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SWISS MONETARY POLICY: CENTRAL BANK INDEPENDENCE AND STABILIZATION GOALS

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Abstract

The paper estimates a reaction function relating the rate of growth of the Swiss monetary base to a set of economic stabilization objectives. Econometric results over quarterly data from 1966:2 - 1983:4 indicate the state of the federal budget, government purchases, the inflation rate and the exchange rate between the Swiss franc and the Deutsche mark to be significant explanatory variables. The results suggest that the monetary base contracts in response to federal budget deficits and to inflation. For government purchases and the exchange rate the response is accommodative.

1. Introduction

Switzerland's first constitution (1848) was modeled after the first American constitution, and, as with the United States, the country's federalist character is reflected in legislation granting the central bank a large degree of formal independence from government. Indeed, the level of autonomy enjoyed by the Swiss National Bank (SNB) has been seen as perhaps the greatest featured by any of the world's central banks (Parkin and Bade, 1978, 1979). As shown in Table 1, Switzerland also has remained relatively immune from the inflationary problems experienced by many countries in recent years. For the 1960-1983 period, Switzerland comes second only to West Germany in a ranking of the inflation records of OECD countries. However, there is very little empirical evidence as to the behavior of the SNB, and hence the importance of the price-stability goal has not been quantified.[1] This study seeks to provide an objective analysis of Swiss monetary policy that may complement the existing studies of the autonomous central banks in the United States and West Germany (see, for example, Barth, Sickles and Wiest, 1982, and Willms, 1983).

2. Perspectives on Central Bank Independence

In terms of the monetary constitutions of the industrialized nations, Parkin and Bade (1978, 1979) distinguish the SNB, West German Bundesbank and the Federal Reserve System as the three banks that are independent of government in the formulation of their monetary policy. In the case of Switzerland, the role of the federal government, or Confederation, is limited to supervision and approval of such matters as the size of the SNB's capital, the denominations of bank notes, and the share of profits

between cantons. The Confederation owns no shares in the SNB, and stock is held by the cantons, cantonal banks and the public. Shares are listed on the Swiss stock exchange.

Of the three independent central banks, only in Switzerland and West Germany does the government not have full power in the appointment of the Governor and members of the central bank's policy board. In West Germany, the federal government has a direct input into the appointment of not more than ten members of the twenty-one member Central Bank Council. Of the ten-member policy board of the SNB, known as the Bank Committee, only the Chairman and Deputy Chairman are directly appointed by the government. The remaining appointments are made by the Bank Council, which consists of 40 members, 25 of whom are appointed by the government cabinet to four-year terms. The remaining 15 are elected by bank stockholders.

Parkin and Bade (1979) find that cross-country comparisons of inflation rates reveal that the three countries with independent central banks experienced lower average inflation rates over the 1972-1977 period than did nine major countries whose central banks are subservient to government. Moreover, the SNB and Bundesbank delivered a lower inflation rate than the Federal Reserve, which is seen as featuring somewhat less independence owing to the Board of Governors being appointed entirely by the executive branch.[2] The 1972-1977 sample itself covered available data on the floating exchange rate period, with earlier years being excluded in view of the additional balance of payments constraints imposed under the fixed exchange rate era.

Empirical support for the importance of central bank autonomy is provided by Banaian, Laney and Willett (1983). Their regression results,

based on pooled data from 17 countries, suggest that central bank autonomy exerts an independent effect on the rate of inflation even after controlling for other factors. A dummy variable representing the autonomous central banks was negative and significant throughout their regression results.[3]

The importance of the price stability objective, in conjunction with a range of other stabilization goals, is examined in the analysis below. The focus here is on the observed response by the SNB to movements in the inflation rate. It is expected that increases in the inflation rate will lead to contractionary policy by the SNB. Such a negative response to inflation was found to be of dominant importance for West Germany by Willms (1983), while rather more fixed findings for the United States are present in the literature discussed by Barth, Sickles and Wiest (1982).

3. The Empirical Procedure

Swiss monetary policy is analyzed using a reaction function to assess the empirical importance of a range of pre-selected stabilization goals. Fiscal policy variables are entered in the reaction function to capture any influence public finance considerations may have on the central bank's decision making. The response to the set of right-hand side variables is measured using the rate of growth of the monetary base (DMB) as the central bank's policy instrument.[4] The monetary policy feedback rule has the general form given in (1) below:

$$DMB = f(DEF, DG, DP, TB, UN, EX, BP) \qquad (1)$$

In this equation, fiscal policy variables comprise DEF, the federal budget deficit divided by gross domestic product, and DG, the rate of growth of real government purchases.[5] The goals of price, interest rate and employment stability are represented by series on the rate of growth of consumer prices (DP), the three-month deposit rate (TB) and unemployment (UN). International influences are represented by the exchange rate between the Swiss franc and the Deutsche mark (EX) and the balance of payments (BP).

