock of some empirical evidence on multipliers of fiscal policy actions provided by (preferably up-to-date) large-scale econometric models and other studies.

Does fiscal contraction really increase output and employment - an argument recently but inappropriately termed as the "German view of fiscal policy" by M. Miller (1987).²⁾ These questions are dealt with in section III. The following considerations are devoted to our own econometric analysis of the impact of fiscal and monetary policy on employment where we pay considerable attention to endogenous policy reaction functions for both authorities. This study is carried out in section IV. A summary of our findings is provided in section V.

II. The Anatomy of Fiscal Policy in the FRG

This section provides a description of fiscal policy undertaken in the FRG from 1970 to 1986. The emphasis of this outline is not only to investigate whether the measures have been expansionary or restrictive but also to illustrate what specific measures have been carried out.

To begin with, figure 1 illustrates very briefly the economic situation during the time period under consideration. Among others the most important aspects which

*) I am very grateful especially to T. Hofmann, and to H. Böhm, H. Dolejsky, and S. Frey for excellent research assistance. P. Bofinger, K. Siebeck, W. Smolny, and K. Thöne (Stuttgart), G. Flaig and V. Steiner (Augsburg), H.J. Schalk (Münster), D. Lüdeke (Freiburg), J. Blazejczak (Berlin) and seminar participants at the Institut for Advanced Studies (Vienna) provided useful insights.

2) "Inappropriately" for two reasons: first, this view is by no means shared by the majority of German economists; second, this view can be traced back to the case of monetarist instability [see the critical discussion in Blinder and Solow (1973)].

differentiate the seventies from the previous decade are the collapse of the Bretton Woods system of pegged exchange rates, the upsurge in prices due to an excess demand in the labor market in the early seventies and the extraordinary spurt in raw material prices. In the aftermath of these events the FRG experienced simultaneous inflation and unemployment accompanied by a slowdown in trend productivity growth. The degree of capital utilization as reported by the Council of Economic Experts (CEE) declined from 99 per cent at the beginning of the previous decade (1970/73) to 93 per cent in 1975 but regained nearly its pre-recession level four years later. This pattern is observed again in the eighties. While the degree of capital utilization moved down as low as 93 per cent, in 1986 this figure amounts to 96 per cent.

Unemployment, however, does not correspond entirely to capital utilization. Its rise occurred basically in two steps, namely 1975 and 1981/83. Whereas the increase in the degree of capital utilization around 1979 was accompanied by a (modest) decline in unemployment, this coincidence did not happen again in the eighties.

Rather than to fall, the unemployment rate remained fairly stable since 1983 at a 9 per cent mark.

The inflation rate of consumer prices - probably the most important measure used in the political arena - peaked 1973/74 and 1981 with a more than 6 per cent figure, but experienced a remarkable slowdown after 1981 to an even (slightly) negative value.

How did monetary and fiscal policy respond to the oil price shocks? While the design and consequences of fiscal policy are discussed in more detail later, figure 1 presents summary statistics of two policy measures. The monetary policy is illustrated by the expansion rate of central bank money stock which since 1973 served as an intermediate target for the policy of the Deutsche Bundesbank.³⁾ Fiscal policy is characterized by the change in the "fiscal impulse". The latter is calculated by the CEE and is defined as the actual budget surplus minus a so-called "neutral" budget surplus which excludes cyclical variations in tax revenue and other factors.⁴⁾

In order to bring down inflation the Deutsche Bundesbank switched to a restrictive policy in 1973. The expansion rate of central bank money declined from 11 per cent in 1973 to about 4 per cent in 1974 but increased afterwards. Hence, the recession began in 1973 already and was not caused by the oil price shock alone, but by a combination of a restrictive monetary policy and supply shocks. The first oil price shock hit the German economy after two quarters of monetary restriction. In contrast, OPEC II, was preceded by a too expansionary policy judged upon the target set by the Deutsche Bundesbank. The following downward correction of monetary expansion undertaken by the Deutsche Bundesbank after 1979 II coincided with OPEC II. Taken together, both oil price shocks were accompanied by a restrictive monetary policy as a response of a previous overly expansionary policy. In contrast to OPEC I the second oil price increase led to an additional tightening of monetary policy.⁵⁾ This phase of a monetary deceleration was completed in 1982. Since 1983 the Deutsche Bundesbank switched to a more expansionary policy with an overshooting of the upper bound of the target zone for more than 2 percentage points in 1986.

In order to provide a first impression of the impact of fiscal policy figure 1 also displays the pattern of the change of the "fiscal impulse". The measurement of the fiscal impulse is published annually by the CEE⁶⁾ and is defined as the dif-

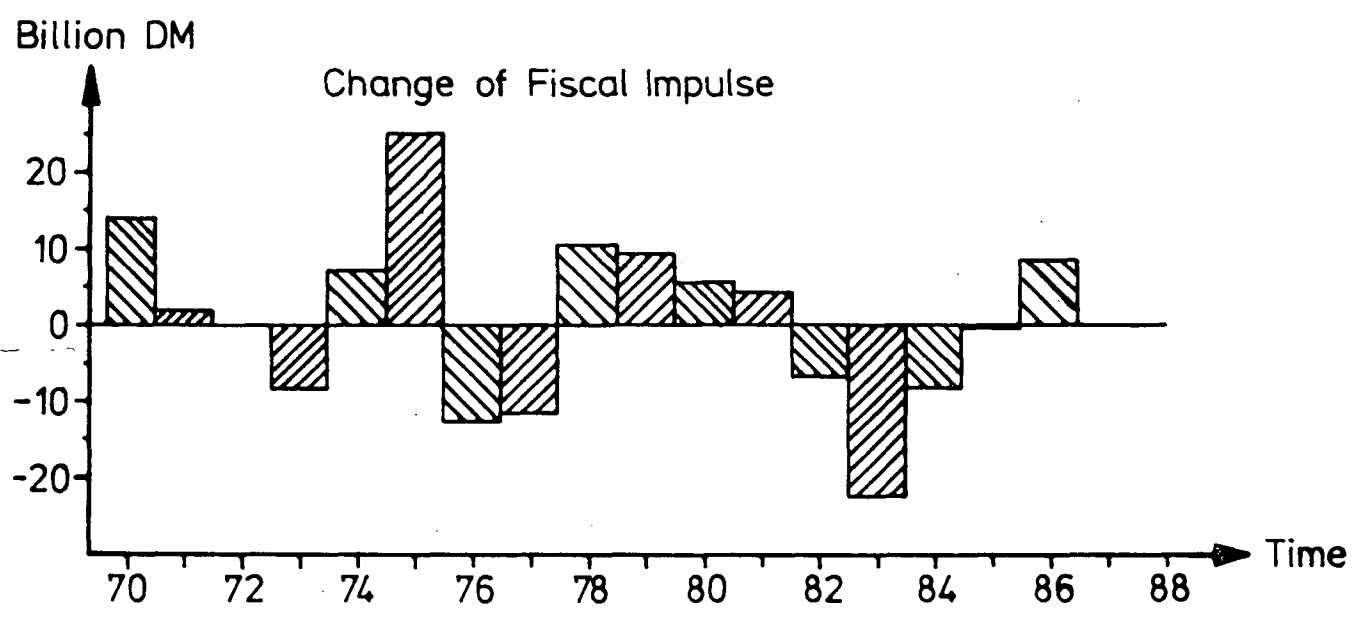
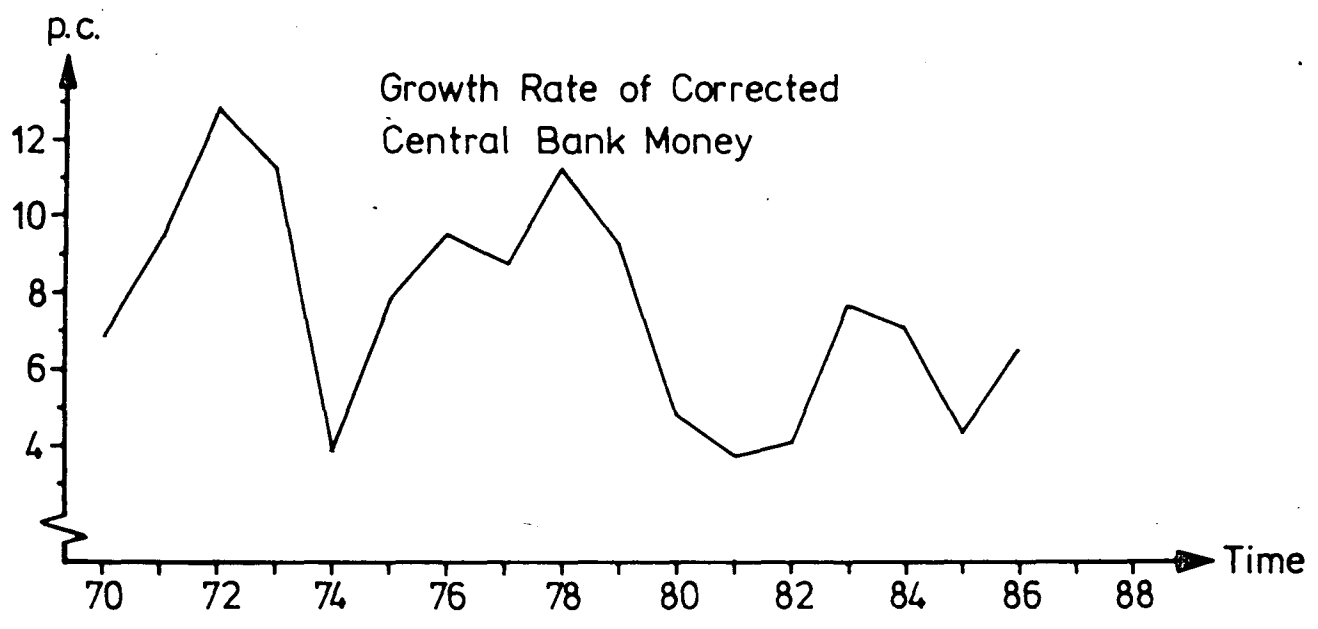
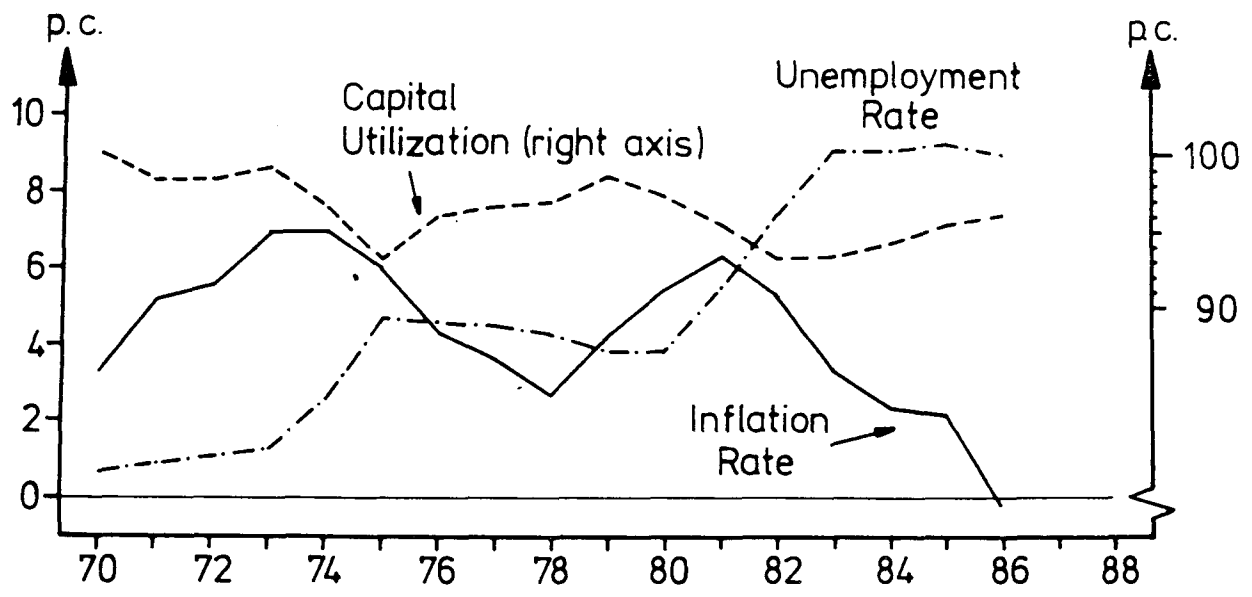
3) The time series of monetary expansion in figure 1 refers to corrected central bank money published by the CEE. It is defined as the sum of currency held by the public (excluding banks) and deposits of banks held at the Deutsche Bundesbank and is corrected for changes in the required reserves - at the Deutsche Bundesbank.

