



Working Paper

Deficit spending in the Nazi recovery, 1933-1938 a critical reassessment

Author(s):

Ritschl, Albrecht

Publication Date:

2000

Permanent Link:

<https://doi.org/10.3929/ethz-a-004373693> →

Rights / License:

[In Copyright - Non-Commercial Use Permitted](#) →

This page was generated automatically upon download from the [ETH Zurich Research Collection](#). For more information please consult the [Terms of use](#).



Institute for Empirical Research in Economics
University of Zurich

Working Paper Series
ISSN 1424-0459

Working Paper No. 68

**Deficit Spending in the Nazi Recovery, 1933-1938:
A Critical Reassessment**

Albrecht Ritschl

December 2000

Running title: *Deficit Spending*

**DEFICIT SPENDING IN THE NAZI RECOVERY, 1933-1938:
A CRITICAL REASSESSMENT***

ALBRECHT RITSCHL

University of Zurich and CEPR

Dept. of Economics
University of Zurich
Raemistrasse 64
8001 Zurich/Switzerland
ritschl@iew.unizh.ch

* This research was funded generously by the German Research Foundation (DFG). Financial support from Universitat Pompeu Fabra and the Spanish Education Ministry's DGICYT program, Project PB94-1101, is also gratefully acknowledged. Data details and worksheets are available from the author on request.

Abstract

This paper examines the effects of deficits spending and work-creation on the Nazi recovery. Although deficits were substantial and full employment was reached within four years, archival data on public deficits suggest that their fiscal impulse was too small to account for the speed of recovery. VAR forecasts of output using fiscal and monetary policy instruments also suggest only a minor role for active policy during the recovery. Nazi policies deliberately crowded out private demand to ensure high rates of rearmament. Military spending dominated civilian work-creation already in 1934. Investment in *autobahn* construction was minimal during the recovery and gained momentum only in 1936 when full employment was approaching. Continued fiscal and monetary expansion after that date may have prevented the economy from sliding back into recession. We find some effects of the Four Years Plan of late 1936, which boosted government spending further and tightened public control over the economy.

Keywords: Nazi recovery, deficit spending, work-creation, war preparation, VAR forecasts

JEL classification codes: N44, N14, E52, E47, E65, E27

I. INTRODUCTION

Assessing the course of the Nazi recovery and identifying its driving forces has long presented a puzzle to researchers. Policies underlying the recovery it have been deemed everything from wildly capitalist to near-communist, from totalitarian to near-liberal¹; and some even claimed that recovery was almost non-existent, being largely a statistical artifact produced by accounting tricks. The early follower of Keynes, Joan Robinson, stated with perplexity that “Hitler had found a cure against unemployment before Keynes was finished explaining it” (Garvy, 1975), and contributed in this way to establishing a Keynesian orthodoxy on the fiscal policies of recovery in Germany. Later critics, however, insisted that the Nazi recovery was merely part of an international upswing that had set in autonomously (see James, 1986, Bernanke/James, 1991).

In international perspective, there is little evidence of fiscal policy having played a major role in the recovery of the 1930s. Brown’s (1956) seminal paper for the US and Middleton’s (1971) analysis for Britain concluded that in neither country, active fiscal policy had been tried. Although both papers met with criticism (see Peppers, 1973, for the US, and Broadberry, 1984, for Britain), their main conclusions appear to be robust. For Germany, however, there is a Keynesian orthodoxy which still maintains that recovery resulted from a dramatic swing in fiscal policy in 1933. Whereas the during the slump, government had applied strict deflationary policies, the Nazis soon ran budget deficits, suspended the gold standard, and eased money supply. Thus, the argument goes, fiscal policy was indeed tried in Germany, and its results were obvious².

However, the Keynesian interpretation was never fully accepted. Erbe (1958) argued that even though there is clear evidence of fiscal pump-priming in the Nazi recovery, large multipliers were absent due to high marginal tax rates and the crowding-out effects of capital market controls. James (1986) is equally skeptical about a Keynesian interpretation, despite the high public deficit figures he produces. Borchardt/Ritschl (1992) and Tilly/Hueck (1994) re-estimated small models of the German economy under Keynesian assumptions and also obtained low multiplier effects. On the other hand, Cohn (1992) calculated full-employment budget surpluses to arrive at the conclusion that fiscal policy was the key to the German recovery of the 1930s. In a similar vein, Overy (1975, 1982) looked into work-creation programs and public investment in highways, arguing that these had important effects on the pace of recovery in its early phase.

The present paper sets out to reconsider the Keynesian interpretation of the recovery from an improved database on the public sector. It draws extensively on the official central government accounts for the years of 1934-1938 that remained classified under Nazi rule but survived in the ministerial collections of German archives³. I combine these with archival information on work-

creation and armament spending to obtain a full picture of central government expenditure and deficits and its effects on the economy. In a second step, I look into disaggregate data on public and private investment to evaluate the effects of work-creation on the German economy of the early 1930s.

The rest of this paper proceeds as follows. The next section briefly looks at the aggregate evidence and places German recovery in an international perspective. Section III deals with the central government budget and asks if fiscal policies can be identified that help sustain a Keynesian interpretation. Section IV turns to investment in order to evaluate the role of state intervention in real capital formation. Section V examines monetary indicators to see if there is a role for deficit monetization and suppressed inflation in explaining the recovery. Section VI employs multivariate time-series forecasts to evaluate the expectational effects of fiscal and monetary policy. Section VII presents concluding remarks and avenues for further research.

II. THE INTERNATIONAL PERSPECTIVE

Unlike the other major economies of Europe, Germany had experienced as deep a slump as the United States. Like in the U.S., the 1928 level of German GNP was surpassed only in 1936 (Figure 1).

(Figure 1 about here)

Figure 1 shows that by international comparison, Germany's recovery was clearly not out of line up to the mid-1930s⁴. Still in 1936, Britain was doing better relative to pre-depression levels than the German economy.

These conclusions from Figure 1 are themselves partly the result of a data revision. The GNP series for Germany employed here originates from the official national income statistics⁵. These data suggest a markedly less rapid recovery from the depression than the more commonly used estimates of Hoffmann (1965). The latter series estimates aggregate expenditure from its individual components. As the Nazi administration had classified data on key components of aggregate spending from 1934 on, Hoffmann's data involve a considerable amount of guesswork for that period. Replacing these estimates with the then classified statistics from archival sources, Hoffmann's figures yield essentially the same results as the official national income statistics (Ritschl, 1998). Drawing the results of this section together, Germany's recovery up to 1936-37 lies well within the bounds of the international upswing, provided only we measure German GNP at the time properly.

III. CENTRAL GOVERNMENT BUDGETS AND FISCAL POLICY

1. Data

Issues of data quality have long obfuscated the precise timing and magnitude of deficit spending in Germany during the 1930s. From 1934 onwards, central government accounts were largely kept confidential. The information that transpired through official statistics and semi-official publications did not suffice to obtain a full picture of the magnitudes involved. Moreover, large parts of the deficit were channeled through an elaborate system of shadow budgets, using the services of public banks and setting up other money-laundering devices⁶. The clandestine nature of these spending programs has made it notoriously difficult to calculate their volume⁷.

Naturally, the estimates obtained under these conditions differ widely. This is due to several reasons. First, there are the data uncertainties mentioned above: some sources do try to include the shadow budgets, others do not. Second, even disregarding shadow budgets, German public budget accounting rules at the time were opaque: long-term “funded” borrowing was accounted for as regular revenues, while short-term borrowing was counted as debt⁸. Debt service was booked as regular expenditure, and a breakdown between interest and repayment of the principal was published only once, namely in a remote bulletin of the Statistical Office. Moreover, a distinction was made between regular and extraordinary budgets. Worst of all, budget laws permitted transferring expenditures and revenues back and forth between regular budgets and sinking funds as well as across fiscal years, to the effect that actual deficits are impossible to find out from published material without heavy recalculation⁹.

Obfuscating Germany’s central government accounts had been an industry already in the 1920s, largely in an attempt to hide deficits away from the Reparation Agent’s monitoring staff in Berlin (James, 1985). Lueke (1958), Netzband/Widmaier (1964), Andic/Veverka (1963), and Witt (1982) made attempts to correct the worst defects in the data for the 1920s. However, they did not convert the data from the German accounting system to an SNA-compatible classification. Also, no serious attempt was made to adjust the data from fiscal years to calendar years, although data on public budgets - always according to the standards then in use - is available at a quarterly frequency. These remaining defects also carry over to the data of James (1986), which are partly used by Cohn (1992). For the Nazi years, Cohn (1992) followed Andic/Veverka (1963) whose data suffer from the same problems. To this he added estimates of the circulation of Mefo bills, taken from Overy (1979).

Rather than following the aforementioned estimates, results of the present paper are based on the full information from the central government accounts that were kept secret at the time but survived in the ministerial collections of Germany's archives. These accounts permitted recalculation of central government consumption, investment, and transfers according to the SNA methodology. Data on the flotation and circulation of work-creation and Mefo bills could be recovered from the files of the Reich's Labor Ministry and the *Reichsbank*. Taking these sources together, a full picture of central government spending and budget deficits throughout the period to 1938 emerged. Data and methods are documented in Ritschl (1997).

2. Full-Employment Surpluses

An obvious first exercise is to look into the time series of public deficits and calculate Full Employment Budget Surpluses (FEBS). In Figure 2, both the actual deficit and the FEBS are given (presented here as full employment deficits)¹⁰. As usual, calculation of the full-employment surplus or deficit involves splicing the data to a base period of high employment, which in this case is taken to be the year of 1928. Actual and full-employment tax returns are then calculated, assuming the income elasticity of tax revenues to be unity.

(Figures 2a and 2b about here)

In Figure 2, both the deficit and its full-employment equivalent exhibit a jump from 1933 to 1934 and then remain virtually stagnant until 1936, when they take off sharply. This pause between 1934 and 1936 was not visible in previous research and data estimates (like Cohn's, 1992, whose estimate is included in Figure 2), which instead painted a picture of much more steady growth in central government budgets and deficits.

To highlight the timing of fiscal policy, Figure 2b looks at the fiscal impulse. In the version employed here, it is equal to the year-to-year change in the full-employment budget deficit, indicating fiscal expansion if the full employment deficit widens and vice versa. As Figure 2b bears out, the years from 1933 to 1936 witnessed what might be termed a full Keynesian policy cycle: deficits built up rapidly in 1934 and stagnated thereafter, and the fiscal impulse petered out as full employment was approached in 1936. After 1936, a remarkable switch to a new policy regime is visible. This is consistent with the renewed fiscal boost generated by the Four-Years Plan for intensified war preparation of late 1936 (Petzina, 1968). Apparently, this effect is not captured by the estimates of Cohn (1992).

In passing, we note the behavior of deficits before and during the Great Depression. During the depression, the budget was more or less in balance up until 1932 and showed only very moderate deficits in 1933¹¹. Data on the fiscal impulse reveal that recessionary pressures from the budget reached their maximum already in 1931, when the Hoover moratorium on German reparations averted debt default in the last minute (James, 1986; Schuker, 1988).

3. Fiscal Policy and Income Fluctuations

The mere emergence of public budget deficits at the end of the depression is not yet sufficient evidence of a Keynesian upswing. In order to have an effect on income, there need to be plausible quantitative relationships between the fiscal impulse and the observed change in output. Under Keynesian primitives, changes in the Full Employment Budget Surplus (or deficit) should induce a one-to-one change in GDP. If the ratio is consistently higher, changes in the public deficit are too small to account for the fluctuations of national income (Figure 3).

(Figure 3 about here)

As Figure 3 shows, the relation of GNP growth to changes in (full employment) budget deficits fluctuated violently. Generally, the ratios are far too high to be explained by the Keynesian income/expenditure mechanism. Still the best candidate seems to be the year of 1934 where the “multiplier” generated by our simple exercise takes on more realistic values. In 1933 as well as in 1935 and 1936, however, other forces of recovery must have been at work. Note also the very high values of the ratio between income and fiscal change during the Great Depression. Although budget policy was clearly restrictive then, its effects are far from being big enough to explain the slump of GNP.

