FOR AGENDA

SM/97/23

CONTAINS CONFIDENTIAL INFORMATION

January 29, 1997

To: Members of the Executive Board

From: The Secretary

Subject: **Switzerland—Selected Issues and Statistical Appendix**

The attached paper provides background information to the staff report on the 1996 Article IV consultation discussions with Switzerland, which was circulated as SM/97/16 on January 22, 1997.

Mr. Jaeger (ext. 35643) is available to answer technical or factual questions relating to this paper prior to the Board discussion.

Unless the Documents Preparation Section (ext. 36760) is otherwise notified, the document will be transmitted, in accordance with the procedures approved by the Executive Board and with the appropriate deletions, to the WTO Secretariat on Thursday, February 6, 1997; and to the Food and Agriculture Organization (FAO) and the Organisation for Economic Cooperation and Development (OECD), following its consideration by the Executive Board.

Att: (1)

Other Distribution:
Department Heads

CONTAINS CONFIDENTIAL
INFORMATION

INTERNATIONAL MONETARY FUND

SWITZERLAND

Selected Issues and Statistical Appendix

Prepared by Albert Jaeger and Wolfgang Merz (both EU1),
Douglas Laxton and Eswar Prasad (both RES)

Approved by the European I Department

January 28, 1997

Contents Page

Text Tables

Charts

Statistical Appendix

Switzerland: Basic Data

Area and population	
Total area	41,293 square kilometers
Total population (1995)	7.1 million
GNP per capita (1995)	$39,956

	1992	1993	1994	1995	1996 1/
		(Percentage changes at 1980 prices)			
Demand and supply					
Private consumption	-0.2	-0.6	0.9	0.7	0.1
Public consumption	-0.1	-1.2	1.3	-0.1	-0.2
Gross fixed investment	-5.0	-2.5	7.2	2.3	1.7
Construction	-2.3	-1.8	5.2	-4.3	-2.9
Machinery and equipment	-9.6	-3.7	11.0	14.1	8.6
Final domestic demand	-1.5	-1.2	2.6	1.0	0.5
Inventory accumulation 2/	-1.9	-0.7	0.9	0.9	-1.1
Total domestic demand	-3.3	-1.8	3.5	1.9	-0.5
Exports of goods and nonfactor services	3.4	1.6	3.4	3.0	1.5
Imports of goods and nonfactor services	-3.7	-0.9	8.9	6.6	1.5
Foreign balance 2/	3.1	1.1	-2.6	-1.9	-0.0
GDP	-0.3	-0.8	1.0	0.1	-0.6
GNP	-0.8	-0.5	0.2	1.8	-0.6
		(In millions, unless otherwise indicated)			
Employment and unemployment					
Employment	3.80	3.78	3.78	3.78	3.78
(Percent change)	-1.6	-0.5	-0.2	0.2	-0.1
Unemployed (Registered)	0.09	0.16	0.17	0.15	0.16
Unemployment rate (In percent)	2.5	4.5	4.7	4.2	4.5
Standarized unemployment rate	2.8	3.8	3.7	3.2	...
		(Percentage changes, unless otherwise indicated)			
Prices and incomes					
GDP deflator	2.6	2.0	1.9	2.5	0.2
Consumer price index	4.0	3.3	0.9	1.8	0.8
Nominal wage growth	5.1	1.6	1.3	2.2	1.0
Unit labor costs (Total economy)	3.7	1.8	0.1	2.3	1.5
Real disposable income 3/	-0.5	-1.9	-0.5	0.9	-0.3
Personal saving ratio (In percent)	12.7	11.5	10.3	10.5	10.1
		(In percent of GDP)			
Public finances					
Central Government					
Financial balance 4/	-1.5	-2.7	-1.9	-1.2	-1.5
Gross debt	16.3	19.2	20.8	22.1	23.2
General Government					
Financial balance	-3.5	-3.7	-2.8	-1.8	-1.9
Primary structural balance	-1.6	-0.9	-0.3	0.7	1.6
Change in primary structural balance (fiscal impulse)	0.3	-0.8	-0.6	-1.1	-0.8
Gross debt	38.3	43.2	45.6	47.0	49.2

1/ Staff projections.
2/ Change as percent of previous year's GDP.
3/ Deflated by the national accounts deflator for private consumption.
4/ Excluding cash surplus of civil service pension fund as revenue and from 1997 onwards including railway loans as expenditure.

Switzerland: Basic Data (continued)

	1992	1993	1994	1995	1996 1/
		(In billions of Sw F, unless otherwise indicated)			
Balance of payments					
Trade balance	-1.4	2.4	2.2	1.0	3.2
Service balance	15.1	16.8	16.1	14.9	11.3
Factor income balance	11.7	13.5	10.8	14.0	...
Net private transfers	-3.3	-3.3	-3.3	-3.3	-3.6
Net official transfers	-0.8	-0.8	-1.5	-1.6	-1.1
Current account	21.3	28.8	24.4	25.0	23.9
(In percent of GDP)	6.3	8.4	6.9	6.9	6.6
Foreign direct investment	7.4	13.1	-10.2	-11.7	...
Outward	8.0	12.9	14.8	14.0	...
Inward	0.6	-0.1	4.6	2.3	...
Portfolio investment	8.6	26.4	-21.8	-5.2	...
Outward	13.6	44.8	26.1	11.0	...
Inward	5.0	18.5	1.2	5.9	...
Banking sector, net	-8.7	14.1	14.8	-1.1	...
Memorandum items:					
Net investment income	19.2	20.7	18.5	19.8	21.0
(In percent of GDP)	5.7	6.0	5.3	5.5	5.8
Net external assets	342.4	362.7	361.1	350.0	373.9
(In percent of GDP)	101.1	105.8	102.3	96.7	103.7
		(Percentage changes in annual averages)			
Monetary data					
Central bank money	-0.9	1.7	1.8	0.3	2.9 2/
Money (M1)	2.0	10.5	5.6	6.8	10.9 2/
Broad money (M3)	2.1	3.9	5.1	2.2	6.5 2/
		(Period averages in percent)			
Interest rates					
Three month deposit rate	7.8	4.8	4.0	3.0	2.0 3/
Yield on government bonds	6.4	4.6	5.0	4.8	4.0 3/
			(Levels)		
Exchange rates					
Sw F per US$ (end of period)	1.46	1.48	1.31	1.15	1.35
Sw F per US$ (annual average)	1.41	1.48	1.37	1.18	1.23
Nominal effective rate (1990=100)	96.6	99.8	106.3	113.3	111.6
Real effective rate (1990=100) 4/	98.1	99.1	108.3	114.9	115.1

Source: International Monetary Fund, World Economic Outlook database; Swiss National Bank; Swiss Institute for Business Cycle Research.

1/ Staff projections unless otherwise noted.
2/ First ten months compared with same period a year ago.
3/ Average January-November.
4/ Based on relative normalized unit labor costs.

INTRODUCTION

This paper contains three chapters on selected issues plus the statistical data appendix. Chapter I assesses Switzerland's recent real GDP performance in terms of underlying movements in **potential output and the cyclical output gap**. Swiss real GDP has been stagnant since 1990, after expanding at an average rate of some 1 3/4 percent during the period 1977-90. While the estimates are fraught with considerable uncertainty, the evidence presented in Chapter I indicates that potential output growth during 1991-95 was significantly below historical average. At the same time, the cyclical output gap in 1996—at some 3½ percent of potential GDP—is nevertheless sizeable and in the middle of the range given by various detrending methods. This estimate of the output gap is also shown to be consistent with the behavior of selected macroeconomic variables using a structural VAR technique.

Using MULTIMOD, Chapter II tries to assess the **possible effects of stage 3 of European Monetary Union (EMU) on Switzerland**. The uncertainties surrounding the creation of EMU may lead to a shift in investors' preferences toward assets denominated in currencies outside the EMU, including the Swiss franc. The simulations present different types of portfolio preference shifts and different policy responses. The simulations indicate that the implications of EMU could range from adverse to beneficial for the Swiss real economy. At the same time, the simulations underscore that as fiscal policy is a relatively unwieldy policy instrument in the Swiss context, monetary policy would need to play a major role in stabilizing the real economy by resisting a currency appreciation. In this connection, a prompt and forceful monetary policy response would be crucial. Present low nominal interest rates, which are near the nominal interest rate floor of zero percent, limit the scope for discretionary easing by monetary policy and suggest a role for a more exchange-rate oriented monetary policy. Nonetheless, a trade off is unavoidable between stabilizing output and securing price stability in the medium term.

Finally, Chapter III reviews **developments in the Swiss banking system**. Since the early 1980s, the Swiss banking sector has been faced with to restructure and consolidate to adapt to worldwide trends in financial deregulation, technological change, and rapid integration of financial markets. Pressures to restructure and consolidate have intensified during the 1990s, owing to portfolio losses from a collapse in prices for real estate and the protracted stagnation of the real economy. A description of these recent challenges and responses is provided with a focus on cantonal banks, which have been relatively more affected by the recent adverse economic developments. For the big banks, cumulative provisions and write offs against loans for the period 1991-96 amounted to some 12 percent of GDP. In 1996, these banks have announced structuring plans, closing a substantial number of branches and trimming their work forces further. The rescue of a canton bank by its canton has placed under close scrutiny the status and operations of all cantonal banks and changes are under consideration.

I. Estimates of Potential Output Growth and the Cyclical Output Gap[1]

This chapter assesses Switzerland's recent real GDP performance in terms of underlying movements in potential output and the cyclical output gap. The level of Swiss real GDP has stagnated since 1990, after expanding at an average growth rate of 1¾ percent during the period 1977-90. The protracted slump in real GDP raises three questions. One, to what extent does the stagnation of real GDP since 1990 reflect a slowdown in potential output growth? Two, what is the current amount of economic slack (or output gap) in the economy? And three, given the assessment of recent potential output growth and the current output gap, what are Switzerland's medium-term growth prospects?

Although any decomposition of observed output movements into trend (or potential) and cyclical (or gap) components is fraught with considerable uncertainty, even approximate estimates are useful in evaluating the stance of macroeconomic policies. The Swiss authorities' monetary framework targets an expansion of the monetary base consistent with potential output growth and a medium-term inflation target of about 1 percent. This framework necessitates the estimation and projection of potential output growth, which is currently estimated at about 2 percent by the Swiss National Bank (SNB) (see Lüscher and Ruoss (1996)). As indicated further below, assuming potential output growth during 1991-95 of some 2 percent would yield a large output gap of about 6½ percent of potential GDP in 1996. As regards fiscal policy, the authorities assess the size of the structural deficit at the federal level, with a view to gauge the additional fiscal consolidation efforts needed to balance the federal budget by 2001. The Federal Finance Administration (FFA) has estimated that almost the entire federal fiscal deficit of about 1½ percent of GDP in 1996 was structural, reflecting an estimate of a cyclical output gap close to zero in 1996. As is shown later, these estimates reflect the range of output gaps associated with different methodological approaches and detrending choices.

The balance of evidence presented in this chapter suggests that potential output growth in Switzerland has slowed significantly since 1990, amounting to about 1 percent in the period 1991-95 compared with an average potential growth of 1¾ percent during 1977-90. The recent slowdown in potential output growth reflects a marked slowdown in the growth rates of potential labor input and potential total factor productivity. The size of the output gap in 1996 is estimated at about 3½ percent of potential GDP. This estimate is broadly supported by evidence from other macroeconomic indicators including inflation, capacity utilization in manufacturing, and private consumption. However, output gap estimates are particularly sensitive to assumptions about the recent trend behavior of total factor productivity. In particular, assuming that potential total factor productivity growth during 1991-96 had remained unchanged from its average growth during 1977-90 would raise the output gap in 1996 to 5¼ percent of potential GDP. Regarding prospects for medium-term growth, potential output growth is projected to increase slightly to 1¼-1½ percent. In that case, actual

---

[1]Prepared by Albert Jaeger.

real GDP growth would need to average about 2 percent per annum during 1997-2002 to close the estimated output gap.

The remainder of this chapter is structured as follows: Section A contains a descriptive analysis of Switzerland's GDP growth experience since 1948. Section B provides univariate decompositions of real GDP movements into trend and cyclical components based on an unobserved components (UC) model and compares the results with estimates obtained from deterministic detrending and Hodrick-Prescott filtering. Section C presents estimates of potential output and the output gap drawing on trend-cycle decompositions of aggregate production function inputs (labor, capital, and total factor productivity). And Section D evaluates information on the degree of economic slack provided by the time series behavior of private consumption and inflation.

A. Real GDP Facts

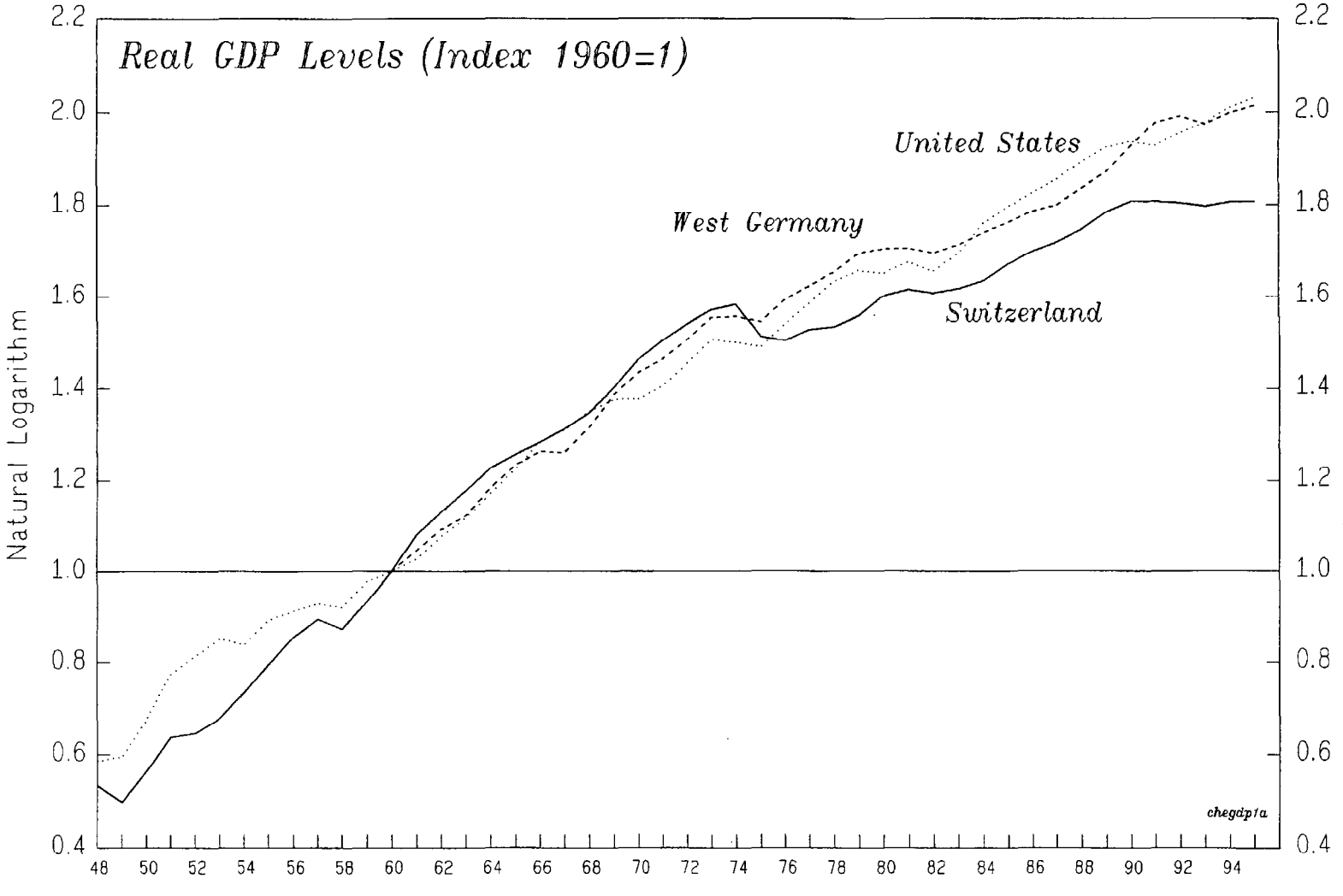
Real GDP growth in Switzerland has slowed markedly since 1975, both compared with Switzerland's growth experience before 1975 and with real GDP growth in most other industrial countries. Chart I-1 shows the behavior of Swiss real GDP from 1948 to 1995 against the backdrop of real GDP movements in the United States and Germany (data for 1990-95 refer to west Germany).[2] Until 1975, Swiss real GDP moved in close tandem with real GDP in the two reference countries; in fact, average real GDP growth rates and standard deviations of growth rates for the period 1961-74 were broadly similar. However, since 1975 Swiss output performance has deviated markedly from the two comparison countries. In particular, real GDP dropped sharply in 1975 (by 6.3 percent) and did not subsequently revert to its previous trend. Average real GDP growth during 1976-95 slowed significantly compared both with Switzerland's previous growth experience and the growth experience of the U.S. and Germany (Table I-1).[3]

---

[2]The time period for Germany starts in 1960 to exclude the rapid growth period in the 1950s following the rebuilding from World War II.