4) The fiscal stimulus will be discussed at some length later.

5) See Lehment (1982) for a more detailed analysis and Fischer (1987) for a comparison with monetary policy in the U.S. and Japan.

6) The concept of the fiscal impulse has undergone several revisions by the CEE. The latest version - on which our data are based - is published in:

Figure 1: Economic Situation in the FRG 1970 - 1986



ference between actual budget and "neutral" budget. The CEE defines the governmental budget as neutral if it does not give rise to a deviation from that degree of aggregate capacity utilization which from a medium-term viewpoint is regarded as normal.⁷⁾ "Normal" is, of course, a loaded word. The CEE considers a 96.5 per cent degree of capacity utilization as a normal value. The time series of the degree of capacity utilization is also plotted in figure 1. It should be noted that in the CEE's calculations only the utilization of the capital stock is taken into account but not the (under-)utilization of labor.

More precisely, the "neutral" budget at time t is the sum of the following three components:

$$(i) \quad g_0 * Y_t^p$$

where g_0 = ratio of public expenditures to potential output in the base year 1985

Y_t^p = potential output measured in "neutral" prices. The latter are an estimate by the CEE. An inflation rate is regarded as neutral if its reduction would imply "unreasonable" costs

$$(ii) \quad (T_t - T_0) * Y_t^n$$

where T = ratio of tax revenues to nominal GNP at the base year ($=T_0$) and at time t ($=T_t$), respectively

Y_t^n = normal GNP, i.e., GNP at a 96.5 per cent utilization of the capital stock and at neutral prices (see Y_t^p above); the reason why the CEE uses normal GNP rather than potential GNP when calculating the effect of changes in the tax revenue ratio is that the CEE aims to eliminate cyclical variations in tax revenues and those caused by inflation.

$$(iii) \quad (S_t - S_0) * Y_t^p$$

where S = ratio of other revenues (such as fees or profits of firms owned by the government) to potential output

The fiscal impulse (FI) is then defined as

$$(1) \quad FI_t = G_t - g_0 * Y_t^p - (T_t - T_0) * Y_t^n - (S_t - S_0) * Y_t^p,$$

where G denotes actual public expenditures.

As it stands, the concept of the fiscal impulse is highly debatable. First, it shares with other more or less related concepts the principle criticism that there are no "model-free" measures of fiscal impact on aggregate demand [Blinder and Solow (1974)] and, more nihilistically, that there is no existing model of the economy which yields the cyclically and inflation - corrected deficit as a measure of fiscal stance [Buiter (1985)]. However, while a more proper measure of fiscal impact on aggregate demand clearly should rest on model simulations with different sets of parameter values in fiscal decision rules, measures of fiscal stance such as the fiscal impulse may serve as a first indicator. Second, both the base year 1985 and capital utilization do not take into account the underutilization of labor. Although the German economy operated in the base year in the near of a normal degree of capital utilization⁸⁾, unemployment amounted to an official rate

Sachverständigenrat, Jahresgutachten 1986/87, p. 183-185. The concept is reviewed more extensively by Hesse (1983), p. 189-196. See also Lachmann (1987), p. 37-38.

7) Sachverständigenrat, Jahresgutachten 1986/87, p. 183.

8) Capital utilization amounted to 95.4 per cent in 1985 compared with the normal degree of 96.5 per cent.

of 9.4 per cent or about 15 per cent if a conservative estimate of hidden unemployment is included.⁹⁾ Third, the concept of a neutral inflation rate is subject to considerable imprecision. A change of 1 percentage point of this inflation rate changes the fiscal impulse for about 2 billion Deutsche Mark which is a non-negligible amount compared with the figures of the fiscal impulse.¹⁰⁾ Fourth, even constant impulses may have different impacts on aggregate demand if the structure of public expenditures and/or tax receipts change. As will be discussed below multipliers may differ for various types of public expenditures and taxes.

These caveats should be kept in mind when reviewing fiscal policy by using figure 1. The first greater increase of the fiscal impulse took place in 1975 (+ 25.7 billion DM), i.e., in this year the fiscal impulse jumped from + 8.0 billion DM (in 1974) to + 33.7 billion DM (in 1975). The latter value amounts to some 3 per cent of normal GNP. The level of the fiscal impulse declined afterwards but regained the 1975-level in 1980 and peaked in 1981 with an amount of 39 billion DM, i.e., 2.5 per cent of normal GNP. The years afterwards experienced a dramatic slowdown of the fiscal impulse. In 1983 the change of the fiscal impulse was - 23 billion DM (see figure 1). The level of the fiscal impulse was zero in 1984 and 1985 and increased slightly in 1986.

How were these changes in fiscal policy brought about and what kind of economic philosophy directed such a policy? To begin with policy actions table 1 presents a summary of major fiscal policy measures 1970-1986.¹¹⁾ By and large, three phases of fiscal policy can be distinguished. The first phase may be characterized as a more short-term oriented global demand management. It was successfully put into effect in the first mild after-war recession 1966/67. This type of demand management was repeated in 1975. The large increase of the fiscal impulse in this year was mainly a reaction to the emerging recession in due course of the restrictive monetary and fiscal policy of previous years and was brought about chiefly by the tax reform.

The second phase of fiscal policy can be dated from 1977-80 and may be characterized as a more steadily oriented growth and structural policy.¹²⁾ Governmental authorities began to recognize the limitations of a short-term anticyclical demand management in the presence of adverse supply shocks and inadequate responses of wage setting. Moreover, as a consequence of the collapse of the fixed exchange rate system the times of an overvalued DM and the resulting protection of the German industry had been foregone. Again, demand management is hardly designed to combat the resulting effects on employment without stimulating inflation. In our view, it is reasonable to argue that demand management was discredited mainly due to the unjustified confidence as a cure all announced widely by its proponents.¹³⁾

9) See Franz (1985a) for more details.

10) Hesse (1983), p. 194.

11) A more detailed list of these measures is contained in each annual report of the CEE from which the items in table 1 are taken.

12) Krupp (1985), pp. 93-95.

13) See Franz (1985b) for a more detailed discussion of this issue.

Table 1: Some Major Fiscal Policy Measures 1970-1986

1970

- Suspension of declining-balance method of depreciation.
- Surcharge on both corporate and income tax to be repaid 1972 (Konjunkturzuschlag).

1971

- Stabilization program: reduction of public investment expenditures, parts of tax receipts are deposited at the Deutsche Bundesbank as a countercyclical reserve, reduction of additional public debt.

1973

- Stabilization program: tax on investment, extension of the supplementary levy on corporate and income tax, reduction of additional public debt, suspension of declining-balance method of depreciation.
- The measures of the stabilization program enacted in May are mostly cancelled in December.

1974

- Law concerning the reform of income taxation passes parliament; the reform includes among other measures higher tax allowances and a new structure of the progressive tax rates, reform comes into effect 1975.
- Program for higher employment and economic growth in a stable economy: higher public investment, governmental subsidies to wage costs and investment.

1975

- Program for higher (public) investment consisting mainly of additional public investment.
- Program for a restructuring of the public budget mostly to the disadvantage of the income of public servants, program comes into effect 1976.