If fiscal impulses were so small, it would have taken large multipliers under a Keynesian income-expenditure mechanism to transmit these into a demand-led upswing. Conceptually, tax schedules with low income elasticity might combine with highly income-elastic consumer demand to invalidate the assumptions underlying the FEBS concept and generate large income responses to small fiscal shocks. To account for this possibility, Figure 4 relates the increase in private consumption to the growth of disposable income during the 1930s.

(Figure 4 about here)

Figure 4 shows that throughout the inter-war period, the relation between consumer spending and disposable income was highly erratic. Apparently, German consumers in the inter-war period were not exactly Keynesian: the marginal ratio of consumption to income fluctuates wildly and repeatedly exceeds the range permitted by Keynesian doctrine. This seems to suggest that the old-time consumption function relating consumption to fluctuations in disposable income was highly unstable. Moreover, the marginal ratio of consumption to income in the 1930s was far too small to be compatible with a Keynesian income-expenditure mechanism that could have generated demand-led recovery. Studies of the Keynesian consumption function for inter-war Germany have usually found pathologically low coefficients on the income term. In one of the very first international studies on the consumption function, Stone/Stone (1937) noticed that while in most other countries, the term was between .6 and .8, in inter-war Germany it would hardly exceed a value of .3. Similarly low parameter values were obtained by Erbe (1958), Borchardt/Ritschl (1992), and Tilly/Huck (1994).

Consumer spending continued to fall through mid-1933 and grew only timidly up to the end of 1934. When consumption finally picked up in 1935, authorities reacted quickly in order to prevent buoyant private spending from conflicting with military demands. Foreign exchange allocations to imports of food and textiles were frozen and often reduced. “Guns, not butter” was the infamous slogan coined in 1935 by the propaganda ministry to explain to the public what the trade-offs were and why recovery should not be followed by a corresponding increase in living standards (see James, 1986, on the restrictions adopted). As the figures for 1936 to 1938 bear out, consumer demand indeed rose slower than disposable income in subsequent years.

In sum, the results of this section suggest that Keynesian fiscal impulses were present in the 1930s but remained too small to account for the Nazi recovery. In contrast to what research has shown for the U.S. and Britain, we do observe a Keynesian policy cycle in the German data. However, the magnitudes remain doubtful. In order to be consistent with Keynesian assumptions, public deficits between 1933 and 1935 would have had to be two to five times larger than they actually were. In addition, the sluggish response of private consumption to fluctuations in disposable income suggests that there is little of a Keynesian textbook-style income-expenditure mechanism being operative in Germany at the time. Apparently, fiscal policy was not the instrument that engineered the Nazi recovery.

IV. PUBLIC INVESTMENT, WORK CREATION, AND THE *AUTOBAHN*

If fiscal policy was not the means to bring about recovery, investment might have been. Public administration notoriously intervened, not only in the capital market but also in private investment. Studies in the relationship between big business and the Nazi administration used to argue for tight links that were held to have created a near-planned economy (Schweitzer, 1963). In the wake of Turner's (1979) criticism, these views have been revised thoroughly. The emerging picture is one of far less than perfect state control of investment activity, if not of outright policy failure. Firms did react to incentives such as tax breaks, subsidies and import protection but remained highly evasive when asked to meet specific investment demands¹². As a response, the Four Years Plan of 1936 was pushed through, and the government began establishing its own state enterprises to accomplish what private business was unwilling to do¹³.

This section focuses on the possible effects of direct public investment on the pace of recovery. Up to 1936, much of this activity took place in work-creation and *autobahn* construction. Overy (1975, 1982, 1994) affirmed that these projects indeed had their significance in gearing the German economy to higher output and employment in the 1930s. Others, like Mason (1977), Silverman (1988), and Hachtmann (1989), pointed to inconsistencies in German labor market statistics to argue that Nazi work creation programs were more of a statistical artifact than a reality. However, as Silverman (1998) acknowledges, the discrepancies were minimal by comparison.

But so was the contribution of these programs to investment. To assess the importance of road construction and the *autobahn*, Table 1 summarizes evidence from various government sources on investment in transportation in Nazi Germany.

(Table 1 about here)

Table 1 lists public-sector investment in the transportation sector. Block I gives investment in roads and *autobahns*, which according to Overy (1975) were pivotal in the managed recovery of the 1930s. Block II includes other public investment in transport, notably in the state railway system and the post office. As can be seen from the last line of the table, investment in roads and the *autobahn* network gained a major share in total investment of that sector only from 1935 on. In the crucial years before, their role is much less important. In 1933 and 1934, combined expenditure on roads and the *autobahn* amounted to 972.8 million RM, which is half the size of the estimate made by Overy (1975, 1994)¹⁴. *Autobahn* construction, in particular, is entirely insignificant in 1934 and gains momentum only in 1936, when the German economy already approached full employment. Therefore, if anything, investment in the infrastructure of motorization had pro-cyclical effects, as

they gained importance only when recovery was already accomplished: the *autobahn*-led recovery was merely a myth, never a fact¹⁵. But work-creation was not just limited to the *autobahn*. As e.g. Silverman (1998) has laid out, work creation was mostly a financing device for a plethora of regional and local programs, of which *autobahns* were only the most visible part. To make a fair assessment of the effects of work-creation, we therefore need to look at its shares in public and aggregate investment. Once again, there exist notorious data problems, as restricting information on precisely this issue was a political goal at the time.

Most of the available estimates of investment (in particular, Ehrlicher, 1954, and Gehrig, 1961) are based on two sources, the statistics of construction activity and the semi-official publications of *Reichskreditgesellschaft*, a state-owned bank that continued publishing data on the composition of investment through 1938¹⁶. Ritschl (1992) evaluates the existing estimates against the sources and shows that these are consistent with archival evidence from the ministry of economics. Table 2 summarizes the available evidence.

(Table 2 about here)

Table 2 provides a sectoral breakdown of investment in Germany along with two different estimates of public investment. As opposed to Table 1, public investment is defined here in a narrow sense which excludes the state railway and the post office. The first of these estimates (“Public Sector I”) is obtained from the total and the other sectoral entries as a residual. The second series (“Public Sector II”) is taken from the reports of *Reichskreditgesellschaft*.

What stands out from these figures is an increase in the share of public investment from one quarter of total fixed investment to around 40%. All of this increase took place up until 1935, when a ceiling was reached. No counter-cyclical tendencies are visible in these figures; apparently, deficit spending served merely as a transitory device to finance a permanently higher public share in investment. Work-creation deficits in relation to public investment are provided in Table 3.

(Table 3 about here)

The idea behind the issue of work-creation bills had been to make credit available to the public budget while the long-term capital market was in disarray (Grotkopp, 1954, Kroll, 1958). This appears to be reflected in Table 3 quite clearly. Work-creation bills played a major role in 1933, when they provided the lion’s share of financing public investment. New legislation in 1934 reopened the capital market for more regular public loans, however by using draconian means. Pri-

vate emissions of equity and bonds were severely restricted, and financial intermediaries were obliged to invest their loanable funds in government bonds. To limit the obvious crowding-out effects, tax breaks on investment were conceded at the same time, and the private sector had to resort mainly on internal finance for its investment activity (see Spoerer, 1996). The effects of this on the composition of central government borrowing are visible in Table 4.

(Table 4 about here)

Table 4 includes the net issue of work-creation and Mefo bills along with budget deficits. During 1932 and 1932, the budgeted data exhibit small surpluses, and a deficit appears only in 1934. Thus, all government deficit in 1933 came in through the shadow budgets, whose importance declined steadily thereafter. Issuing work-creation and armament bills was thus not a pump-priming effort but served to bridge the government's credit needs while credit from the long-term capital market was not forthcoming. That is, their importance is not so much in Keynesian demand creation per se but rather in alleviating credit restrictions on the public budget that prevailed at the end of the depression in Germany (on these, see Borchardt, 1979).

Note again the discrepancy with the deficit estimates in Cohn (1992). Had central government deficits indeed been as large as his data suggested, the case for Keynesian demand creation in the 1930s would be considerably stronger. In contrast, the overall fit of Erbe's (1958) deficit estimates with the actual data is quite good. The only major exception is the year of 1934, in which he appears to have underestimated the deficit by one half.

We also note that in contrast to received wisdom (e.g., Overy, 1979), the issue of Mefo armament bills clearly exceeded work creation bills already in 1934. Increasing military spending had been set as a priority already in the first cabinet meeting of the Nazi government in early 1933 (James, 1986) and gained importance very quickly thereafter.

(Table 5 about here)

As Table 5 shows, the military spending accounts for half of government expenditure already in 1934/35. In the fiscal years from 1933-4 to 1935-6, military spending totaled some 11.2 billion RM, as opposed to the 8-9 billion RM assumed by Overy (1994). From 1933 to 1934, the expansion of the public budget also led to an increase in non-military spending. For the next two years, however, non-military expenditure fell again to a level below 1933. Thus, there is no question that already by

1934, central government expenditure was dominated by war preparation. This further substantiates the claim made above that, except for 1933, there is little role for motorization-led public expenditure à la Overy (1975): if anything, it was possibly the motorization of the *Wehrmacht* that drove public deficit spending at the time.

This notwithstanding, we do agree with Overy (1975) that motorization of the German economy did have visible effects during the 1930s. Regulations from the Weimar Republic that had restricted long-distance road transport were lifted. At the same time, taxes on registering cars, which had been prohibitively high, were brought down to more popular levels. There is little doubt that the Nazi government was committed to promoting automobile production and car ownership on a wide scale. However, as Spoerer (1998, Fig. 2) shows, the stock of motorcars in Nazi Germany did not grow beyond the trends set by the Weimar Republic before the Great Depression: much of the spectacular growth rate in auto production during the early recovery was a rebound effect. In any case, Nazi policy in that sector consisted more in supply-side measures and deregulation in the transport market than anything else.

V. REPRESSED INFLATION? FISCAL POLICY AND MONETARY INDICATORS

The lack of sufficiently strong fiscal impulses in the early phase of recovery in Germany suggests a role for monetary policy. Indeed, the monetary regime in Germany changed swiftly in 1933, with the Reichsbank selling off its gold reserves, freezing foreign accounts, and blocking convertibility (Klug, 1993). One of the most traditional claims (echoed in James, 1986) is that Germany's monetary policies in the 1930s were inherently inflationary and would necessarily have collapsed even without a war.

Surprisingly, this does not seem to be so obvious. As a first check, I calculate the ratios of public debt and M1 to nominal GNP.

(Figure 5 about here)

As Figure 5 shows, the debt/income ratio rose quickly already during the depression. This was so mainly because GNP declined dramatically, driving the ratio upward. Note that the ratio remained stationary between 1932 and 1936 in spite of the deficit spending analyzed above. The obvious reason why initial debt/income ratios were so low is of course the German hyperinflation that had wiped out most domestic-currency debt. Note that the debt figures underlying the series in Figure 5 include both the extra-budget bills and the foreign part of the public debt, valued at par. The remarkable stability of the debt/income ratio during the 1930s is once again an indication that fiscal

impulses are unlikely to have generated the Nazi recovery. Had deficit spending been the major demand impulse, the increase in debts should have been higher than GNP growth.

Looking at the ratio of M1 to GNP, it also seems difficult to find a big role for monetary impulses in the Nazi recovery: the money/income ratio began to decline in 1930, signaling strong monetary contraction. Interestingly, the decline continued through most of the recovery. The Reichsbank did monetize work-creation and Mefo bills at its discount window but nevertheless managed to keep the quantity of money in line with GNP. Monetary growth was apparently not a driving force of the Nazi recovery.

Nor was money growth much of a problem in the late 1930s, which is equally surprising. Conventional wisdom has it that the introduction of price controls in the year of 1936 marked the beginning of repressed inflation. The evidence in Figure 5 does not lend much support to this hypothesis, except for the year of 1938. The money/income ratio did later skyrocket during World War II, ultimately leading to West Germany's currency reform of 1948, which reduced savings to about 15% of their nominal value. In the pre-war monetary data, however, there is only scant indication of repressed inflation.