[3]The reasons are unclear as to why Switzerland's real GDP growth rate since 1976 has been markedly lower than in other industrial countries with similar per capita income levels and despite the sustained high Swiss national savings rate. However, the following factors and/or caveats are often put forward in this context. First, Switzerland's terms of trade improved significantly since 1975 (by some 25 percent), suggesting that real GDP growth underestimates the rise in living standards. Second, the large supply shocks since the mid-1970s combined with heavily regulated labor and product markets may have inhibited the Swiss economy's growth potential. Third, the sharp rise in women's labor force participation rate since the mid-1970s was accompanied by a distinct trend to part-time work. And fourth, measurement problems related to the national accounts statistics could have led to downward biases in output measures.

CHART 1-1
Switzerland
Real GDP, 1948-1995



Sources: IMF, IFS database; Swiss Institute for Business Cycle Research, data tape.

Table I-1. Switzerland: Real GDP Developments, 1960-95

	Switzerland	Germany 1/	United States
		(In percent)	
Average real GDP growth			
1961-95	2.3	2.9	2.9
1961-74	4.2	4.0	3.6
1976-95	1.5	2.4	2.7
Standard deviation of real GDP growth			
1961-95	2.6	2.2	2.1
1961-74	1.7	2.1	2.0
1976-95	1.6	1.9	2.1
Persistence of real GDP shocks 2/	2.0	1.2	1.2
Memorandum items:			
Average per capita GDP growth			
1961-95	1.5	2.4	1.9
1961-74	2.8	3.2	2.4
1976-95	1.0	2.0	1.7

Source: IMF, IFS database and staff estimates.

1/ 1990-95 West Germany.

2/ Long-run effect on the level of real GDP (in percent) of a 1 percentage point shock to real GDP, based on an estimated autoregressive model of order two for the period 1960-95.

The fluctuations of real GDP during the period 1960-95 appear to reflect the prevalence of highly persistent real GDP shocks, where persistence is defined as the long run response of the output level (in percentage points) to a 1 percentage point innovation in real GDP. Indeed, the persistence of real GDP shocks in Switzerland is estimated at almost double the persistence estimates for the United States and Germany (Table I-1). This is *prima facie* evidence that fluctuations of real GDP in Switzerland reflect at least some highly persistent real shocks. Persistent shocks would be reflected in movements in potential output, although high persistence estimates do not rule out the existence of significant cyclical output gaps.

Chart I-2 provides a decomposition of real GDP fluctuations during the period 1976-95 in terms of underlying aggregate production function inputs, i.e. labor input measured in hours, the capital stock, and total factor productivity (the sources and methodology for calculating the production function inputs are described in the data appendix).[4] The series on the production function inputs appear to indicate that capital accumulation was the key driving force behind Swiss GDP growth since 1976, while labor input and total factor productivity growth were relatively sluggish during this time period.

B. Univariate GDP Decompositions

To derive estimates of potential output growth and the cyclical output gap, the logarithm of observed real GDP (Y(t)) is decomposed into two unobservable components:

$$(1) \qquad \ln(Y(t)) = \ln(YPOT(t)) + YGAP(t),$$

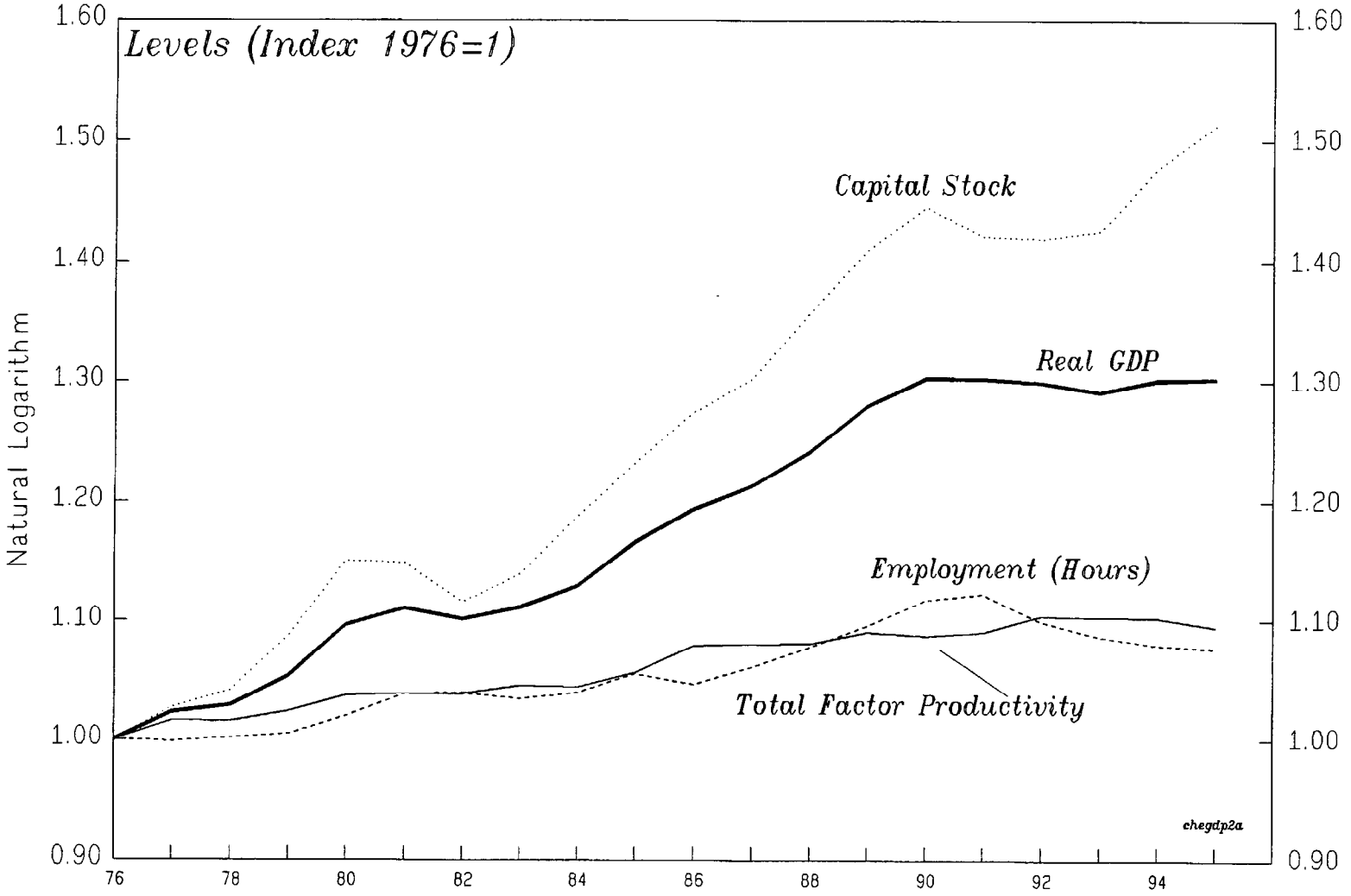
where YPOT(t) is potential output and YGAP(t) is the cyclical output gap component. The two unobserved components are defined in terms of their statistical properties: movements in the potential output component are assumed to reflect the effects of those GDP shocks that lead to permanent (i.e. persistent) changes in the level of GDP, while movements in the output gap are assumed to reflect the effects of those GDP shocks that lead to transitory (i.e. non-persistent) changes in the level of GDP. Statistical identification of the two unobserved components can be based on univariate models of real GDP (univariate decomposition) or by exploiting postulated links between one or both of the unobserved components and other macroeconomic variables (multivariate decomposition) including the inputs of an aggregate production function, unemployment, private consumption, or the inflation rate.

As a first approach, the two unobservable components in (1) were estimated by postulating a statistical model for the trend component of real GDP—a linear deterministic time trend—and by employing a linear filter procedure—the Hodrick-Prescott filter—and then the output gap

---

[4]The decomposition is based on a Cobb-Douglas production function assuming factor income shares of 0.7 and 0.3 for labor and capital income, respectively.

CHART I-2
Switzerland
Real GDP, Employment (Hours),
Capital, and Total Factor Productivity, 1976-1995



Sources: Swiss Institute for Business Cycle Research, data tape, and staff estimates.

was derived as the residual component between actual and estimated trend output. However, these detrending approaches, while simple and easy to implement, amount to a rather mechanical assignment of output fluctuations to the potential and cyclical components of real GDP. In particular, these approaches do not exploit all the information provided by the observed GDP time series. A useful alternative framework for achieving decomposition (1) is provided by the class of unobserved components (UC) models. In the context of the trend-cycle decomposition exemplified by (1), UC models specify statistical models for both the trend and the cyclical component (see Harvey (1989) and Harvey and Jaeger (1993) for details). In particular, potential output is modeled by a flexible linear trend:

$$\ln(YPOT(t)) = \ln(YPOT(t-1) + \beta(t-1) + \eta(t) \tag{2}$$

$$\beta(t) = \beta(t-1) + \zeta(t), \tag{3}$$

where $\eta(t)$ and $\zeta(t)$ denote shocks to the level and drift (average growth) rate of potential GDP, respectively. The cyclical component is modeled as a stationary autoregressive moving-average process with two autoregressive and one moving-average term (ARMA(2,1)):

$$GAP(t) = \phi(1)GAP(t-1) + \phi(2)GAP(t-2) + \epsilon(t) + \theta\epsilon(t-1), \tag{4}$$

where $\phi(1)$, $\phi(2)$, and θ are the parameters of the ARMA process, and $\epsilon(t)$ denotes the shock to the cyclical component (which, by assumption, has only a transitory effect on the level of real GDP). A number of popular detrending methods are special cases of the UC model. For example, restricting the variances of the permanent shocks $\eta(t)$ and $\zeta(t)$ to zero is equivalent to assuming that potential output follows a linear deterministic trend. When only the variance of $\zeta(t)$ is restricted to zero, but the variance of $\eta(t)$ is allowed to be positive, potential output is restricted to follow a random walk with constant drift. Finally, the results of applying a Hodrick-Prescott filter would be replicated by an UC model if the assumption of a fixed numerical ratio between the variance of changes in the potential output growth rate and the variance of the cyclical output gap would obtain in the GDP series.[5]

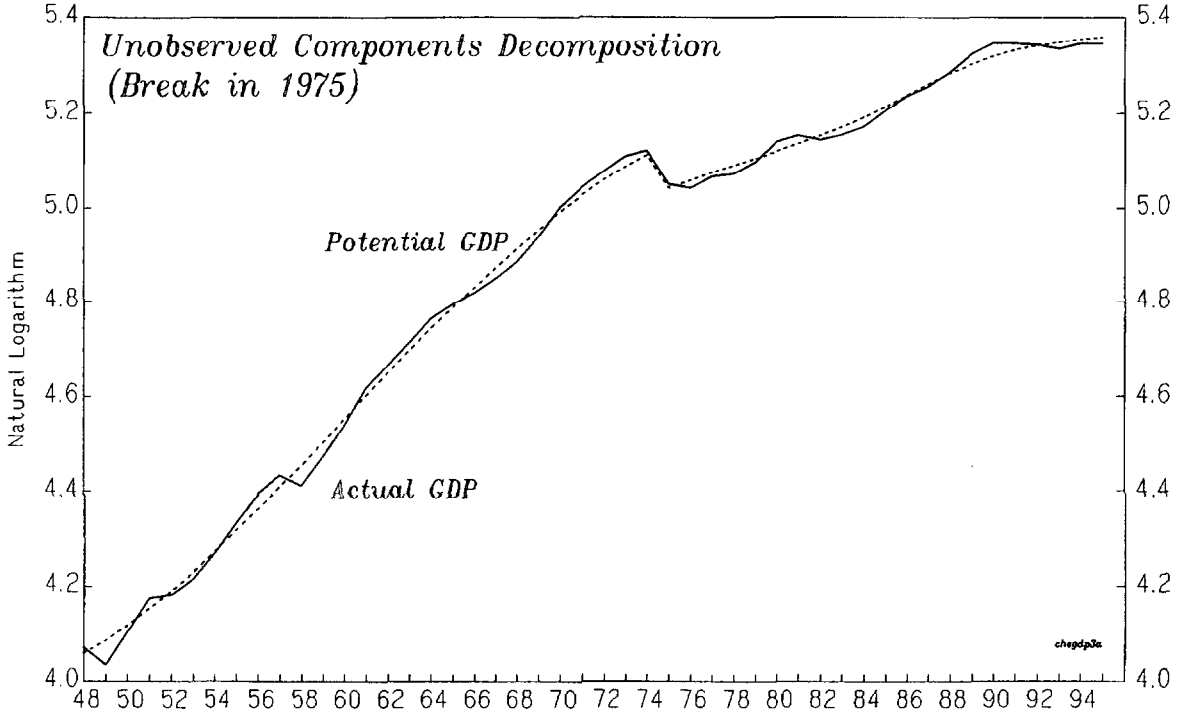
Estimates of potential output and the output gap based on the UC model (2) to (4) are set out in Chart 3 and Table 2.[6] Estimating the unrestricted unobserved components model resulted in an acceptable fit, but diagnostic test statistics indicated that the large one-time level shock

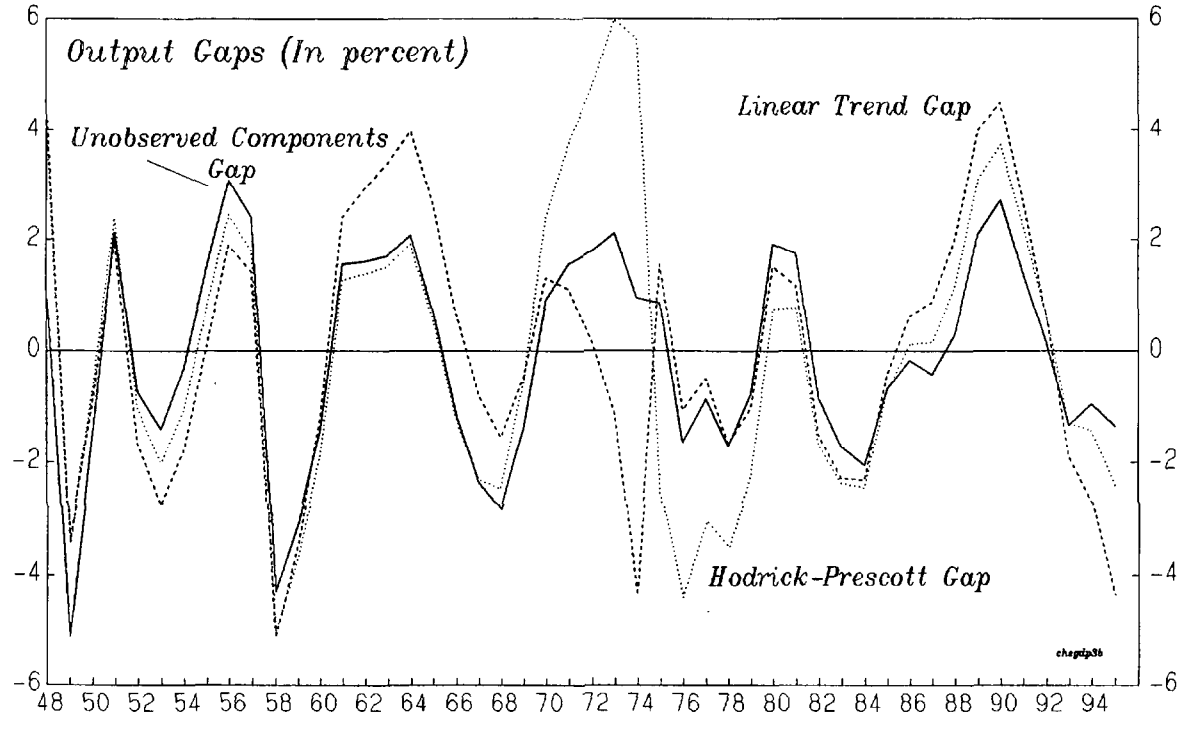
---

[5]If the smoothing constant of the Hodrick-Prescott filter is fixed at the widely used value 1,600 (for quarterly data), the Hodrick-Prescott filter will represent an "optimal filter" (in the sense of yielding decompositions in potential output and output gap that are congruent with the statistical properties of the GDP series) if the variance $\eta(t)$ is zero and the ratio between the variances of $\zeta(t)$ and GAP(t) is equal to 1,600 (Harvey and Jaeger (1993)).