1977

- Investment program especially designed for a prospective better future ("Zukunftsinvestitionsprogramm" = ZIP), consisting mainly of public investment such as in energy and water supply and transportation. The program covers the years 1977 to 1981 and amounts to 14 billion DM.
- Higher tax allowances for employees and higher depreciations for firms (partly in effect in 1978).

(continued)

1979/80

- Higher tax allowances for income tax; higher value added tax rate.

1982/83

Former federal government (SPD/FDP):

- Program for more workplaces, economic growth, and stability: subsidies for private investment, higher value added tax rate.
- Reduction of subsidies and tax allowances, higher contributions to unemployment insurance.

New federal government (CDU/CSU/FDP):

- Further reductions of tax allowances (but higher allowances for children).
- Surcharge on income tax to be repaid 1990/93 in order to finance investment in housing construction ("Investitions-hilfeabgabe"), this tax, however, was cancelled by the supreme court in November 1984.
- Reductions in transfer payments.

1984/86

- Various tax reductions: profit and wealth taxes (1984), income tax (1986).

This second phase of fiscal policy is partly a reaction to these shortcomings. Its principal design can be best illustrated by the "investment program for a better future" (ZIP). It had a medium term perspective in that it aimed for a development of fiscal expenditures according to the growth rate of potential output. Moreover, as pointed out by Krupp (1985, p. 96), the ZIP reversed priorities. Its main goal was to ensure sufficient economic growth and to restructure the economy. The employment effect was, of course, important but not decisive. However, the program was enacted too late. Capacities in construction industries had been cut down substantially in preceding years. Therefore, when the ZIP came into effect in 1978 it soon reached the capacity limits of the construction industries and created higher inflation. From a today's viewpoint the program should have been enacted earlier in order to stabilize capacities in the construction industry at a higher level or the program should have been dimensioned smaller in 1979.¹⁴⁾

The third phase of fiscal policy can be characterized as a combination of supply side policy and a rigorous consolidation of the public budget, i.e., a sharp reduction of net borrowing requirements. The general government budget deficit as a percentage of GNP fell from 4.9 per cent in 1980 to 2.1 per cent in 1985. What had happened?¹⁵⁾

14) Vesper and Zwiener (1982), p. 251.

15) See Fels and Fröhlich (1987) and Krupp (1985) for different views about the years 1980-1985.

There were two main reasons for embarking upon such a course of consolidation. First, there was a widespread campaign by several (political) groups and in parts of the press that the government had pursued a misguided demand policy and had lost control over public finances. Although in an international perspective the figures on public debt in Germany were by no means particularly impressive (see tables 2 and 3), parts of the public were led to the impression that Germany was on the brink of bankruptcy. Anecdotally we note, that even the catholic church, headed by the archbishop of Cologne, criticized loudly public debt (the "burden" of which, however, did not prevent this institution from asking for public subsidies for the Pope's visit in Germany).

Table 2: General Government Budget Balances

Year	General Government Budget Balances ^{a)}				FRG Federal Government Budget Balances ^{b)}	
	FRG	EEC	US	OECD	Actual	Corrected ^{c)}
	(1)	(2)	(3)	(4)	(5)	(6)
1970-74	-1.1	-1.2	-0.6	-0.3	-3.8	
1975-79	-3.2	-3.9	-1.3	-2.5	-27.8	
1980-84	-3.1	-4.7	-2.6	-3.4	-32.8	-39.8
1980	-3.2	-3.5	-1.2	-2.4	-27.6	-27.6
1981	-4.1	-5.0	-0.9	-2.7	-37.9	-40.2
1982	-3.8	-5.2	-3.8	-4.1	-37.7	-48.2
1983	-2.5	-5.2	-3.9	-4.3	-31.9	-43.0
1984	-1.9	-4.7	-3.1	-3.6	-28.6	-40.0
1985	-1.4	-	-	-	-22.7	-35.6

a) Per cent of GDP/GNP; excluding social security;

b) billion Deutsche Mark; figures are not comparable with col (1) due to different definitions of the governmental sector;

c) Excluding profit transfers from the Deutsche Bundesbank.

Sources: Col. 1,5,6: Sachverständigenrat, Annual Report 1986, p. 222, 243; calculations by the author;

Col. 6: Geschäftsbericht der Deutschen Bundesbank, various issues; calculations by the author;

Col. 2,3,4: Price and Muller (1984), p. 36.

Second, after 14 consecutive years of surpluses the German current account swung into deficit in 1979. In 1980 that deficit reached an unprecedented level of nearly 2 per cent of GNP. The Deutsche Bundesbank expressed difficulties in tolerating such a deficit without spurring inflation and switched to a restrictive monetary policy. The belief that the public budget was the key issue for these problems was underscored by the CEE's concept of a psychological or expectations - induced crowding out. The basic idea of this well known concept is that a rapidly growing government deficit and an accompanying current account deficit undermine international confidence in the Deutsche Mark. As a consequence, the

initial expansionary impact of higher government expenditures is offset either by a weaker consumer spending (in due course of an inflation spurred by the depreciation) or by reduced investment (if interest rates are kept higher in order to avoid the depreciation).

Table 3: Gross Debt of the General Government Sector
(as percentage of nominal GNP/GDP)

Year	1973	1980	1985	1987 ^{a)}
Country				
France	25.1	25.0	34.6	38.3
FRG	18.6	32.5	42.3	43.2
Italy	60.6	67.4	99.6	107.1
U.K.	69.7	54.9	53.7	53.0
U.S.A.	40.6	37.7	48.5	51.6
Japan	17.0	52.0	69.4	69.5

a) Forecasts by the OECD.

Source: OECD, Economic Outlook 41 (June 1987), p. 20, Table 15.

Although plans for fiscal consolidation date back to the times of the agony of the social - liberal coalition in 1981/82, it became a primary goal of the conservative - liberal coalition which was installed in 1982 and confirmed by elections in 1983. In evaluating the success of the consolidation process it is important to note that conventional figures of the development of federal government debt are misleading. The Deutsche Bundesbank has to transfer its profits to the federal government. While these transfers were of minor importance in the seventies (if there were any at all), they gained relevance especially since 1982.¹⁶⁾ As table 2 indicates (cols. 5 and 6) the reduction of the federal budget deficit appears less successful if corrected for these profit transfers.

How was the decrease of the fiscal impulse after 1982 (see figure 1) managed? The main tool was a slowdown of expenditure growth. Between 1983 and 1986 nominal government expenditures rose by an average annual rate of 2.9 per cent compared with the corresponding figure for nominal GNP growth of 5.0 per cent. This stands in marked contrast to the time span 1978-82: expenditures grew at a 7.3 per cent rate while GNP growth amounted to 5.9 per cent (both figures are in nominal terms again). The main burden of adjustment in expenditure growth was put on transfer payments and public investment (-1.5 per cent and -7.1 per cent, respectively, compared with 1982).

In contrast to the reduction of public investment several measures to stimulate private investment were undertaken such as general investment premiums, special depreciation allowances, and subsidies for housing construction. By

16) The reasons for the huge increase in the Deutsche Bundesbank's profits were increased revenues from refinancing operations with banks due to the high interest rates and the higher value of foreign interest payments.

Table 4: Dynamic Real GNP Multipliers of Public Expenditures with an Accommodating Monetary Policy ^{a)}

Model	Simulation- period ↓	Multiplier														
		Year ↘	1				2				Year					
		Quarter ↘	1	2	3	4	1	2	3	4	3	4	5	6	7	8
Bonn	1960 - 77	N	1.61				1.03				0.62	0.57	0.46	0.37	0.36	-
Deutsche Bundesbank	1974 - 81	N	0.90	0.89	0.90	0.91	0.83	0.70	0.61	0.46	0.09	-0.22	-0.28	-0.27	-0.29	-0.31
Dieckheuer	1968 - 73	R	1.04	1.34	1.60	1.84	1.88	1.90	1.86	1.81	1.55	1.69	2.10	2.09	-	-
DIW ^{c)}	1974 - 81	R	1.05	1.14	1.29	1.33	1.48	1.42	1.39	1.39	1.57	1.78	1.91	2.14	2.48	2.71
IfW ^{d)}	1982 - 83	R	0.9	0.9	1.1	1.2	1.2	1.3	1.1	1.2						
RWI ^{e)}	1980 - 81	R	1.51				1.65									
SYSIFO ^{b)}	1975 - 79	R	-	1.6	1.4	1.5	1.5	1.7	1.8	2.0	2.2	1.7	1.2			
Freiburg	1964 - 85	R	0.1	0.2	0.4	0.5	0.7	0.9	1.0	1.3	1.9	2.4	2.9	3.4	3.8	4.1

Notes: a) See text for more details. Most models simulate a higher public investment (remaining on the higher level). The fiscal stimulus is measured sometimes in nominal terms (= N), sometimes in real terms (= R). GNP is always at constant prices.

b) Approximate numbers taken from a figure. c) Deutsches Institut für Wirtschaftsforschung.

d) Institut für Weltwirtschaft. e) Rheinisch-Westfälisches Institut für Wirtschaftsforschung.

Sources: Caesar (1985), Bismut and Kröger (1985), p. 315, private communication with D. Lüdeke (Freiburger Modell).

governmental announcement these measures should improve conditions on the supply side of the economy. Unlike the theoretical predictions of the supply-siders, however, real growth rates were not revived substantially. The German economy was trapped in a combination of low growth and high and persistent unemployment.¹⁷⁾ The economic recovery 1983/85 - nominal GNP changed for 168 billion DM between these two years - was mainly brought about by higher exports (123 billion DM). Investment spurred recovery only in 1986 while exports weakened in this and the following year.