VI. EXPECTATIONAL EFFECTS OF FISCAL AND MONETARY POLICY

The observation that fiscal and monetary policies apparently did not operate traditional expenditure and monetary multipliers obviously does not rule out other channels of transmission. This section adopts an expectational perspective in the search of other transmission effects. A natural way to do so is to employ a reduced-form time series approach, in which (Granger-) causation and effects can be traced without the need for a structural model. In order for policy variables to have an effect, the time series of their realizations should in some way have predictive power for the policy target variable. The following implements specification, estimation and prediction in a Bayesian vector autoregression (VAR) framework (see Appendix A for data sources and specification details). I obtain both "unconditional" forecasts, i.e. out-of-sample predictions in historical time, and conditional forecasts or impulse-response functions, i.e. in-sample predictions in logical time¹⁸. To account for time-varying coefficients, I re-estimate the system and obtain updated forecasts and impulse responses at various critical points in time.

In a framework of unconditional VAR forecasts, policy efficiency translates itself into gains in predictive power. If policy works through surprises, including the policy instrument in a VAR forecast of the target variable should improve its predictive power. At the same time, a VAR forecast excluding the policy instrument would fail to predict the relevant economic variables ade-

quately. If policy follows a pre-assigned rule and works systematically, the effects of policy would be fully factored into the expectations of the public, and both output and policy should be predictable with and without the policy instrument in the VAR. (Such a case might occur e.g. if the private sector is inherently unstable and requires continuing intervention by the public sector, as more radical versions of Keynesianism would maintain). Appendix B provides details on the identification of these policies and their effectiveness.

Conditional forecasts or impulse responses impose more structure on the variance-covariance matrix. I adhere to the conventional Cholesky triangularization, which imposes restrictions on the number of admissible contemporaneous correlations of the residuals. This restriction allows to distinguish surprise, or "exogenous" policy, from rule-bound policies. Shocks to an exogenous policy instrument would not be contemporaneously correlated with shocks to other economic variables, and the policy shock would only be propagated through the economic system through the dynamic multipliers of the VAR. Conversely, policy is said to follow a feedback rule if shocks to the other economic variables affect the policy instrument contemporaneously. These differing characterizations of policy thus translate into a different ordering of variables in the Cholesky decomposition (see Appendix C).

These above forecasts will be obtained at various critical junctures. Obvious candidates for these are, in turn, the end of 1932, before the Nazis came to power, late 1934 when civilian work-creation programs ended, and late 1936 when the Four Years Plan was adopted and turned Germany into a wartime command economy.

1. Fiscal Policy

This paragraph examines fiscal policy and its effects on output. Figure 6 (a) shows forecasts of government spending under an output-oriented feedback rule. These forecasts are obtained from a VAR that includes output, private consumption, and a consumer price index. If policy operated through surprises, its realizations should deviate from the prediction significantly. For most of the benchmarks this is indeed the case, however with the notable exception of the first one, taken for the end of 1932. Actual fiscal policy exceeded the confidence bands from this forecast only by early 1935. During the year of 1935, government spending underwent a series of upward surprises. By the end of the year, expectations of a gradual reversion to the historical mean had been broken, and the policy forecast now correctly predicts the rapid expansion of government spending during the Four Years Plan. Previously, however, fiscal policy did not present a major departure from the

forecast: during the year of 1933 and into 1934, actual spending even remained mostly below the forecast mean.

(Figure 6 about here)

For policy to have major effects on output, a forecast of output from a VAR including the policy instrument should provide satisfactory predictive power. Figure 6 (b) presents results from such forecasts at critical benchmarks. Two features stand out from these results: first, a major recovery is predicted by late 1932, before the Nazis came to power and long before they had a coherent concept for fiscal policy. Although the algorithm slightly underpredicts the speed of recovery, it correctly predicts its magnitude to levels higher than the pre-depression peak. Second, the later forecasts unanimously predict another recession to occur during 1937 – which indeed was to become the turning point of the international business cycle. This warrants the conclusion that the forecast as of late 1932 picks up quantitatively important properties from the inherent dynamics of the German business cycle. Note that the policy surprises from fiscal policy that occurred after 1934 did not affect the forecasts of output until 1936, when full employment was reached. Fiscal policy had no apparent effects during the crucial phase of the Nazi recovery.

The impression of rather small effects of fiscal policy is confirmed by looking into the output forecasts from the same VAR in Figure 6 (c), where now the fiscal policy variable has been excluded. Results are essentially undistinguishable from the VAR including policy, except possibly for the last two forecasts. As outlined in Appendix B, this would be consistent with systematic (i.e., rule-bound) policy that stabilizes an inherently unstable private sector and is fully factored into the expectations of the public. However, as Figure 6 (a) showed, policy could be termed systematic only during the first year of recovery and again after 1935. Hence, the policy surprises of 1934 and 1935 probably had only very limited effects.

An even more surprising conclusion arises from the prediction as of late 1932: even if the policy instrument is not included, the forecast correctly predicts full recovery to the levels reached around 1935. Fiscal policy during the early years of the Nazi recovery was apparently immaterial for the upswing. When Hitler came to power, recovery was already around the corner. This confirms research that has found signs of recovery in the German economy being present already in the second half of 1932 (James, 1985, Buchheim, 1994).

Last in this section, Figures 7a and 7b examine the dynamic multipliers of fiscal policy through the impulse-response functions from the same VAR over eight quarters. The graphs pro-

vide the dynamic responses of output and government spending to an orthogonalized shock in government spending (see Appendix C). Under the assumption of exogenous fiscal policy, i.e. ordering government spending first, the dynamic responses of output all are negative, violating the Keynesian sign restriction on the expenditure multiplier (Figure 7a). Ordering policy last, i.e. assuming endogenous government spending, the dynamic multipliers on output have the right sign during four quarters but tend to violate sign restrictions subsequently. Still, even where signs are positive the size of the responses is minimal (Figure 7b)¹⁹. This corroborates the results from Section IV above, in which fiscal impulses had been found to have been too small to account for a demand-managed recovery. Note also that there is little temporal variation of the impulse responses across time: the overall multipliers of government spending remained essentially unchanged as recovery progressed. This would imply that the fluctuations in the fiscal impulses obtained in Section IV above do not reflect changes in the efficacy of fiscal policy but rather exogenous movements of output.

2. Monetary Policy

Section VI further above had argued that money supply was not obviously inflationary until 1938. Yet the transition to an inconvertible currency, Germany's external debt default, and the introduction of capital market controls should have left their marks on expectation formation. The first issue to analyze is whether these regime changes resulted in shocks to monetary policy, i.e. deviations from a feedback rule. Figure 6 (d) presents forecasts of money from a VAR in money demand under a feedback rule. A significant departure of money supply from the policy rule becomes visible only in 1935. A second, quantitatively much more important policy shock occurred in 1938. As in the case of fiscal policy, a monetary forecast predicts sustained recovery into 1937 already by the end of 1932, see Figure 6 (e). Again, predictive power does not worsen visibly if the policy instrument is left out, as in Figure 6 (f). This would suggest that monetary policy played only a minor role: during the early recovery, policy continued to be systematic, and recovery was only slightly faster than an economic agent running VARs could have predicted in later 1932. The upward shocks to money supply in 1935 did not affect the economy very much: factoring money supply into a forecast of output does not improve its quality, although it should if the policy shock had an effect. A really big shock to money supply occurred only in 1938, reflecting the monetary effects of the annexation, or “Anschluss”, of Austria, and the transition to openly inflationary war finance.

(Figure 7 about here)

The impulse response functions (in Figure 7) again reveal very minor effects of monetary policy. Now, if the policy instrument, money, is considered endogenous (Figure 7d), the responses of output have the wrong sign. Assuming policy to be exogenous, signs are positive (Figure 7c). However, the dynamic multipliers of money on output are again minimal. Money supply may have been exogenous to pre-assigned rules but clearly had only very little impact on output. Again, the efficiency of macroeconomic policies does not appear to have improved during the 1930s, Hjalmar Schacht notwithstanding.

VIII. CONCLUDING REMARKS

A critical reassessment of deficit spending during the Nazi recovery reveals a surprisingly small role for macroeconomic policy. Both the descriptive evidence and the results from multivariate time series forecasts suggest that recovery from the Great Depression was mainly driven by a rebound effect that was visible in the data already by late 1932. Up to around 1936, the German recovery was no more advanced than that of Britain or the United States, where far less expansionary fiscal policies were followed. However, even in Germany the fiscal impulse generated by the budget deficit was too small to be consistent with Keynesian demand stimulation under an income/expenditure mechanism. In order to explain the very high, at times two-digit growth rates of GNP during the recovery, deficits would have had to be two to five times higher than they actually were. Apparently, recovery was due to forces other than fiscal and monetary policy, just as in the cases of Britain and the United States.

Much of the uncertainty about the nature of the Nazi recovery was connected with measurement problems. The results of this paper rest to some extent on extensive data revisions, relying on unpublished data that had been classified during the Nazi years but survived in ministerial and central bank files and other archival collections in Germany. These include the full central government accounts which previously had not been available completely. Use of these data from archival sources made it possible to convert the budget figures from German accounting concepts to modern national accounting standards. Based on these data, a detailed, new picture emerges in which the Nazi recovery appears less spectacular than was hitherto believed.

Our results also indicate that government spending was dominated by war preparation already in a very early phase of the Nazi recovery. I find little justification for the popular interpretation that recovery was sparked off by non-military work-creation and the construction of the *autobahn* network. Investment in the *autobahn* reached sizable magnitudes only in 1936. All these projects pale in comparison with the rapid build-up of military expenditure, except for the year of 1933

when rearmament had not yet really begun. To secure the desired high speed of war preparation, the Nazi administration took early, often draconian steps to crowd out private demand. The growth in consumer spending fell short of the increase in national product, and the contribution of private investment to the recovery remained unimpressive.

Strict control of private expenditure was partly achieved by maintaining taxation at the high levels reached during the depression years. Thus, public deficits did not grow faster than GNP until 1937. Monetary growth was actually even slower than the expansion of national product. The popular claim that the Nazi recovery resulted in repressed inflation must therefore be taken with care. Only as late as 1938 do we observe a reversion in the downward trend of the money/GNP ratio. Examining feedback rules in predicting monetary and fiscal policy, I find that during the first two years of recovery, neither of these policy variables deviated significantly from the predictions that an informed agent could make by the end of 1932. Surprise shocks to policy became visible only during 1935, when recovery had already progressed significantly. Still, I find little or no evidence for these policy shocks to have had much effect on the economy.

The results of this paper indicate that the deeper reasons why recovery went smoothly must probably be sought elsewhere. The persistence of low wages is one factor that has been highlighted in several studies (see, most recently, Fisher and Hornstein, 2000). More research is also needed on the restructuring of the banking system that accompanied the introduction of capital-market controls, a theme that has been treated in some institutional detail by Barkai (1990).

We conclude that the Nazi recovery was not a textbook exercise in Keynesian demand stimulation, although the state absorbed an ever-growing share of the idle resources for its own use. Economic recovery in Germany in the 1930s remains the paradox case of public demand expansion without Keynesian demand creation.

REFERENCES

- Andic, A., and Veverka, J. (1963), "The Growth of Public Expenditure in Germany since the Unification", *Finanzarchiv* N.F. **23**, 169-278.
- Balderston, T. (1977), "The German Business Cycle in the 1920s: A Comment", *Economic History Review* **30**, 159-161.
- Barkai, A. (1990), *Nazi Economics*, New Haven: Yale University Press.
- Bernanke, B., and James, H. (1991), "The Gold Standard, Deflation and Financial Crisis in the Great Depression: An International Comparison", in: R.G.Hubbard (ed.), *Financial Markets and Financial Crises*, Chicago: Chicago University Press, 33-68.
- Birkenfeld, W. (1964), *Der synthetische Treibstoff, 1933-1945; ein Beitrag zur nationalsozialistischen Wirtschafts- und Ruestungspolitik*, Goettingen: Musterschmidt.
- Borchardt, K., and Ritschl, A. (1992), "Could Brüning Have Done It? A Keynesian Model of Interwar Germany, 1925-1938", *European Economic Review* **36**, 695-701.
- Broadberry, S. (1984) "Fiscal Policy in Britain During the 1930s", *Economic History Review* **37**, 95-102.
- Brown, E.C. (1956), "Fiscal Policy in the Thirties: A Reappraisal", *American Economic Review* **46**, 857-879.

