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FURTHER EVIDENCE ON THE  
RELATIVE IMPORTANCE OF  
FISCAL AND MONETARY ACTIONS  
IN GERMANY (FR)

by

Dr Nikolaus K.A. Läufer

DISKUSSIONSBEITRÄGE

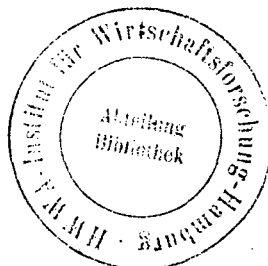
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I.

In a study for the United States (US) ANDERSEN and JORDAN (referred to as AaJ) found the reaction of economic activity to measures of monetary policy to be larger (stronger), more reliable (better to predict) and faster (forthcoming more quickly) than the corresponding reaction to measures of fiscal policy. <sup>1)</sup> These hypotheses are the results of a regression analysis in which AaJ used the ALMON lag technique. Economic activity was measured by nominal GNP. Preferably the narrow money stock and to a smaller degree the extended monetary base were used as alternative indicators of monetary policy, while fiscal policy was represented either by the high employment surplus or by its components, full employment expenditures and full employment tax receipts of the government.

The narrow money stock is composed of currency and demand deposits. The monetary base may be defined from the user's side by summing currency, banks' actual reserves at the central bank and vault cash of banks. The extended monetary base is obtained by further adding (cumulated) past changes of legally required reserves. The high employment budget surplus is an estimate of the government budget surplus defined in the framework of national income analysis for a more or less arbitrary level of high employment economic activity. As an indicator of changes in direction and strength of discretionary fiscal policy, the concept of a high employment budget attempts to eliminate the influence of current changes in GNP on the budget position by measuring government expenditures

and receipts at a level of GNP consistent with full or high employment. 2)

The tests performed by AaJ are based on estimates of coefficients and statistics in an equation of the following distributed lag type:

$$(1) \quad Y_t = a + b t + \sum_{i=0}^{l_m} m_i I_{t-i}^m + \sum_{j=0}^{l_f} f_j I_{t-j}^f + u_t$$

where

$Y_t$  = nominal GNP in period  $t$

(measure of economic activity)

$t$  = measure of trend if not an index of the time period

$I_{t-i}^m$  = indicator of monetary policy in period  $t-i$

$I_{t-j}^f$  = indicator of fiscal policy in period  $t-j$

$u_t$  = stochastic error term

(bundle of all remaining but not explicitly considered determinants of economic activity)

$a$  = constant term

$b$  = trend coefficient

$m_i$  = coefficients of monetary policy

$f_j$  = coefficients of fiscal policy

$m_0$  ( $f_0$ ) is a measure of the impact of monetary (fiscal) policy, while  $m_1, m_2, \dots$  ( $f_1, f_2, \dots$ ) are measures or weights of lagged effects.

$l_m$  ( $l_f$ ) represents the maximal length of the lag of monetary (fiscal) policy.

The total (= impact + lagged) effects of monetary (fiscal) policy are given by the total sum of coefficients:

$$\sum_{i=0}^{l_m} m_i \quad \left( \sum_{j=0}^{l_f} f_j \right)$$

The hypotheses of AaJ relate to the difference in size of (estimated) sums of coefficients, to the differences in reliability of statistical estimates and to the difference in time necessary for lagged effects of both types of policy to show up. Reliability is measured by t-ratios, which indicate the degree of significance that may be attached to estimated coefficients. The difference in time may either be measured by the difference in average lag or by the difference in total lag. 3)

## II.

Equation (1) does not represent a specific theory or a specific model. It should be interpreted as either a final form equation or as an interim form, if not as a reduced form equation. 4)

It defines a class of models or theories whose elements have final, interim or reduced forms containing at least an equation of the type represented by equation (1). Since the error term  $u_t$  may be interpreted to contain linear combinations of additional predetermined and/or exogenous variables, the models of this class are not necessarily limited to the exogenous variables  $I_t^m, I_{t-1}^m, \dots$  and  $I_t^f, I_{t-1}^f, \dots$ . From these considerations it is obvious that equation (1) does not imply a specific concept of the transmission mechanism 5) for impulses of monetary and fiscal policy 6).

There is no doubt in economic theory as to the direction in which economic activity is affected by a change in the quantity of money or in the monetary base. The debate has only been concerned with the size or the quantitative extent of the effects in particular of an expansionary monetary policy. There has been unanimity as to the non-contractive effects of an expansion in the quantity of money or in the monetary

base as well as to the non-expansionary effects of a contraction in the quantity of money or in the monetary base. Thus, both for the individual coefficients  $m_i$  and for their sum, positive values are expected on theoretical grounds. The  $m_i$ 's may be close to zero, but a significant negative single coefficient and <sup>a</sup> negative sum of coefficients are not expected.

In Keynesian economics expectations with respect to the effects of fiscal policy are equally unanimous. An increase of the budget deficit or an increase in the initial stimulus (to be defined below!) is expected to have an expansionary effect. A decrease of the budget deficit or a decrease in the initial stimulus is expected to have a contractive effect on economic activity.

According to Keynesian economics, positive single coefficients  $f_j$  and a positive sum for these coefficients are expected on theoretical grounds. Monetarists hold a different view. They expect an expansionary effect only if fiscal policy is accompanied by an expansion of the quantity of money or of the monetary base. In this case, monetarists are inclined to attribute the expansionary effect of fiscal policy exclusively to the accompanying monetary expansion.

Of course, monetarists are well aware of the fact that these observations of parallel policy do not represent discriminating evidence. Therefore, they have directed their attention increasingly towards historical situations, in which impulses of monetary and fiscal policy have shown opposite, nonparallel movements. Here monetarists examine which of the two impulses has dominated and has determined the development of economic activity. If, in a phase of contractive fiscal policy and simultaneous expansionary monetary policy, economic activity expands, then the monetary impulse is interpreted as dominating.

In such a situation Keynesians are induced to look for other non-monetary factors, which might have compensated for the fiscal impulse and at the same time might have led to a monetary expansion. In an open economy with strong international linkages, exports are such a possible factor. An increase in export demand as part of total effective demand may, under a system of fixed exchange rates, easily lead to a surplus in the balance of payments and have an expansionary effect on the monetary base and the quantity of money. If the increase in export demand is overcompensating the contractive effect of fiscal policy, then a parallel expansion in economic activity would result. Also, contrary to the initial assumption this would again represent nondiscriminating evidence. Yet, at such a point an ambitious monetarist would not give up but examine the question of how and <sup>on</sup> the basis of which monetary factors, and, in particular, on the basis of which actions of monetary policy in foreign countries, it was possible for such an expansion in export demand, and, above all, of the monetary base



and the quantity of money, to take place inside the country under investigation.

It seems useful to give an interpretation of the coefficients  $m_i$  and  $f_j$ . These coefficients represent partial correlations. They measure the effect of the associated explanatory variable on the dependent variable assuming constancy of all other explicit explanatory variables in the equation (including the error term as a whole). Thus, the coefficient  $m_i$  is an expression of the partial effect, delayed by  $i$  periods, that a unit impulse of monetary policy exerts on economic activity under the assumption, that fiscal policy as well as other factors and impulses do not change at the same time. A similar statement holds for  $f_j$ , the measure of the partial fiscal effect on economic activity.