In the second half of the eighties a "tax reform" has been introduced in two stages, 1986 and 1988. The main emphasis of this program is to lower the tax burden by raising certain kinds of tax allowances and by lowering marginal taxes for most if not all income ranges. In contrast to this progress, the Kohl government did not cut subsidies as it had promised. Total subsidies increased substantially and have become a permanent source of income to declining sectors such as shipyards and agriculture.¹⁸⁾

III. Multipliers of Fiscal Policy Actions

In this section we throw light on the impact of fiscal policy on aggregate output. After this discussion we try to figure out to what extent this impact is plagued by crowding out. This is done by inspection of some econometric models for the FRG. With a few exceptions the governmental sector is highly aggregated in such models. Hence, we have to step down from the detailed description of policy measures presented in the previous section.¹⁹⁾

To begin with, table 4 reports dynamic real GNP multipliers of an increase of (nominal or real) public expenditures (mostly public investment). The simulations assume an accommodating monetary policy although they differ in how such a policy is implemented (expansion of monetary aggregates or constant interest rates, respectively, to mention two examples). As can be seen, the models are everything but unique in the value of their multipliers. It should be noted that most if not all models are short-term models so that the long-run results are subject to greater imprecision. Moreover, the models differ substantially in whether certain key variables such as wages are endogenous and how they treat expectations, for example. Neglecting the first two models²⁰⁾ - which measure the fiscal stimulus at current prices - the remaining models obtain, by and large, multipliers in the range of 1 and 1.5 for the first year and between 1.2 and 1.8 in the second. An average multiplier of these two years of about 1.4 corresponds roughly with results obtained for U.S. models such as Michigan (1.5), DRI (1.4), and Hickman-Coen (1.5), but are lower than Brookings (2.6) and Wharton (1.8).²¹⁾ Finally, according to a recent econometric study by Schalk (1985) real impact GDP multipliers of nominal public investment do not differ very much when distinguishing between several public sectors such as traffic and construction (1.85), education and sciences (1.94) or medical services (1.94).²²⁾

17) See figure 1. Growth rates for real GNP: 1.8 (1983), 3.0 (1984), 2.5 (1985), 2.4 (1986).

18) See Hellwig and Neumann (1987).

19) For more details about these models and a comparison of simulation experiments see the conference volume on simulation experiments with econometric models edited by Langer, Martiensen and Quinke (1984).

20) The results of the Deutsche Bundesbank model have been effectively criticized by Heilemann (1983) and Zwiener (1983) in that they rest mainly on a questionable formulation of price and wage formation. Moreover, other simulations of the Bundesbank model do not find crowding out effects even in the long run; see Zwiener (1983).

21) The multipliers are taken from Helberger (1976). They refer to the first two years of the simulation period only although the actual simulation period is longer.

22) Schalk (1985), p. 175. The study reports no other than impact multipliers. Due to the availability of data the model covers the time period 1960-74.

As predicted by macroeconomic theory real GNP multipliers of an increase of public expenditures are larger than those of a tax reduction. Table 5 reports the results of a simulation with the DIW long-term econometric model. While the difference between the real GNP multiplier of an increase of public investment and a reduction of taxes on wages amounts to 1.3 in the first year, it approaches a value of unity in later years. The results obtained with the DIW models are roughly confirmed by Schalk (1985) who obtains a real GDP multiplier of a reduction of taxes on labor income of 0.73 (impact multiplier). According to this model, however, a reduction of indirect taxes nearly doubles the respective multiplier.²³⁾

As the DIW study the model by Schalk reports employment effects of various fiscal policy measures. The results of the DIW model are displayed in table 5. They are higher compared with the model by Schalk which obtains impact multipliers of 30.2 and 13.0 thousand persons for an increase of nominal public investment and a reduction of taxes on labor income of 1 billion Deutsche Mark, respectively.²⁴⁾ One reason for different values of employment multipliers may be whether they treat productivity as an endogenous variable. Whatever estimate the more reliable, they show that expansive fiscal policy cannot serve as a cure-all of our unemployment problem: an extremely high stimulus would be necessary in order to bring the unemployed into jobs.

Table 5: Real GNP and Employment Multipliers

Multiplier	0	1	2	5	9	0	1	2	5	9
	Years after									
	An Increase in Public Investment					A Reduction of Taxes on Wages a)				
Real GNP	1.8	1.8	1.8	1.4	1.4	0.5	0.6	0.7	0.4	0.4
Employment b)	75	69	62	32	23	21	24	23	9	6

a) Deflated by the GNP deflator;

b) Additional employment in thousand persons per 1 billion Deutsche Mark costs of the policy, i.e., netreduction of taxes which includes effects of additional tax revenues resulting from macroeconomic expansion.

Source: Blazejczak (1985), p. 118.

With respect to crowding out of government expenditures it is well known the consequences of financing that public spending programs by substituting public borrowing for taxes include effects on private saving, investment, and the current account of the balance of payments. Moreover, in the longer run the capital intensity of production and the country's net external asset position may also be affected.²⁵⁾

Empirical studies which go beyond an inspection of multipliers presented above usually follow two routes. One possibility is to test whether private consumption is sensitive to the choice of tax versus debt financing of current government expenditure and to what extent government spending directly substitutes for

23) Schalk (1985), p. 176.

24) Schalk (1985), p. 202

25) See Buiters (1985), Dieckheuer (1980), and Siebke et al. (1981) for surveys.

private consumer expenditure.²⁶⁾ A second route is to investigate econometrically whether (the change of) public debt influences interest rates.²⁷⁾

For Germany, empirical studies which cover both aspects are carried out recently by Flaig (1986, 1987). Other empirical work for Germany in this field is either largely atheoretical or is subject to the criticism that only unanticipated changes of the relevant variables matter as claimed by the theory of rational expectations and efficient markets. A possible misspecification may be therefore present in the studies by Franke and Friedrich (1984) and Ketterer (1984), for example.

The study by Flaig (1986) avoids this problem. The econometric test of his model of efficient markets and rational expectations yields the empirical result that in Germany no significant effect of public debt on asset returns is found.²⁸⁾ The inflation rate and the Treasury bill rate in the U.S. are the most important determinants in explaining German interest rates. The finding that the interest rate in Germany is not affected by public borrowing requirements may be explained partly by a concomitant increase in private savings. In a life-cycle model of savings with rational expectations Flaig (1987) shows econometrically that unanticipated changes of governmental deficits reduce the growth rate of private consumption. While the view of a unique correspondence of tax and debt financing is not supported by this study, the hypothesis of fiscal illusion is clearly rejected.

Taken together, the concern that public debt or its change produces high interest rates thus hindering capital formation seems to be misplaced. However, people may not be fooled completely by fiscal illusion: The hypothesis that higher public deficits lead to higher private savings cannot be rejected at the present state of empirical knowledge.

IV. Employment Effects of Fiscal and Monetary Policy

This section is devoted to a closer look on the employment effects of fiscal policy. The rationale for such a specific treatment is at least threefold. The German federal government has often been urged by national and international institutions to undertake expansionary measures to raise employment. How reasonable is this demand in terms of a gain in jobs beyond quantitatively negligible numbers? Secondly, econometric model simulations mostly include the sixties but rarely the eighties. Since the sixties may be still characterized by specific developments (such as the aftermath of the reconstruction phase), what is the econometric evidence on the employment effects of fiscal policy if the simulation period covers the time period after the sixties? Thirdly, as is well known fiscal and monetary policy is not exogenous. To what extent do policy reaction functions take into account (un-)employment and how sensitive are the estimates if these policy reaction functions are treated endogenously?

26) Aschauer (1985) and Boskin (1987) present recent studies of this type.

27) See Evans (1985) and Mortensen (1987) for an analysis in this direction. The latter study concludes that although the rise in real interest rates in the OECD area as a whole can be attributed to a large extent to the increase in a growth-adjusted budget balance, individual countries may diverge substantially from the OECD area. Missing information about which countries diverge render these results questionable for our analyses of the FRG. Nicoletti (1988) also examines the empirical basis for the debt-neutrality hypothesis in a cross-section of eight major OECD countries. This evidence rejects, in most instances, the hypothesis of full debt neutrality. The degree of fiscal illusion is low precisely in the countries where the growth of public debt is explosive.

28) In this study unanticipated changes of variables are generated by using uni- and multivariate autoregressive models.

A tentative answer to these questions is given within the framework of a four equations model. The first two equations are reduced forms of an employment and inflation equation. Explanatory variables of employment are among others fiscal and monetary policy variables. Both variables are then determined endogenously by two policy reaction functions. The model is then estimated by TSLS for the time period 1971-1986 using quarterly data.

The theoretical framework underlying the subsequent empirical analysis is similar to that published recently by Turnovsky and Wohar (1987). Basically it consists of a conventional IS-LM-model with a Phillips curve. Unlike Turnovsky and Wohar (1987), we solve our model for employment rather than for unemployment since official unemployment figures in Germany are somewhat misleading because they include only those unemployed persons who register themselves as such at the labor office. Moreover, we do not distinguish between different models of budget financing as it is carefully done in Turnovsky and Wohar (1987) since this topic is beyond the scope of the present paper. On the other hand, we take considerable efforts to estimate fiscal and monetary policy reaction functions more thoroughly than in Turnovsky and Wohar (1987).

IV.1 Employment Equation

Employment is determined by fiscal and monetary policy and, in principle, by all exogenous variables of the model. In practice, however, only a few exogenous (?) variables turned out to be significant. More precisely, employed persons are explained by a fiscal and monetary impulse variable, by the external value of the Deutsche Mark and by a variable which attempts to capture an occupational mismatch between unemployed persons and vacancies. To avoid problems due to multicollinearity all variables are calculated as first differences (on a quarterly basis).²⁹ Hence, the change of employment depends on the change of the fiscal impulse, for example since changing the neutral component of the governmental budget may not have employment effects.³⁰ Moreover, in order to take into account delayed reactions due to adjustment costs and expectations, all explanatory variables enter the equation as a distributed lag.