- Buchheim, C. (1994), "Zur Natur des Wirtschaftsaufschwungs in der NS-Zeit", in: C. Buchheim, M. Hutter, and H. James (Eds.), *Zerrissene Zwischenkriegszeit, Festschrift Knut Borchardt*, Baden-Baden: Nomos, 97-119.
- Cole, H., and Ohanian, L. (2000) "New Deal Policies and the Persistence of the Great Depression: A General Equilibrium Analysis", *Federal Reserve Bank of Minneapolis Working Paper* No. 597.
- Cohn, R. (1992), "Fiscal Policy in Germany during the Great Depression", *Explorations in Economic History* **29**, 318-42.
- Deutsche Bundesbank (ed.) (1976), *Deutsches Geld- und Bankwesen in Zahlen*, Frankfurt: Knapp.
- Doan, T. (1992), *RATS User's Manual 4*, Evanston: Estima.
- Ehrlicher, W. (1956), *Geldkapitalbildung und Realkapitalbildung*, Tuebingen: Mohr (Siebeck).
- Erbe, R. (1958), *Die nationalsozialistische Wirtschaftspolitik 1933-1939 im Lichte der modernen Theorie*, Zurich: Polygraphischer Verlag.
- Feinstein, C.H. (1972), *National Income, Expenditure and Output of the UK 1855-1965*, Cambridge: Cambridge University Press.
- Fisher, J., and Hornstein, A. (2000) "A Neoclassical Perspective on the German Economy, 1925-1938", mimeo, Federal Reserve Bank of Richmond.
- Garvy, G. (1975) "Keynes and the Economic Activists of pre-Hitler Germany", *Journal of Political Economy* **83**, 391-405.
- Gehrig, G. (1961), "Eine Zeitreihe fuer den Sachkapitalbestand und die Investitionen", in: *idem* u.a. (1961), Bestimmungsfaktoren der deutschen Produktion, *Ifo-Studien* **7**, 7-60.
- Gregor, N. (1998), *Daimler-Benz in the Third Reich*, New Haven: Yale University Press, 1998.
- Grotkopp, W. (1954), *Die grosse Krise*, Duesseldorf: Econ.
- Hachtmann, R. (1989), *Industriearbeit im Dritten Reich*, Goettingen: Vandenhoeck & Ruprecht.
- Hamilton, J. (1994), *Time Series Analysis*, Princeton: Princeton University Press.
- Hansen, B., and Snyder, W. (1969), *Fiscal Policy in Seven Countries 1955-1965*, Paris: OECD.
- Hayes, P. (1987), *Industry and Ideology: IG Farben in the Nazi Era*, Cambridge: Cambridge University Press.
- Hoffmann, W.G., et al. (1965), *Das Wachstum der deutschen Wirtschaft seit der Mitte des 19. Jahrhunderts*, Berlin: Springer.
- Hoffmann, W.G., and Mueller, H. (1959), *Das deutsche Volkseinkommen 1851-1957*, Tuebingen: Mohr (Siebeck).
- James, H. (1986), *The German Slump*, Oxford: Clarendon.
- James, H. (1985), *The Reichsbank and Public Finance in Germany, 1924-1933*, Frankfurt: Knapp.
- Kendrick, J. (1961), *Productivity Trends in the United States*, New York: Columbia University Press.
- Klein, B. (1959), *Germany's Economic Preparations for War*, Cambridge: Harvard University Press.
- Klug, A. (1993), *The German Buybacks, 1932-1939: A Cure for Overhang?*, Princeton: Princeton University Press (= Princeton Studies in International Finance **75**).
- Konjunkturstatistisches Handbuch 1936*, ed. by E. Wagemann (1935), Hamburg: Hanseatische Verlagsanstalt.
- Kitterer, W. (1998) "Oeffentliche Finanzen und Notenbank", in: Deutsche Bundesbank (ed.), *Fuenfzig Jahre deutsche Mark*, Munich: Beck, 199-256.
- Kroll, G. (1958), *Von der Weltwirtschaftskrise zur Staatskonjunktur*, Berlin: Duncker & Humblot.
- Lautenbach, W. (1952), *Zins, Kredit und Produktion*, Mohr (Siebeck).
- Lueke, R. (1958) *Von der Stabilisierung zur Krise*, Zurich: Polygraphischer Verlag.
- Mason, T. (1977), *Sozialpolitik im Dritten Reich*, Opladen: Westdeutscher Verlag.
- Mollin, G. (1988), *Montankonzerne und "Drittes Reich"*, Goettingen: Vandenhoeck & Ruprecht.
- Netzband, K.B., and Widmaier, H.P. (1964), *Waehrungs- und Finanzpolitik der Aera Luther 1923-1925*, Basel/Tuebingen: Kyklos-Verlag/Mohr (Siebeck).
- Overy, R.J. (1994), *War and Economy in the Third Reich*, Oxford: Clarendon.
- Overy, R.J. (1982), *The Nazi Economic Recovery 1932-1938*, London: Methuen.
- Overy, R.J. (1979) "The German *Motorisierung* and Rearmament: A Reply", *Economic History Review* **32**, 107-113.
- Overy, R.J. (1975), "Cars, Roads, and Economic Recovery in Germany, 1932-8", *Economic History Review* **28**, 466-483.
- Peppers, L. (1973), "Full Employment Surplus Analysis and Structural Change: The 1930's", *Explorations in Economic History* **10**, 197-210.
- Petzina, D. (1968), *Autarkiepolitik im Dritten Reich. Der nationalsozialistische Vierjahresplan*, Stuttgart: Deutsche Verlagsanstalt.
- Plumpe, G. (1990), *Die I.G. Farbenindustrie AG*, Berlin: Duncker & Humblot, 1990.
- Reichskreditgesellschaft* (ed.), *Deutschlands wirtschaftliche Lage*, various issues 1935-1939.
- Ritschl, A. (1992), "Ueber die Hoehe und Struktur der gesamtwirtschaftlichen Investitionen in Deutschland 1935-1938", *Vierteljahrsschrift fuer Sozial- und Wirtschaftsgeschichte* **79**, 156-176.
- Ritschl, A. (1997), *Deutschlands Krise und Konjunktur 1924-1934: Binnenkonjunktur, Auslandsverschuldung und Reparationsproblem zwischen Dawes-Plan und Transfersperre*, unpublished manuscript.
- Ritschl, A., and Spoerer, M. (1997), "Das Bruttosozialprodukt in Deutschland nach dem amtlichen Volkseinkommens- und Sozialproduktsstatistiken 1901-1995", *Jahrbuch fuer Wirtschaftsgeschichte* 1997/2, 27-54.
- Ritschl, A. (1998), "Measuring National Product in Germany, 1925-38: The State of the Debate and Some New Results", in: T. Dick (ed.), *Business Cycles since 1820*, Cheltenham: Elgar, 91-109.

- Sargent, T. (1999), *The Conquest of American Inflation*, Princeton: Princeton University Press.
- Schuker, S. (1988), *American Reparations to Germany, 1924-1933*, Princeton: Princeton University Press (= Princeton Studies in International Finance **61**).
- Schweitzer, A. (1964), *Big Business in the Third Reich*, Bloomington: Indiana University Press, 1964.
- Siegfried, K.-J. (1986), *Ruestungsproduktion und Zwangsarbeit im Volkswagenwerk 1939-1945*, Frankfurt: Campus.
- Silverman, D. (1998), *Hitler's Economy. Nazi Work Creation Programs, 1933-1936*, Cambridge: Harvard University Press.
- Silverman, D. (1988), "National Socialist Economics: The 'Wirtschaftswunder' Reconsidered", in: B. Eichengreen and T. Hatton (Eds.), *Interwar Unemployment in International Perspective*, Dordrecht: Kluwer, 185-220.
- Spoerer, M. (1998), "Die Automobilindustrie im Dritten Reich: Wachstum um jeden Preis?", in: L. Gall and M. Pohl (Eds.), *Unternehmen im Nationalsozialismus*, Munich: Beck, 61-68.
- Spoerer, M. (1996), *Von Scheingewinnen zum Ruestungsboom. Die Eigenkapitalrentabilitaet der deutschen Industrie-aktiengesellschaften 1925-1941*, Stuttgart: Steiner.
- Statistisches Handbuch von Deutschland 1928-1944*, ed. by Laenderrat des amerikanischen Besatzungsgebiets (1949), Munich: Ehrenwirth.
- Stuebel, H. (1951), "Die Finanzierung der Aufruestung im Dritten Reich", *Europa-Archiv* **6**, 4128—4136.
- Temin, P. (1989), *Lessons from the Great Depression*, Cambridge: MIT Press.
- Turner, H. (1979), *German Big Business and the Rise of Hitler*, New York: Oxford University Press.
- Von Kruedener, J. (ed.) (1990), *Economic Crisis and Political Collapse. The Weimar Republic 1924-1933*, Oxford: Berg.
- Wallich, H. (1955), *Mainsprings of the German Revival*, New Haven: Yale University Press.
- Witt, P.-C. (1982), "Finanzpolitik als Verfassungs- und Gesellschaftspolitik", *Geschichte und Gesellschaft* **8**, 386-414.

LEGENDS TO THE FIGURES

Legend to Figure 1:

| | |
|--------------|--------------------------------------|
| Sources: US: | Kendrick (1961, Table A-III) |
| Britain: | Feinstein (1971, T16/Table 5, (10)); |
| Germany: | Ritschl/Spoerer (1997, Table A.1-IX) |

Legend to Figure 4:

| | |
|---------|-----------------------------|
| Source: | Ritschl (1997), Appendix B. |
|---------|-----------------------------|

Legend to Figure 5:

| | |
|------------------|----------------------------|
| Source: GNP: | Ritschl/Spoerer (1997). |
| Public debt, M1: | Deutsche Bundesbank (1976) |

Legend to Figure 6:

| | |
|---------------------------------|------------|
| Data Sources and Specification: | Appendix A |
| Identification: | Appendix B |

Legend to Figure 7:

| | |
|-----------------|------------|
| Data Sources: | Appendix A |
| Identification: | Appendix C |

APPENDIX A: Data Sources, VAR Specification and Estimation

Data: Data are quarterly from 1925:1 to 1938:4. All interpolations by Chow/Lin method.

Output: GDP at 1913 prices from Ritschl/Spoerer (1997, Table A.1.VIII), interpolated with estimates of quarterly value added from Wagemann (1936) and *Vierteljahrshefte zur Konjunkturforschung*, various issues.

Consumption: Private consumption at 1913 prices, Ritschl/Spoerer (1997, Table 3.III/IV), interpolated with quarterly estimates of consumer goods output from Wagemann (1936) and *Vierteljahrshefte zur Konjunkturforschung*, various issues.

Government Spending: Ritschl (1997, Tables A.8-A.10). Deflated by CPI.

CPI, Reichsbank Rate, Money Circulation: *Deutsche Bundesbank* (1976), *Statistisches Jahrbuch fuer das deutsche Reich*, various issues.

Specification and Estimation:

Figures 6 a,b: 4th order BVAR in logs of output, private consumption, government spending, consumer prices.

Figure 6c: excludes government spending from the above specification.

Figures 6d,e: 4th order BVAR in Reichsbank rate and logs of money, output, and consumer prices.

Figure 6f: excludes money from the above specification.

Choice of prior:

Bayesian vector autoregression employing a Litterman prior. The prior for the mean was set to the near-unit root of 0.9. All other parameters were set to the defaults suggested e.g. in Doan (1992, Section 8.8). As promised by Uhlig (1993), results were robust to variations of the parameters about their default, notably to changing the AR(1) term. Experiments with an alternative specification allowing for cointegration produced generally higher mean-squared errors with no apparent change in the fundamental results.

APPENDIX B: Characterization and Identification of Policy

An out-of-sample method to assess policy effectiveness is to examine its contribution to an out-of-sample forecasts of the economic target variable y . Let

$$\hat{y}_t = E_{t-1}(y_t | I_{t-1}) \quad (\text{B.1})$$

be the expectation of y_t conditional on the information I_{t-1} available to private agents at time $t-1$. Rational use of past information should result in a mean squared error (MSE) of this forecast:

$$\text{MSE}(y_t | I_{t-1}) = E_{t-1}[(y_t - \hat{y}_t)^2 | I_{t-1}] \quad (\text{B.2})$$

which is minimal among all forecasts conditional on this information set.