An expansion of the extended monetary base while the fiscal indicator remains constant is either the consequence of pure open market policy <sup>7)</sup> or the result of lowering the rates of legally required reserves. Or it is due to a change in financing a given constant budget deficit by using central bank credit instead of emitting government securities on the market. Of course, any actual change in the extended monetary base is the net effect of these three pure ways of changing the base, which may occur simultaneously and even in counter-current fashion. With a given constant monetary base, financing an increase of the government budget deficit (pure fiscal policy) may mean financing by displacing private demand for finance capital. This way of financing has been termed crowding-out. <sup>8)</sup> Crowding-out of borrowing for private expenditures can cause negative partial and even negative total effects of pure fiscal policy; <sup>9)</sup> it may cause single negative  $f_j$ -coefficient and

even cause a negative sum total of these coefficients. The crowding-out interpretation is particularly important in discussing statistical results. It is obvious from these considerations that positive  $m_1$ -coefficients and  $f_j$ -coefficients of either sign are capable of an economic interpretation in the spirit of the ceteris-paribus-condition of economic theory.

### III.

There are various shortcomings of the full employment government budget surplus (FES) as an indicator of fiscal policy. The concept is difficult to estimate and it is based on a series of doubtful assumptions with respect to growth of real income, inflation and the distribution of income. The main defect stems from the upward trend in full employment tax receipts (FET), which is a consequence of growth in full employment GNP. Due to this trend the FES changes even where government expenditures and tax rates remain unchanged. Thus, normal growth of real income, enforced by inflation according to the GNP deflator, introduces an upward movement of the FES without any discretionary change in fiscal policy. Especially during periods of inflation, the irregular behaviour of the GNP deflator, applied for converting real GNP into nominal GNP, would introduce a strongly fluctuating endogenous dependency into the FES observations. Therefore, we have used the initial stimulus concept instead of the FES as a fiscal policy indicator. This criticism of the FES and the alternative concept of an initial stimulus (IS) are due to CORRIGAN and OAKLAND <sup>10)</sup>.

The IS-concept attempts to include exclusively those movements in the budget, which are caused by discretionary acts of fiscal policy. We consider as discretionary on the expenditure side all variations in total government expenditures and on the revenue side all initial <sup>11)</sup> variations in legislative changes in tax receipts due to tax rates, the tax base and/or the terms of payments. In this concept those changes in tax receipts are neglected consciously and with intent, which may be explained by the dependence of tax receipts on economic activity (income growth) and by the development of prices (inflation).

To some degree even the indicators of monetary policy used by AaJ are to be criticized. This holds true for the money stock. The money stock or the existing money supply may be decomposed analytically into a product of the monetary base times the money multiplier. The multiplier incorporates the required reserves policy of the central bank as well as the portfolio behaviour of the banks and the nonbank public. Assuming a constant monetary base and an unchanged policy with respect to required reserves, autonomous as well as income- and interest-induced changes in the portfolio behaviour result in a fluctuating multiplier and therefore in nondiscretionary movements of the quantity of money.

An unbiased indicator of monetary policy should take account only of those movements in the stock of money which are the exclusive result of actions of monetary policy. Policy induced changes in the quantity of money are due either to central bank controlled movements in the monetary base or to variations in the money multiplier in consequence of changes in legally required

reserve ratios. The money stock as an indicator of monetary policy includes both these factors, but it is also influenced by the behaviour of banks and the nonbank public. The ordinary monetary base does not include the impact of the required reserves policy. Therefore, as an indicator of monetary policy, it is incomplete. Yet, the concept of the extended base permits the disadvantages of both these indicators to be avoided. By adding the so-called "liberated reserves" to the ordinary monetary base one obtains the extended base. The liberated reserves are those amounts of central bank money, which for the banks have become disposable in consequence of a decrease in ratios of required reserves. The extended base thus is a summary indicator of all acts of monetary policy which are important from an aggregative point of view <sup>12)</sup>.

From these considerations it follows that the quantity of money is the worst, the ordinary monetary base is a better and the extended monetary base is the best among the three indicators of monetary policy.

#### IV.

For the purpose of stabilization policy in a growing economy one is interested in cyclical relations between measures of policy and economic activity and not in relations between trend components

of these measures. One is looking at the effects of an acceleration or a deceleration in the rate of growth of policy variables on the rate of growth in economic activity. Therefore, some attention should be given to the method of eliminating trend from the variables to be correlated.

If there is linear trend in all variables, then its influence is correctly captured by the term  $b \cdot t$  of equation (1). In this case, using first differences of variables is a successful method of trend elimination. But if the trend is nonlinear, first differences are an insufficient method and eventually introduce bias in favor of monetary policy. Actually, this may be observed in the FRG where - in the trend movement - economic activity is better correlated with measures of monetary policy than with measures of fiscal policy. If this nonlinear trend is exponential, then the application of growth rates of variables is a successful method of trend elimination.

The application of first differences is consistent with a model, in which variables are connected additively as in equation (1) (additive model), while the application of growth rates would be consistent with a multiplicative model in which variables are connected multiplicatively. The multiplicative model is an additive model in the logarithm of variables. Thus, equation (1) would represent a multiplicative model if all variables, except  $t$ , were replaced by their logarithm. Now, using growth rates is equivalent to the application of first differences to a model, which is additive in the logarithm of variables.

Unfortunately, one cannot choose between an additive and a multiplicative model simply on the basis of a higher coefficient of determination ( $R^2$ ), since an  $R^2$  based on first differences is not comparable with an  $R^2$  based on growth rates. Yet, according to considerations a priori, in a growing economy like the FRG a multiplicative model seems to be more appropriate. In addition, for the FRG during the period 1960 - 1970 first differences of quarterly GNP and quarterly money stock still show a significant upward trend. <sup>13)</sup> This indicates a nonlinear trend which may be approximated exponentially. Thus, in the case of FRG first differences are not a sufficient method to eliminate trend and the application of growth rates seems to be an improvement. Growth rates have the additional advantages of reducing heteroskedasticity of the residuals and of reducing multicollinearity among the variables.