[6]The econometric software package STAMP (Structural Time Series Analyser, Modeller and Predictor) was used for estimating the unobserved component models reported in Table 3.

CHART I-3
Switzerland
Univariate Real GDP Decompositions, 1948-1995





Souces: Swiss Institute for Business Cycle Research, data tape, and staff estimates.

Table I-2. Unobserved Components (UC) Models of Real GDP, 1948-95

	Unrestricted UC model	Unrestricted UC model with trend break in 1975	Deterministic trend model with trend break in 1975	Hodrick-Prescott filter
Likelihood value	140.4	144.0	...	...
Average potential output growth:				
1985-90 1/	2.2	2.1	1.8	1.9
1991-95 1/	0.6	0.8	1.8	1.2
Standard deviation of output gap in 1948-95 1/	2.1	1.9	2.4	2.7
Estimated output gaps implied:				
1995 2/	-0.9	-1.5	-4.3	-2.4
1996 2/3/	-2.5	-3.0	-6.5	-3.9

Source: Staff estimates .

1/ In percent.
2/ In percent of potential GDP.
3/ Based on staff projections assuming a contraction in real GDP of ½ percent in 1996.

Table I-3. Potential GDP Growth and Output Gap Estimates
Based on Production Function, 1976-2002

A. Potential Output Growth

Period	Potential GDP growth	Contributions to potential GDP growth by:		
		Labor	Capital	Total factor productivity
1977-90	1.8	0.4	0.7	0.7
1991-95	1.0	0.1	0.6	0.3
1996 1/	1.3	0.2	0.6	0.5
1997-02 1/	1.3	0.2	0.6	0.5

B. GDP Gap

Period	GDP gap	Contributions to GDP gap by:		
		Labor	Capital	Total factor productivity
1990	3.1	1.8	1.7	-0.4
1991	1.1	1.5	--	-0.4
1992	-0.2	-0.1	-0.8	0.7
1993	-1.4	-0.8	-1.0	0.4
1994	-0.8	-0.9	--	0.1
1995	-1.6	-1.3	0.5	-0.8
1996 1/	-3.5	...	...	...

Source: Staff estimates.

1/ Staff projections.

in 1975 is not well captured by the model, constituting an outlier. As a consequence, the model was augmented by incorporating a one-time level shock in 1975, which improved both the fit (as indicated by the significant increase in the model's likelihood value) and the diagnostic test statistics turn out satisfactory. The estimates of the unresticted unobserved components model with a trend break in 1975 suggest a substantial slowdown in potential output growth during 1991-95 compared with the period 1985-90; average annual growth in potential output during 1991-95 was only 1 percent compared with 1 3/4 percent during 1977-90. Reflecting the sharp slowdown in potential output growth, the size of the cyclical output gap in 1995 amounted to about 1½ percent, widening to 3 percent of potential GDP in 1996 if real GDP contracts by ½ percent in 1996 as currently projected. However, using mechanical detrending based on deterministic extrapolation indicates significantly larger output gaps of 4½ and 6½ percent in 1995 and 1996, respectively. Finally, applying a Hodrick-Prescott filter to the annual time series results in estimates of output gap that are smaller—2½ percent of potential GDP in 1995 and a projected gap of almost 4 percent in 1996.[7]

C. Production Function-Based Estimates of Output Gap

The production function-based approach for disentangling potential and cyclical output movements draws on estimated trend-cycle decompositions of underlying factor input. Following recent work of Lüscher and Ruoss (1996) and Marty (1996) on potential output estimates for Switzerland, a Cobb-Douglas production function is assumed, and thus real GDP can be written as:

$$\ln(Y(t)) = \alpha \ln(L(t)) + \beta \ln(K(t)) + \ln(TFP(t)), \tag{5}$$

where L(t) is effective labor input, K(t) is the effective stock of capital, and TFP(t) denotes total factor productivity, and α and β are the parameters of the Cobb-Douglas production function. The production function-based approach requires the calculation of decompositions of the three underlying inputs into potential and cyclical components. Accordingly, combining (1) and (5), potential output can be written as a linear combination of the potential components of the three production function inputs:

$$\ln(YPOT(t)) = \alpha \ln(LPOT(t)) + \beta \ln(KPOT(t)) + \ln(TFPPOT(t)). \tag{6}$$

Similarly, the cyclical output gap is given by a linear combination of the cyclical gaps of the three production function inputs:

---

[7]However, the Hodrick-Prescott filter estimates are very sensitive to the choice of data frequency and/or smoothing constant (as should be expected from the above discussion of the UC model). For example, applying the Hodrick-Prescott filter to quarterly GDP data spanning 1976.Q1-1996.Q2 and using a smoothing constant of 1,600 gives an output gap of almost zero, in line with unpublished results reported by the FFA.

(7) $$YGAP(t) = \alpha LGAP(t) + \beta KGAP(t) + TFPGAP(t).$$

It is noteworthy that the production function-based approach effectively transforms the univariate detrending problem of Section B into a trivariate detrending problem, raising difficult measurement problems for the underlying factor input variables. On the other hand, tracing potential and cyclical output movements to movements in the underlying factor inputs adds economic content to the assessment of the cyclical position of the economy.

The determination of the labor input gap (LGAP(t)) is taken up first. By definition actual annual labor input in hours is given by:

(8) $$L(t) = POPW(t)*LFP(t)*(1-U(t))*H(t),$$

where POPW(t) measures the resident working population aged 20-64, LFP(t) is the labor force participation rate, U(t) denotes the unemployment rate, and H(t) is a measure of average annual work hours per employed person. To estimate potential labor input, cyclical variations in the labor force participation and the unemployment rate need to be removed. Thus, the size of the resident working population and average annual work hours per employed person are assumed to be noncyclical. While the data series on average annual work hours appear to be consistent with this assumption, the data series on the resident working population (which includes foreign workers) appears to have been sensitive to the business cycle, although the data are not characterized by a clear cyclical pattern owing perhaps to changes over time in permit policies for foreign workers. On this, several observers, e.g. OECD (1996), have noted that the cyclical sensitivity of the labor force has declined since the mid-1970s.

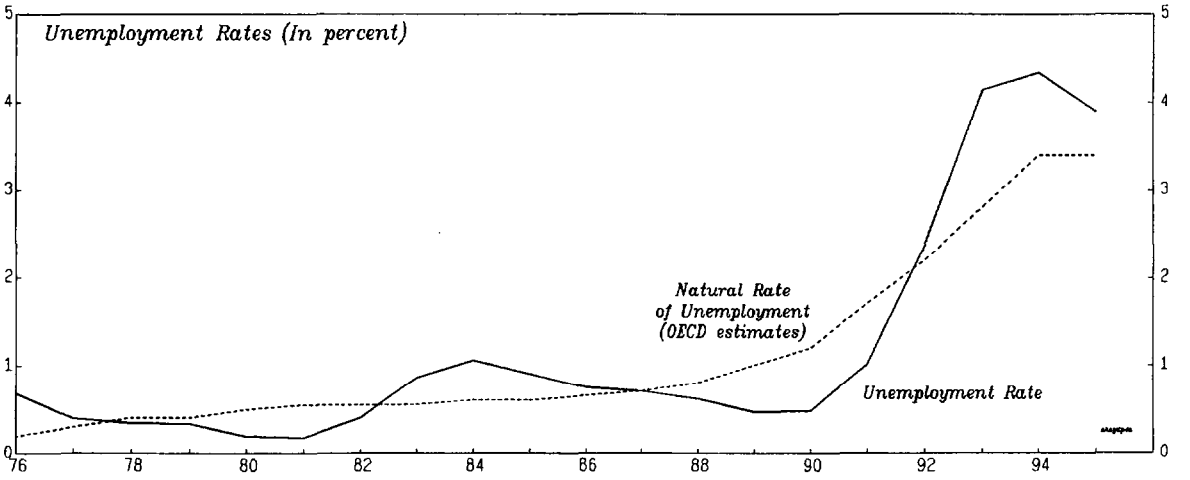
As regards the unemployment rate, measurement of cyclical slack is made difficult by recent structural changes in the composition of the labor force (increased share of foreign residents with permanent work permits) and the reforms of the unemployment insurance system (increased coverage and, until more recently, a trend to more generous unemployment benefits). The Swiss unemployment rate—defined as the number of registered unemployed persons as a percent of the labor force—has risen drastically at the beginning of the 1990s (Chart I-4). For the purpose of this study, the rate of unemployment that abstracts from cyclical influences, the natural rate of unemployment, is taken from OECD (1996). The implied cyclical unemployment rate in 1995 is about 1 percent.

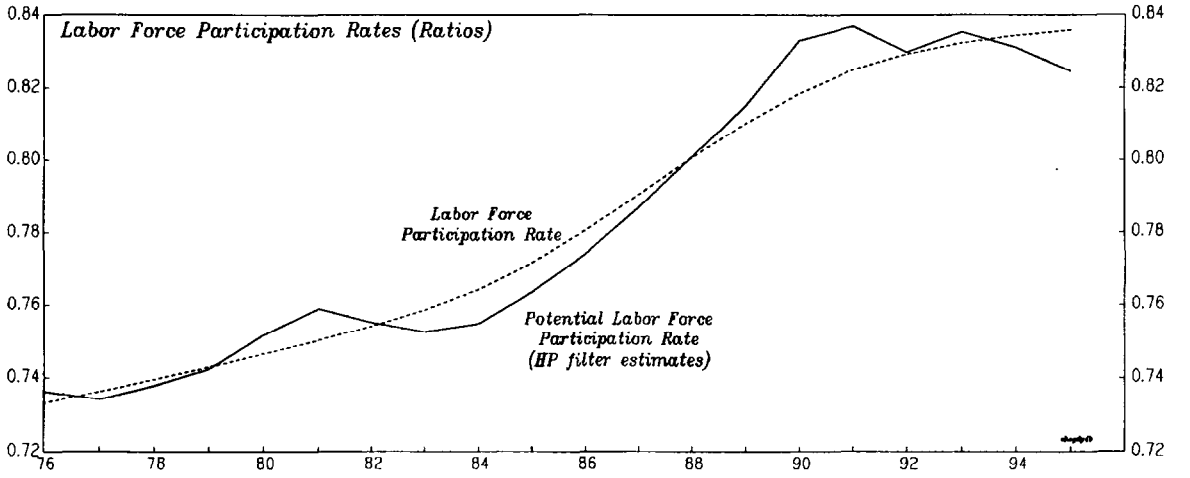
Labor force participation rates in Switzerland also appear to exhibit cyclical fluctuations, reflected in variations of labor force participation rates of women and resident foreign workers. Moreover, variations in the number of seasonal and frontier workers—which are included in the labor force measure but not in the measure of the resident working population—arel also reflected in fluctuations of the participation rate. To account for the cyclical variation in the overall participation rate, a Hodrick-Prescott filter was applied to annual data for the period 1976-95 (the smoothing constant was set at 100). The resulting estimates suggest that the procyclial behavior of labor force participation rates add a

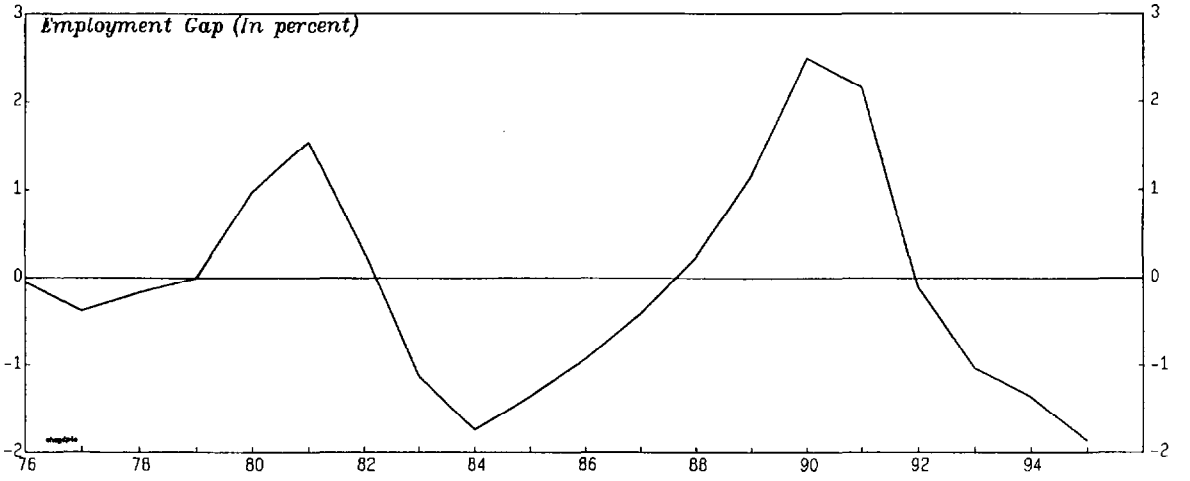
CHART I-4

Switzerland

Cyclical Labor Market Indicators, 1976-1995







Sources: Swiss Institute for Business Cycle Research, OECD Economic Survey 1994-95 for Switzerland, and staff estimates.

considerable amount of cyclical slack to the labor market.[8] Combining the estimates of the natural rate of unemployment and the HP-filter estimates of the "normal" labor force participation rate allows to estimate the level of potential labor input, and expressing the gap between actual and potential labor input as a percent of potential labor input yields the employment gap (Chart I-4).

Survey data on capacity utiliztion in manufacturing are used to calculate the level of potential capital. In particular, the average level of capacity utilization during 1976-95 (83.6 percent) is assumed to represent the normal level of capital stock utilization for the whole economy and the measured capital stock is adjusted for the variations of capacity utilization around the normal level to gauge the amount of effectively employed capital (Chart I-5). These assumptions imply that the "capital gap" is equivalent to the deviation of actual capacity utilization from its normal level.

Finally, the decomposition of total factor productivity growth into its trend and cyclical component is based on applying a Hodrick-Prescott filter to annual estimates of total factor productivity for the period 1976-95 (see the data appendix for the construction of the series for total factor productivity).

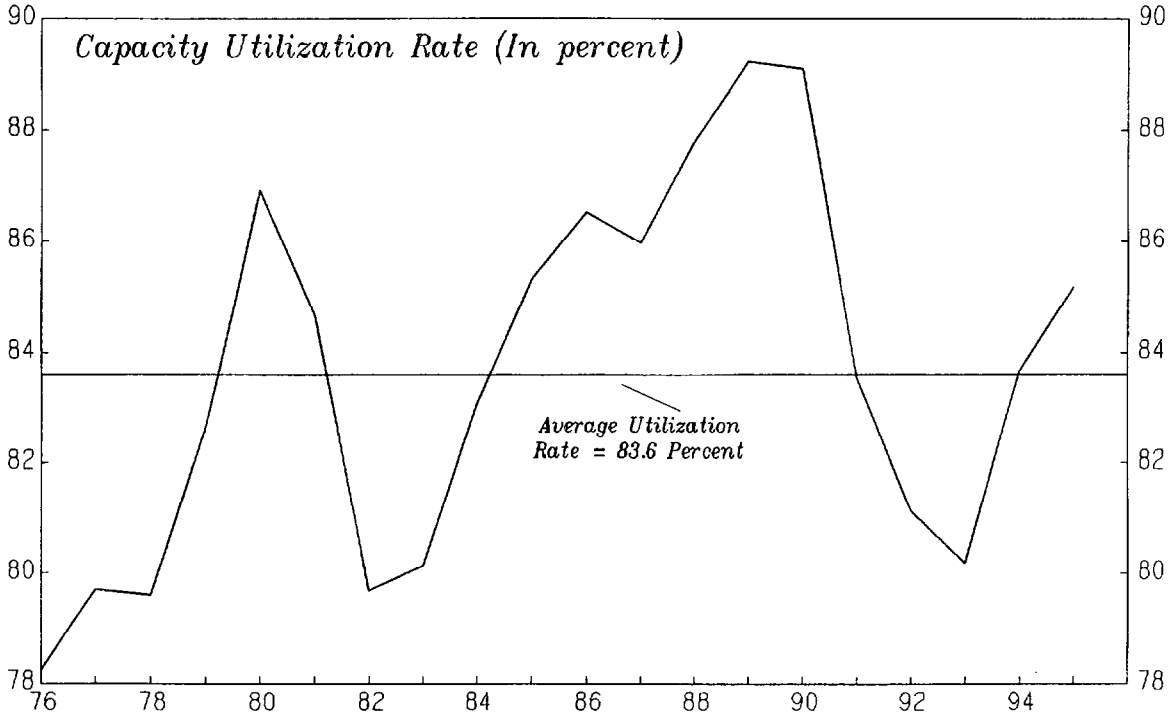
Combining the estimates of potential growth and cyclical gaps for the three production function inputs yields estimates of potential GDP and the cyclical output gap (Table I-3). Similar to the univariate decomposition evidence based on the estimated unobserved components model, the production function-based approach suggests that potential GDP growth slowed considerably since 1990, reflecting lower growth rates in the potential growth rates of all three production function inputs. Moreover, the estimates of the cyclical output gap corresponds closely with the univariate estimates derived from the unobserved components model.