Since a more detailed description of variables and sources of data is relegated to an appendix, the following short remarks should be sufficient. The fiscal policy variable is defined as the ratio of the real fiscal impulse to real gross domestic product. The definition of the fiscal impulse (and its shortcomings) have been discussed at some length in section II. The monetary policy variable which enters the employment equation is defined as the ratio of actual real M1 to its long-run value. A more detailed discussion of this policy variable is postponed to the treatment of the monetary policy reaction function.³¹ The real external value of the Deutsche Mark is - roughly speaking - measured by the exchange rate, i.e., a basket of foreign currencies vis-a-vis the Deutsche Mark, times the relative price of domestic goods compared with foreign goods. A decrease of this variable due to a devaluation of the Deutsche Mark and/or an increase in foreign prices relative to domestic prices means an improvement of competitiveness of German firms ceteris paribus. Hence, we expect a negative sign of the coefficient associated with this variable. Finally, the mismatch

29) Since first differences are on a quarterly basis, seasonal dummies are added if significant. First differences on an annual basis have a major disadvantage: In case of an equation with lagged endogenous variables each successive four-quarter change term in a quarterly regression equation contains three one-quarter changes in common, creating positive serial correlation in the residuals.

30) One could, of course, think of versions where the level of the fiscal impulse (and not its change) affects the change of employment. Tentative experiments along these lines (also with respect to the monetary impulse) showed that much if not all of the difference was absorbed by lower regression coefficients. Put differently, our estimates can be viewed as the more conservative ones with respect to the magnitude of the impact of fiscal policy on employment.

31) A related measure used in McCallum (1986) is the percentage change of money supply deflated by the GNP minus trend growth of money supply.

variable is designed to capture the possibility that an expansion of employment is hampered by bottlenecks resulting from a lack of workers with certain qualifications. For this variable, we therefore expect also a negative influence on employment.

Table 6: Employment Equations 1971/I - 1986/II ^{a)} (OLS)
Dependent Variable: First Difference of Employed Persons

Explanatory Variables ^{b)}	Coefficient (t-value)	Lags ^{d)} (DP)	Coefficient (t-value)	Lags ^{d)} (DP)
	(1)	(2)	(3)	(4)
Distributed Lag of ^{c)}				
▲ Fiscal Impulse	31.510 (4.2)	0 to 6 (2)	21.083 (2.9)	0 to 6 (2)
▲ Monetary Impulse	6.797 (4.5)	0 to 8 (2)	13.138 (6.3)	0 to 12 (3)
▲ External Value of the Deutsche Mark	-36.788 (2.7)	1 to 8 (3)	-28.203 (2.3)	0 to 8 (3)
▲ Mismatch	-3.094 (2.4)	1 to 8 (2)	-3.427 (2.6)	1 to 10 (2)
\bar{R}^2	0.915		0.941	
Durbin-Watson-Statistic	1.524		1.862	
Standard Error of Estimate	62.591		52.204	

Notes: a) See appendix for definitions of variables and sources of data.

b) Seasonal quarterly dummies and constant not reported.

c) Estimated using the Almon technique with an endpoint restriction. The coefficients represent the sum of lag coefficients.

d) Lags = lag length

DP = degree of polynomial of lag distribution.

Since economic theory does not offer much guidance as to which lag length of the explanatory variables is appropriate we experimented with different assumptions concerning lag length and the degree and restrictions of the lag polynomial by using the Almon-technique. Table 6 reveals that changes in these assumptions do affect the results substantially.

The two versions reported in table 6 are chosen according to the minimum and maximum value, respectively, of the coefficient associated with the fiscal impulse variable obtained by several attempts. Although the changes concern only the specification of the distributed lag of variables other than the fiscal impulse, in the second version the latter variable displays about two third of its value obtained in col. (1). On the other hand, the impact of the monetary impulse

doubles when the lag length is extended to 12 quarters. Thus, our results point to one possible source of the wide range of estimated effects of monetary and fiscal policy reported in other empirical studies. For a given specification of the distributed lags, however, the coefficients of the fiscal and the monetary impulse remain fairly unchanged whatever other explanatory variables we included.³²⁾ Both the external value of the Deutsche Mark and the occupational mismatch variable enter the regression with the sign expected theoretically. We unsuccessfully experimented with additional explanatory variables such as (the speed of) structural change of sectoral employment, regional mismatch and the like. While most of the variables were signed correctly, they lacked significance in all versions.

IV.2 Price Equations

Table 7: Phillips Curve Estimates 1971/I - 1986/II ^{a)} (OLS)
Dependent Variable: Inflation Rate of Consumer Prices

Explanatory Variables ^{b)}	(1)	(2)	(3)
Lagged Endogenous Variable	1.002 (19.4)	0.9336 (19.6)	0.9742 (17.9)
Employment	-	0.4866*10 ⁻³ (2.3)	0.3395*10 ⁻³ (1.5)
Change of Employment	0.001778 (2.3)	-	0.001252 (1.5)
Inflation Rate of Raw Material Prices	0.008239 (2.9)	0.005863 (2.0)	0.006572 (2.2)
\bar{R}^2	0.921	0.921	0.923
Durbin's h	1.538	2.504	1.703
Standard Error of Estimate	0.5065	0.5068	0.5013

- Notes: a) See appendix for definitions of variables and sources of data.
 b) Constant and seasonal dummies are not reported.
 c) The critical value for a significance level of 5 per cent is $h > 1.645$.
 d) Numbers in brackets are t-values.

32) To some extent our results seem to be in contrast to those obtained by Tulli (1987) who found that in Germany the domestic budget surplus has no systematic effects on output. Due to rather different definitions and some data limitations (his regression have 6 or 7 degrees of freedom), however, his results are not directly comparable with ours.

Table 7 displays estimates of extremely simple Phillips curves as a reduced form of a wage and price equation. Explanatory variables are (the change of) employment and the inflation rate of raw material prices. The lagged endogenous variable is designed to capture price inflexibility as well as adaptive expectations. Since a more extensive econometric treatment of Phillips curves for Germany has been presented elsewhere [Franz (1987)] and an inflation equation is needed only for avoiding a simultaneous equation bias, we disregard other explanatory factors such as taxes, productivity, hysteresis, and the like. As can be seen from table 7, employment and its change play a significant role if they enter the regression as separate variables. They lose significance when they are included both. The lagged endogenous variable is not significantly different from unity but falls short of this value if it is modelled as a distributed lag³³⁾ (not displayed in table 7). The high value for Durbin's h points to significant autocorrelation in cols. (2) and (3) while its value in col. (1) is a borderline case. Experiments with additional explanatory variables (not reported here) show that autocorrelation is to a substantial extent the result of omitted variables. Taken together, the equation contained in col. (1) seems sufficient for the purposes of including a price equation mentioned above.

IV.3 Monetary Reaction Function

As is well known, the OLS estimates displayed in table 6 are subject to a bias if the fiscal and/or monetary impulse variables are influenced by employment. The most obvious channel through which such an influence may work is that governmental and monetary authorities take into account (the development of) employment conditions when making their policy decisions. This argument calls for test of this hypothesis by estimating policy reaction functions. There is a rich literature on this subject covering themes such as rules consistent with stabilization theory, contingent rules, and the credibility issue.³⁴⁾ In principle, we assume that policy makers intend to minimize quadratic loss functions depending on targets such as employment or inflation. The optimal policy rule for the decision variables fiscal and monetary impulse are then linear functions of these and all exogenous variables. For reasons specified below some policy reaction functions differ slightly from this theoretical framework.

Such reasons are most obvious for the analytical treatment of monetary policy. Prior to the collapse of the Bretton Woods system the money stock in Germany was, by and large, not under control by the Deutsche Bundesbank. To a considerable extent it was determined endogenously by (world)inflation. After 1973 this situation changed. The expansion rate of central bank money stock served now as an intermediate target for monetary policy. The control over central bank money by the Deutsche Bundesbank is, of course, not perfect especially if exchange rates have to be stabilized within the EMS or according to the Louvre agreement, to mention two important examples.

In order to incorporate these considerations into a policy reaction function we first experimented with a distinction between a target growth rate of central bank money stock and its percentage deviation from actual growth as an unanticipated part of a monetary stimulus. Several attempts were carried out to specify target monetary growth as a policy rule. Such a target is announced annually by the Deutsche Bundesbank since 1975. The target itself is central bank money stock, i.e., currency plus required reserves where the latter are calculated using reserve ratios of 1974. Put differently, it can be described (as the Deutsche Bundesbank does) as a weighted sum of components of the broad money stock with the weights reflecting the liquidity of the components. Begin-

33) This latter result confirms results obtained in previous studies, e.g. Franz (1987).

34) See Barro (1986), Blanchard (1987) and Persson (1987) for more recent surveys.

ning from 1979 the target was formulated as a range ("corridor"). For these years we used the deviations from the mean of this range as the dependent variable. Significant and negatively signed explanatory variables were the inflation rate and its change, the U.S. Treasury bill rate, and more importantly for our considerations, the change in employed persons. Some forty percent of the variance of target monetary growth could be explained with this or similar regressions.

Table 8: Monetary Policy Reaction Function 1971/I - 1986/II^{a)} (OLS). Dependent Variable: First Difference of Monetary Impulse.

Explanatory Variables ^{b)}	Coefficients (t-value)	
	(1)	(2)
Inflation Rate ^{c)}	-0.3343*10 ⁻² (2.5)	-0.3165*10 ⁻² (1.9)
▲ Employed Persons	-0.6659*10 ⁻⁴ (2.6)	-0.5237*10 ⁻⁴ (2.1)
▲ Fiscal Impulse (t-1)	2.6625 (3.4)	2.2602 (2.8)
▲ Trade Balance Surplus (t-1)	0.1200*10 ⁻² (2.0)	0.1177*10 ⁻² (2.0)
Interest Rate of U.S. Treasury Bills (t-1)	-0.2290*10 ⁻² (2.9)	-0.2460*10 ⁻² (3.0)
\bar{R}^2	0.912	0.908
Durbin-Watson-Statistic	2.126	2.082
Standard Error of Estimate	0.01701	0.01740

- Notes: a) See appendix for definitions of variables and sources of data.
 b) Constant and seasonal dummies not reported.
 c) Col. (1): Inflation rate of consumer prices, Col. (2): Difference between inflation rate of consumer prices and inflation rate of import prices weighted with the share of imports in GNP.