## V.

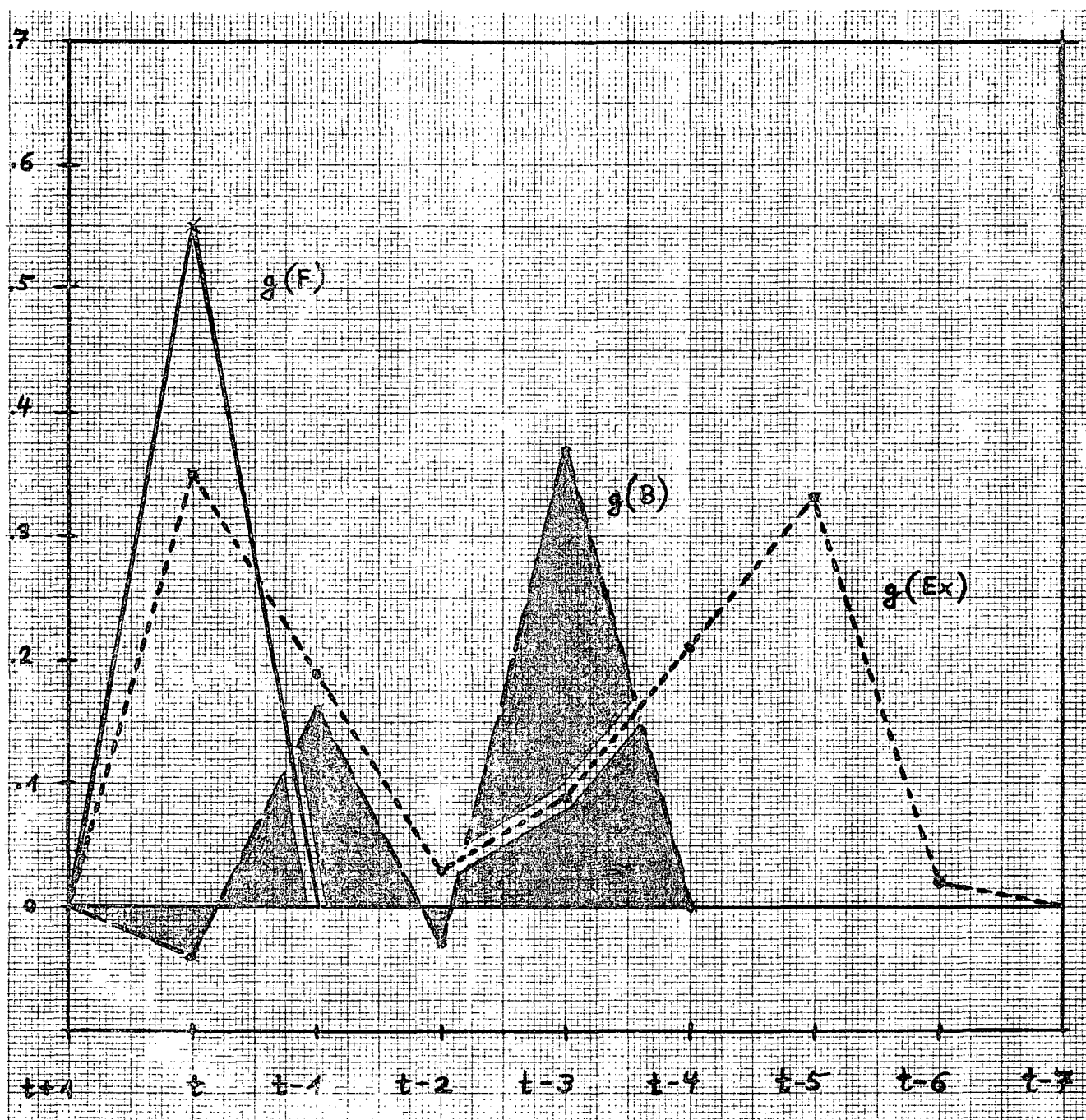
In the tabular survey we have summarized the technical details of the procedure underlying our empirical results. We may emphasize that no end point restrictions were imposed on the polynomials which we applied in order to restrict the estimates of distributed lag coefficients. We have searched the lag space from zero up to sixteen lagged periods (quarters) allowing the lag length to be different for each of the three variables (fiscal and monetary policy indicators, exports). This required the calculation of close to five thousand regressions. <sup>14)</sup> Applying the minimum standard error criterium does not lead to clear cut results. There are several relative minima for the standard error. But an interesting border line exists dividing the lag space into two separate subspaces.

Tabular survey and comparison of method

authors	Andersen a. Jordan	Läufer
country	USA	FRG
period	1952 <sub>I</sub> - 1968 <sub>II</sub>	1960 <sub>I</sub> - 1970 <sub>IV</sub>
optimality criteria	?	minimum standard error of regression equation
lag technique	ALMON-Lags	
degree of polynomials	4	
constraining of polynomials	one and two end point restrictions	no end point restrictions
length of the lag distribution	variable, but a priori equal for fiscal and monetary policy	variable, but <u>not</u> a priori equal for fiscal policy, monetary policy and foreign impulses
data-form	seasonally adjusted quarterly data	seasonally adjusted quarterly data + seasonal dummies
transformation of variables	first differences (growth rates unpublished)	growth rates (first differences rejected)
indicator of economic activity	GNP (nominal)	
indicator of fiscal policy	a) full employment budget surplus b) full employment gov. expenditures alone c) full employment gov. expenditures and tax receipts as separate variables	initial stimulus
indicator of monetary policy	preferred (75 %): money stock less (25 %): extended monetary base	extended monetary base (rejected: money stock)
indicator of foreign impulses	neglected	exports

Diagram 1

Current and lagged effects of monetary policy, fiscal policy and of foreign impulses on economic activity in the FRG\* (effects of unit impulses)



\*Beta-coefficients of equation 1 in table I

$g( )$  = growth rate

F = initial stimulus (fiscal policy indicator)

B = extended monetary base (monetary policy indicator)

Ex = exports (foreign impulses)



In the first subspace the total time used by the fiscal policy variable to work out its effects on GNP is below two years (less than eight quarters). Monetary policy does not require more than two and a half years (requires less than eleven quarters), while foreign impulses (exports) do not require more than two years (require less than nine quarters). The second subspace is defined by a time requirement of two years and more (eight and more quarters) for fiscal policy, more than two and a half years (eleven and more quarters) for monetary policy and more than two years (nine and more quarters) for foreign impulses (exports).

In the first subspace the optimal regression <sup>15)</sup> according to the minimum standard error (equation 1 in table I) all hypotheses of AaJ may be refuted. The effects of monetary policy are neither larger (stronger), nor more reliable (of higher statistical significance), nor faster (forthcoming more quickly). Instead, fiscal policy has an instantaneous effect which is highly significant, while monetary policy does not show a significant single effect before the third lagged period and the total effect of fiscal policy as measured by the sum of beta coefficients <sup>16)</sup> is higher (by 20 %) than the total effect of monetary policy, while it is slightly lower (by a third) if ordinary instead of the beta coefficients <sup>17)</sup> are compared. <sup>18)</sup> In the second subspace we have a monetarist world with significant crowding out effects of fiscal policy <sup>and a</sup> confirmation of AaJ's hypotheses. <sup>19)</sup>

In addition, the whole lag space has been investigated by considering a row of successively larger lag spaces at first with a maximum of six, then seven up to a maximum of sixteen lags for each of the three variables (F, B, Ex). Using the minimum standard error criterion an optimal regression has been determined for each of the successive lag spaces considered. The results are presented in tables I - VI as equations 1 to 8.

It is interesting to note, that any regression, which is optimal for a given lag space, loses the property of optimality when the lag space is sufficiently extended. Thus, for the alternative lag spaces considered, the best regression (optimum optimum) is obtained when the lag space has reached its largest extensions (equation 8).

The fiscal coefficients in equation 8 oscillate from significant positive to significant negative values back to significant positive values. In the present context such an oscillatory behaviour is hard to explain or understand by means of economic theory and seems to be a statistical artifact.

With no theoretical reason for oscillatory true coefficients the oscillations may indicate an overstated lag length.

It is well known <sup>20)</sup>, that a specification error is committed whenever the lag length is overstated by a number of periods larger than the degree of the polynomial (less the number of end point restrictions). If the true lag is zero, then with no end point restrictions and a 4th-degree polynomial a specification error is committed as soon as a lag length of more than four quarters is assumed.