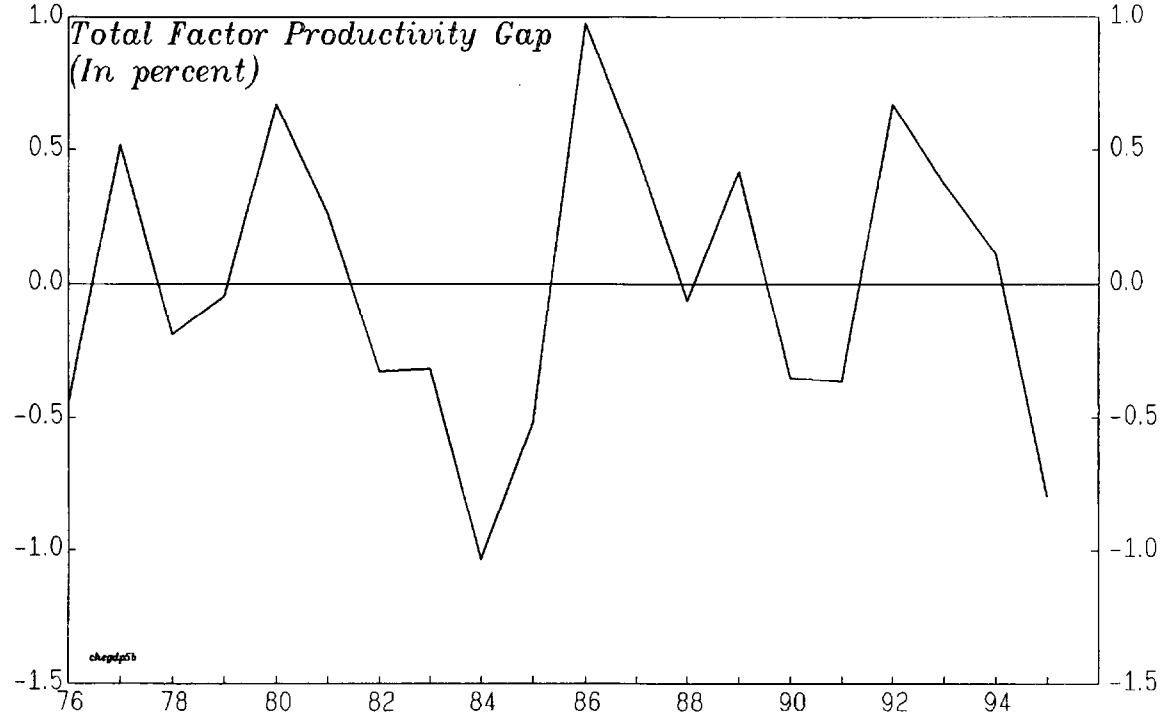
The production-function based estimates are sensitive to the underlying trend assumptions for production function inputs. In particular, assuming that potential total factor productivity growth during 1991-95 did not slow from 0.7 percent (1977-90) to 0.3 percent—as suggested by the Hodrick-Prescott filter estimates—but remained at its previous level would increase the

---

[8]The pronounced procyclicality of the labor force participation rate may suggest that some real GDP fluctuations in Switzerland are characterized by hysteresis, i.e. cyclical output fluctuations lead to changes in the size of the labor force and—through this channel—"spill over" into changes in potential output. However, standard decompositions of GDP into trend and cyclical output components rule out the possibility of hysteresis a priori. Preliminary work based on an UC model that allows the cyclical component to affect potential output with a lag, suggests that hysteresis models of GDP growth could be germane for Switzerland during this period.

CHART I-5
Switzerland
Cyclical Fluctuations in Capital Utilization and Total Factor Productivity, 1976-1995





Souces: Swiss Institute for Business Cycle Research, data tape, and staff estimates.

size of estimated cyclical output gaps in 1995 and 1996 by 2 percentage points of potential GDP and raise average potential output growth during 1991-95 to 1¾ percent.[9]

Regarding prospects for medium-term growth, potential output growth could accelerate in the second half of the 1990s to 1¼ percent, reflecting a partial recovery of total factor productivity growth to its previous trend growth rate. Potential labor input and capital stock growth during 1997-02 were assumed to remain in line with their respective trend growth rates during the first half of the 1990s. The resident population during the period 1997-02 is assumed to grow at an average rate of 0.6 percent, the rate projected in the "population continuity scenario" of the Federal Statistical Office (1992). The medium-term trend of the labor force participation rate is extrapolated to increase by ½ percentage point per annum during 1997-02. To close the estimated output gap of 3½ percent in 1996, and assuming potential GDP growth of 1¼ percent during the period 1997-02, actual real GDP growth would have to average about 2 percent per annum during 1997-02. If potential total factor productivity growth recovers back to previous to its trend growth rate of 0.7 percent, potential GDP would expand at a rate of about 1½ percent.

D. Other Macroeconomic Evidence: Inflation and Private Consumption Behavior

This section examines additional macroeconomic evidence on potential output growth and the cyclical output gap, drawing on the time series behavior of inflation and private consumption during the period 1976Q1-1996Q2.

Standard models of short-term output and price determination associate movements in the inflation rate with movements in the cyclical output gap (though a short-term Phillips curve relationship). However, while inflation is (positively) correlated with the cyclical output gap, it is also assumed that inflation has no long-term effect on the level of real GDP (vertical long-run Phillips curve).[10] These ideas may be exploited in a bivariate decomposition of output into a "supply component"—which is driven by shocks with permanent effects on the level of output—and a "demand component"—which reflects the shocks with transitory effects on the level of output. In this exercise, movements in inflation rates are assumed to provide the necessary information to identify the transitory and permanent output shocks using a vector autoregressive model (VAR) (see Blanchard and Quah (1989) for details regarding model specification and estimation).

---

[9]Recent SNB work by Lüscher and Ruoss (1996) arrives at an estimate of potential output growth rate of 1¾ percent during 1991-95, mainly reflecting their assumption that total factor productivity follows a deterministic trend throughout the period 1976-95.

[10]However, Akerlof, Dickens, and Perry (1996) have argued—based on U.S. evidence—that the long-run Phillips curve bends to the left (using output gaps as the slack indicators) at low inflation rates.

A vector autoregressive (VAR) model was applied to quarterly data on real GDP growth and GDP inflation rate data for the period 1976.Q1 to 1996.QII using 8 lags of each variable in the VAR. The estimated supply and demand components derived from the VAR suggest that the transitory output component at the end of the sample interval (i.e. in 1996.QII) is about 1 percent (Chart I-6). This estimate is below the output gap estimates obtained from the production function or linear trend approaches. However, there are three caveats attached to this exercise. First, the relationship between inflation and the cyclical output gap may be nonlinear in the sense that at low inflation rates prices become stickier and a larger portion of a given demand shock is reflected in cyclical output movements (see Clark, Laxton, and Rose (1995)). Given Switzerland's experience of relatively low inflation rates—particularly since 1993—the presence of nonlinearity would clearly reduce the output gap downwards. Second, at least some of the inflation were likely correlated with supply shocks (e.g., sharp changes in oil prices). This would obfuscate the correlation between the demand component and inflation. And third, the moderate length of the available time series imparts some imprecision to the VAR results.

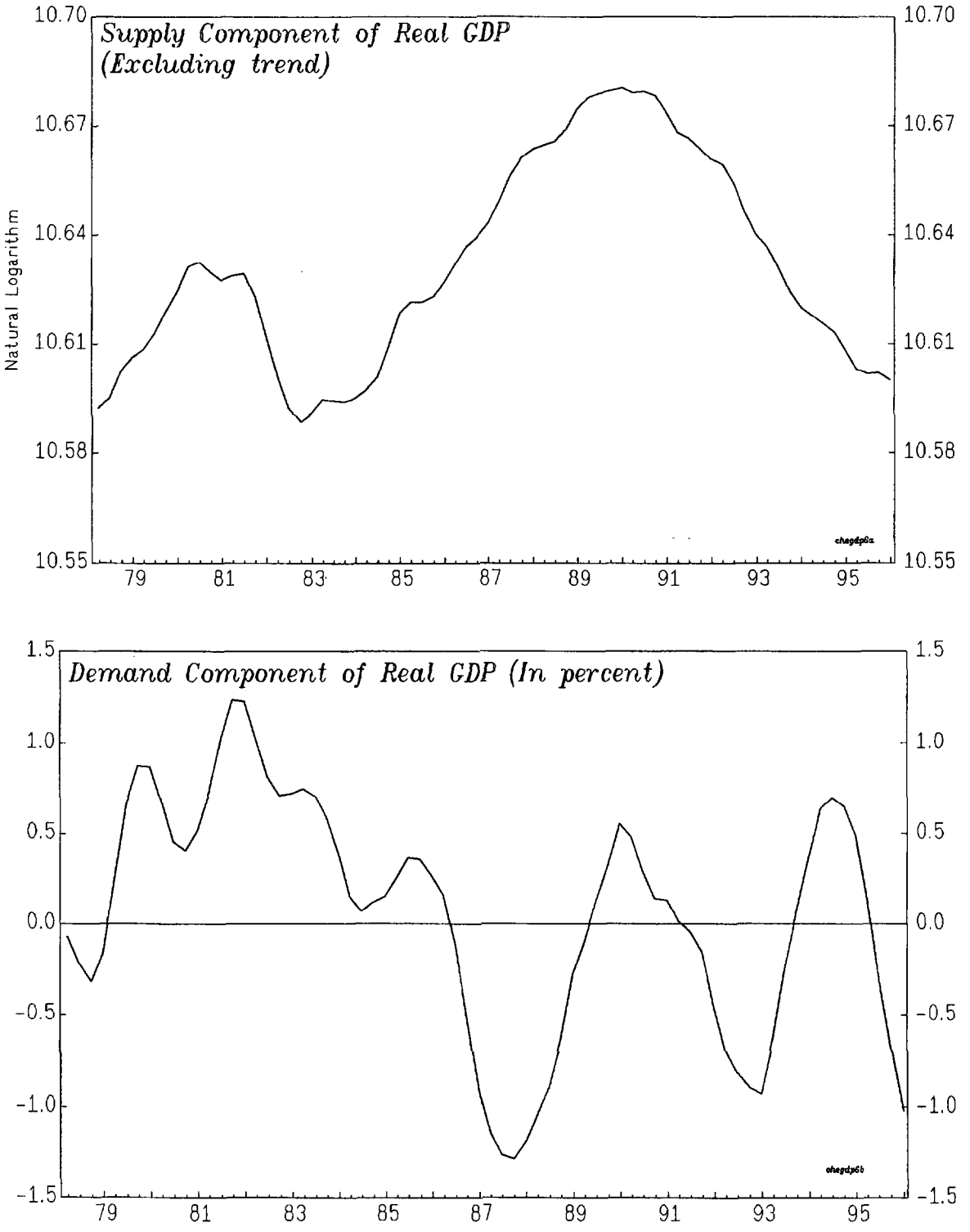
An alternative macroeconomic indicator that could provide some evidence on the size of transitory output movements is the time series for private consumption (see Cochrane (1994) for a discussion). Most (successful) models of private consumption behavior predict that consumers seek to smooth their consumption spending with respect to transitory ups and downs in real income. More pertinently, according to the permanent income hypothesis of consumption, consumers would smooth consumption with respect to transitory real income movements, while adjusting real consumption to perceived movements in permanent income. A simple approach was adopted by regressing the logarithm of private consumption on the logarithm of real GDP. The residual ("spread") of the regression is interpreted as a predictor of future transitory GDP movements. Accordingly, if the spread is positive—i.e. measured consumption is above measured real GDP—this would provide evidence that consumers view measured real GDP as below permanent or potential GDP.

The estimated spread from a linear regression of real private consumption on real GDP for the time period 1976Q1-1996 indeed suggests that consumers considers actual GDP to be below permanent GDP but not by a large margin (Chart I-7). Similar regressions with other (and perhaps more appropriate) real income concepts including real GNP and real disposable income (the latter is only available at annual frequencies) yield similar results. Two important caveats attach to this exercise. First, to the extent that liquidity constrained consumers account for a significant share of total consumption, private consumption would also reflect transitory movements in real incomes.[11] And secondly, consumers in Switzerland may have reacted to the significant increase in job and income insecurity since 1990 by increasing their propensity for precautionary saving. This structural break would be reflected in co-movements

[11]Previous staff work has estimated that the share of liquidity constrained consumers in Switzerland could amount to about 50 percent.

CHART I-6
Switzerland

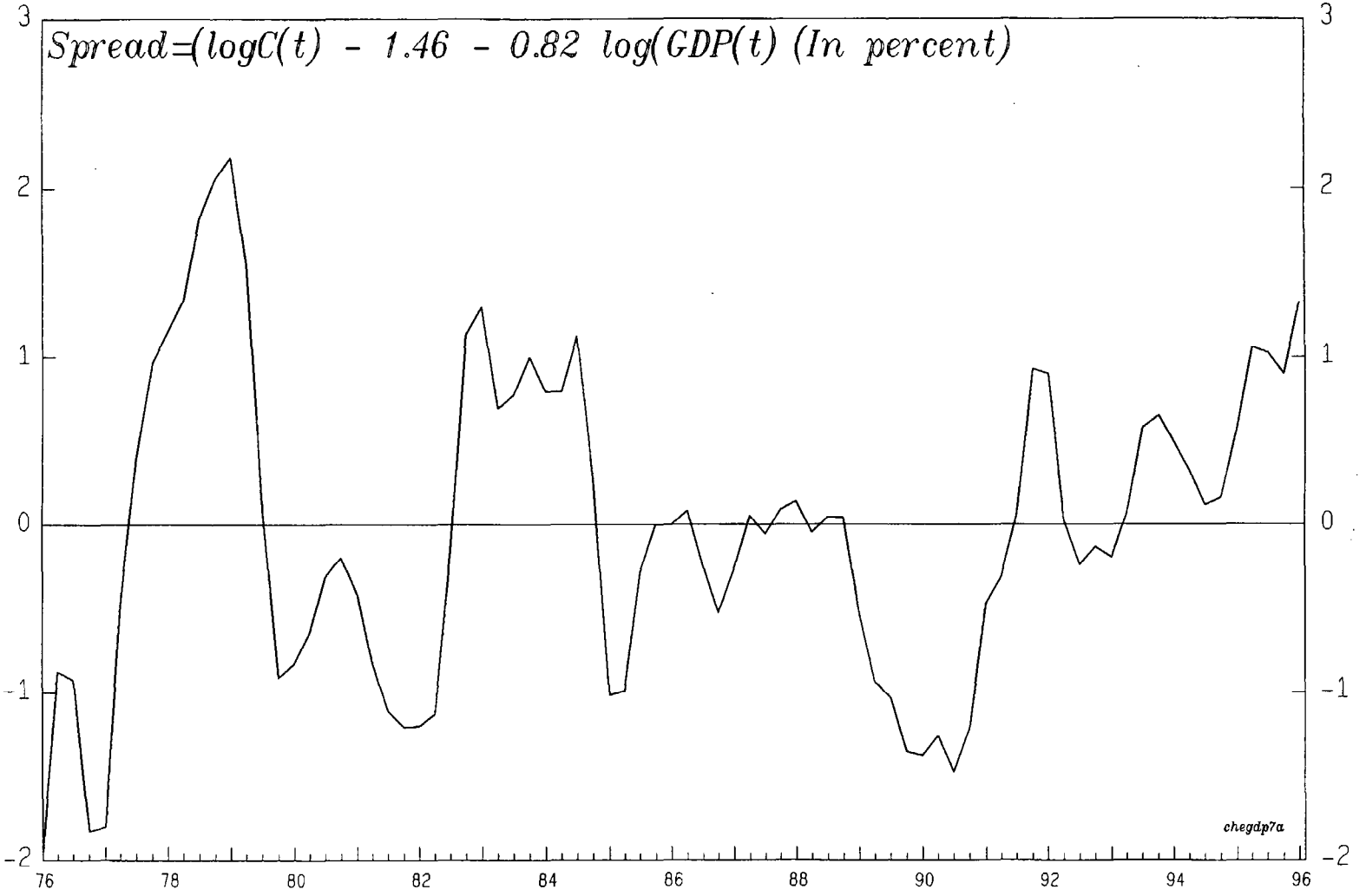
Bivariate Decomposition of Real GDP in Supply and Demand Components, 1978Q1 - 1996Q2



Source: Staff estimates.