Economic policy surprises would distort y_t away from the expectation in (1), as the choice of policy variables, X_{t-1} , is not included in the information set available to private agents, I_{t-1} . Then, knowledge of the actual realizations of the policy shock (available to the researcher ex post and possibly to the policy maker but not to private decision makers in $t-1$) should help improve the forecast. Such an augmented forecast would add the realization of policy in the information set alongside the information available to private agents:

$$\tilde{\hat{y}}_t = E_{t-1}(y_t | I_{t-1}, X_{t-1}) \quad (\text{B.3})$$

The left hand side of eq. (3) is the expectation of y_t , conditional on the union of information set I_{t-1} and (by slight abuse of notation) the policy realization at $t-1$, X_{t-1} . Augmenting the information set as in (3) would reduce the MSE of a forecast if the additional series Granger-causes the target variable or else leave the MSE unaffected:

$$\text{MSE}(y_t | I_{t-1}, X_{t-1}) \leq \text{MSE}(y_t | I_{t-1}) \quad (\text{B.4})$$

Under pre-assigned "feedback rules", policy follows a regular pattern, depending on its own past realizations and on the history of the target variables:

$$X_t = \phi(y_{t-1} \dots y_{t-p}; X_{t-1} \dots X_{t-p}) \quad (\text{B.5})$$

Policy surprises would occur whenever the realizations of the policy instrument deviate significantly from the policy forecast based on (5).

The framework provided by (1), (3), and (5) identifies policy shocks, rule-bound policy, and policy effectiveness. The resulting identification scheme can be represented as follows:

| | | Feedback Rule, eq. (5) | Augmented Forecast, eq. (3) | Simple Forecast, eq. (1) |
|---------------------------------------|-----|-------------------------------|------------------------------------|---------------------------------|
| | | X, y together predict X | X, y together predict y | y alone predicts y |
| Systematic policy, effective | 1. | Yes | Yes | No |
| Systematic policy, ineffective | 2a. | Yes | Yes | Yes |
| | 2b. | Yes | No | No |
| Surprise policy, effective | 3. | No | Yes | No |
| Surprise policy, ineffective | 4a. | No | Yes | Yes |
| | 4b. | No | No | No |

APPENDIX C: Cholesky Orderings in Impulse Response Functions in Descending Degree of Exogeneity

Figure 7a. Government Spending - Private Consumption - CPI - Output

Figure 7b. Output - Private Consumption - CPI - Government Spending

Figure 7c. Money- Reichsbank Rate-CPI-Output

Figure 7d: Output-Reichsbank Rate-CPI-Money

NOTES

¹ The first view goes probably back to contemporary discussions but is still reflected in Temin (1989). For the second view, see e.g. James (1986).

² Garvy (1975) documents that proto-Keynesian ideas circulated in German academic circles during the depression. Barkai (1990) and others have argued that these ideas indeed shaped policy-making during the Nazi recovery. Detailed accounts of these contemporary debates and their influence on Nazi economic policy are given by Grotkopp (1954) and Kroll (1958).

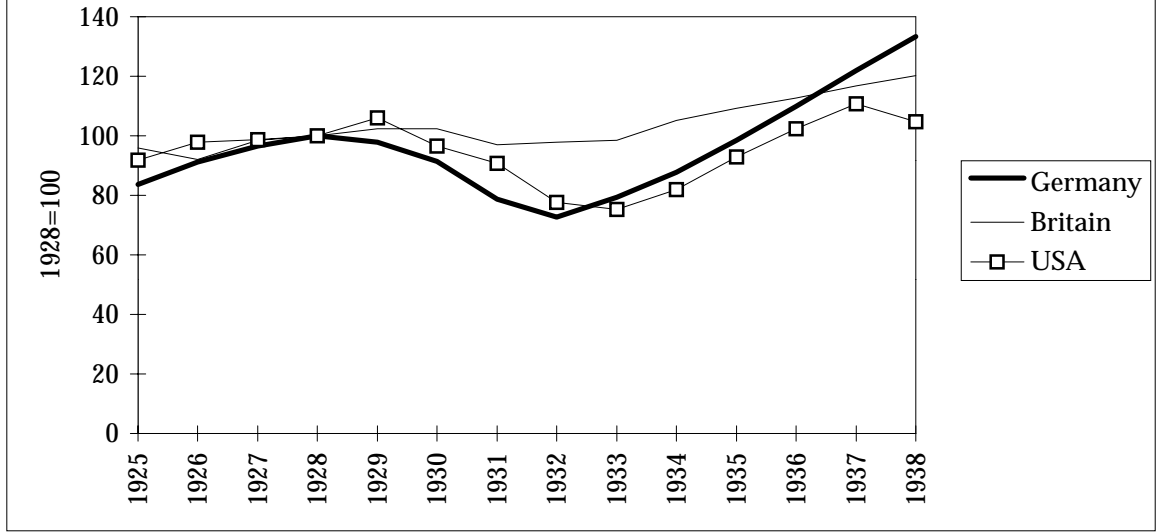
³ *Institut für Zeitgeschichte* Munich, *Da 03.03*. This includes the complete ex-post central government accounts from 1934 through 1940. The history of these records is documented in the files of the finance ministry in Germany's national archive, *Bundesarchiv R2 Anhang*. The ex-ante budgets survived in the former East German Potsdam archives.

⁴ The evidence in Figure 1 would be consistent with a heavily contested claim of Temin (1971) who argued for a beginning of the Great Depression in Germany in 1927. For a criticism, see Falkus (1975) and Balderston (1977).

⁵ Conversion to GNP was first undertaken by the West German Statistical Office, (see *Wirtschaft und Statistik*, 1954). Refined versions of this series are in Hoffmann/Mueller (1959). Further adjustments and a refined deflator are provided by Ritschl/Spoerer (1997).

- ⁶ The most notorious of these was Mefo, an enterprise set up by the central bank in cooperation with a number of major arms suppliers. See e.g. Barkai (1990).
- ⁷ Existing data are often based on estimates by Erbe (1958) or on data made available during the Nuremberg war crime trials (Stuebel, 1951).
- ⁸ More precisely, debt was considered revenue and inserted above the line if it was budgeted, else it counted as deficit which later would have to be funded.
- ⁹ A more rational system of budgeting was introduced only in 1969 (see e.g. Kitterer, 1998, which includes a brief overview of German budgeting procedures).
- ¹⁰ All relevant studies restrict their attention to central government deficit, as net borrowing of states and municipalities became negative from 1934 on (see e.g., *Statistisches Handbuch von Deutschland*, 1949). Hence, the deficit data in Figure 2 are slightly upward biased, suggesting an excessively strong Keynesian demand effect.
- ¹¹ The motivation of these austerity policies has been controversial. See e.g. the contributions in Von Kruedener (1990).
- ¹² See e.g. Birkenfeld (1964) on synthetic fuel, Hayes (1987) and Plumpe (1990) on chemical industry, Mollin (1988) on iron and steel, and Gregor (1996) on Daimler-Benz.
- ¹³ The most notable examples are the Reichswerke steel trust and the Volkswagen works. See Mollin (1988) on the former and Mommsen (1996) on the latter.
- ¹⁴ The source from which Overy (1994, Table 2.7) is working seems to be adding up data from the investment statistics plus work-creation. That would result in double-counting, as the investment statistics underlying Table 1 above are consistent with the volume of construction activity.
- ¹⁵ There is hardly a better way of combining popular beliefs about the Nazi recovery than the cover of Silverman's (1998) recent book. Under the title: "Hitler's Economy. Nazi Work Creation Programs, 1993-1936", it shows an advertisement for a beetle car. No visual message could convey the fictitious character of the motorization-led recovery more clearly, as it displays the centerpiece of Nazi iconology: the ad shown on the cover is actually not for the car itself but rather for a savings scheme. A beetle drives on an empty road in front of a hugely magnified 5-reichsmark coin of 1936 (which was the weekly contribution the driver was supposed to make in order to eventually get his own beetle). In 1936, work-creation was already running out. Of the brave subscribers, no one ever got a beetle in return, as the Nazi labor organization administering the scheme went under in 1945. Deliveries of beetle cars to the market did not start until the late 1940s. See e.g. Siegfried (1986).
- ¹⁶ The same data are also used by Hoffmann (1965). For unknown reasons, Hoffmann's data on public investment are nevertheless upward biased against his source data. The various different data sources are evaluated against each other and checked for consistency in Ritschl (1992), where also supporting archival evidence from the economics ministry is discussed.
- ¹⁷ Results did not change when repeating the exercise with the wider money aggregate M 2.
- ¹⁸ As Sargent (1999) notes, the terms "unconditional" and "conditional" forecasts are misnomers, as the former are obviously conditional on the information set at the start of the forecasting period.
- ¹⁹ Figure 7 provides the impulses responses, scaled by the respective standard deviations. To make magnitudes strictly comparable, I also obtained the unscaled impulse response functions. Measured on the same scale as government spending, the responses of output in Figures 7a and b became almost invisible. The same holds for the output responses to monetary shocks in Figures 7c and d.

Figure 1: Indices of Real GNP



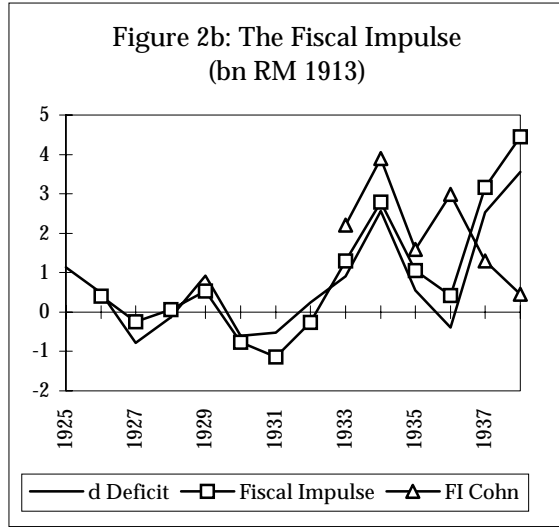
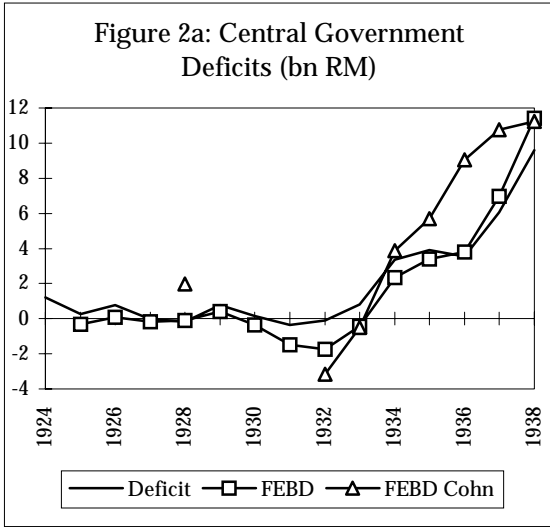