In the optimal regressions of the alternative lag spaces considered, negative fiscal coefficients do not appear before there is a (maximal) lag length of more than six quarters for the fiscal policy variable. Thus, it is not before there exists a technical possibility of committing a specification error by overstating the lag length that we observe negative fiscal policy coefficients of an oscillatory nature. In addition, though not as obvious as in regression 8, the oscillatory nature of fiscal coefficients is present in all regressions presented except, of course, in regression 1 where fiscal policy appears with no lag. Therefore, the interpretation of oscillatory coefficients in equation 8 as a sign of a specification error may also be applied to equations 2 to 7.

Such specification errors lead to biased and inconsistent estimates and invalid tests. Therefore, in the regressions presented, whenever the fiscal policy variable appears with negative coefficients, it is very likely that this is not a sign of crowding out of private by fiscal expenditure but merely the consequences of a specification error committed by overstating the lag length.

If the negative coefficients really are due to a specification error, then our results imply that without prior specification of the proper lag space to be considered, specification errors may be committed even if "optimal" regressions are selected according to the minimum standard error criterion.

## VI.

Thus we arrive at the point where it is obvious that we need further information in order to make a correct decision about

the lagspace to be considered. This a priori information might come from as yet unavailable knowledge about the underlying economic structure. In the meanwhile we are led to the following result. In the German case the AaJ tests do not lead to firm conclusions unless a price is paid in form of additional restrictions a priori. If one ~~assumes that~~ <sup>with the author</sup> the effects of fiscal policy work out in less than two years, while those of monetary policy do not require more than two and a half years and those of foreign impulses (exports) do not require more than two years, then the regression results for the FRG do not confirm but allow the rejection of the hypotheses of AaJ. <sup>21) Instead, we find that,</sup> ~~in the FRG~~ the effects of fiscal policy on economic activity are about equally strong and at the same time they are faster (forthcoming more quickly) and more reliable (predictable with less errors) than those of monetary policy.

In an open economy there is an interesting reason for crowding out to exist but not to lead to a zero total effect of fiscal policy on GNP even if private expenditures are crowded out by an amount equal to the additional fiscal expenditures. If the import content of private expenditures is higher than the import content of government expenditures, crowding out of private expenditures by an amount equal to the additional fiscal expenditures implies crowding out of imports. But crowding out of imports leads to an improvement in the balance of trade which finally allows for a positive total effect of fiscal policy on GNP. Under this condition it is also possible for crowding out of private expenditures to exist but not to appear in form of negative lagged effects of fiscal policy on GNP. If the improvement in the balance

of trade is distributed over time in roughly the same manner as the lagged part of crowding out, the two may neutralize each other over (lagged) time. Therefore, it is possible from a theoretical point of view to have an initial positive effect (positive impact) of government expenditures, while its lagged effects are zero. Thus, special details of those of our empirical results which disconfirm and even conflict with the hypotheses of AaJ are not necessarily devoid of theoretical interpretation.

Appendix

(A guide to the tables and to the sources of data)

1. A guide to the tables

The following explanations hold for all tables of this paper.

g( ) = growth rate

Ex = exports (indicator of foreign impulses)

B = extended monetary base (monetary policy indicator)

F = initial stimulus (fiscal policy indicator)

t-ratios are stated in brackets below the coefficients.

R\*R ADJ. = coefficient of determination adjusted for degrees of freedom

R\*R = coefficient of determination unadjusted

F = F-statistic of the F-test

FG1 and FG2 = degrees of freedom associated with the F-statistic

FG2 = degrees of freedom for the t-test

SE = standard error

DW = DURBIN-WATSON's d-statistic to test (first order) autocorrelation

N = sample size

\* = t-value is significant at a level of significance of at least 95 % (two-sided hypothesis)

2. Sources of data

The data for the initial stimulus (IS), the extended monetary base and the quantity of money are those of M. J. M. NEUMANN as described in: K. BRUNNER, M. FRATIANNI, J. JORDAN, M. J. M. NEUMANN, The Monetary Fiscal Approach to Inflation: A Multi Country Study,

Chapt. III, The German Case, forthcoming; a preliminary version appeared as discussion paper No. 9b of the Department of Economics at the University of Konstanz.

I gratefully acknowledge the seasonal adjustment of the monetary series by the German Institute for Economic Research (DIW), Berlin.

The seasonally adjusted data for quarterly GNP and exports were taken from the following publications of this institute. DIW:

"Vierteljährliche volkswirtschaftliche Gesamtrechnung , Bundesrepublik Deutschland, Saisonbereinigte Daten 1950 - 1965," and

DIW: "Vierteljährliche volkswirtschaftliche Gesamtrechnung , Bundesrepublik Deutschland einschl. Saarland und Berlin, Saisonbereinigte Daten 1960 - 1971," Berlin Juli 1971.

POLICY COMPARISON - Regressions of relative changes in GNP on relative changes in indicators of monetary policy, fiscal policy and of foreign impulses

(initial stimulus (F) as fiscal policy indicator, extended base as monetary policy indicator, exports as indicator of foreign impulses; growth rates (g))

CONST.	-0.65 (-0.53)	
2. VAR.	0.56 (0.92)	} seasonal dummies
3. VAR.	-0.15 (-0.25)	
4. VAR.	0.16 (0.27)	

equation 1

7. VAR.  $g(Ex)$

4th d. polynomial no end point restr.

5. VAR.	$g(F)$	
NO POLYNOMIAL RESTRICTIONS		
PERIOD	COEFF.	BETA-COEFF.
T - 0	0.22* (2.85)	0.55
SUM OF COEFF.	0.22* (2.85)	0.55
6. VAR.	$g(B)$	
NO POLYNOMIAL RESTRICTIONS		
PERIOD	COEFF.	BETA-COEFF.
T - 0	-0.03 (-0.19)	-0.04
T - 1	0.13 (0.71)	0.16
T - 2	-0.02 (-0.14)	-0.03
T - 3	0.29* (2.04)	0.37
SUM OF COEFF.	0.36 (0.94)	0.46

PERIOD	COEFF.	BETA-COEFF.
T - 0	0.17 (1.68)	0.35
T - 1	0.09 (0.98)	0.19
T - 2	0.02 (0.21)	0.03
T - 3	0.02 (0.25)	0.04
T - 4	0.10 (1.47)	0.21
T - 5	0.16 (1.60)	0.33
T - 6	0.01 (0.10)	0.02
SUM OF COEFF.	0.56 (1.95)	1.17
R*R ADJ.	0.26	
R*R	0.53	
F	1.97	
F1/F2	13 / 23	
SE	0.012392	
DW	1.43	
N	37	

lag space for F, B and Ex: 0-6 lagged quarters, or F: 0-6  
B: 0-9 lagged quarters  
Ex: 0-7

the lag spaces indicated the regression has minimal standard error.