CHART I-7
Switzerland

Real Private Consumption as an Indicator of Potential Output Growth, 1976Q1 - 1996Q2



Source: Staff estimates.

of observed real consumption and income since 1990, thus undermining the identifying assumption of the present exercise.

APPENDIX

Data on real GDP, private consumption, the GDP deflator employment, number of registered unemployed persons, capacity utilization in manufacturing, and the resident population are taken from the data base of the Swiss Institute for Business Cycle Research.

The data on the real capital stock are constructed as the cumulative values of investment in machinery and equipment and non-residential structures using the data in Lüscher and Ruoss (1996). The annual depreciation rates for machinery and equipment and non-residential structures were fixed at 20 percent and 4 percent, respectively. The measurement of the data on labor input also follows the methodology in Lüscher and Ruoss (1996), and the SNB provided series on the number of part-time workers and annual hours worked.

Total factor productivity is derived as the residual from the production function (5) in the text, where the capital stock is measured in effective units, i.e. after adjusting for capacity utilization.

II. Possible Effects of European Monetary Union: An Analysis Using MULTIMOD Simulations[11]

This chapter examines the possible effects on Switzerland of stage 3 of European Monetary Union (EMU). The initial ramifications of EMU on the Swiss economy will depend on a number of factors, including investors' perceptions about the macroeconomic and financial discipline within EMU. Concerns about such discipline could well lead to an increase in investors' preferences for assets denominated in hard currencies outside the new *euro* area, including the Swiss franc. This paper focuses on the macroeconomic implications of such an increase in the demand for Swiss franc-denominated assets on the Swiss economy and considers alternative policy responses.

Using MULTIMOD, the IMF's global macroeconometric model, a number of scenarios are examined in order to gauge the possible effects of EMU on the Swiss economy. Modeling the effects of a shift in investors' preferences towards assets denominated in Swiss francs is, however, complicated for a number of reasons. First, the magnitude and persistence of the preference shift toward Swiss franc-denominated assets is a matter of conjecture. Second, for a small open economy such as Switzerland, the impact of such asset preference shifts on the exchange rate and domestic interest rate is not independent of the policy rules adopted by the authorities. MULTIMOD simulations are used in this paper to analyze alternative scenarios derived from different assumptions about the magnitude and persistence of the increased demand for Swiss franc-denominated assets that could be stimulated by EMU and to then investigate the effects of various policy responses.

Before proceeding, however, it is useful to review some salient features of the Swiss economy. Over the last three decades, the Swiss have enjoyed relatively low rates of inflation and a trend appreciation in the real effective exchange rate. Households in Switzerland also appear to have a significantly lower rate of time preference compared to other OECD countries. This low rate of time preference is reflected in a domestic saving rate (30 percent of GDP) and ratio of net foreign assets to GDP (over 100 percent) that are among the highest in OECD countries. Swiss real interest rates—adjusted for the real exchange rate appreciation—have been markedly lower than real interest rates in other industrialized economies including Germany, although this differential relative to Germany has narrowed. This departure from the standard open interest parity condition has been interpreted as an exchange rate risk discount—indicating a willingness by foreign investors to hold Swiss franc-denominated assets, even though these assets yield a lower rate of return than assets denominated in other hard currencies.[12]

---

[11]This chapter was prepared by Douglas Laxton and Eswar Prasad.

[12]For a recent analysis of Switzerland as a low "interest rate island", as well as additional

(continued...)

Since the beginning of the 1990s, economic performance in Switzerland has deteriorated, with an average real growth rate close to zero and an unemployment rate much higher than its historical average. A sharp appreciation of the Swiss franc from 1993 through 1995 caused a decline in net exports and is widely regarded as having dampened aggregate output growth. In this context, a further appreciation of the Swiss franc could significantly worsen prospects for economic recovery and medium-term growth. Hence, an analysis of the channels through which EMU could affect the Swiss economy is of considerable interest.

Possible responses by monetary and fiscal policy to exchange rate appreciation pressures are, however, constrained by present circumstances in Switzerland. The official discount rate was lowered during 1996 to 1 percent, and overnight market rates are currently around 1½ percent. Such low interest rates limit the scope for further easing of monetary policy, given the nominal rate floor of zero percent. The effectiveness of fiscal policy at the Confederation (federal) level, on the other hand, is limited by the relative openness of the Swiss economy; for example, an expansionary fiscal policy could result in higher imports and would lead, ceteris paribus, to pressures on the currency to appreciate, thereby dampening the direct aggregate demand effects on real GDP. These issues are highlighted in the MULTIMOD simulations. In addition, the effectiveness of fiscal policy for short-run demand management in Switzerland has been limited by the relatively small size of the Confederation budget, excluding transfers, the procyclical behavior at lower levels of government, and substantial policy inertia imparted by political institutions.

The simulation experiments indicate that monetary policy is likely to be a more effective tool than fiscal policy for stabilizing domestic output in response to portfolio preference shifts in favor of Swiss franc-denominated assets. The magnitude and persistence of such asset preference shifts is difficult to determine in advance, but the effectiveness of policy measures in stabilizing output depend on a prompt and commensurate policy response to these shifts. The simulations also illustrate the additional risks posed by the constraints on monetary policy in responding to external shocks in an environment with low levels of domestic inflation and nominal interest rates. These constraints make it all the more important that monetary policy responses not be delayed. Alternative monetary policy strategies for reducing short-run output losses from upward pressures on the Swiss franc are examined—either increasing the rate of growth of money supply within the monetary targeting framework or explicitly allowing monetary policy to be guided by exchange rate developments. The simulations indicate that stabilizing output in the short run using monetary policy does entail the risk of increasing inflation over the medium term. This highlights the premium placed on timely policy responses.

Many of the issues discussed in this paper are also studied in a Swiss report prepared by an EMU Working Group of the *Kommission für Konjunkturfragen* (KfK). This report presents a

---

[12](...continued)
references on this issue, see Mauro (1995).

less formal, but more comprehensive, analysis of various possible scenarios related to EMU and their potential effects on Switzerland and also evaluates different policy responses that could be appropriate under these scenarios. The main points of this report are summarized in the next section of the paper and provide a useful conceptual framework for the MULTIMOD analysis that follows.

Section B describes the extension of MULTIMOD to incorporate certain key features of the Swiss economy and highlights some modeling issues that are of particular relevance to the questions addressed in this paper. Section C presents simulation results under alternative assumptions about the nature of the increase in foreign investors' demand for Swiss franc-denominated assets. The effects of alternative policy responses are then analyzed. The conclusions are presented in Section D.

A. The Swiss Report on the Economic Implications of EMU

The KfK's EMU Working Group was commissioned by the government to prepare a report on the possible economic implications of EMU for Switzerland. This working group was composed of individuals from various branches of government and the Swiss National Bank (SNB) as well as representatives from academia, private research institutes, and private sector banks. The report—entitled "Switzerland and the European and Economic Monetary Union: An Analysis of the Economic Aspects"—was published in November 1996.

The report first delineates four distinct scenarios, while emphasizing that the actual outcome would be expected to be some combination of these scenarios. Scenario 1 envisages that the third stage of EMU would be initiated as planned on January 1, 1999, and would be limited to a core of stability-oriented countries, including Germany and France, that satisfied a strict application of the convergence criteria. The European Central Bank (ECB) would focus monetary policy towards price stability; budget deficits and public debt within the monetary union would be kept low; and a sanctioning mechanism in the fiscal area would be introduced and received favorably by financial markets. Initial uncertainties and technical difficulties could lead to an interest rate premium on the *euro* and large exchange rate fluctuations, leading to an appreciation of the Swiss franc in the short run. In the longer run, however, these would be reversed as the credibility of ECB and the *euro* are established.

Scenario 2 considers a more liberal interpretation of the convergence criteria that would enable virtually all countries of the EU to join the monetary union at the time of its formation. The absence of pressures to attain the Maastricht criteria and the lack of an effective mechanism for enforcing fiscal discipline within the currency union is then seen as likely to reduce the urgency for fiscal consolidation. The ECB would include countries without a tradition of price stability and the presence of countries with high levels of public debt would exert pressures for looser monetary policy. Thus, there would be a greater likelihood that investors would not have much confidence in the *euro*. This lack of financial markets' confidence would likely result in a longer-lasting flow of financial capital towards assets

denominated in hard currencies outside the EMU, including the Swiss franc. This could produce a more persistent appreciation of the Swiss franc.

The formation of the monetary union would be postponed in scenario 3 to a fixed date in the future in order to give countries more time to meet the convergence criteria, although the legal basis for such a postponement was viewed as strongly disputed. Postponement to a fixed date would permit EU governments to continue consolidation efforts and would enable a stricter application of the Maastricht criteria and also more extensive preparatory work on a common monetary policy. These developments could increase confidence in the *euro*. Under these circumstances, risk premiums on interest rates and exchange rates would decrease; any upward pressure on the Swiss franc would be temporary. Further developments and prospects were seen to correspond to those under scenario 1.

In the fourth scenario, EMU would be postponed indefinitely and with the prospect of creeping rejection of the EMU project. Differences in fiscal positions, including on the sanctioning of excessive deficits, are seen as expressing deeper political tensions. With an uncertain future for EMU, pressures for fiscal consolidation would dissipate and fiscal policies would turn expansionary. The EU currencies would, at best, remain linked to one another via an exchange rate mechanism. The deutsche mark and related European currencies would appreciate against other international hard currencies, including the Swiss franc.

After discussing these scenarios, the report differentiates between two frameworks for conducting monetary policy in the face of challenges posed. One option would be to link the Swiss franc to the *euro* in some manner. The SNB could orient its monetary policy towards maintaining a particular nominal exchange rate relationship between the Swiss franc and the *euro* or towards limiting such exchange rate fluctuations within a band of differing possible widths. A closer linkage, however, would increase the risk of speculative pressures that could make such an exchange rate policy a costly undertaking for the SNB. In particular, a higher inflation rate could result as money supply expansion is incompatible with desired inflation. Also the closer the exchange rate link, the more the scope for an independent monetary policy by Switzerland is reduced; monetary policy decisions would effectively be taken by the ECB where Switzerland would not be represented.

If the Swiss franc exchange rate were fixed on a long-term basis, ECB policy would, in effect, determine the inflation rate in Switzerland, which would imply an increase in domestic inflation from its current level. Interest rates would also rise to the *euro* level or judging by present differentials with German long-term interest rates by over 200 basis points. Real interest rates were viewed as increasing with adverse implications: Domestic debtors would lose, given variable interest rates. Holders of fixed-interest rate assets would incur capital losses. Higher mortgage rates would lead to a fall in real estate prices. Domestic industry would lose its locational advantage and have to lower capital intensity of production. Banks could no longer profit from the good reputation of the Swiss franc.

A temporary exchange rate link, on the other hand, would enable domestic monetary policy to remain more oriented towards price stability in the long run, although an expansive, inflationary monetary policy might be necessary in the short run. Fighting inflation entails high costs, owing to indexing mechanisms (including between apartment rents and mortgage interest rates) and highly protected markets that limit price flexibility and prolong the process of reducing inflation.

The second broad option would be for monetary policy to retain its present monetary targeting framework, including a flexible exchange rate, as well as its medium-term orientation toward price stability. In this case, the SNB relies on the inbuilt "automatic stabilizers" of monetary targeting. In particular, a currency appreciation would slow domestic activity which in turn lowers the expansion of money demand. As a result and given steady money supply growth, interest rates will fall, slowing currency appreciation. These developments would support a revival in activity. If the operation of "automatic monetary stabilizers" were not sufficient to prevent a marked appreciation of the Swiss franc, a discretionary easing of monetary policy could be considered to offset pressures for a currency appreciation. The danger in this course of action would be that, as is well known, the effects of monetary policy on output are manifested only with a considerable lag. Further, expansionary monetary policy could result in an increase in medium-term inflation as economic activity recovered. Thus, the trade-off between a short-term slowdown in economic activity and a later inflation resurgence might be unavoidable.

The report notes that, no matter which course of action were adopted, an announcement of the orientation of monetary policy would be of great importance. The announcement of an exchange rate target at a given parity or in the form of a not overly wide band could, however, offer too large a target for speculation. A "non-quantified" announcement that monetary policy would consider exchange rate developments to a greater degree could, on the other hand, limit the appreciation of the Swiss franc and reduce the risk of speculation against the franc. Under this circumstance, as long as it was made clear that the SNB would still give first priority to price stability, the danger of a decline in the SNB's credibility was viewed as limited, especially given its good track record.

The report recommends that, in response to scenarios 1 or 3 (a "hard" *euro* or postponement of the third stage of EMU), the SNB should maintain an autonomous monetary policy. The costs of a temporary slowdown in economic activity due to the likely exchange rate appreciation were viewed as lower than the costs associated with a future fight against inflation that would be unleashed by the short-run easing of monetary policy necessary to defend against excessive appreciation. Scenario 2 (a "soft" *euro*) was considered to be the bane of the Swiss economy, since the alternatives would then be to accept a strong appreciation of the Swiss franc or to fix the exchange rate, accepting the costs of *euro* levels of inflation and interest rates. Under Scenario 4 (gradual abandonment of EMU), a temporary easing of monetary policy was deemed necessary to avoid deflationary tendencies in the economy. Underlying these recommendations was the recurrent theme that an expansionary stance of monetary policy in the short run would inevitably have inflationary consequences

over the medium term. Thus, a key challenge for economic policy would be to balance the costs of short-term output losses against the costs of reducing a near-term rise in inflation.

The report also noted that monetary policy, although circumscribed by various factors, would be the most effective policy instrument for responding to an EMU-related shock. The report viewed as impracticable other options such as controls on capital inflows, sterilized intervention, and the splitting of the exchange rate whereby different exchange rates would apply to current account and capital account transactions. In addition, fiscal policy was viewed as likely to be of limited effectiveness, particularly given the current level of the public debt. Enhancing the flexibility of labor markets and fostering increases in technological and other dimensions of international competitiveness of the industrial sector were mentioned as being necessary to mitigate the effects of EMU-related shocks on the Swiss economy, although these measures were unlikely to have much impact in the short run.

The report's final section summarized some key recommendations of the working group. In the event of the emergence of an EMU where policies were not stability-oriented, it would be difficult for Switzerland to insulate itself completely from the consequences—either of an overshooting exchange rate or of higher imported inflation. The report recommended that, in any case, it would be appropriate for the SNB to continue to pursue an autonomous monetary policy which could be used to dampen the impact of external influences. A sustained exchange rate peg, on the other hand, would eliminate Switzerland's real interest rate advantage. The working group counseled the SNB to monitor macroeconomic developments carefully and decide on a case-by-case basis between a monetary policy that limits itself exclusively to automatic monetary stabilizers and a discretionary loosening of monetary policy. In the case of sharp and persistent upward pressures on the exchange rate, the working group argued that a temporary exchange rate peg was a last resort option that should not be ruled out. In addition, the SNB should publicly clarify that exchange rate developments were a factor in monetary policy decisions without making pronouncements that would give speculators a firm exchange rate target. In order to ensure that banks domiciled in Switzerland are not placed at a disadvantage to their competitors abroad, it was deemed desirable for Swiss Interbank Clearing to join the EMU's Real Time Gross Payments System (TARGET).

The remainder of this paper provides the staff's quantitative assessment of the economic implications of the third stage of EMU on the Swiss economy and the potential effectiveness of alternative policy responses. Although the staff's MULTIMOD analysis was undertaken independently, the main issues and scenarios are similar to those described in the KfK report.