Figure 3: The Instability of the Keynesian Expenditure Multiplier

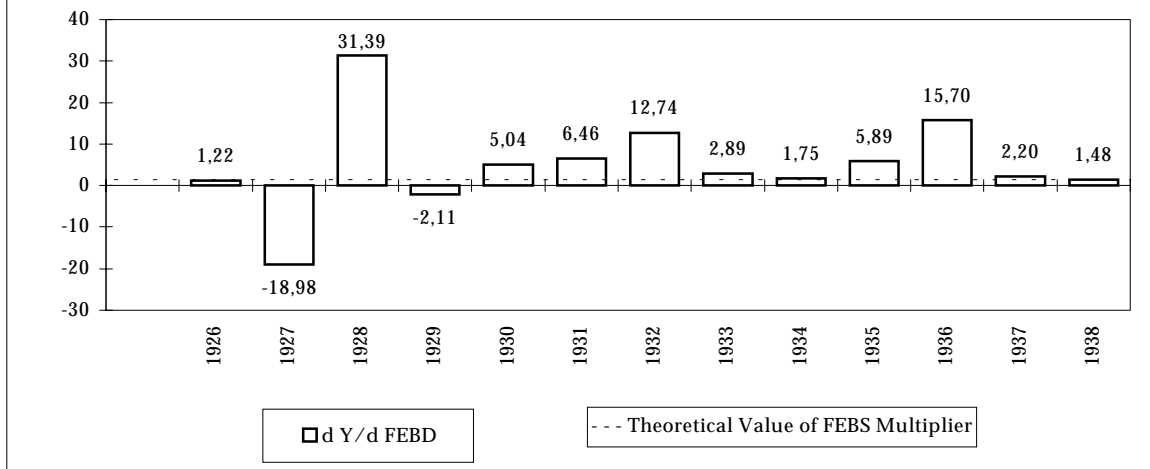


Figure 4: The Instability of the Keynesian Consumption Function

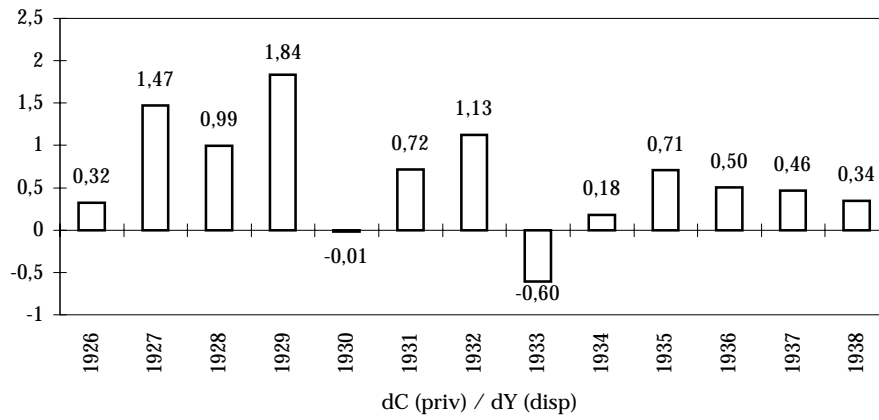


Figure 5: Ratios of Money and Public Debt to GNP

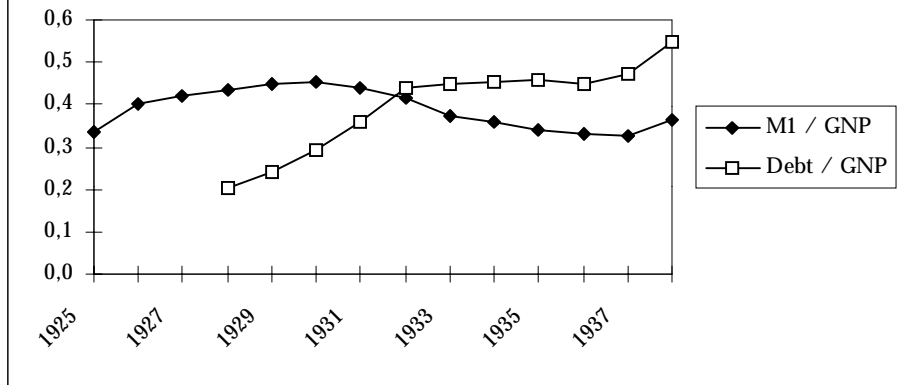
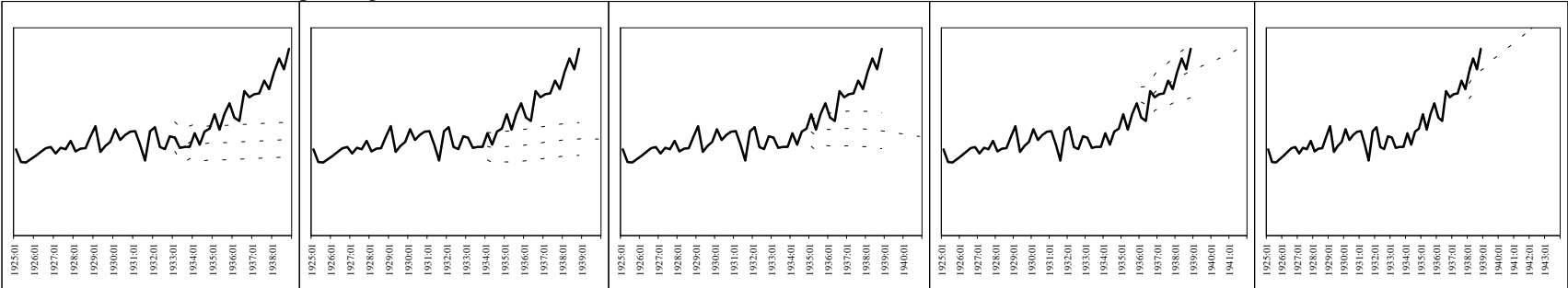
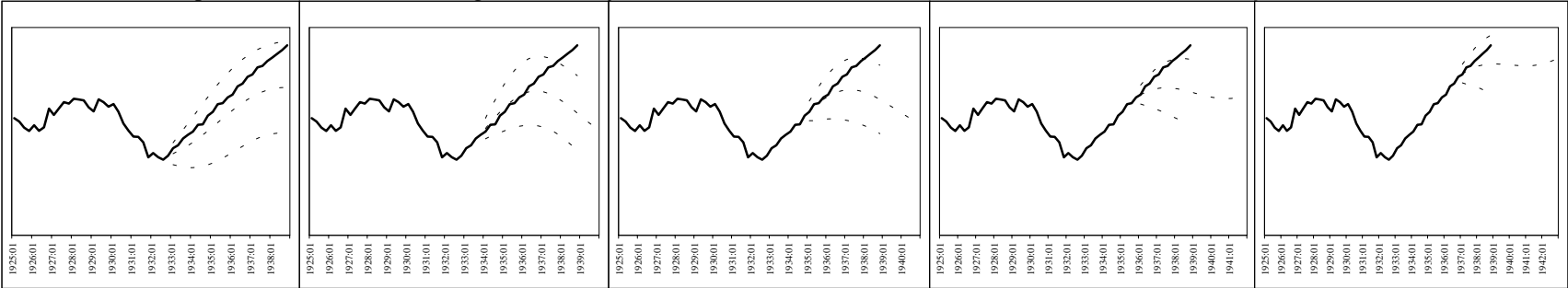


Figure 6: Out-of-Sample Forecasts of Output and Macroeconomic Policy

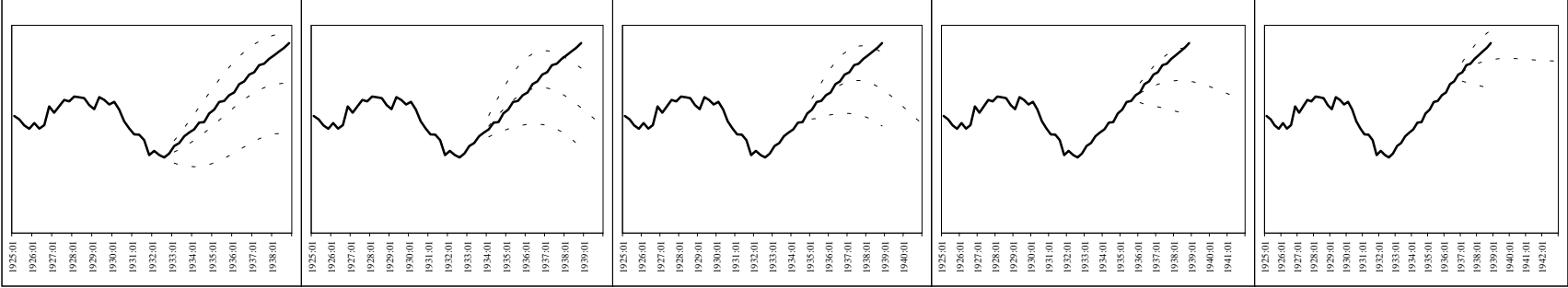
(a) Forecast of Government Spending Under a Feedback Rule



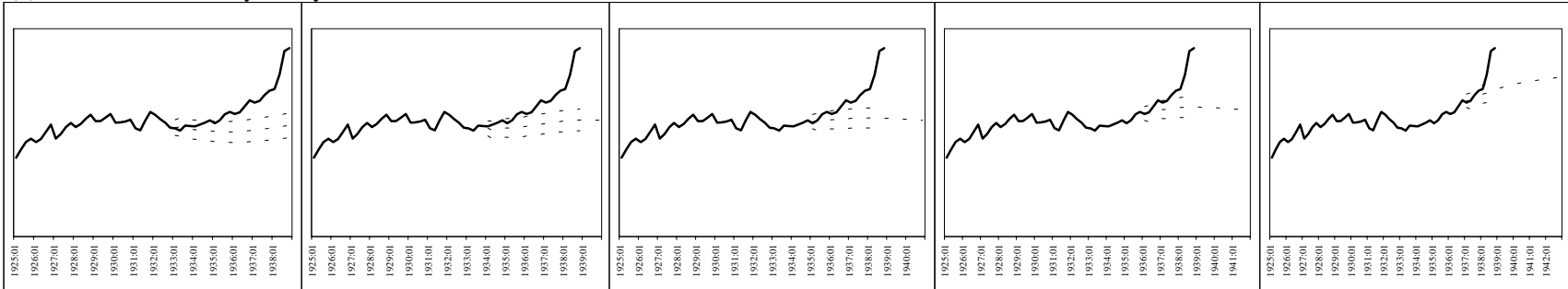
(b) Forecast of Output from Full VAR Including Fiscal Policy Instrument



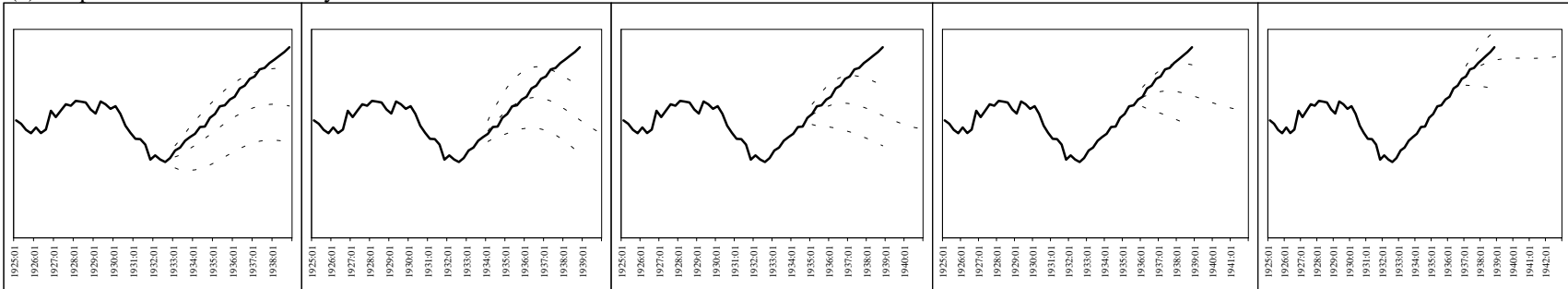
(c) Forecast of Output from Full VAR Excluding Fiscal Policy Instrument