TABLE III

POLICY COMPARISON - Regressions of relative changes in GNP on relative changes in indicators of monetary policy, fiscal policy and of foreign impulses

(initial stimulus (F) as fiscal policy indicator, extended base as monetary policy indicator, exports as indicator of foreign impulses; growth rates (g))

equation 2			equation 3		
5. VAR. $g(F)$			CONST.	1.33 (0.88)	
4th d. polynomial no end point restr.					
PERIOD	COEFF.	BETA-COEFF.	2. VAR.	0.35 (0.61)	} seasonal dummies
T - 0	0.28 (3.42)	0.69	3. VAR.	0.06 (0.09)	
T - 1	0.05 (0.56)	0.12	4. VAR.	0.66 (1.11)	
T - 2	0.04 (0.48)	0.10			
T - 3	0.06 (0.75)	0.15			
T - 4	0.01 (0.18)	0.03			
T - 5	-0.11 (-1.36)	-0.26			
T - 6	-0.21 (-2.29)	-0.53			
T - 7	-0.13 (-1.26)	-0.32			
SUM OF COEFF.	-0.01 (-0.03)	-0.02			
6. VAR. $g(B)$			7. VAR. $g(Ex)$		
NO POLYNOMIAL RESTRICTIONS			NO POLYNOMIAL RESTRICTIONS		
PERIOD	COEFF.	BETA-COEFF.	PERIOD	COEFF.	BETA-COEFF.
T - 0	0.10 (0.53)	0.13	T - 0	0.21 (1.89)	0.45
T - 1	0.12 (0.57)	0.15	T - 1	0.01 (0.11)	0.02
T - 2	-0.25 (-1.41)	-0.32	T - 2	0.11 (1.10)	0.23
T - 3	0.24 (1.44)	0.31	T - 3	-0.15 (-1.36)	-0.31
T - 4	-0.22 (-1.50)	-0.26	SUM OF COEFF.	0.19 (0.82)	0.39
SUM OF COEFF.	-0.01 (-0.01)	-0.01	R <sup>2</sup> ADJ.	0.39	
			R <sup>2</sup>	0.68	
			F	2.30	
			F1/F2	17 / 18	
			SE	0.011436	
			DW	1.15	
			N	36	
			5. VAR. $g(F)$		
			4th d. polynomial no end point restr.		
			PERIOD	COEFF.	BETA-COEFF.
			T - 0	0.26 (3.13)	0.63
			T - 1	0.05 (0.68)	0.13
			T - 2	0.02 (0.26)	0.05
			T - 3	-0.03 (0.44)	0.08
			T - 4	0.02 (0.28)	0.05
			T - 5	-0.04 (-0.64)	-0.11
			T - 6	-0.14 (-1.81)	-0.34
			T - 7	-0.19 (-2.40)	-0.47
			T - 8	-0.09 (-1.12)	-0.23
			SUM OF COEFF.	-0.08 (-0.31)	-0.20
			6. VAR. $g(B)$		
			NO POLYNOMIAL RESTRICTIONS		
			PERIOD	COEFF.	BETA-COEFF.
			T - 0	0.35 (1.82)	0.45
			T - 1	0.31 (1.65)	0.46
			T - 2	-0.13 (-0.72)	-0.17
			T - 3	0.29 (1.68)	0.38
			SUM OF COEFF.	0.83 (1.84)	1.06
			7. VAR. $g(Ex)$		
			NO POLYNOMIAL RESTRICTIONS		
			PERIOD	COEFF.	BETA-COEFF.
			T - 0	0.12 (1.21)	0.24
			T - 1	0.01 (0.10)	0.02
			T - 2	0.19 (1.61)	0.40
			SUM OF COEFF.	0.32 (1.49)	0.66
			R <sup>2</sup> ADJ.	0.40	
			R <sup>2</sup>	0.66	
			F	2.51	
			F1/F2	15 / 19	
			SE	0.011366	
			DW	1.52	
			N	35	

In the lag spaces indicated the regressions have minimal standard error.

Lag space for F, B and Ex: 0-7 lagged quarters.

Lag space for F, B and Ex: 0-8 lagged quarters.

TABLE III

POLICY COMPARISON - Regressions of relative changes in GNP on relative changes in indicators of monetary policy, fiscal policy and of foreign impulses

(initial stimulus (F) as fiscal policy indicator, extended base as monetary policy indicator, exports as indicator of foreign impulses; growth rates (g))

equation 4			equation 5		
CONST.	0.41 (0.32)		CONST.	0.10 (0.10)	
2. VAR.	0.36 (0.57)	seasonal dummies	2. VAR.	0.70 (1.40)	seasonal dummies
3. VAR.	-0.59 (-1.98)		3. VAR.	-0.12 (-0.24)	
4. VAR.	0.25 (0.42)		4. VAR.	0.01 (0.02)	
5. VAR.	g(F)		5. VAR.	g(F)	
4th d. polynomial no end point restr.			4th d. polynomial no end point restr.		
PERIOD	COEFF.	BETA-COEFF.	PERIOD	COEFF.	BETA-COEFF.
T - 0	0.21 (2.73)	0.53	T - 0	0.23 (3.60)	0.57
T - 1	0.06 (0.70)	0.14	T - 1	0.11 (1.49)	0.26
T - 2	0.04 (0.53)	0.11	T - 2	0.07 (1.05)	0.18
T - 3	0.07 (0.87)	0.17	T - 3	0.07 (1.25)	0.18
T - 4	0.05 (0.50)	0.16	T - 4	0.06 (1.05)	0.14
T - 5	0.00 (0.05)	0.01	T - 5	0.01 (0.21)	0.03
T - 6	-0.10 (-1.61)	-0.25	T - 6	-0.07 (-1.29)	-0.17
T - 7	-0.20 (-2.75)	-0.50	T - 7	-0.16 (-3.25)	-0.40
T - 8	-0.22 (-2.75)	-0.54	T - 8	-0.22 (-3.66)	-0.55
T - 9	-0.02 (-0.23)	-0.04	T - 9	-0.19 (-3.22)	-0.47
SUM OF COEFF.	-0.09 (-0.34)	-0.23	T - 10	0.02 (0.35)	0.05
SUM OF COEFF. 0.60 (1.08) 0.77			SUM OF COEFF. -0.07 (-0.24) -0.17		
7. VAR. g(Ex)			7. VAR. g(Ex)		
NO POLYNOMIAL RESTRICTIONS			NO POLYNOMIAL RESTRICTIONS		
PERIOD	COEFF.	BETA-COEFF.	PERIOD	COEFF.	BETA-COEFF.
T - 0	0.07 (0.79)	0.15	T - 0	0.04 (0.53)	0.11
T - 1	0.02 (0.15)	0.03	T - 1	0.06 (0.70)	0.14
T - 2	0.23 (2.11)	0.48	T - 2	0.07 (0.87)	0.17
SUM OF COEFF.	0.32 (1.48)	0.66	T - 3	0.05 (0.50)	0.16
R <sup>2</sup> ADJ. 0.42			R <sup>2</sup> ADJ. 0.51		
R <sup>2</sup> 0.70			R <sup>2</sup> 0.79		
F 2.51			F 4.33		
F1/F2 10 / 17			F1/F2 15 / 17		
SE 0.011310			SE 0.0092678		
D <sub>t</sub> 1.28			D <sub>t</sub> 1.27		
N 24			N 33		

Lag space for F, B and Ex: 0-9 lagged quarters.

Lag space for F, B and Ex: 0-10  
or  
0-11

In the lag spaces indicated the regressions have minimal standard error.

lagged quarters.