A major problem with this procedure is that it covers only the time period after 1974. In order to take into account years prior to 1975 we attempted to explain the monetary impulse variable used in table 6 directly despite the institutional changes outlined above. Table 8 illustrates two outcomes of an OLS estimation. The change of monetary impulse depends, firstly, on the inflation rate and the change of the number of employed persons. The two columns in table 8 differ in the definition of the inflation rate. While the results in col. (1) refer to the inflation rate of consumer prices, in col. (2) the difference between this variable

and the inflation rate of import prices weighted by the share of imports in GNP enters the regression. The latter variable is designed to capture the possibility that the Deutsche Bundesbank does not respond to exogenous price shocks such as OPEC with a restrictive policy. As can be seen from table 8, however, the results displayed in col. (2) are slightly inferior to those reported in col. (1).

Since the inflation rate but not its change had a significant impact on the change of the monetary impulse, this implies from the viewpoint of stabilization theory that the Deutsche Bundesbank attempts to stabilize the price level rather than a (positive) inflation rate.³⁵⁾

At first glance, the inclusion of employment in the monetary reaction function might be viewed as a misspecification because the Deutsche Bundesbank allows only for a growth rate of potential output (besides unavoidable inflation) when setting its target.³⁶⁾ However, within the target range there is room for allowances for variables such as employment. For example, in 1982/83 the Deutsche Bundesbank deliberately stayed in the upper half of the range explicitly due to business conditions.³⁷⁾

The positive coefficient of the change of the fiscal impulse variable reflects in an admittedly simplified manner the extent to which the fiscal impulse and a possible concomitant public deficit is money-financed. As has been mentioned, M1 is not perfectly under control by the Deutsche Bundesbank. As an additional variable, the trade surplus is likely to increase the money stock if the Deutsche Bundesbank has to stabilize certain exchange rates for example within the Bretton Woods system or, in later years, in periods of managed floating. The interest rate for U.S. treasury bills as a proxy for foreign interest rates is included for similar reasons: An increase of this variable means an export of capital from Germany to, say, the U.S. and, hence, a devaluation of the Deutsche Mark *ceteris paribus*. If the Deutsche Bundesbank stabilizes the exchange rate of the Dollar vis-a-vis the Deutsche Mark, this implies a reduction in M1 *ceteris paribus*.

With respect to parameter stability of the monetary reaction function an CUSUM - test reveals that the hypothesis of structural stability cannot be rejected at a 5 p.c. level of significance.

From the preceding discussion it should be clear that the monetary reaction function displayed in table 8 is anything but perfect. The key issue of this paper is, however, not to elaborate substantially on policy reaction functions but simply to test whether employment plays a significant role in the Deutsche Bundesbank's monetary policy rule. At this stage we cannot reject the hypothesis that the Deutsche Bundesbank to some extent has pursued a countercyclical policy during the time period under consideration. Therefore, the reduced forms of the employment and inflation equation have to be estimated simultaneously with the monetary reaction function.³⁸⁾

IV.4 Fiscal Policy Reaction Function

In order to investigate whether this also holds for fiscal policy we develop a fiscal policy reaction function. Assuming that the government wishes to minimize a quadratic loss function involving unemployment and prices, converting unemployment into employment gives the optional policy rule for the fiscal impulse as

35) Hence, a more accurate (but less significant) variable would be the first difference of the price level rather than the inflation rate.

36) In former times the Deutsche Bundesbank took also velocity change into account. This was given up due to its unpredictability

37) See Geschäftsbericht der Deutschen Bundesbank (1983), p. 35.

38) While the interest rate of U.S. treasury bills may be regarded as an exogenous variable, the trade balance surplus is certainly not exogenous. Since an analytical treatment of this variable is beyond the scope of this paper, it will be instrumented when estimating the system simultaneously.

a linear function of employment and the price level. Taking first differences, the decision variable: change of fiscal impulse depends then on the change of employment and approximately of the inflation rate.

There are three considerations which lead to a slightly different policy rule. First, in case of exogenous price shocks such as the spurt in raw material prices the government may wish to implement a countercyclical policy only for that part of inflation which goes beyond the increase of import prices. We test this possibility by introducing "home-made inflation" which is approximated by the difference between the inflation rate of consumer prices and those of import prices where the latter is weighted by the share of imports in GNP. As an empirical result and in contrast to the results for the monetary reaction function, in all versions this specification was much superior compared with just inflation as the explanatory variable. Second, one major argument against fiscal policy financed by public debt was the increasing share of interest payments in public expenditures. The fear was - rightly or not - that for a given amount of public expenditures there would be an unacceptable declining room for expenditures to be really at disposal of the government and - evenly important - under control of the parliament. Whether this argument has influenced the fiscal impulse is also tested. Third, when the new government of chancellor Kohl came to power, an immediate priority was given to fiscal consolidation (see section II). The rationale of this policy was not only to bring the growing budget deficit under control but also and more importantly to reduce the scale of government by cutting down the share of public expenditures in GNP. Since these objectives and promises mean a significant reversal in the direction of economic policy, these changes are taken into account by a dummy variable for the new conservative government. This dummy is unity for the period after 1982/II and zero for the preceding quarters. In light of the foregoing argument we expect a negatively signed coefficient associated with this dummy variable.

The results in col. (1) of table 9 confirm the theoretical expectations. All variables are highly significant but only some sixty percent of the variable of the first difference of the fiscal impulse can be explained with this specification. We therefore attempted to gain explanatory power by introducing variables which allow fiscal policy to recognize that the FRG is an open economy of a considerable size. According to the well known Mundell-Fleming approach an increase in foreign interest rates gives room for expansionary measures in a system of flexible exchange rates and high capital mobility: As long as fiscal expansion at home raises domestic interest rates this leads ceteris paribus to an appreciation and a deterioration of the current account. Fiscal policy is the less effective the more perfect capital mobility is. If, however, foreign interest rates are high or increasing capital exports may - to some extent - compensate the appreciation and render fiscal policy more effective despite high capital mobility. We have tested the importance of this argument by introducing the change of U.S. interest rates or the level of this variable into the regression. While the former definition seems preferable on theoretical grounds it lacked significance. As col. (2) of table 9 shows the level of the U.S. interest rate plays a significant role and has the sign expected theoretically. The variance explained increases by 8 percentage points. Various attempts to improve the explanatory power by allowing for additional explanatory variables such as the exchange rate (col. (3) of table 9) were widely unsuccessful. This holds especially for unemployment variables which were inferior to employment in most if not all versions. Important for the focus of our paper is that the coefficient associated with the change of employment does not vary more than negligible across various specifications.

Table 9: Fiscal Policy Reaction Function 1971/I - 1986/II ^{a)} (OLS)
 Dependent Variable: First Difference of Fiscal Impulse

Explanatory Variables ^{b)}	(1)	(2)	(3)
Change of Employment	-0.1456*10 ⁻² (4.9)	-0.1470*10 ⁻² (5.5)	-0.1486*10 ⁻² (5.6)
Change of the Share of Governmental Interest Payments (t-1)	-1.4468 (5.1)	-2.0518 (6.9)	-2.1624 (6.9)
"Home Made" Inflation ^{c)}	-0.09146 (3.6)	-0.06619 (2.8)	-0.04696 (1.6)
Dummy Variable for Kohl Government ^{d)}	-0.2905 (3.6)	-0.2505 (3.5)	-0.1884 (2.1)
Interest Rate of U.S. Treasury Bills		0.03723 (3.9)	0.03224 (3.0)
Exchange Rate of U.S. Dollar			-0.08473 (1.1)
\bar{R}^2	0.591	0.675	0.676
Durbin-Watson-Statistic	1.594	2.137	2.151
Standard Error of Estimate	0.206	0.183	0.183

a) See appendix for definitions of variables and sources of data.

b) Constant and seasonal dummies are not reported.

c) Difference between inflation rate of consumer prices and inflation rate of import process weighted with the share of imported goods.

d) Since 1982/III = 1, zero for preceding quarters.

IV.5 Employment Effects of Fiscal Policy

We are now in a position to calculate employment effects of an increase in the fiscal impulse. For this purpose the model is estimated by TSLS. It consists of the equations displayed in table 6 either col. (1) or col. (3), table 7 col. (1), table 8 col. (1), and table 9 col. (2). In the Phillips curve, however, we restrict the coefficient associated with lagged inflation (= 1.002) to unity since it is not significantly different from this value. We therefore have four equations and four endogenous variables namely the change of employment, inflation, monetary and fiscal impulse. All but one remaining variables are treated as exogenous or predetermined if lagged. The exception is the change in the trade surplus (stemming from the monetary reaction function) which is instrumented in order to circumvent the estimation of further equations. Since most estimates obtained by TSLS are similar to OLS results their presentation is relegated to the appendix. Most important for the focus of our paper is the magnitude of the fiscal

impulse variable in the employment equation.³⁹⁾ From table 6 we know that the range for the sum of lag coefficients is 31.5 to 21.1 if the equations are estimated by OLS. The respective figures for TOLS are 38.2 to 19.5 (see appendix). Hence, the spread of the impact of fiscal impulse on employment (both measured as first differences) has increased if policy reaction functions are taken into account. Moreover, t-values for both figures decline slightly in the TOLS versions. Both observations reemphasize the statement made before that employment multipliers of fiscal policy are subject to considerable imprecision. On the other hand, the coefficients associated with the monetary impulse remain remarkably unchanged but wind up with lower t-values in the TOLS versions, too.

The following simulations are based on the TOLS version which exhibits for the employment equation the lower value of the sum of lag coefficients associated with the fiscal impulse variable. The employment effects reported below can therefore be regarded as the more conservative figures compared with other estimates obtained in this paper. The baseline solution with which the simulations are compared use all informations at our disposal, i.e., the corresponding residuals are added to each estimated equation. Therefore, the baseline solution coincides with actual figures, which renders the figures of the simulation results more realistic.