(d) Forecast of Monetary Policy Under a Feedback Rule



(e) Output Forecast From Money Demand Function



(f) Output Forecast From VAR Excluding Money Supply

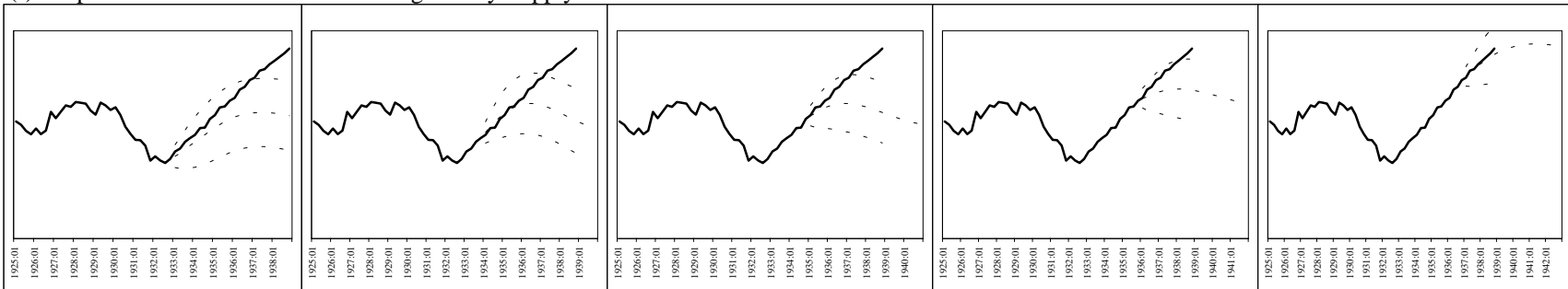
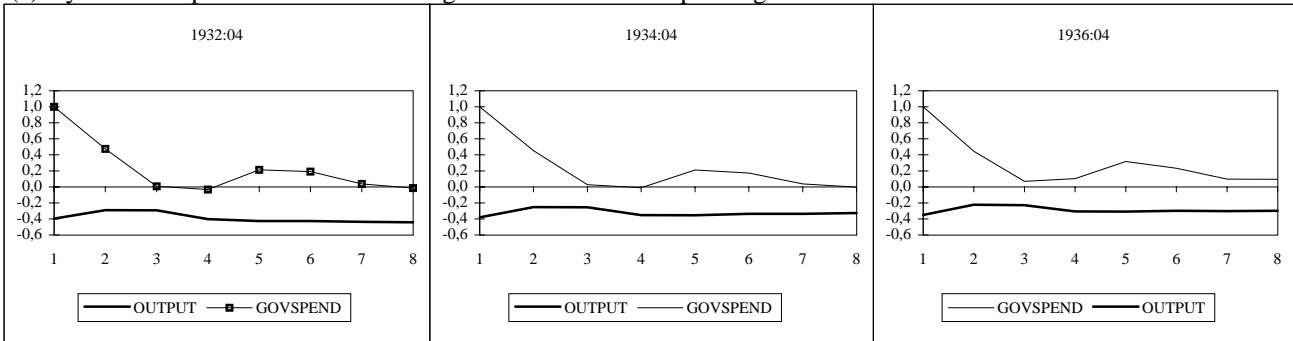
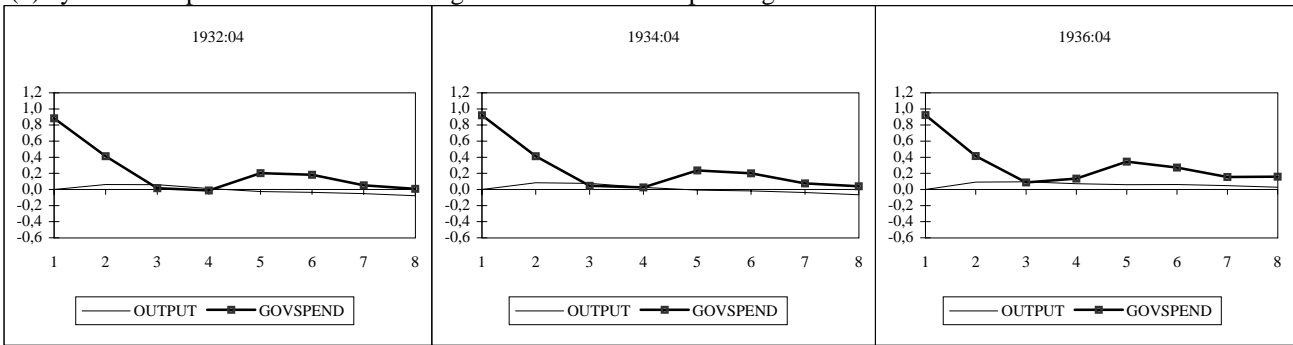


Figure 7: Impulse Response Analysis of Macroeconomic Policy

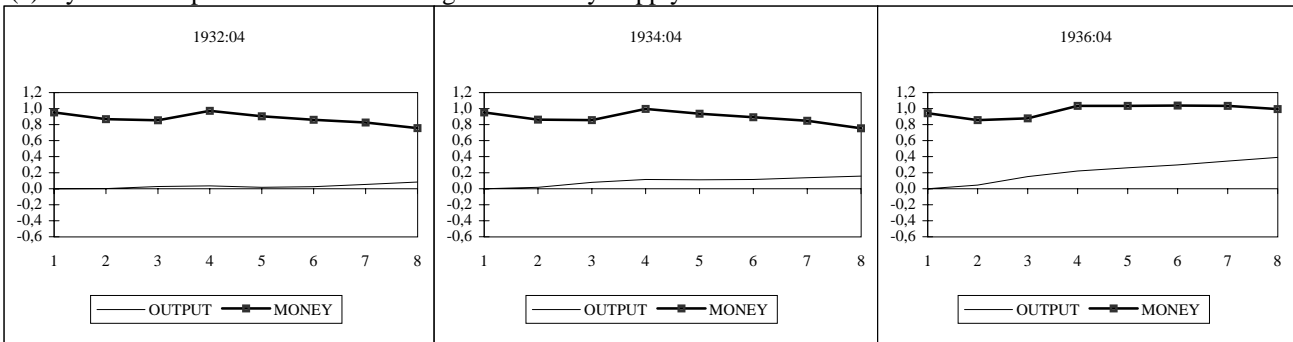
(a) Dynamic Responses to Shock in Exogenous Government Spending



(b) Dynamic Responses to Shock in Endogenous Government Spending



(c) Dynamic Responses to Shock in Exogenous Money Supply



(d) Dynamic Responses to Shock in Endogenous Money Supply

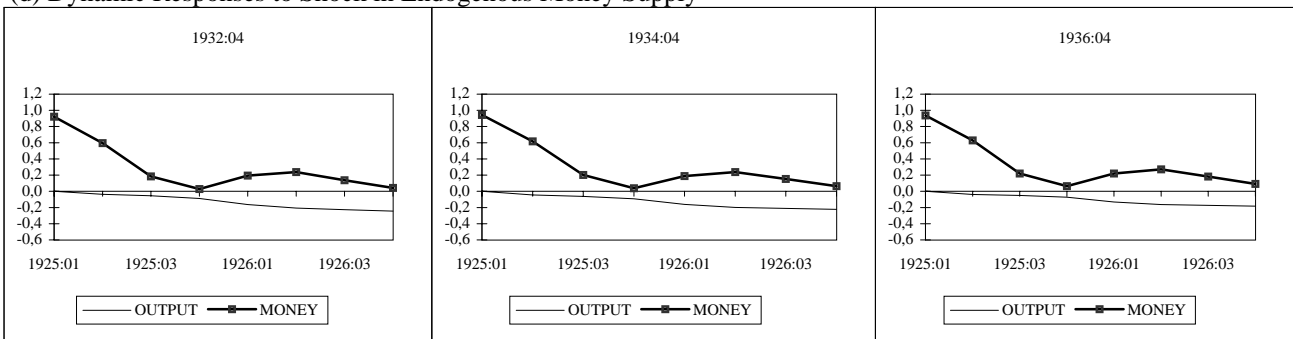


Table 1: Public Investment in Transport and
 Motorization, 1932-1938
 - mill. reichsmarks -

| | 1932 | 1933 | 1934 | 1935 | 1936 | 1937 | 1938 |
|--------------------------|-------|--------|--------|--------|--------|--------|--------|
| Roads | 150.8 | 360.1 | 431.3 | 437.1 | 471.5 | 559.1 | 867.6 |
| <i>autobahns</i> | -- | 3.1 | 178.3 | 464.7 | 692.2 | 679.2 | 916.4 |
| I. total motorization: | 150.8 | 363.2 | 609.6 | 901.8 | 1163.7 | 1238.3 | 1784 |
| II. Other transport | 703.2 | 952.0 | 1191.2 | 1213.5 | 1278.3 | 1511.3 | 2016.6 |
| III. Grand total: | 854.0 | 1315.2 | 1800.8 | 2115.3 | 2442.0 | 2749.6 | 3800.6 |
| % Share of motorization: | 17.7 | 27.6 | 33.9 | 42.6 | 47.8 | 45.0 | 47.0 |

Source: *Statistisches Jahrbuch fuer das deutsche Reich*, various issues

Table 2:
The Composition of Aggregate Investment, 1932-1938
(bn reichsmarks)

| | 1932 | 1933 | 1934 | 1935 | 1936 | 1937 | 1938 |
|--------------------------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
| Total fixed investment | 4.247 | 5.104 | 8.253 | 11.6 | 13.8 | 16 | 19 |
| Manufacturing | 0.449 | 0.52 | 0.95 | 1.636 | 2.159 | 2.843 | 3.691 |
| Public utilities | 0.218 | 0.2 | 0.225 | 0.556 | 0.657 | 0.936 | 1.148 |
| Housing | 0.764 | 0.929 | 1.494 | 1.563 | 2.207 | 2.12 | 2.15 |
| Transportation | 0.854 | 1.315 | 1.770 | 2.115 | 2.442 | 2.750 | 3.861 |
| <i>of which public::</i> | <i>0.232</i> | <i>0.522</i> | <i>0.636</i> | <i>1.078</i> | <i>1.323</i> | <i>1.425</i> | <i>2.031</i> |
| Agriculture | 0.554 | 0.596 | 0.727 | 0.775 | 0.85 | 0.981 | 1.029 |
| Miscellaneous | 0.545 | 0.650 | 0.78 | 0.75 | 0.85 | 1.0 | 1.2 |
| Public sector (I) | 1.095 | 1.416 | 2.943 | 5.3 | 6 | 6.8 | 7.9 |
| Public sector (II) | 1.095 | 1.7 | 3.5 | 4.9 | 5.4 | 6.1 | 7.9 |
| <i>% Share of public sector (I)</i> | <i>25.8</i> | <i>27.7</i> | <i>35.7</i> | <i>45.7</i> | <i>43.5</i> | <i>42.5</i> | <i>41.6</i> |
| <i>% Share of public sector (II)</i> | <i>25.8</i> | <i>33.3</i> | <i>42.4</i> | <i>42.2</i> | <i>39.1</i> | <i>38.1</i> | <i>41.6</i> |

Sources and Methods:

Konjunkturstatistisches Handbuch 1936, p. 61
Investment 1932-1934: Reichskreditgesellschaft (1938), *Statistisches Handbuch von Deutschland* (1949), pp. 604-607, Ehrlicher (1954), Gehrig (1961).
Investment 1935-1938: Calculated as a residual.
"Public Sector I": Reichskreditgesellschaft (1939)
"Public Sector II":

TABLE 3
The Emission of Work-Creation Bills
bn reichsmarks, by fiscal years (April-March)

| | 1932-3 | 1933-4 | 1934-5 | 1935-6 | 1936-7 | 1937-8 | 1938-9 |
|---|-------------|-------------|-------------|-------------|--------------|------------|------------|
| <i>Autobahn</i> | --- | --- | 0.346 | 0.149 | -0.045 | --- | -0.160 |
| Other | 0.154 | 1.111 | 0.959 | 0.458 | -1.495 | -0.007 | -0.433 |
| Buybacks (-) before maturity | --- | --- | -0.120 | -0.718 | -0.267 | -0.060 | +1.045 |
| Total: | 0.154 | 1.111 | 0.839 | -0.260 | -1.762 | 0.053 | 0.612 |
| <i>As percent of public investment (II)</i> | <i>14.6</i> | <i>65.4</i> | <i>24.0</i> | <i>-5.3</i> | <i>-32.6</i> | <i>0.8</i> | <i>7.7</i> |

Sources: Hauptarchiv der Deutschen Bundesbank, Rbk 1/7; Bundesarchiv Potsdam, R25.01/6514-18, 6638-41; Bundesarchiv Koblenz, R2/3846,18656,18701.
Methods of calculation in Ritschl (1997), Table A.8.