TABLE IV

POLICY COMPARISON - Regressions of relative changes in GNP on relative changes in indicators of monetary policy, fiscal policy and of foreign impulses

(initial stimulus (F) as fiscal policy indicator, extended base as monetary policy indicator, exports as indicator of foreign impulses; growth rates (g))

5. VAR. g(F)			equation 6		
4th d. polynomial no end point restr.			CONST.	12.03 (3.08)	
PERIOD	COEFF.	BETA-COEFF.	2. VAR.	0.66 (1.55)	
T - 0	0.32 (5.17)	0.78	3. VAR.	-0.02 (-0.04)	
T - 1	0.16 (2.02)	0.39	4. VAR.	-0.11 (-0.25)	
T - 2	0.09 (1.14)	0.21	} seasonal dummies		
T - 3	0.04 (0.71)	0.10			
T - 4	-0.02 (-0.28)	-0.04			
T - 5	-0.10 (-1.64)	-0.26			
T - 6	-0.22 (-3.27)	-0.54			
T - 7	-0.34 (-4.80)	-0.84			
T - 8	-0.41 (-5.21)	-1.02			
T - 9	-0.37 (-4.64)	-0.92			
T - 10	-0.13 (-1.77)	-0.31			
SUM OF COEFF.	-0.99 (-3.26)	-2.44		7. VAR. g(Ex)	
6. VAR. g(B)			4th d. polynomial no end point restr.		
PERIOD	COEFF.	BETA-COEFF.	PERIOD	COEFF.	BETA-COEFF.
T - 0	-0.24 (-1.13)	-0.31	T - 0	0.13 (1.24)	0.27
T - 1	-0.03 (-0.12)	-0.03	T - 1	-0.06 (-0.78)	-0.13
T - 2	-0.11 (-0.53)	-0.14	T - 2	-0.19 (-2.22)	-0.39
T - 3	-0.17 (-0.89)	-0.22	T - 3	-0.26 (-2.93)	-0.54
T - 4	-0.08 (-0.44)	-0.10	T - 4	-0.29 (-3.28)	-0.60
T - 5	0.12 (0.78)	0.16	T - 5	-0.29 (-3.37)	-0.60
T - 6	0.21 (1.18)	0.26	T - 6	-0.26 (-3.33)	-0.55
T - 7	-0.24 (-1.90)	-0.31	T - 7	-0.24 (-3.32)	-0.50
SUM OF COEFF.	-0.53 (-0.46)	-0.68	T - 8	-0.22 (-3.35)	-0.45
			T - 9	-0.21 (-3.34)	-0.45
			T - 10	-0.25 (-3.45)	-0.52
			T - 11	-0.33 (-3.76)	-0.69
			T - 12	-0.47 (-3.62)	-0.99
			SUM OF COEFF.	-2.93 (-3.71)	-6.14
			R*R ADJ.	0.72	
			R*R	0.89	
			F	5.28	
			F1/F2	18 / 12	
			SE	0.0078304	
			D*	2.97	
			H	31	

Lag space for F, B and Ex: 0-12  
or  
0-13 lagged quarters.

In the lag spaces indicated the regression has minimal standard error

TABLE V

POLICY COMPARISON - Regressions of relative changes in GNP on relative changes in indicators of monetary policy, fiscal policy and of foreign impulses

(initial stimulus (F) as fiscal policy indicator, extended base as monetary policy indicator, exports as indicator of foreign impulses; growth rates (g))

equation 7

CONST.	-2.60 (-2.53)	
2. VAR.	-0.04 (-0.14)	} seasonal dummies
3. VAR.	-0.51 (-1.64)	
4. VAR.	-0.13 (-0.43)	

5. VAR. $g(F)$		
4th d. polynomial no end point restr.		
PERIOD	COEFF.	BETA-COEFF.
T - 0	0.24 (5.29)	0.59
T - 1	0.16 (4.52)	0.39
T - 2	0.07 (1.68)	0.16
T - 3	-0.02 (-0.59)	-0.05
T - 4	-0.10 (-3.14)	-0.24
T - 5	-0.15 (-4.84)	-0.38
T - 6	-0.19 (-5.26)	-0.47
T - 7	-0.20 (-5.48)	-0.50
T - 8	-0.19 (-6.05)	-0.47
T - 9	-0.17 (-6.76)	-0.41
T - 10	-0.13 (-5.11)	-0.32
T - 11	-0.10 (-2.71)	-0.24
T - 12	-0.08 (-1.83)	-0.20
T - 13	-0.09 (-2.35)	-0.22
T - 14	-0.15 (-3.59)	-0.37
SUM OF COEFF.	-1.11 (-5.51)	-2.73

6. VAR. $g(B)$		
4th d. polynomial no end point restr.		
PERIOD	COEFF.	BETA-COEFF.
T - 0	0.60 (3.93)	0.77
T - 1	0.23 (1.58)	0.29
T - 2	0.62 (6.48)	0.79
T - 3	0.96 (8.76)	1.23
T - 4	0.91 (8.33)	1.17
T - 5	0.66 (4.97)	0.84
T - 6	0.84 (7.58)	1.07
SUM OF COEFF.	4.81 (8.09)	6.17

7. VAR. $g(Ex)$		
NO. POLYNOMIAL RESTRICTIONS		
PERIOD	COEFF.	BETA-COEFF.
T - 0	-0.34 (-5.95)	-0.70
T - 1	-0.28 (-5.36)	-0.58
T - 2	0.13 (2.49)	0.27
SUM OF COEFF.	-0.48 (-4.16)	-1.01

R*R ADJ.	0.87
R*R	0.94
F	12.48
F1/F2	16 / 12
SE	0.0654507
DW	2.94
N	29

Lag space for F, B and Ex: 0-14  
or lagged quarters.  
0-15

In the lag space indicated the regression has minimal standard error

TABLE VI

POLICY COMPARISON - Regressions of relative changes in GNP on relative changes in indicators of monetary policy, fiscal policy and of foreign impulses (initial stimulus (F) as fiscal indicator, extended base (B) as monetary policy indicator, exports as indicator of foreign impulses; growth rates (g))

equation 8

CONST.	-0.17 (-0.23)	
2. VAR.	0.52 (3.20)	} seasonal dummies
3. VAR.	-0.07 (-0.45)	
4. VAR.	-0.06 (-0.44)	
5. VAR.	$g(F)$	
4th d. polynomial no end point restr.		
PERIOD	COEFF.	BETA-COEFF.
T - 0	0.23 (9.97)	0.56
T - 1	0.17 (12.05)	0.43
T - 2	0.10 (5.72)	0.24
T - 3	0.01 (0.44)	0.02
T - 4	-0.08 (-5.48)	-0.19
T - 5	-0.15 (-10.79)	-0.37
T - 6	-0.20 (-12.55)	-0.50
T - 7	-0.23 (-12.47)	-0.57
T - 8	-0.23 (-12.21)	-0.57
T - 9	-0.21 (-12.12)	-0.51
T - 10	-0.16 (-11.63)	-0.40
T - 11	-0.10 (-8.03)	-0.25
T - 12	-0.03 (-2.14)	-0.08
T - 13	0.03 (1.27)	0.07
T - 14	0.07 (2.86)	0.17
T - 15	0.07 (3.33)	0.17
T - 16	0.01 (0.76)	0.04
SUM OF COEFF.	-0.71 (-6.22)	-1.76