The first simulation experiment rests on the employment equation and treats both the monetary and the fiscal reaction function as exogenous. Starting in 1972/I the fiscal impulse is for each year set on a one billion Deutsche Mark higher level (in prices as of 1980) throughout the simulation period, i.e., until 1986/II.⁴⁰⁾ This additional fiscal impulse amounts to nearly 0.09 per cent of real GNP. The exogeneity of the monetary reaction function implies some neutrality of the Deutsche Bundesbank: It does not accommodate the expansionary measures by financing them, but on the other hand, it accepts the increase in inflation due to these measures rather than to try to reduce it by a restrictive monetary policy. The same holds mutatis mutandis for fiscal policy. Increasing inflation and employment is not viewed as a signal to lower the fiscal impulse as it does otherwise.

As a result of this admittedly simple experiment we obtain after six quarters a permanent higher level of employment of about 17,100 persons. Parenthetically we note that the most "optimistic" estimate (see appendix A2) gives employment effects two times higher than the conservative figure mentioned before. Hence, the employment effects are in a range of 17,100 to 34,200 persons for a one billion higher fiscal impulse in each year throughout the simulation period. As a crude check for plausibility of these figures we refer to the impact employment effects of the DIW - and the Schalk-model discussed in section III. While the DIW-model winds up with about 75,000 persons, the Schalk-model reports some 30,000 persons. Hence, our figures are closer to the results obtained by the Schalk-model. But these comparisons should be viewed with great caution due to large differences between all three models. For example, the models mentioned before assume an accommodating monetary policy whereas our simulations here rest on a "neutral" monetary policy since the monetary impulse is kept on its historical level throughout the simulation period. Simulations with the Freiburg econometric model wind up with an employment effect of some 14,000 additional employed persons if governmental investment is kept on a one billion DM higher level annually and if the central bank money stock is held constant. Since this simulation comes close to our experiment and our findings, our results may not be completely unrealistic.

Things go even worse if the Deutsche Bundesbank's concern about price stability comes into play. On the basis of the experiment mentioned at the beginning, inflation is about 0.6 percentage points higher at the end of the simulation period. In addition, the increase of employment leads also to a reduction of the

39) Note that the fiscal and monetary impulses used in section IV differ from those displayed in figure 1. See appendix B for definitions.

40) That means a 250 million Deutsche Mark higher fiscal impulse for each quarter.

monetary impulse according to the estimated policy reaction function. This is, of course, the result of the specification of the policy maker's quadratic loss function which treats positive and negative deviations from targets symmetrically. The same holds for the governmental policy reaction function (also with respect to employment and inflation).⁴¹⁾

While this symmetry may be a too pessimistic view of the design of economic policy, it does not seem to be completely unrealistic. For example, in the late seventies expansionary fiscal measures such as the ZIP program have been (partly) offset by reductions of other expenditures.⁴²⁾

In any case, this symmetry in both reaction functions may serve as a reference point for a misguided economic policy even if it has not been undertaken frequently. If so, figures 2 to 4 display the worst of all cases.⁴³⁾

From figure 2 we notice that the exogenous increase of the real fiscal impulse (as a percentage of real GNP) of about 0.1 per cent is corrected downwards to about 0.05 percent.⁴⁴⁾ While the 1970 increase of the fiscal impulse is to some extent financed in that year by the Deutsche Bundesbank by a higher monetary impulse, such an expansionary monetary policy is reversed from 1973 on. As figure 3 shows monetary policy does with one modest exception in 1975 never accommodate expansionary fiscal policy again but remains restrictive during the whole simulation period. The employment effects revealed in figure 4 are disastrous. Despite a higher fiscal impulse held permanently on a one billion DM higher annual level employment effects approach a zero value.

Again we want to stress that we do not view this second simulation experiment as a description of how to carry out economic policy. Its main purpose is to point out possible pitfalls in managing expansionary measures.

V. Conclusions

The purpose of this paper is at least twofold. Firstly, we give a record of fiscal policy in the FRG by describing various phases of its design during the past twenty years on the background of changing economic conditions and different monetary regimes. Secondly, we attempt to evaluate the performance of fiscal policy in the FRG both by taking stock of some empirical results obtained in other studies and by own econometric investigations where we elaborate extensively on fiscal and monetary policy rules in order to take into account explicitly the possibility that these policies have to be treated as (partly) endogenous variables.

As a major outcome of the first point, three phases of fiscal policy may be distinguished. While the first is characterized by a short-term oriented global demand management prevailing until the mid - seventies, fiscal policy was more in favour of a steadily oriented growth and structural policy afterwards. This phase was succeeded by an embarkment upon a course of fiscal consolidation since the beginnings of the eighties.

41) In a study by Franz, Kempf, and Kräger (1985) this problem has been mitigated by allowing for very ambitious targets so that actual and/or simulated values (e.g. for employment) are always below targets. Another possibility is a step-wise quadratic loss function. In this paper we have not experimented along these lines.

42) See section II and Vesper and Zwiener (1982).

43) All figures show the difference between the simulation and the baseline solution (=actual figures).

44) Recall that the share of governmental interest payments is taken as exogenous.

Figure 2 Simulated Fiscal Impulse

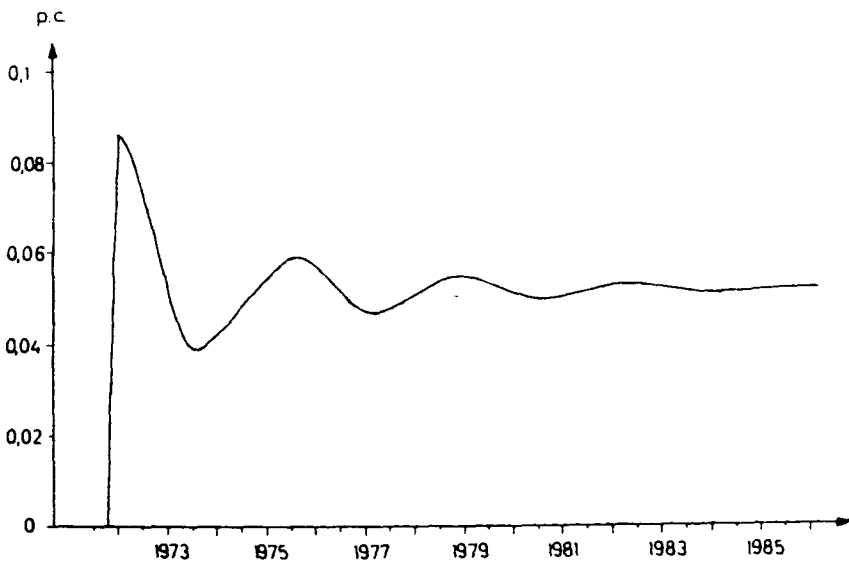


Figure 3: Simulated Monetary Impulse

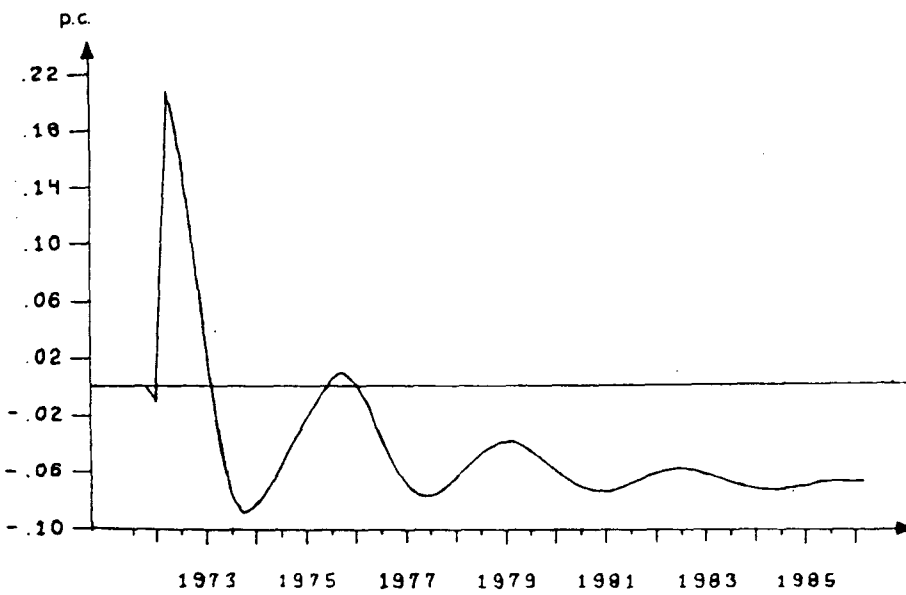
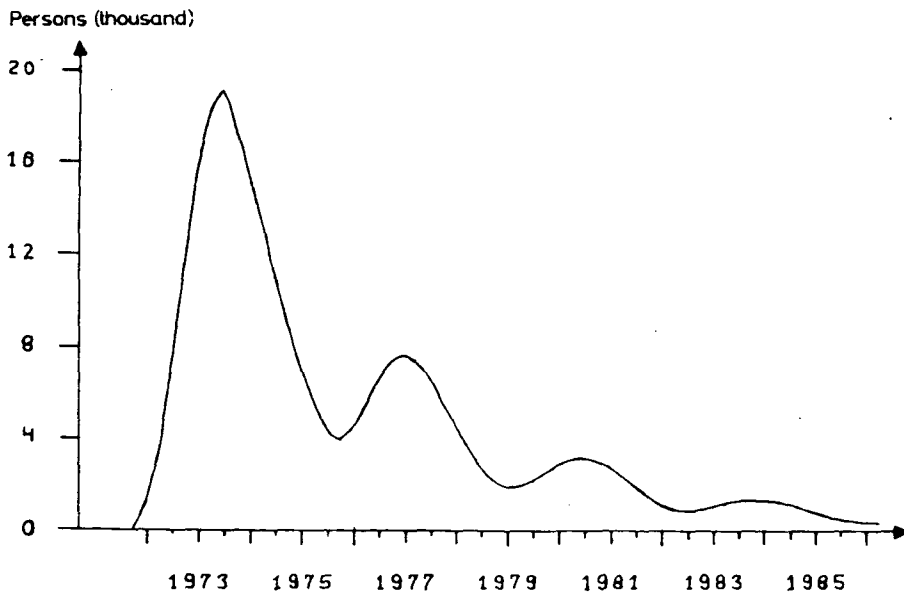