B. Analytical Issues in Modeling a Shift in Investor Preferences

MULTIMOD is a general equilibrium macroeconometric model developed at the IMF to analyze the transmission of changes in macroeconomic policy within and across countries.[13] The model is not intended as a tool for making unconditional forecasts. Rather, MULTIMOD takes the World Economic Outlook (WEO) forecasts made by IMF country specialists as the baseline for simulation scenarios analyzing the effects of policy changes or other exogenous changes in the economic environment. The basic version of MULTIMOD is an annual model that includes each of the G-7 countries and two country blocks that aggregate the small industrial countries and developing countries, respectively. For the purposes of this paper, Switzerland has been modeled separately, while the other small industrial countries remain in a single block.

Some features of MULTIMOD are worth highlighting before proceeding. The model derives a consistent path for all endogenous variables in response to exogenous shocks, while respecting stock-flow equilibrium conditions during the transition to the new steady state. The model incorporates forward-looking expectations and these expectations are imposed in a model-consistent manner. Since the model has an explicit characterization of technology, household preferences, and other structural features, it is possible to calibrate it to replicate certain stylized facts and thereby gain a better understanding of the economy's dynamic properties. For instance, under certain assumptions, an economy with a lower rate of time preference than that implied by the world real interest rate would have a relatively high domestic saving rate, a trend appreciation of the real exchange rate and a path of accumulation of net foreign assets similar to that observed for Switzerland. Thus, in addition to policy experiments, the model could provide a basis for explaining certain relevant stylized facts.

The proximate determinant of exchange rates in MULTIMOD is an equation for open interest parity across short-term interest rates in different countries; that is, the Swiss short-term interest rate is equal to the expected appreciation of the Swiss franc relative to any other currency plus the short-term interest rate on assets denominated in the latter currency.[14] More specifically, the open interest parity equation that determines the Swiss franc-DM exchange rate is as follows:

$$1 + SWI/100 = (1 + DMI/100)*(ER(t+1)/ER(t)) + RES\_ER \qquad (1)$$

---

[13]A detailed description of the main features of the model can be found in Masson, Symansky and Meredith (1990). See Zurlinden (1992) for an earlier extension of MULTIMOD to Switzerland.

[14]The level of the exchange rate, particularly in the long run, is of course determined by economic fundamentals.

where SWI and DMI are the nominal short-term interest rates on assets denominated in Swiss francs and deutsche marks, respectively; ER is the nominal exchange rate expressed as DM per Swiss franc (i.e., an increase in the exchange rate indicates an appreciation of the Swiss franc); and RES_ER is a residual term. The expected values of both ER and RES_ER are unobservable. Forward-looking expectations of the nominal exchange rate are, however, generated internally by the model and are consistent with forecasted values. The residual term RES_ER reflects deviations from open interest parity and is interpretable as a premium paid for holding Swiss franc-denominated assets. A negative residual indicates that investors are willing, at the margin, to accept a lower nominal rate of return on assets denominated in Swiss francs than in DMs. In simulations of the model, reducing this residual (i.e., making it more negative) is the obvious way of modeling an increase in investors' preferences for assets denominated in Swiss francs.

There is, of course, a real counterpart to the open interest parity equation that was described above in nominal terms. The trend real appreciation of the Swiss franc in recent years despite a persistently lower real interest rate in Switzerland than in Germany indicates that there was a persistent residual in the interest parity relationship in real terms also, which reflects the lower real return that investors appear to be willing to accept for the privilege of holding Swiss franc-denominated assets.[15]

Both real and nominal outcomes are of interest in these simulations. MULTIMOD works with an interest parity equation that is defined in nominal terms but the differential would carry through in real terms. The nominal interest parity equation is crucial because the conduct of monetary policy is through instruments such as the nominal interest rate and the presence of a floor on nominal interest rates therefore has important implications. To account for the effects of an interest rate floor, a nonlinear money demand specification was estimated for Switzerland. The estimated elasticities appeared quite reasonable (see Appendix I) but there are some important caveats. First, the span of the available time series data is not long and does not cover many periods with low levels of interest rates and inflation. Second, nonlinear models are difficult to estimate with much precision and, in particular, statistical tests for discriminating among different nonlinear models have limited power. Given the importance of this issue for the operation of monetary policy in an environment with low nominal interest rates, however, the use of a nonlinear specification could not be avoided.[16]

---

[15]Mauro (1995) presents evidence showing that the real interest differentials between Switzerland and other countries reflect premia attributable to lower foreign exchange rate risk on Swiss franc-denominated assets rather than premia paid by investors to have deposits located in Switzerland owing to "safe haven" considerations.

[16]This approach does not capture the institutional features that could account for the nominal interest rate floor at zero percent, but it has the merit of avoiding discontinuities that could complicate model simulations. See Chadha and Tsiddon (1996) for a theoretical analysis of the

(continued...)

A second dimension in which MULTIMOD is nonlinear is the Phillips curve relationship. Although the long-run Phillips curve is vertical, the model allows for short-run inflation-unemployment tradeoffs. The convexity in the short-run Phillips curve implies that demand management policies can not significantly boost output in the short run without severe inflationary consequences. In addition, the forward-looking structure of expectations and the role for policy credibility in the model could result in downward inflation inertia. This implies that a substantial and prolonged contraction of output would be required to lower inflation in response to large aggregate demand shocks that drive output above potential. The convexity also implies that the attainment of a very low level of inflation may involve substantial real costs in terms of output and unemployment.

Estimating a nonlinear Phillips curve for each country is, unfortunately, fraught with complications, in part stemming from the wide confidence intervals around the parameter estimates. The general strategy that has been employed for MULTIMOD is to estimate a nonlinear Phillips curve using pooled data from the G-7 countries and to impose those common parameters on all industrial countries.[17] Although the data do not reject the use of common parameters among the G-7 countries, using the same parameters for Switzerland raises a number of issues. Switzerland's unemployment history has been different from that of the G-7 countries. Switzerland has traditionally had a lower measured unemployment rate than has been observed in G-7 countries. In addition, wage differentiation and nominal wage flexibility appear to be greater in Switzerland than that prevailing in most European industrial economies (see the 1996 OECD *Economic Survey* of the Swiss economy). Both of these considerations, but particularly the latter one, suggest that the short-run trade off in Switzerland may be better than that for the G-7 countries. However, in the absence of a well-grounded empirical alternative, the nonlinear Phillips curve specification with parameters based on G-7 data was retained for the MULTIMOD simulations because this specification has important implications for the conduct of monetary policy.[18] A nonlinear short-run Phillips curve implies, for instance, that prompt actions to offset positive aggregate demand shocks can reduce the need to take stronger compensating actions down the road to reduce inflationary pressures. On the other hand, the real costs of reducing inflation to very low levels could be quite substantial. In a world rife with uncertainty, including uncertainty about the levels of potential output and the output gap, the nonlinear Phillips curve places a premium on

---

[16](...continued)
consequences of this floor for monetary policy and its effects on output variability.

[17]The functional form, econometric procedure, and estimation results are described in detail in Laxton, Meredith and Rose (1995). Debelle and Laxton (1996) argue that, for certain G-7 countries, a nonlinear Phillips curve model fits the data better than linear models.

[18]A preliminary examination of the data by staff at the SNB has found a nonlinear relationship; overheating has a greater upward impact on inflation than the downward impact on inflation of economic slack.

forward-looking and timely policy actions that could minimize the deleterious effects of exogenous shocks.

Another important issue that arises in adapting MULTIMOD to the Swiss economy concerns the re-estimation of certain equations. Previously, all small industrial countries (SIC) were grouped into one block and parameters were estimated for this block as a whole. In the context of a small open economy, the trade equations are of particular interest and, therefore, these equations were re-estimated for Switzerland. The export and import volume equations for manufactured goods were re-estimated for Switzerland using annual data over the period 1970-1995 as was the export price equation. The parameter estimates for the re-estimated equations were different from the previously estimated SIC parameters, but the differences were not large. The estimated equations and the coefficient estimates are presented in Appendix 1. These equations have more explanatory power, as measured by the adjusted R squared, for the Swiss data than the corresponding equations for the SICs. For certain equations such as the oil consumption equation, individual country estimation yielded very imprecise and sometimes implausible estimates. Hence, pooled estimates from the full model have been retained.

It is also necessary, from a theoretical perspective, to impose the small open economy assumption on the model for Switzerland. In practice, this simply meant that changes in Swiss variables are constrained not to have an effect on any global variables. This assumption is particularly important when analyzing the effects of changes in the stance of macroeconomic policies in Switzerland. It implies, for instance, that changes in Swiss interest rates do not affect the benchmark "world interest rate".

C. MULTIMOD Simulations

This section presents results from a set of MULTIMOD simulations that attempt to model the possible effects of EMU on Switzerland.[19] Many of the scenarios presented in this section are similar to those discussed in the KfK report. A possible scenario could run as follows: in early 1998, an announcement is made—based on data for 1997—concerning the initial participants in stage 3 of EMU in 1999. The group of countries could be large and based on a "flexible" interpretation of the Maastricht criteria. The resulting *euro* is perceived as a "soft" currency by market participants and the new European Central Bank (ECB) lacks the credibility of the outgoing Bundesbank. Consequently, holders of the new *euro* prefer to hold assets denominated either in higher-yield currencies (e.g., pound sterling or U.S. dollar) or low-yield currencies (i.e., Swiss franc) outside EMU.

The magnitude of such portfolio shifts is a matter of conjecture and the share that would be directed towards Swiss franc-denominated assets is difficult to predict ex ante. In early 1997,

---

[19]Note that the simulation results are all expressed as deviations from the baseline staff projections taken from the October 1996 World Economic Outlook.

Swiss short-term interest rates are about 375 basis points and 400 basis points, respectively, below comparable rates for U.S. dollar and pound sterling denominated assets. These differentials could make it very expensive to move into Swiss franc assets rather than assets denominated in dollars or sterling. An additional consideration in the simulations is that, reflecting uncertainty, the *euro* interest rate could rise above the present baseline interest rate for deutsche mark-denominated assets, placing upward pressures on Swiss interest rates. For analytical purposes, in the simulations presented below, these considerations will be examined separately. It should be recognized that the eventual outcome is likely to be some combination of these effects.

As noted earlier, a shift in investor sentiment can be introduced in the model by changing the exogenous residual term in the open interest rate parity equation. A decrease in this residual reflects an exogenous increase in the preference of foreign investors for assets denominated in Swiss francs. Given the world interest rate, the combination of domestic interest rate declines and exchange rate appreciations that maintain the interest parity condition are then determined by the dynamics of behavioral relationships in the model.

In MULTIMOD, a monetary feedback rule based on money targeting is used to anchor nominal variables over the medium term, although this rule operates somewhat flexibly in the short run. In the short run, nominal money balances are allowed to adjust to changes in the price level and output.[20] This feedback rules appears to be a reasonable representation of the regular operation of the Swiss monetary policy framework. The nonlinear specification of the money demand function prevents the interest rate in any of the simulations from falling to zero. The monetary feedback rule is assumed to be credible and known to all agents. Thus medium-term inflation and inflationary expectations are anchored.

Temporary portfolio preference shifts

First, a scenario is considered where investors temporarily increase their preferences for Swiss franc-denominated assets due to the uncertainty and possible instability engendered by the formation of EMU. A plausible scenario would be one where investors' preferences shift for a few years and then, as the uncertainties concerning EMU diminishes, the preference of international investors for Swiss franc-denominated assets would gradually decline. A key feature of this transitory preference shift is that it does not alter any long-run fundamentals of the Swiss economy even though it could have important short-run effects.

This scenario is modeled as a temporary change in the residual of the interest parity equation. The effect that the change in this residual has on interest rates and exchange rates is

---

[20]For instance, consider an asset preference shift that would normally result in a change in domestic interest rates. If domestic interest rates were for some reason constrained to remain temporarily unchanged, the nominal money supply would have to adjust to accommodate the change in money demand.

determined by the properties of the model. The residual is lowered (i.e., made more negative relative to its baseline level) by 0.05 for three years beginning in 1998, by 0.025 in the fourth year, and is set to zero thereafter. The simulations are presented in Chart II-1, with a few key variables also shown in Table II-1 as Scenario 1A.[21] This scenario assumes a delayed reaction of monetary policy, i.e., short-run interest rates are kept unchanged in the first year. Consequently, the full impact of the preference shift is on the nominal exchange rate, which appreciates by nearly 4½ percent in the first year, while the real exchange rate appreciates by over 2½ percent.[22] Investment increases due to the decline in ex ante real interest rates, even though nominal short-term interest rates do not decline in the first year.[23] On the other hand, given that Switzerland is a very open economy, the trade balance deteriorates sharply in the short run due to the exchange rate appreciation. The net contractionary impact leads to a fall in disposable income and, hence, in consumption. Overall, real GDP contracts by about 1¼ percent. The deterioration in the current account balance also implies a decline in the ratio of net foreign assets to GDP.[24]

In the second year, interest rates begin to decline and, over the next two years, they fall by almost 2 percentage points relative to the baseline. As short-term interest rate in the WEO baseline increase, the interest rate floor is not binding in this scenario.

This simulation illustrates the negative short-run consequences of a temporary increase in the demand for Swiss franc-denominated assets. Aggregate output and, in particular, the traded goods sector are adversely affected by the resulting real exchange rate appreciation. At the same time, the transitory nature of this shift implies that any possible long-run benefits from a lower interest rate are considerably muted.

---

[21]Note that the numbers of the scenarios described in this section do not correspond to those in the KfK report.

[22]In MULTIMOD, the real effective exchange rate is calculated as the ratio of the home country's export price to a foreign price that includes weighted averages of foreign GDP deflators and competitors' export prices.

[23]Note that the figure only shows the ex-post realization of interest and inflation rates in response to a sequence of shocks. Investment decisions at each point in time are based on current and future ex-ante real interest rates, which are not shown here. The investment equation in MULTIMOD is a formulation based on Tobin's Q. See Masson, Symansky and Meredith (1990) for more details.

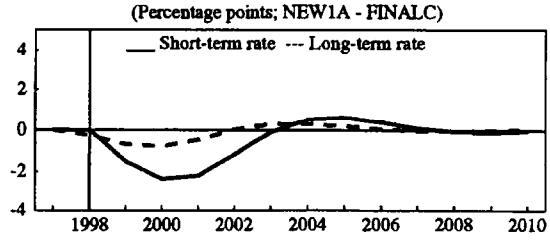
[24]Although it is not apparent from the chart, which shows the simulation results only through the year 2010, the net foreign assets to GDP ratio does return to base line over the longer term in this and all other simulations below. The desired NFA/GDP ratio in the model is influenced by fundamental determinants such as the rate of time preference, the real interest rate, and the planning horizon of agents in the model.