TABLE 4
The Composition of Central Government Borrowing, 1932-1938
bn reichsmarks, by fiscal years (April-March)

| | 1932/3 | 1933/4 | 1934/5 | 1935/6 | 1936/7 | 1937/8 | 1938/9 |
|---|--------|--------|--------|--------|--------|--------|--------|
| I. Shadow Budgets | | | | | | | |
| Work-creation bills | 0.154 | 1.111 | 0.839 | -0.260 | -1.762 | 0.053 | 0.612 |
| Mefo bills: | | 0.166 | 1.979 | 2.715 | 4.646 | 2.494 | -0.067 |
| Total: | 0.154 | 1.277 | 2.818 | 2.455 | 2.884 | 2.441 | 0.545 |
| % Share of work creation in shadow budgets: | 100.0 | 87.0 | 29.8 | -0.1 | -61.1 | 0.21 | 112.3 |
| II. Regular Budget | | | | | | | |
| Reich Budget Deficit | -0.205 | -0.033 | 1.113 | 1.715 | 2.125 | 3.267 | 9.638 |
| III. Grand Total | | | | | | | |
| Total Deficit: | -0.051 | 1.244 | 3.931 | 4.170 | 5.009 | 5.814 | 10.813 |
| for comparison: Erbe (1958) | | 1.567 | 2.027 | 4.200 | 5.707 | 5.393 | 10.503 |
| for comparison: Cohn (1992) | .986 | 2.166 | 5.314 | 6.130 | 8.207 | 8.862 | 9.728 |
| % Share of shadow budgets in total deficit: | -301.9 | 102.7 | 71.7 | 58.9 | 57.6 | 42.0 | 0.5 |

Sources and Methods: Mefo and work-creation bills: See previous table. Reich deficit: *Haushaltsrechnungen des Deutschen Reiches*, various issues, IfZ Munich, Da 03.03.
Methods of calculation in Ritschl (1997), Appendix Tables A1-A.5.

TABLE 5
The Share of Military Spending in Central Government Expenditure
bn reichsmarks, by fiscal years (April-March)

| | 1932-3 | 1933-4 | 1934-5 | 1935-6 | 1936-7 | 1937-8 | 1938-9 |
|---|-------------------|--|--------|--------|--------|--------|--------|
| Budgeted military expenditure | 0.4 | 0.4 | 1.9 | 4.0 | 5.8 | 8.2 | 18.4 |
| Mefo bills | --- | 0.166 | 1.979 | 2.715 | 4.646 | 2.494 | -0.067 |
| total military expenditure | 0.4 | 0.6 | 3.9 | 6.7 | 10.2 | 10.8 | 19.4 |
| <i>of which: Mefo bills</i> | --- | 30% | 50% | 33% | 43% | 23% | -5% |
| Total central government spending on goods and services | 1.950 | 3.367 | 7.681 | 9.154 | 12.609 | 15.771 | 24.154 |
| <i>of which: military spending</i> | 20% | 17% | 51% | 73% | 81% | 68% | 80% |
| Total non-military spending on goods and services | 1.550 | 2.767 | 3.781 | 2.454 | 2.409 | 4.971 | 4.754 |
| Sources: | 1932-3, 1933-4: | <i>Statistisches Jahrbuch fuer das Deutsche Reich</i> , various issues | | | | | |
| | 1934-5 to 1938-9: | <i>Haushaltsrechnungen des Deutschen Reiches</i> , IfZ Munich, Da 03.03. Mefo bills etc.: see previous tables | | | | | |

Working Papers of the Institute for Empirical Research in Economics

No.

1. Rudolf Winter-Ebmer and Josef Zweimüller: *Firm Size Wage Differentials in Switzerland: Evidence from Job Changers*, February 1999
2. Bruno S. Frey and Marcel Kucher: *History as Reflected in Capital Markets: The Case of World War II*, February 1999
3. Josef Falkinger, Ernst Fehr, Simon Gächter and Rudolf Winter-Ebmer: *A Simple Mechanism for the Efficient Provision of Public Goods – Experimental Evidence*, February 1999
4. Ernst Fehr and Klaus M. Schmidt: *A Theory of Fairness, Competition and Cooperation*, April 1999
5. Markus Knell: *Social Comparisons, Inequality, and Growth*, April 1999
6. Armin Falk and Urs Fischbacher: *A Theory of Reciprocity*, July 2000
7. Bruno S. Frey and Lorenz Goette: *Does Pay Motivate Volunteers?*, May 1999
8. Rudolf Winter-Ebmer and Josef Zweimüller: *Intra-firm Wage Dispersion and Firm Performance*, May 1999
9. Josef Zweimüller: *Schumpeterian Entrepreneurs Meet Engel's Law: The Impact of Inequality on Innovation-Driven Growth*, May 1999
10. Ernst Fehr and Simon Gächter: *Cooperation and Punishment in Public Goods Experiments*, June 1999
11. Rudolf Winter-Ebmer and Josef Zweimüller: *Do Immigrants Displace Young Native Workers: The Austrian Experience*, June 1999
12. Ernst Fehr and Jean-Robert Tyran: *Does Money Illusion Matter?*, June 1999
13. Stefan Felder and Reto Schleiniger: *Environmental Tax Reform: Efficiency and Political Feasibility*, July 1999
14. Bruno S. Frey: *Art Fakes – What Fakes?, An Economic View*, July 1999
15. Bruno S. Frey and Alois Stutzer: *Happiness, Economy and Institutions*, July 1999
16. Urs Fischbacher, Simon Gächter and Ernst Fehr: *Are People Conditionally Cooperative? Evidence from a Public Goods Experiment*, July 2000
17. Armin Falk, Ernst Fehr and Urs Fischbacher: *On the Nature of Fair Behavior*, August 1999
18. Vital Anderhub, Simon Gächter and Manfred Königstein: *Efficient Contracting and Fair Play in a Simple Principal-Agent Experiment*, September 2000
19. Simon Gächter and Armin Falk: *Reputation or Reciprocity?*, September 1999
20. Ernst Fehr and Klaus M. Schmidt: *Fairness, Incentives, and Contractual Choices*, September 1999
21. Urs Fischbacher: *z-Tree - Experimenter's Manual*, September 1999
22. Bruno S. Frey and Alois Stutzer: *Maximising Happiness?*, October 1999
23. Alois Stutzer: *Demokratieindizes für die Kantone der Schweiz*, October 1999
24. Bruno S. Frey: *Was bewirkt die Volkswirtschaftslehre?*, October 1999
25. Bruno S. Frey, Marcel Kucher and Alois Stutzer: *Outcome, Process & Power in Direct Democracy*, November 1999
26. Bruno S. Frey and Reto Jegen: *Motivation Crowding Theory: A Survey of Empirical Evidence*, November 1999
27. Margit Osterloh and Bruno S. Frey: *Motivation, Knowledge Transfer, and Organizational Forms*, November 1999
28. Bruno S. Frey and Marcel Kucher: *Managerial Power and Compensation*, December 1999
29. Reto Schleiniger: *Ecological Tax Reform with Exemptions for the Export Sector in a two Sector two Factor Model*, December 1999
30. Jens-Ulrich Peter and Klaus Reiner Schenk-Hoppé: *Business Cycle Phenomena in Overlapping Generations Economies with Stochastic Production*, December 1999
31. Josef Zweimüller: *Inequality, Redistribution, and Economic Growth*, January 2000
32. Marc Oliver Bettzüge and Thorsten Hens: *Financial Innovation, Communication and the Theory of the Firm*, January 2000
33. Klaus Reiner Schenk-Hoppé: *Is there a Golden Rule for the Stochastic Solow Growth Model?* January 2000
34. Ernst Fehr and Simon Gächter: *Do Incentive Contracts Crowd out Voluntary Cooperation?* February 2000
35. Marc Oliver Bettzüge and Thorsten Hens: *An Evolutionary Approach to Financial Innovation*, July 2000
36. Bruno S. Frey: *Does Economics Have an Effect? Towards an Economics of Economics*, February 2000
37. Josef Zweimüller and Rudolf Winter-Ebmer: *Firm-Specific Training: Consequences for Job-Mobility*, March 2000

The Working Papers of the Institute for Empirical Research in Economics can be downloaded in PDF-format from
<http://www.unizh.ch/iew/wp/>

Institute for Empirical Research in Economics, Blümlisalpstr. 10, 8006 Zurich, Switzerland

Phone: 0041 1 634 37 05 Fax: 0041 1 634 49 07 E-mail: bibiewzh@iew.unizh.ch

Working Papers of the Institute for Empirical Research in Economics

No.

38. Martin Brown, Armin Falk and Ernst Fehr: *Contract Enforcement and the Evolution of Longrun Relations*, March 2000
39. Thorsten Hens, Jörg Laitenberger and Andreas Löffler: *On Uniqueness of Equilibria in the CAPM*, July 2000
40. Ernst Fehr and Simon Gächter: *Fairness and Retaliation: The Economics of Reciprocity*, March 2000
41. Rafael Lalive, Jan C. van Ours and Josef Zweimüller: *The Impact of Active Labor Market Programs and Benefit Entitlement Rules on the Duration of Unemployment*, March 2000
42. Reto Schleiniger: *Consumption Taxes and International Competitiveness in a Keynesian World*, April 2000
43. Ernst Fehr and Peter K. Zych: *Intertemporal Choice under Habit Formation*, May 2000
44. Ernst Fehr and Lorenz Goette: *Robustness and Real Consequences of Nominal Wage Rigidity*, May 2000
45. Ernst Fehr and Jean-Robert Tyran: *Does Money Illusion Matter? REVISED VERSION*, May 2000
46. Klaus Reiner Schenk-Hoppé: *Sample-Path Stability of Non-Stationary Dynamic Economic Systems*, Juni 2000
47. Bruno S. Frey: *A Utopia? Government without Territorial Monopoly*, June 2000
48. Bruno S. Frey: *The Rise and Fall of Festivals*, June 2000
49. Bruno S. Frey and Reto Jegen: *Motivation Crowding Theory: A Survey of Empirical Evidence, REVISED VERSION*, June 2000
50. Albrecht Ritschl and Ulrich Woitek: *Did Monetary Forces Cause the Great Depression? A Bayesian VAR Analysis for the U.S. Economy*, July 2000
51. Alois Stutzer and Rafael Lalive: *The Role of Social Work Norms in Job Searching and Subjective Well-Being*, July 2000
52. Iris Bohnet, Bruno S. Frey and Steffen Huck: *More Order with Less Law: On Contract Enforcement, Trust, and Crowding*, July 2000
53. Armin Falk and Markus Knell: *Choosing the Joneses: On the Endogeneity of Reference Groups*, July 2000
54. Klaus Reiner Schenk-Hoppé: *Economic Growth and Business Cycles: A Critical Comment on Detrending Time Series*, August 2000
55. Armin Falk, Ernst Fehr and Urs Fischbacher: *Appropriating the Commons – A Theoretical Explanation*, September 2000
56. Bruno S. Frey and Reiner Eichenberger: *A Proposal for a Flexible Europe*, August 2000
57. Reiner Eichenberger and Bruno S. Frey: *Europe's Eminent Economists: A Quantitative Analysis*, September 2000
58. Bruno S. Frey: *Why Economists Disregard Economic Methodology*, September 2000
59. Armin Falk, Ernst Fehr, Urs Fischbacher: *Informal Sanctions*, September 2000
60. Rafael Lalive: *Did we Overestimate the Value of Health?*, October 2000
61. Matthias Benz, Marcel Kucher and Alois Stutzer: *Stock Options: the Managers' Blessing. Institutional Restrictions and Executive Compensation*, October 2000
62. Simon Gächter and Armin Falk: *Work motivation, institutions, and performance*, October 2000
63. Armin Falk, Ernst Fehr and Urs Fischbacher: *Testing Theories of Fairness – Intentions Matter*, September 2000
64. Ernst Fehr and Klaus Schmidt: *Endogenous Incomplete Contracts*, November 2000
65. Klaus Reiner Schenk-Hoppé and Björn Schmalfuss: *Random fixed points in a stochastic Solow growth model*, November 2000
66. Leonard J. Mirman and Klaus Reiner Schenk-Hoppé: *Financial Markets and Stochastic Growth*, November 2000
67. Klaus Reiner Schenk-Hoppé: *Random Dynamical Systems in Economics*, December 2000
68. Albrecht Ritschl: *Deficit Spending in the Nazi Recovery, 1933-1938: A Critical Reassessment*, December 2000

The Working Papers of the Institute for Empirical Research in Economics can be downloaded in PDF-format from
<http://www.unizh.ch/iew/wp/>

Institute for Empirical Research in Economics, Blümlisalpstr. 10, 8006 Zürich, Switzerland

Phone: 0041 1 634 37 05 Fax: 0041 1 634 49 07 E-mail: bibiewzh@iew.unizh.ch