Figure 4: Simulated Employment Effects



Appendix A1: TSLS Estimates of the Model 1971 II - 1986 II

Explanatory Variables	Dependent Variables			
	Employed Persons ^a	Inflation Rate	Monetary Impulse ^a	Fiscal Impulse ^a
	(1)	(2)	(3)	(4)
Fiscal Impulse	19.545 ^{a, b} (1.9)		2.7549 ^{a, d} (3.0)	
Monetary Impulse	13.788 ^{a, b} (5.4)			
External Value of Deutsche Mark	-26.512 ^{a, b} (2.0)			
Mismatch	-3.203 ^{a, b} (2.0)			
Employed Persons ^a		0.2476*10 ⁻² (2.6)	-0.6973*10 ⁻⁴ (1.9)	-0.2063*10 ⁻² (6.2)
Inflation Rate of Raw Materials		0.8230*10 ⁻² (2.9)		
Inflation Rate		1.0228 ^d (18.9)	-0.3291*10 ⁻² (2.1)	-0.05736 ^c (2.1)
Trade Balance Surplus ^{a, d}			0.3172*10 ⁻² (1.8)	
U.S. Interest Rate			-0.2525*10 ⁻² (2.8) ^d	0.04071 (4.0)
Governmental Interest Payments ^{a, d}				-2.3010 (7.2)
Dummy for Kohl Government				-0.2279 (2.9)
\bar{R}^2	0.9411	0.9213	0.8919	0.6543
Durbin-Watson-Statistic	1.8510	1.7567 ^e	2.3056	2.2820
Standard Error of Estimate	52.326	0.5109	0.01886	0.001898

Notes: Constant and seasonal dummies are not reported; see text and appendix B for definitions of variables and sources of data;
a) first difference; b) sum of lag coefficients;
c) home made inflation; d) t-1; e) Durbin's h.

Appendix A2: TSLS Estimates of the Model 1971 II - 1986 II

Explanatory Variables	Dependent Variables			
	Employed Persons ^a	Inflation Rate	Monetary Impulse ^a	Fiscal Impulse ^a
	(1)	(2)	(3)	(4)
Fiscal Impulse	38.205 ^{a, b} (3.9)		2.8192 ^{a, d} (3.4)	
Monetary Impulse	6.296 ^{a, b} (3.7)			
External Value of Deutsche Mark	-41.912 ^{a, b} (2.9)			
Mismatch	-4.010 ^{a, b} (2.6)			
Employed Persons ^a		0.2767*10 ⁻² (2.9)	-0.5054*10 ⁻⁴ (1.5)	-0.2128*10 ⁻² (6.2)
Inflation Rate of Raw Materials		0.8225*10 ⁻² (2.9)		
Inflation Rate		1.0294 ^d (18.8)	-0.3169*10 ⁻² (2.2)	-0.05118 ^c (1.8)
Trade Balance Surplus ^{a, d}			0.2108*10 ⁻² (1.4)	
U.S. Interest Rate			-0.2278 ^d (2.7)	0.03972 (3.9)
Governmental Interest Payments ^{a, d}				-2.3790 (7.2)
Dummy for Kohl Government				-0.2201 (2.8)
\bar{R}^2	0.9121	0.9190	0.9069	0.6337
Durbin-Watson-Statistic	1.6045	1.7518 ^e	2.1706	2.1958
Standard Error of Estimate	63.500	0.5141	0.01751	0.001944

Notes: Constant and seasonal dummies are not reported; see text and appendix B for definitions of variables and sources of data;
a) first difference; b) sum of lag coefficients;
c) home made inflation; d) t-1; e) Durbin's h.

With respect to the effectiveness of fiscal policy actions most empirical studies come up with positive GNP and/or employment multipliers. They differ, however, substantially in their magnitude. Moreover, there is not much empirical evidence for serious crowding out effects. Our own econometric analysis is based on a four equations model. Basically it consists of a conventional IS-LM-model with a very simple Phillips curve. In addition, we estimate fiscal and monetary reaction functions in order to avoid biased coefficients associated with the impact of fiscal and monetary impulses on employment.

With respect to a warranted robustness of estimates our results are not very encouraging. Simply by varying the lag structure of the influence of fiscal and monetary impulses on employment, we are able to replicate their wide range of the order of magnitude obtained in previous studies. Put differently, employment multipliers of fiscal policy actions are subject to considerable imprecision. Our most conservative estimate displays an increase of the level of employment by some 17,100 persons had there been a one billion Deutsche Mark higher fiscal impulse in each year through the whole simulation period under consideration. The most "optimistic" estimate doubles this number. Both results are valid only if monetary policy is exogenous. If the Deutsche Bundesbank's policy is treated endogenously its concern about price stability comes into play. As an extreme case the Deutsche Bundesbank reacts to even a very small increase of the price level with a restrictive monetary policy. If so, the employment effects of an expansive fiscal policy are negligible. We want to stress, however, that we do not view this case as the most realistic one. In practice, the Deutsche Bundesbank has not carried out such a misguided policy. If anything can be learnt from these considerations, they show how important it is (econometrically) to treat policies as endogenous variables. Moreover, our results point to the well-known experience that only a combination of expansive fiscal and monetary measures is suitable to fight against unemployment. But - to reiterate Tobin's introductory statement - this will not solve all the problems, to be sure.

Appendix B: Definitions of variables and sources of data used in section IV

1. Employment:

Number of non-self employed persons (in thousand); Source: DIW, Vierteljährliche Volkswirtschaftliche Gesamtrechnung.

2. Fiscal Impulse:

The variable fiscal impulse is defined as the ratio of real fiscal impulse to real gross domestic product (GDP). The fiscal impulse is calculated and published by the German Council of Economic Experts CEE (Sachverständigenrat zur Begutachtung der gesamtwirtschaftlichen Entwicklung, Annual Report 1986/87 appendix IV. D). The definition of the fiscal impulse is discussed in section II. It is the difference between actual and neutral government expenditures. These two variables are published annually. Quarterly figures are obtained by linear interpolation of annual growth rates of each variable (so that the sum of all four quarters gives the annual figure published by the CEE). This procedure is applied in order to obtain more smooth quarterly data rather than a step-like time series with four constant values at each year. The fiscal impulse is deflated by the price index of public expenditures. This variable and real GDP are taken from DIW, Vierteljährliche Volkswirtschaftliche Gesamtrechnung.

3. Monetary Impulse

The monetary impulse is defined as the ratio of M1 times the long-run income velocity of money to potential output. Long-run income velocity of money is the ratio of real GDP and real M1 and is constructed as a fourth-order ratio moving average of annual data divided by four in order to obtain quarterly figures. Potential output is taken from: Sachverständigenrat zur Begutachtung der gesamtwirtschaftlichen Entwicklung, Annual Report 1986/87, appendix IV.1, revised calculations; GDP and its deflator are from DIW, Vierteljährliche Volkswirtschaftliche Gesamtrechnung; the source of M1 is: Monatsberichte der Deutschen Bundesbank (I.2).

4. Mismatch

The mismatch indicator is defined as $\sum |u_i - v_i|$ where u_i refers to the proportion of unemployed persons in occupation i and v_i to the corresponding proportion of vacancies. The indicator covers 327 occupational groups since 1976. The data are taken from: Amtliche Nachrichten der Bundesanstalt für Arbeit, various volumes. Such a detailed classification for u_i and v_i is not available prior to 1976. Therefore a less detailed classification is used taken from Jackman and Roper (1985). All figures are calculated annually but interpolated and smoothed by a fourth-order moving average to obtain quarterly data.

5. External Value of the Deutsche Mark

This series is published by the Deutsche Bundesbank in: Monatsberichte der Deutschen Bundesbank (IX.10) and is basically defined as the DM exchange rate (e.g., \$/DM) times the relative price of domestic goods compared with foreign goods. It is calculated as an index with 1972 being the base year. This figure aims to indicate the degree of competitiveness of German goods on export and import markets for the manufacturing sector. A higher external value means a loss in competitiveness. In calculating the index weights are taken into account which represent the share of German and foreign exports, respectively, among the total supply of goods in each of the 14 industrial

respectively, among the total supply of goods in each of the 14 industrial countries included in the index. On the import side weights represent the share of each of these countries among imports in Germany. The overall external value of the DM is then a geometric mean of all 14 countries with the weights as described above. Values prior to 1972 are our own estimates.

6. Trade Balance Surplus

Difference between nominal exports and imports. Source: DIW, Vierteljährliche Volkswirtschaftliche Gesamtrechnung.

7. U.S. Interest Rate

Interest Rate of U.S. 3 month-treasury bills. Source: Monatsberichte der Deutschen Bundesbank (V.9).

8. Governmental Interest Payments

Defined as the ratio of public interest payments to public expenditures (times 100) both in nominal terms. Source for both variables: Sachverständigenrat zur Begutachtung der gesamtwirtschaftlichen Entwicklung, Annual Report 1986/87, Table 36*. Value for 1986 is our own estimate. Quarterly data are obtained by linear interpolation and calculating a moving average.

9. Inflation Rates

Defined as the inflation rate of consumer prices for all households. Source: Monatsberichte der Deutschen Bundesbank (VIII.7). For the calculation of a "home made" - inflation rate the following term is subtracted: inflation rate of imported raw materials times the share of imports of raw materials among GNP. Source for these variables: Sachverständigenrat zur Begutachtung der gesamtwirtschaftlichen Entwicklung, Annual Report 1986/87, Tables 64*, 58*, 29*.

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