Assuming that the SNB does not have current information on the state of the economy, each of the above variables must be entered with an appropiate lag length. Allowance is also made for lagged values of the monetary base. The specific lag lengths, which remain indeterminate from a theoretical perspective, are determined by applying Akaike's (1970) minimum final prediction error (FPE) criterion to the model. This procedure allows the lag length for each right-hand side variable to differ, and is equivalent to using an F-test with a varying significance level. In this case, the maximum lag length is set at four quarters, and each of the right-hand side variables is then tested in turn with the lag length on the other variables held at the maximum.

The estimation itself is over quarterly data from 1966:2 to 1983:4, using ordinary least squares.[6] Estimation results include those for the fixed and floating exchange rate periods taken separately, as well as those for the full sample.

4. Empirical Results for Switzerland

Application of the model to Switzerland shows the budget deficit, government purchases, the inflation rate and the exchange rate with the Deutsche mark to be selected by the FPE criterion over the full sample.[7] The inclusion of the exchange rate and inflation variables accords with the stress placed on these two objectives by Rich and Béguelin (1985). The extremely favorable unemployment figures for Switzerland may well be a factor accounting for the failure of this variable to be selected by the FPE criterion. Moreover, as in the case of 1974-75, any transitory unemployment difficulties could be alleviated by reductions in Switzerland's large migrant labor force. The importance of immigration policy as a policy instrument has been suggested by Segalman (1986, p. 108), who states that "Swiss policy on immigration operates almost as if it were controlled by a calibrated spigot which is opened only when labor shortages exist and is quickly shut when Swiss natives begin to draw excessively on unemployment compensation."

The inclusion of the fiscal policy variables suggests that the SNB takes at least some account of the policy being pursued by the government. However, the response to the deficit is actually strongly negative, implying that monetary policy offsets, rather than supports, the direction of fiscal policy. This pattern of behavior may well have been influenced by the fact that the Swiss federal budget has on the average been balanced over the sample period. (At the mean there is a deficit equal to half a percent of GDP, while at the median there is a surplus equal to two tenths of a percent of GDP.) Certainly, the pressure implied by the large and growing deficits in countries such as the United States has not been

experienced in Switzerland.[8]

The significance of the variables in the Swiss monetary policy reaction function is addressed in Table 2. Here, the deficit, inflation and exchange rate variables are shown to be significant at the five percent level, while government purchases are at least significant at the ten percent level.

The results presented in Table 3 show that there is a positive response of monetary base growth to government purchases and the exchange rate, and negative response to budget deficits and to inflation. Although the reaction to government purchases suggests monetary accomodation of increases in spending, this result actually deals with the specific case of a balanced budget increase in government purchases since the deficit is being held constant. Anti-inflationary policy is evidenced by the negative coefficients on the inflation variable, DP; and SNB behavior appears to reflect the emphasis given to the price-stability objective in the earlier discussion of central bank independence. The net tendency for expansion in the monetary base in response to a depreciation in the exchange rate likely reflects attempts by the SNB to quell upward pressure on the Swiss franc. Upward pressure on the Swiss franc led to the SNB intervening to sell Swiss francs not only during the fixed exchange rate era, but also during the late 1970s (see Schiltknecht, 1983).

Given the importance of exchange rate effects to a small economy such as Switzerland, a Chow test was used in order to allow for a possible structural break corresponding with the adoption of floating exchange rates in January 1973. The null hypothesis of stability across exchange rate regimes could be rejected at the ten percent level -- a surprisingly low

level of significance in view of the open nature of the Swiss economy.[9] So as to deal with the possibility of a structural shift, the Swiss monetary policy reaction function was in any event re-estimated over the separate fixed exchange rate (1966:2 - 1973:1) and floating exchange rate (1973:2 - 1983:4) sub-samples.

Table 4 shows that in the brief fixed exchange rate sample, only the lagged monetary base, the deficit and the exchange rate are significant at the ten percent level or higher. For the post-1973 sample, government purchases, the inflation rate and the exchange rate are significant, but the deficit is not. The requirement of maintaining a fixed exchange rate may explain the insignificance of the inflation rate in the pre-1973 sub-sample. The results in Table 5 indicate that the response to inflation remains uniformly negative, however, and this response is certainly highly significant (at better than the one percent level) for the post-1973 sample. The effect of the deficit continues to be negative. For each sub-sample there is a marginal tendency for the monetary base to expand in response to a depreciation in the exchange rate. The response to government purchases becomes negative for the fixed exchange rate sample, but with an extremely low level of significance.