Switzerland

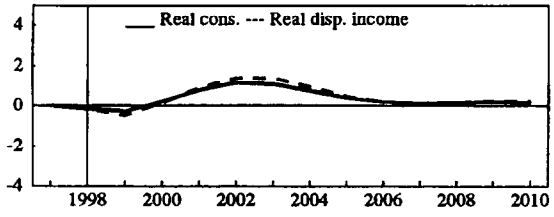
Chart II-1. Temporary Portfolio Preference Shift with a Delayed Monetary Reaction

Real and Potential GDP
(Percentage change; NEW1A - FINALC)

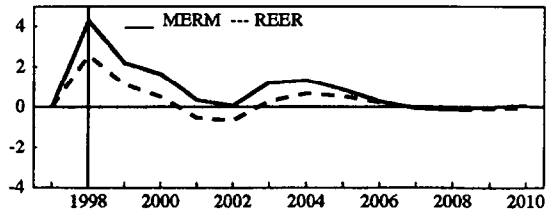
Interest Rates
(Percentage points; NEW1A - FINALC)



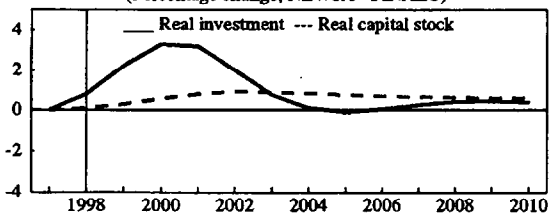
Consumption and Disposable Income
(Percentage change; NEW1A - FINALC)



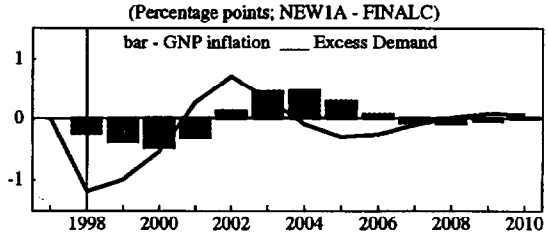
Nominal and Real Eff. Exchange Rate
(Percentage change; NEW1A - FINALC)



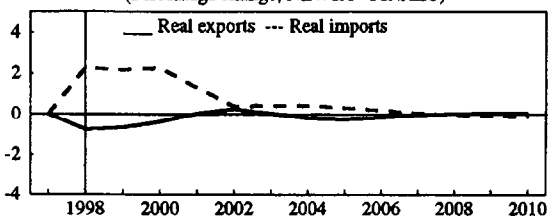
Investment and Capital Stock
(Percentage change; NEW1A - FINALC)



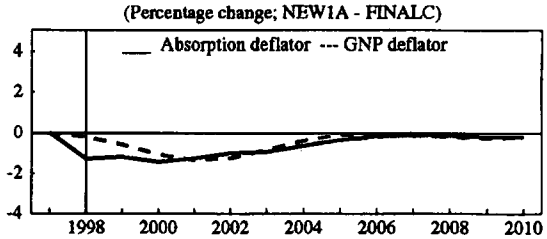
Inflation and Excess Demand
(Percentage points; NEW1A - FINALC)



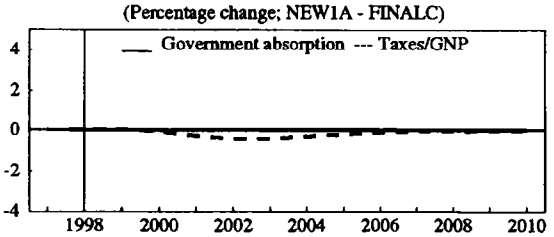
Exports and Imports
(Percentage change; NEW1A - FINALC)



Deflators
(Percentage change; NEW1A - FINALC)



Government Sector
(Percentage change; NEW1A - FINALC)



Debt and Net Foreign Assets
(Percentage points; NEW1A - FINALC)

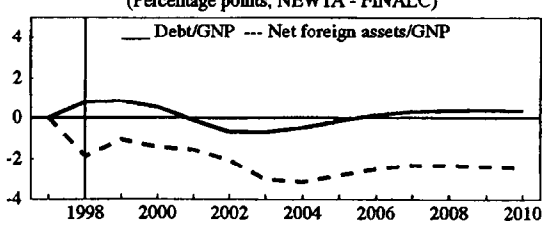


Table II-1. Multimod Simulation Scenarios

	1998	1999	2000	2001	2002	2003	2004	2005
Output gap								
Scenario 1A	-1.19	-1.00	-0.55	0.26	0.70	0.32	-0.10	-0.30
Scenario 1B	-0.81	-0.75	-0.50	0.18	0.59	0.26	-0.11	-0.27
Scenario 1C	-0.72	-0.65	-0.44	0.16	0.51	0.21	-0.11	-0.24
Scenario 1D	-1.25	-1.22	-0.88	0.16	0.85	0.52	-0.01	-0.32
Scenario 1E	-1.25	-1.22	0.15	0.61	0.95	0.37	-0.24	-0.51
Scenario 1F	-0.53	-0.61	-0.55	0.36	0.97	0.31	-0.36	-0.61
Scenario 2A	-0.40	-0.28	-0.10	0.04	0.11	0.10	0.05	0.00
Scenario 2B	-0.15	-0.03	0.07	0.07	0.05	0.01	-0.01	-0.02
Scenario 3	-0.20	-0.13	-0.04	0.02	0.05	0.05	0.02	-0.00
GNP inflation								
Scenario 1A	-0.25	-0.38	-0.48	-0.31	0.12	0.44	0.46	0.27
Scenario 1B	-0.16	-0.27	-0.35	-0.23	0.12	0.38	0.37	0.20
Scenario 1C	-0.16	-0.24	-0.31	-0.18	0.12	0.33	0.32	0.16
Scenario 1D	-0.26	-0.45	-0.63	-0.49	0.02	0.50	0.61	0.43
Scenario 1E	-0.26	-0.45	-0.35	0.06	0.75	1.17	1.11	0.78
Scenario 1F	-0.10	-0.18	-0.25	-0.02	0.58	0.94	0.80	0.40
Scenario 2A	-0.12	-0.21	-0.26	-0.25	-0.19	-0.12	-0.07	-0.05
Scenario 2B	-0.05	-0.07	-0.05	-0.02	0.02	0.03	0.03	0.02
Scenario 3	-0.06	-0.10	-0.13	-0.12	-0.09	-0.06	-0.03	-0.03
Short-term nominal interest rate								
Scenario 1A	0.00	-1.55	-2.39	-2.22	-1.18	-0.12	0.50	0.59
Scenario 1B	-1.03	-1.83	-2.33	-2.06	-1.06	-0.09	0.44	0.50
Scenario 1C	-0.95	-1.68	-2.13	-1.85	-0.92	-0.07	0.37	0.40
Scenario 1D	0.00	-1.20	-1.60	-1.95	-1.44	-0.35	0.47	0.71
Scenario 1E	0.00	-1.20	-1.02	-1.64	-0.88	0.36	1.11	1.16
Scenario 1F	-1.75	-1.70	-1.69	-2.18	-1.77	0.00	0.92	0.95
Scenario 2A	-0.56	-0.97	-1.21	-1.32	-1.29	-1.19	-1.08	-1.00
Scenario 2B	-0.88	-1.01	-1.23	-1.13	-1.03	-0.96	-0.92	-0.92
Scenario 3	-0.28	-0.48	-0.61	-0.66	-0.64	-0.59	-0.54	-0.50

Table II-1. Multimod Simulation Scenarios (concluded)

	1998	1999	2000	2001	2002	2003	2004	2005
Nominal effective exchange rate								
Scenario 1A	4.26	2.19	1.64	0.34	0.06	1.21	1.21	0.84
Scenario 1B	3.00	1.96	1.67	0.30	-0.13	0.88	0.97	0.55
Scenario 1C	3.17	2.19	1.89	0.39	-0.24	0.64	0.71	0.35
Scenario 1D	4.49	2.86	2.49	0.46	-0.09	1.30	1.64	1.19
Scenario 1E	4.49	2.86	-1.04	-0.35	-1.19	-0.36	-0.70	-1.74
Scenario 1F	2.14	1.98	1.88	-0.72	-1.79	-0.10	-0.10	-0.98
Scenario 2A	1.34	0.91	0.87	1.08	1.39	1.67	1.86	1.93
Scenario 2B	0.52	0.40	0.41	0.62	0.75	0.78	0.74	0.66
Scenario 3	0.65	0.43	0.41	0.51	0.67	0.81	0.89	0.93
Real effective exchange rate								
Scenario 1A	2.56	1.11	0.49	-0.54	-0.68	0.29	0.65	0.54
Scenario 1B	1.82	1.06	0.69	-0.32	-0.55	0.30	0.60	0.48
Scenario 1C	1.92	1.23	0.88	-0.17	-0.53	0.21	0.45	0.34
Scenario 1D	2.70	1.49	0.90	-0.69	-1.08	0.06	0.66	0.66
Scenario 1E	2.70	1.49	-1.18	-0.77	-0.89	0.34	0.83	0.67
Scenario 1F	1.31	1.15	0.97	-0.68	-1.06	0.57	1.10	0.82
Scenario 2A	0.79	0.40	0.23	0.20	0.28	0.39	0.48	0.51
Scenario 2B	0.31	0.20	0.17	0.31	0.41	0.46	0.47	0.44
Scenario 3	0.38	0.19	0.10	0.09	0.13	0.19	0.23	0.24

Note: All simulation results represent deviations from the baseline WEO forecast. The output gap is expressed as the percentage deviation of actual GDP from potential GDP. The inflation and interest rate responses are in percentage points while the exchange rate responses are in percent.

We now consider alternative policy responses. It should be emphasized that the aim here is only to illustrate the effects of a range of policy actions, rather than to precisely determine the optimal policy response. The real appreciation in the exchange rate and the fall in output could potentially be offset by a more timely easing of monetary policy—the consequences of a lowering of interest rates in the first year are shown in Scenario 1B (Chart II-2). The nominal exchange rate takes up less of the burden of adjustment in the first year and, consequently, the real exchange rate appreciation is much smaller than in Chart II-1 (also see Table II-1). This policy response has favorable implications for all components of domestic demand and, since the real exchange rate appreciation is more muted, also leads to a smaller deterioration in the trade balance.[25] The output gap is thus smaller due to the rapid monetary accommodation in response to the external shock. This is achieved without a substantially different medium-term inflation outcome, indicating the benefits of a timely and appropriate monetary reaction.

Next, in response to the same shock, we consider the effects of fiscal policy. Contractionary fiscal policy could, through standard Mundell-Flemming channels, offset the appreciation of the real exchange rate generated by the shift in asset preferences.[26] However, the direct negative effects on aggregate demand would tend to dominate the effects of resisting the exchange rate appreciation in the short run, exacerbating the short-run weakness in economic activity. Conversely, a fiscal expansion in isolation would also tend be of limited effectiveness as the direct expansionary effects on aggregate demand would be diluted by the consequent exchange rate appreciation, which would be unhelpful in view of the initially postulated excessive currency appreciation.[27] Hence, any fiscal expansion aimed at stimulating demand may need to be accompanied by an greater easing of monetary policy.

Scenario 1C (Chart II-3) shows the effects of a temporary increase of 2 percentage points in the ratio of government expenditure to GDP that is accommodated by a concomitant lowering of short-term interest rates in response to the portfolio preference shift. The output and inflation effects of this policy mix are similar to those in the scenario with the monetary policy reaction (Chart II-2). Short-term interest rates decline marginally less and the exchange rate

---

[25]The response of imports is similar in the two simulations since the smaller exchange rate appreciation in the latter simulation is offset by the effects of stronger domestic activity. The effect of the differences in exchange rate responses is primarily reflected in the responses of exports.

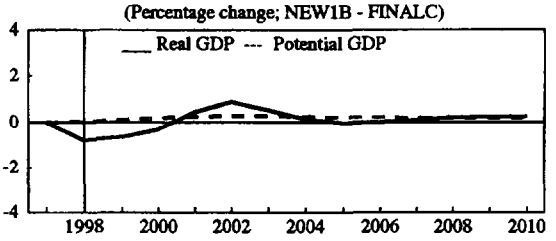
[26]Changes in the stance of fiscal policy could influence the long-term credibility of fiscal discipline and, if these effects were strong enough, could have the opposite effect on the exchange rate. This channel is probably not very important in the case of Switzerland.

[27]Simulation results showed, for instance, that the external sector leakages resulting from an exchange rate appreciation caused by even a large increase in government expenditure (five percentage points of GDP), coupled with the crowding out effects caused by an increase in interest rates, yielded a trivial short-run output response.

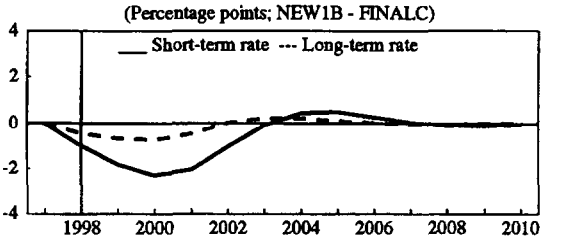
Switzerland

Chart II-2. Temporary Portfolio Preference Shift with a Timely Monetary Reaction

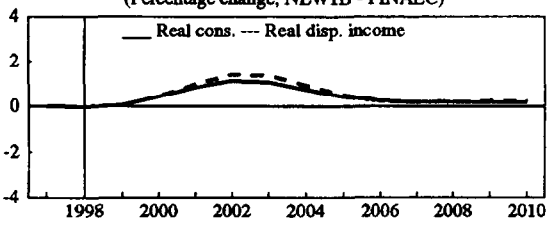
Real and Potential GDP
(Percentage change; NEW1B - FINALC)



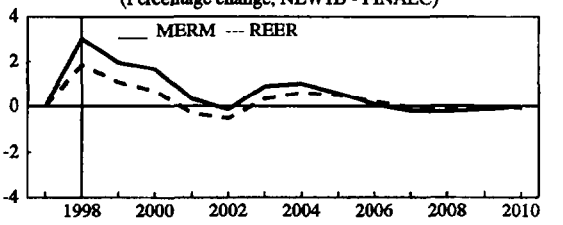
Interest Rates
(Percentage points; NEW1B - FINALC)



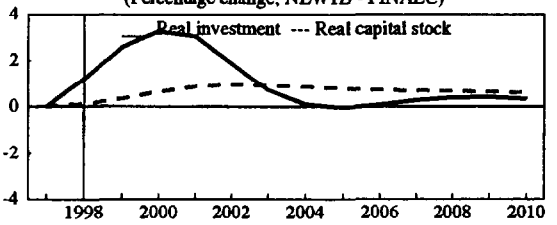
Consumption and Disposable Income
(Percentage change; NEW1B - FINALC)



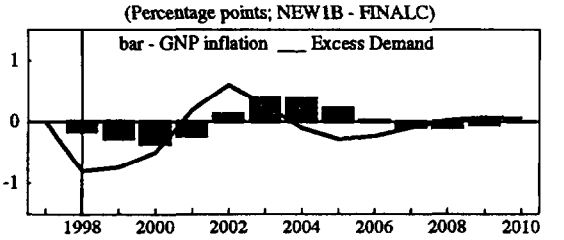
Nominal and Real Eff. Exchange Rate
(Percentage change; NEW1B - FINALC)



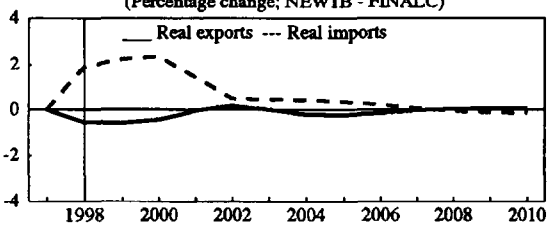
Investment and Capital Stock
(Percentage change; NEW1B - FINALC)



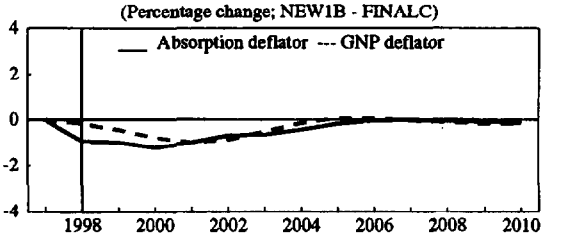
Inflation and Excess Demand
(Percentage points; NEW1B - FINALC)



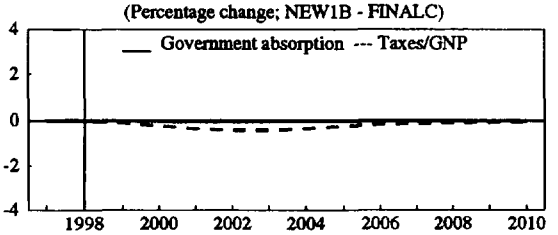
Exports and Imports
(Percentage change; NEW1B - FINALC)



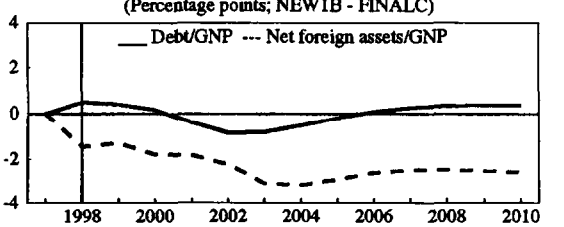
Deflators
(Percentage change; NEW1B - FINALC)



Government Sector
(Percentage change; NEW1B - FINALC)

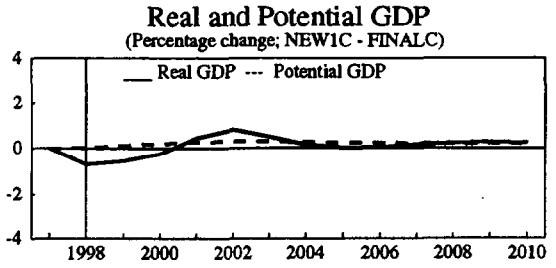


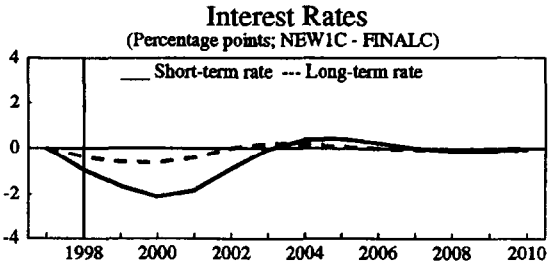
Debt and Net Foreign Assets
(Percentage points; NEW1B - FINALC)