6. VAR.	$g(B)$	
4th d. polynomial no end point restr.		
PERIOD	COEFF.	BETA-COEFF.
T - 0	0.24 (2.28)	0.31
T - 1	0.25 (3.39)	0.32
T - 2	0.25 (3.75)	0.32
T - 3	0.33 (5.03)	0.42
T - 4	0.48 (7.32)	0.61
T - 5	0.58 (9.48)	0.74
T - 6	0.42 (6.19)	0.54
T - 7	-0.31 (-5.67)	-0.40
SUM OF COEFF.	2.23 (5.31)	2.86

7. VAR.	$g(Ex)$	
NO POLYNOMIAL RESTRICTIONS		
PERIOD	COEFF.	BETA-COEFF.
T - 0	-0.01 (-0.36)	-0.02
T - 1	-0.19 (-5.73)	-0.40
T - 2	-0.05 (-1.07)	-0.11
T - 3	-0.12 (-3.49)	-0.25
T - 4	0.19 (7.46)	0.39
SUM OF COEFF.	-0.18 (-1.88)	-0.38
R <sup>2</sup> R ADJ.	0.98	
R <sup>2</sup> R	0.99	
F	59.52	
F1/F2	18 / 8	
SE	0.0023643	
DW	2.11	
N	27	

Lag space for F, B and Ex: 0-16 lagged quarters.

In the lag space indicated the regression has minimal standard error.

## FOOTNOTES

- 1) Cf. L.C.ANDERSEN and J.L.JORDAN, Monetary and Fiscal Actions: A Test of Their Relative Importance in Economic Stabilization, Review (Federal Reserve Bank of St.Louis) November 1968, pp. 11-23, with a commentary by F.DE LEEUW in Review (Federal Reserve Bank of St.Louis) April 1969, pp. 6-11 and the reply of L.C.ANDERSEN and J.L.JORDAN, op. cit. pp. 12-16.

Cf. also E.G.CORRIGAN, The Measurement and Importance of Fiscal Policy Changes, Monthly Review (Federal Reserve Bank of New York) June 1970, pp. 133-145.

In addition cf. M.W.KERAN, Monetary and Fiscal Influences on Economic Activity - The Historical Evidence, Review (Federal Reserve Bank of St.Louis) November 1969, pp. 5-27 and his Monetary and Fiscal Influences on Economic Activity: The Foreign Experience, Review (Federal Reserve Bank of St.Louis) February 1970, pp. 16-28.

The first article of KERAN extends the test period for the US chosen by AaJ and uses quarterly data for the years 1919 to 1969. In the second article KERAN arrives at results for Canada, Japan and the Federal Republic of Germany (FRG) confirming those for the US. Since KERAN is proceeding strictly along the lines of AaJ <sup>method</sup> and its justification form an implicit criticism of KERAN's procedure as far as the FRG is concerned.

A critical summary of the results of various studies for the US including the results of large scale econometric models is given by G. FISHER and D. SHEPPARD, Effects of Monetary Policy on the United States Economy, A Survey of Econometric Evidence, OECD Economic Outlook, Occasional Studies, December 1972.

- 2) Full employment government expenditures differ from actual government expenditures by government expenditures for unemployment compensation.

In times of low or insignificant unemployment the difference between actual and discretionary expenditures is negligible contrary to full employment government receipts which differ substantially from actual government receipts. Full employment receipts are computed as a sum of corresponding direct and indirect tax receipts.

In order to estimate direct tax receipts, the projected nominal full employment income is decomposed into personal income, including wages and salaries and into corporate income, using a formula for the income distribution, which is found distinctive of full or high employment years and which changes only secularly. Applying average tax rates to these income categories gives direct taxes among full employment government tax receipts.

The tax rates are computed from actual tax payments relative to an income category in full employment years. They are adjusted for discretionary changes in tax rates.

Indirect taxes are projected according to their trend movement and are similarly adjusted for autonomous tax rate changes.

The full employment government budget surplus is given by the difference between full employment tax receipts,

and full employment government expenditures.

Multiplying this surplus by  $-1$  gives the corresponding deficit.

- 3) The total lag is measured by  $l_m(l_f)$ . The average time-lag is defined as the weighted average of the number of time periods.

by which lagged effects are delayed:

$$\frac{\sum_{i=1}^m i w_i}{\sum_{i=1}^m w_i}$$

the weights or coefficients of lagged effects being assumed to be positive. It is interesting to note that the average time-lag cannot be defined in a meaningful way if the coefficients for the lagged effects,  $w_i$ , are not all at least of equal sign. Now, since AaJ have found both positive and negative coefficients (weights) for fiscal policy, a finding which they interpret as indicating crowding out effects of fiscal policy, their statement as to the relative speed of the two policies has no meaning and thus cannot be termed either true or false.

In the case of changing signs of coefficients (weights), a meaningful measure of the speed of the policy effects may still be obtained by estimating, independently,  $l_m$  and  $l_f$ .

AaJ have excluded this possibility by assuming, a priori,  $l_m = l_f$ .

In view of these considerations AaJ's finding of a relative higher speed of the effects of monetary policy seems to be unwarranted even for the US.

- 4) It has been seriously doubted that it is justified to call equation (1) a reduced form equation. See G. FISHER and D. SHEPPARD, op. cit., pp. 98-101.
- 5) A survey of alternative concepts of the transmission mechanism of monetary impulses is given by K. BRUNNER, A Survey of Selected Issues in Monetary Theory, Schweizerische Zeitschrift für Volks-



wirtschaft und Statistik, /1971, pp. 1 - 146, esp. pp. 26 - 35.

A particularly clear representation of the monetarist concept of the transmission mechanism may be found in M. FRIEDMAN and D. MEISELMAN, in: The Relative Stability of Monetary Velocity and the Investment Multiplier in the United States, 1897 - 1958, in: Commission on Money and Credit, Stabilization Policies, Englewood Cliffs, N.J. 1963, esp. pp. 215 - 222.

- 6) This non-commitment seems to form a particular advantage of the AaJ approach to a test of the relative importance of monetary and fiscal policy actions. However, this point of view loses much of its attractiveness if examined more thoroughly as is done by G. FISHER and D. SHEPPARD, op. cit., pp. 98 - 101.
- 7) Open market policy here is to be understood in an extensive meaning, including rediscounts, loans on collateral etc.
- 8) Cf. J.M. CULBERTSON, Macroeconomic Theory and Stabilization Policy, New York 1968, p. 463 and R.W. SPENCER and W.P. YOHE, The "Crowding out" of Private Expenditures by Fiscal Policy Actions, Review (Federal Reserve Bank of St. Louis) October 1970, pp. 12 - 24.
- 9) Pure fiscal policy is given when there is a change in the government budget deficit while the extended monetary base remains constant.

10) Cf. W.H. OAKLAND, Budgetary Measures of Fiscal Performance, Southern Economic Journal, April 1969, pp. 348 - 58 and E.G. CORRIGAN, Budgetary Measures of Fiscal Performance - A Comment, Southern Economic Journal, April 1970, pp. 470 - 73; see especially by the same author, The Measurement and Importance of Fiscal Policy Changes, Monthly Review (Federal Reserve Bank of New York) June 1970, pp. 133 - 145.