5. Conclusions

Quantification of a countercyclical response to inflation by the SNB remains the most evident feature of the estimation results. The other significant explanatory variables in the monetary reaction function were the exchange rate with the Deutsche mark, the deficit and the rate of growth of real government purchases. The results for the deficit suggest

that SNB policy tends to offset movements in the federal budget. Like the importance of the price-stability objective, the apparent response to fiscal policy represents a pattern of behavior that supports the formal independence of the SNB.

Table 1

Comparative Inflation Rates For OECD Countries

Year to year percentage changes
in consumer price indices

	Average				
	60-68	68-73	73-79	79-83	60-83
West Germany	2.7	4.6	4.7	5.1	4.0
Switzerland	3.4	5.6	4.0	4.8	4.3
Austria	3.6	5.2	6.3	5.5	5.0
Luxembourg	2.3	4.6	7.4	8.1	5.1
United States	2.0	5.0	8.5	8.2	5.4
Belgium	2.8	4.9	8.4	7.7	5.5
Netherlands	3.6	6.9	7.2	5.5	5.6
Canada	2.4	4.6	9.2	9.8	5.9
Japan	5.7	7.0	10.0	4.3	6.8
Australia	2.2	5.6	12.1	10.3	6.9
Norway	3.9	6.9	8.7	11.1	7.0
Sweden	3.8	6.0	9.8	10.8	7.0
France	3.6	6.1	10.7	12.1	7.4
Denmark	6.2	6.3	10.8	10.2	8.1
Finland	5.6	5.8	12.8	10.4	8.3
New Zealand	3.3	7.4	13.8	13.9	8.7
United Kingdom	3.6	7.5	15.8	10.7	8.7
Greece	1.9	5.6	16.1	22.6	9.7
Italy	4.0	5.8	16.1	17.5	9.7
Ireland	4.0	8.9	15.0	16.5	10.0
Spain	6.6	7.1	18.3	14.2	11.0
Portugal	3.2	8.4	23.7	21.1	12.4
Turkey	5.8	12.1	34.4	46.2	20.6
Iceland	10.5	14.3	40.5	60.6	26.5
Total OECD	2.9	5.6	10.0	9.1	6.4

Source: Organisation for Economic Co-Operation and Development, 1985, Historical Statistics 1960-1983 (OECD, Paris) p. 83.

TABLE 2

Significance of the FPE Selected Lags

	Lag Length	Test-Statistic	Critical Value (0.10/0.05)
DMB	2	$F_{2,56} = 18.19$	2.40/3.17
DEF	4	$F_{4,56} = 3.48$	2.05/2.55
DG	1	$F_{1,56} = 3.62$	2.80/4.02
DP	2	$F_{2,56} = 5.35$	2.40/3.17
EX	2	$F_{2,56} = 7.41$	2.40/3.17

TABLE 3

Results for the Swiss Monetary Policy Reaction Function

Dependent Variable DMB
Sample 1966:2 - 1983:4

	Coefficient	t-Statistic
Constant	0.016	(0.26)
DMB(-1)	-0.685	(-5.92)
DMB(-2)	-0.183	(-1.51)
DEF(-1)	-0.162	(-0.31)
DEF(-2)	0.314	(0.59)
DEF(-3)	-1.747	(-3.43)
DEF(-4)	-0.544	(-0.99)
DG(-1)	0.343	(1.90)
DP(-1)	-0.868	(-1.08)
DP(-2)	-1.869	(-2.24)
EX(-1)	-0.006	(-2.79)
EX(-2)	0.007	(3.33)
$\bar{R}^2 = 0.74$	DW = 2.18	$\sigma = 0.044$

Note: As in each subsequent case, three seasonal dummies were included in the regression alongside those variables listed in the table.

TABLE 4

Significance of the Lags in the Separate Sub-Samples

Sample 1966:2 - 1973:1

	Lag Length	Test-Statistic	Critical Value (0.10/0.05)
DMB	2	$F_{2,13} = 5.01$	2.76/3.81
DEF	4	$F_{4,13} = 5.62$	2.43/3.18
DG	1	$F_{1,13} = 0.06$	3.14/4.67
DP	2	$F_{2,13} = 1.11$	2.76/3.81
EX	2	$F_{2,13} = 3.76$	2.76/3.81

Sample 1973:2 - 1983:4

	Lag Length	Test-Statistic	Critical Value (0.10/0.05)
DMB	2	$F_{2,28} = 13.90$	2.50/3.34
DEF	4	$F_{4,28} = 1.55$	2.16/2.71
DG	1	$F_{1,28} = 3.49$	2.89/4.20
DP	2	$F_{2,28} = 5.49$	2.50/3.34
EX	2	$F_{2,28} = 5.02$	2.50/3.34

TABLE 5

Results for the Separate Sub-Samples

Dependent Variable DMB
Sample 1966:2 - 1973:1

	Coefficient	t-Statistic
Constant	-0.641	(-1.82)
DMB(-1)	-0.686	(-2.94)
DMB(-2)	-0.225	(-1.03)
DEF(-1)	-0.368	(-0.22)
DEF(-2)	0.643	(0.44)
DEF(-3)	-5.765	(-3.61)
DEF(-4)	-2.210	(-1.32)
DG(-1)	-0.155	(-0.25)
DP(-1)	-1.967	(-0.55)
DP(-2)	-2.586	(-0.90)
EX(-1)	-0.008	(-1.56)
EX(-2)	0.015	(2.49)
$\bar{R}^2 = 0.79$	DW = 2.11	$\sigma = 0.041$

Sample 1973:2 - 1983:4

	Coefficient	t-Statistic
Constant	0.060	(0.92)
DMB(-1)	-0.812	(-5.26)
DMB(-2)	-0.230	(-1.44)
DEF(-1)	0.006	(0.01)
DEF(-2)	0.104	(0.17)
DEF(-3)	-1.388	(-2.45)
DEF(-4)	-0.234	(-0.41)
DG(-1)	0.388	(1.87)
DP(-1)	-1.218	(-1.49)
DP(-2)	-1.902	(-2.17)
EX(-1)	-0.006	(-2.65)
EX(-2)	0.007	(3.01)
$\bar{R}^2 = 0.75$	DW = 2.42	$\sigma = 0.040$

Appendix

Data Sources and Definitions

The TB, UN and BP data series are taken from OECD (1984). The MBASE and PRICE series are obtained from the IFS tape. The remaining series are by courtesy of the Swiss Bundesamt für Statistik (Bern, Switzerland) and the Swiss National Bank (Zurich, Switzerland).

(1) DMB = log (MBASE/MBASE(-1))

where MBASE is the monetary base.

(2) DEF = (-1 x BUDGET)/GDP

where BUDGET is the government budget surplus,

GDP is gross domestic product.

(3) DG = log (GOV/GOV(-1))

where GOV is real government and social security consumption.

(4) DP = log (PRICE/PRICE(-1))

where PRICE is the level of consumer prices (1980 = 100).

(5) UN is the number unemployed (thousands).

(6) TB is the three-month deposit rate (major banks, Zurich).

(7) EX is the exchange rate between the Swiss franc and the Deutsche mark.

(8) BP is the deficit on the balance of trade.

The only seasonally adjusted series apart from the national accounts data is BP.

Notes

1. Recent SNB policy is discussed by Rich and Bêguelin (1985), Baltensperger (1985) and Schiltknecht (1983). Only Rich and Bêguelin perform empirical tests, however, and here they focus on the monetary base and M1 as competing intermediate targets rather on than the execution of stabilization policy per se. Elsewhere, Lusser (1985) compares Swiss and West German monetary policy performance, while Corti (1983) provides an in-depth analysis of Switzerland's financial system and money markets. There is to the best of my knowledge no published reaction function study of Swiss monetary policy.
2. The extent of the control is limited, however, by the very long, staggered 14-year terms that are granted to the members of the board.
3. In Banaian, Laney and Willett (1983), controlling factors are represented by rates of growth of per capita real gross domestic product (GDP), the Gini coefficient, import shares of GDP, deficits as a share of savings and union membership as a share of the labor force. The independence dummy is defined for Switzerland, the United States, West Germany and pre-1967 Canada. Further use of country-specific dummies showed these to in each case have the correct sign, although surprisingly Switzerland's estimated reduction in inflation was not at all significant and that of West Germany was only marginally so.
4. The monetary base was officially adopted as an instrument for controlling the growth of M1 in 1975, and received further attention in 1980 when it was chosen as the new target variable. SNB emphasis on the monetary base has a much earlier origin, however, and Schiltknecht

(1983) states that even in the fixed exchange rate era the trend in the monetary base was regarded as the best indicator of monetary ease or tightness. Meanwhile, the "switch to a floating exchange rate gave the Swiss National Bank virtually full control over the monetary base" (Schiltknecht, 1983, p. 73).

5. This accords with certain optimal public finance considerations raised by Barro (1979).

6. It should be noted that, due to the majority of the data not being seasonally adjusted, three seasonal dummies were included in all regressions alongside the variables noted in the text.

7. Initial application of the FPE criterion also led to the TB variable being selected with a lag length of three. However, given that an F-test showed the variable not to be significant even at the ten percent level, it was dropped from the specification discussed in the text. ($F_{3,52} = 1.91 < F^{critical}_{(0.10)} = 2.20.$)

8. Allowance was also made for an interactive effect of the deficit on the response to the stabilization goals. However, while such an interactive effect was found to be significant for the United States in Burdekin (1986) no such effect was found to be present in the regressions for Switzerland.

9. The result of the Chow test was as follows: $F_{14,42} = 1.69 > F^{critical}_{(0.10)} = 1.67$.

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