Following the lines of CORRIGAN and OAKLAND M.J. NEUMANN has constructed indicators of fiscal policy in the FRG for the years 1959 - 1970, see chapt. III, The German Case, in: K. BRUNNER, M. FRATIANNI, J. JORDAN, M.J. NEUMANN, The Monetary Fiscal Approach to Inflation: A Multi Country Study (forthcoming), a preliminary version appeared as discussion paper No. 9b of the department of economics at the University of Konstanz.

11) In this paper initial changes in tax receipts ( $\Delta T_i$ ) are changes during the first quarter after an alteration of the tax laws. The initial stimulus (IS) may be formally defined by  $F_t = E_t - TC_t$ , which is the difference between government expenditures, E, and cumulated initial changes of tax receipts,  $TC_t = \sum_{i=0}^t \Delta T_i$ . An act of discretionary fiscal policy, as understood in the text, refers to  $\Delta F_t = \Delta E_t - \Delta T_t$  or to  $g(F_t) = g(E_t - TC_t)$ . Using the example of a tax system, where only income is taxed, the meaning of  $\Delta T_i$ , the initial tax change, may further be clarified. Let  $t$  be the tax rate and  $Y_i$  the income (GNP). Then, according to the IS-concept,  $\Delta T_i$  is defined as

$$\Delta T_i = Y_i \Delta t$$

in contrast to

$$(Y_i + \Delta Y_i)(t + \Delta t) - Y_i t = \Delta(Y_i t) = Y_i \Delta t + t \Delta Y_i + \Delta Y_i \Delta t$$

$t \Delta Y_i$  is precisely that part of the additional tax receipts, which is included by the FES but excluded by the IS-concept, since it is not directly related to acts of discretionary fiscal policy.

$\Delta Y \cdot \Delta t$  is neglected by both concepts.

On the basis of simple Keynesian models and their reduced forms OAKLAND, op. cit., has proposed, as an alternative of the IS-concept outlined above, the weighted IS-concept. This is a fiscal indicator where the initial tax receipt changes,  $Y_i \Delta t$ , do not carry a weight equal to 1, but a weight according to the aggregate marginal propensity to consume. This concept not only causes theoretical problems deriving from the difference between the average and the marginal propensity to consume in various stages of employment (under vs. full- or excess employment), but it also suffers from being based on a specific structural hypothesis, the Keynesian one.

As a substitute we have worked with alternative weights 1 and 0 assigned a priori. Using a weight 0 corresponds to the exclusive use of E instead of F.

These two weights probably cover the range of relevant weights inside Keynesian structures.

As it turns out the results change only slightly by switching weights (variables).

12) We are assuming throughout that the central bank can control the monetary base.

The reader should not necessarily interpret this assumption as a creed which he might be invited to join. The following results may be viewed upon under the perspective of an as-if-correctness of the controllability assumption.

13) Regressing first differences of GNP ( $\Delta Y$ ), of the stock of money ( $\Delta M$ ), of the fiscal indicator ( $\Delta F$ ) and of the extended base ( $\Delta B^e$ ) on time, we obtain the following t-ratios for the positive trend coefficients:

	Y	M	F	$B^e$
t	3.09 <sup>1</sup>	1.70 <sup>2</sup>	1.48	0.48
degrees of freedom: 41				

1) significant at a 0,5 % level (one-sided hypothesis)

2) significant at a 5 % level (one-sided hypothesis)

14) If the distributed lag of a variable does not extend to more than four (lagged) periods the application of a fourth degree polynomial (without end point restrictions) would either be nonfeasible (in case of less than four lagged periods) or without effect (in case of exactly four lagged periods). Thus in all cases (combinations) where the lag length of a variable was below five periods, ordinary least squares were applied without polynomial restrictions for that variable. According to this rule the search of the three-dimensional lag space was not limited to combinations (triples) of lags of at least four periods but was extended to any combination of at least zero (!) lagged periods.

15) As it turns out in the optimal regression of the first subspace only the coefficients of the export variable are constrained by a polynomial while those of the monetary policy variable (ex-

tended monetary base) are left unconstrained.

- 16) Beta-coefficients are regression coefficients of standardized variables. Standardized variables are variables with a mean value zero and standard deviation one. Any variable may be standardized by subtracting the mean value and dividing the difference by the standard deviation of the variable. Thus standardized variables are variables of identical variability as measured by the standard deviation. Any difference in the size of the beta coefficients is not related to the difference in variability (as measured by the standard deviation).
- 17) Since the reader may doubt the relevance of beta coefficients for this comparison, we may add that we even doubt the relevance of the difference in total effects question. In actual policy making, any difference in size of these effects may be compensated for by an appropriate choice in the size of the policy variable (growth rate of the policy indicator). It is not before we know more about the relative social costs of adjusting policy variables that we can attach much significance to the question of difference in size of the policy effects as measured by the size of coefficients. This is different when the question of speed and reliability is considered.
- 18) In an earlier unpublished paper and in spite of several differences in method and for a subspace similar to the first one we arrived at basically the same empirical results. In that paper end point restrictions were applied while seasonal dummies were omitted.

This indicates that Ph. DHRYMES is overstating his case against end point restrictions, which is also obvious from the fact that in his examples he uses second degree polynomials. With fourth degree polynomials he would not be able to observe such dramatic numerical changes due to alterations in end point restrictions on which he reports.

Cf. P.J. DHRYMES, Distributed Lags: Problems of Estimation and Formulation, San Francisco 1971, pp. 232 - 234.

For an extension of DHRYMES's argument against end point restrictions in the present context see P. SCHMIDT and R.N. WAUD, The Almon Lag Technique and the Monetary versus Fiscal Policy Debate, Journal of the American Statistical Association, 68/ 1973 pp. 11 - 19

- 19) Additional calculations have shown that the tax component of our fiscal indicator is of neglectable influence in the following sense. Almost identical results would be obtained by substituting government expenditures (as applied in constructing the fiscal indicator) for the fiscal indicator.
- 20) Cf. P. SCHMIDT and R.N. WAUD, op. cit., p. 13
- 24) For Great Britain (1958 - 67 III) the hypotheses of AaJ also appear not to be confirmed.

"The results of the regressions presented would, if they were accepted as valid reduced forms, perhaps suggest that it is fiscal measures (at least in the representation they have been given) rather than monetary measures which are the more powerful and certainly the quicker-acting".

Cf. M.J. ARTIS and A.R. NOBAY, The Attempt to Reinstate Money, in H.G. JOHNSON et al., ed., Readings in British Monetary

Economics, Oxford 1972, pp. 67 - 89, esp. p. 87

Recently, disconfirming evidence also has been presented for the US.

R.N. WAUD found, that as soon as the question of the relative importance of fiscal and monetary policy is examined on a more disaggregated level where the possibility of reversed causation and the problem of single-equation least squares bias is reduced "fiscal influences and monetary influences on economic activity are both significant and appear equally important".

Cf. R.N. WAUD, Monetary and Fiscal Effects on Economic Activity: A Reduced Form Examination of Their Relative Importance, The Review of Economics and Statistics, 56/1974, pp. 177 - 187.