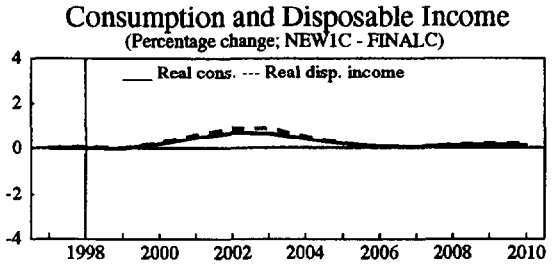


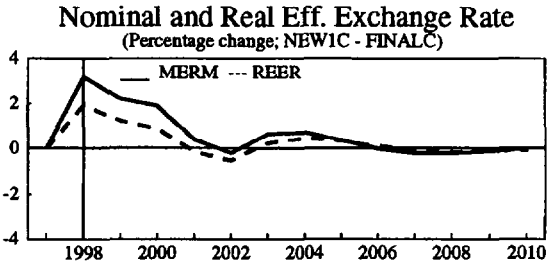
Switzerland

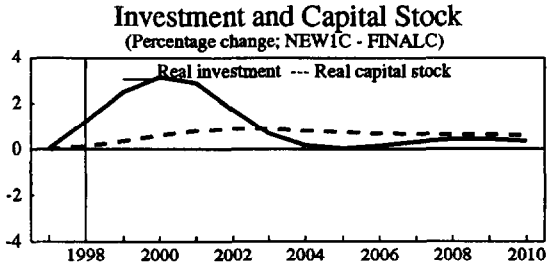
Chart II-3. Temporary Portfolio Preference Shift with a Monetary and Fiscal Policy Reaction

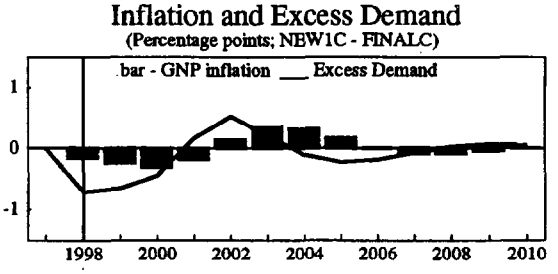


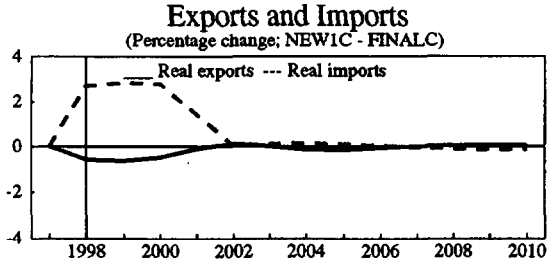


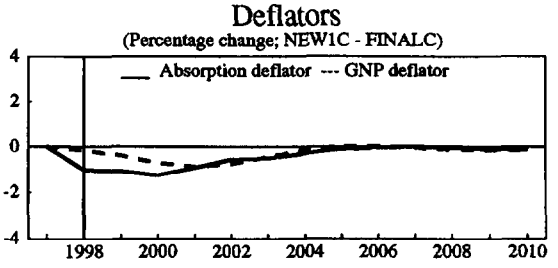


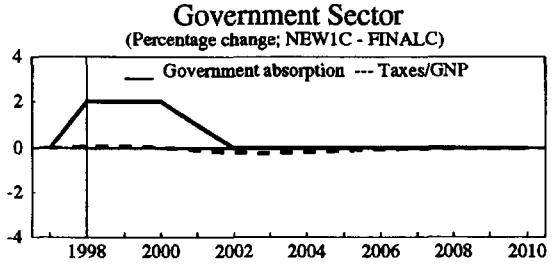


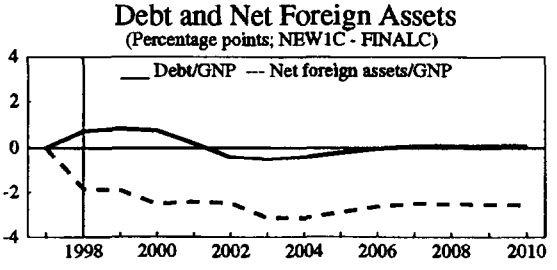












appreciates more in the short run. The principal effect of choosing between a monetary policy reaction and a mix of monetary and fiscal policy is on the composition of aggregate demand. In the latter case, private demand is crowded out to some extent by the increase in government consumption and the traded goods sector is more adversely affected.

In the simulations presented above, it was assumed that the portfolio preference shift would occur in 1998, when the short-term interest rate is projected by the staff to be well above the nominal interest rate floor. If this preference shift occurred earlier, however, or if interest rates in 1998 turned out to be significantly lower, then the interest rate floor could become a tighter constraint on the interest rate channel for monetary policy. Another possibility is that the preference shift would be much larger than in the simulations presented here, again constraining the interest rate response to accommodate the shock. In this case, the effects of the preference shift on the domestic economy could be larger.

This is illustrated in the next simulation (Scenario 1D), which repeats the same shock considered in the previous three simulations, but assumes that nominal short-term interest rates are fully constrained by the interest rate floor in the first year and can then fall by a maximum of 200 basis points in the following three years (Chart II-4). In this case, the exchange rate appreciation is larger and more persistent and, in addition, the smaller decline in interest rates yields a correspondingly smaller positive effect on domestic demand. Consequently, relative to the baseline, the cumulative output loss over the first three years is 3½ percent of potential output compared with over 2 percent in the scenario without the binding interest rate constraint (Chart II-2). The price level falls sharply in the short run, resulting in a decline in inflation that is balanced by a moderate increase of about ½ percentage points in medium-term inflation as prices return to their baseline level.

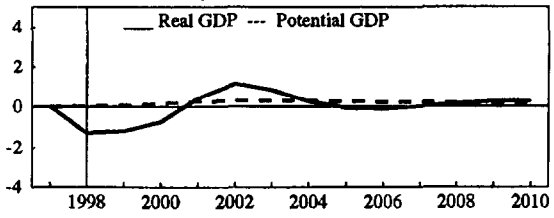
This scenario highlights the real output costs of the constraints imposed on monetary policy in responding to an asset preference shift when the inflation rate and the short-term interest rate are at low levels. In the event that nominal interest rate reductions were constrained, a faster increase in the money supply could be engineered within the existing monetary targeting framework or, alternatively, monetary policy could be guided more explicitly by exchange rate developments. These policy responses are likely to have the effects of limiting the appreciation of the exchange rate and dampening short-term output losses, but at the cost of increasing medium-term inflation. The next two simulations consider the effects of these two strategies.

A simulation of the first type of policy response is shown in Scenario 1E (Chart II-5), which assumes a five percent increase in the money supply target starting in the third year of the simulation. Since nominal interest rates are constrained in the model, the increase in the money supply target has the effect of depreciating the nominal exchange rate sharply. This gives a boost to the external sector and, consequently, has a positive effect on aggregate output. Relative to Scenario 1D, this expansionary monetary policy results in an output gain of over 1½ percent over a three-year horizon. The cost of this policy, however, is a marked (although temporary) increase in medium-term inflation relative to the scenarios presented

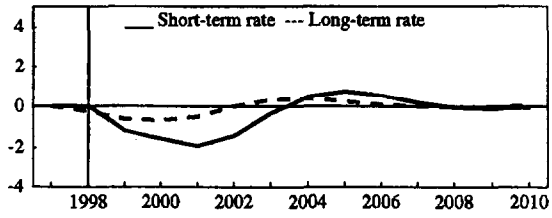
Switzerland

Chart II-4. Portfolio Preference Shift with an Interest Rate Floor

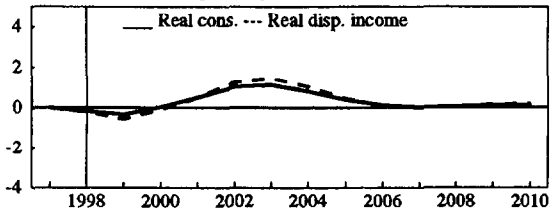
Real and Potential GDP
(Percentage change; NEW1A - FINALC)



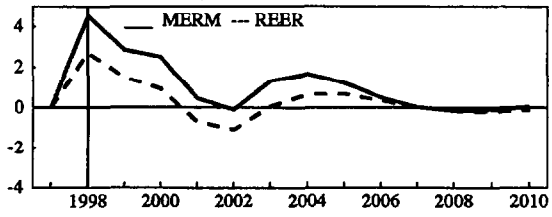
Interest Rates
(Percentage points; NEW1A - FINALC)



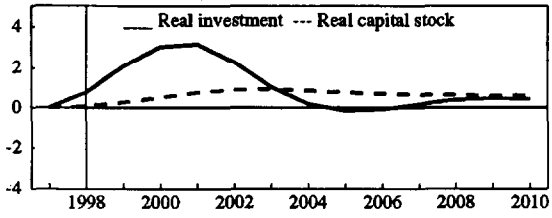
Consumption and Disposable Income
(Percentage change; NEW1A - FINALC)



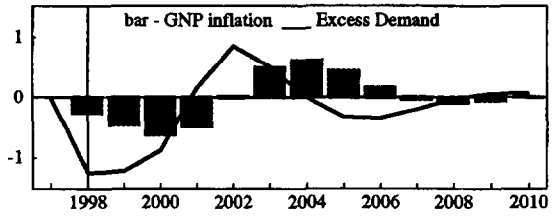
Nominal and Real Eff. Exchange Rate
(Percentage change; NEW1A - FINALC)



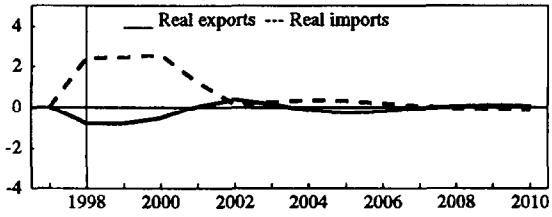
Investment and Capital Stock
(Percentage change; NEW1A - FINALC)



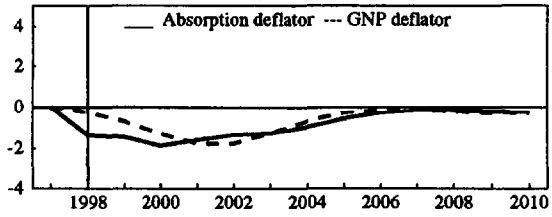
Inflation and Excess Demand
(Percentage points; NEW1A - FINALC)



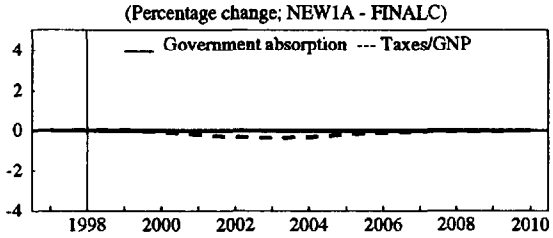
Exports and Imports
(Percentage change; NEW1A - FINALC)



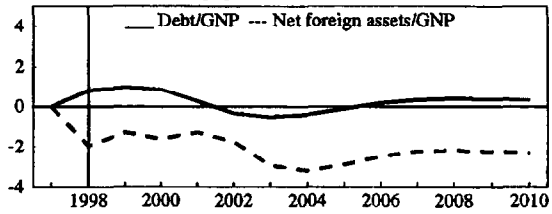
Deflators
(Percentage change; NEW1A - FINALC)



Government Sector
(Percentage change; NEW1A - FINALC)



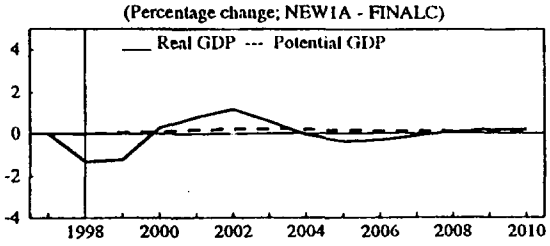
Debt and Net Foreign Assets
(Percentage points; NEW1A - FINALC)



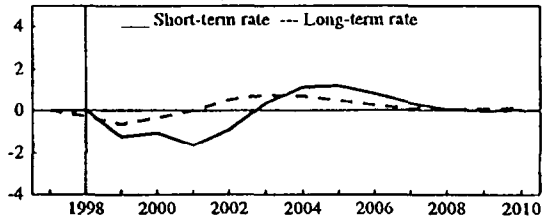
Switzerland

Chart II-5. Portfolio Preference Shift with an Interest Rate Floor and Monetary Stimulus

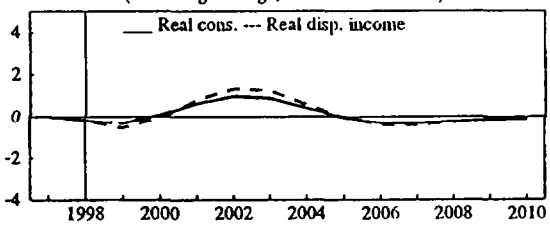
Real and Potential GDP
(Percentage change; NEW1A - FINALC)



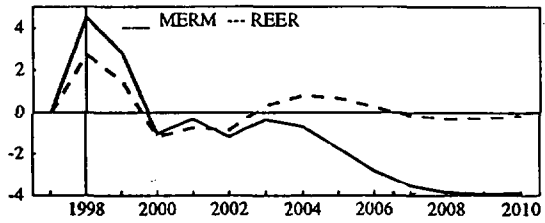
Interest Rates
(Percentage points; NEW1A - FINALC)



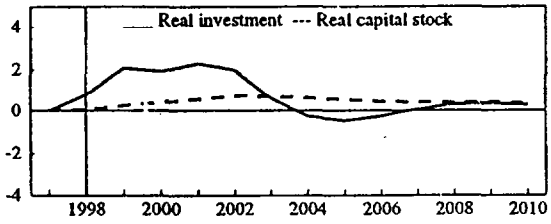
Consumption and Disposable Income
(Percentage change; NEW1A - FINALC)



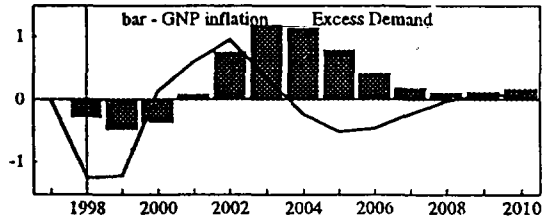
Nominal and Real Eff. Exchange Rate
(Percentage change; NEW1A - FINALC)



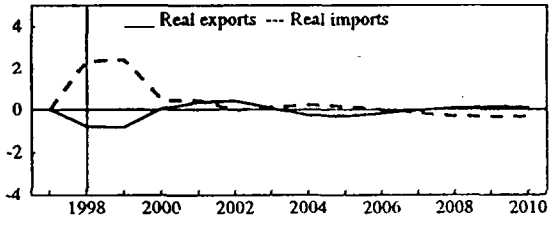
Investment and Capital Stock
(Percentage change; NEW1A - FINALC)



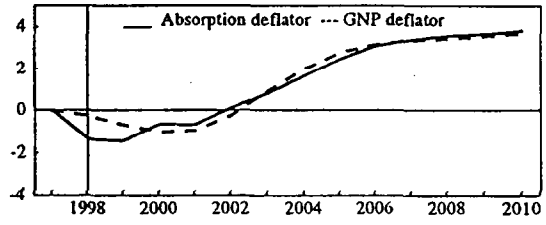
Inflation and Excess Demand
(Percentage points; NEW1A - FINALC)



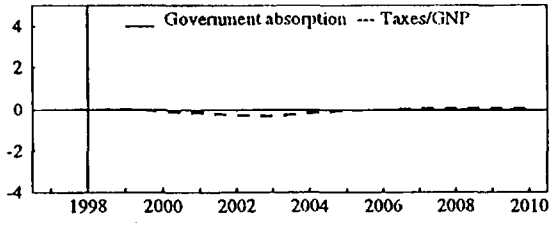
Exports and Imports
(Percentage change; NEW1A - FINALC)



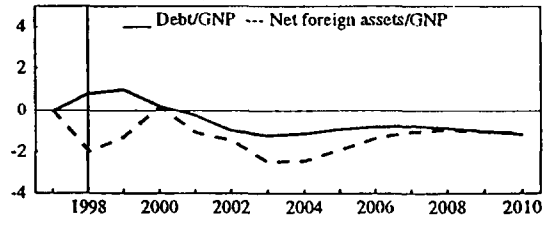
Deflators
(Percentage change; NEW1A - FINALC)



Government Sector
(Percentage change; NEW1A - FINALC)



Debt and Net Foreign Assets
(Percentage points; NEW1A - FINALC)



before, with inflation rising by over one percentage point above the baseline level by the sixth year of the simulation.

Scenario 1F (Chart II-6) shows the effects of an credible temporary exchange rate ceiling, where the monetary authority tries to limit the initial nominal exchange rate appreciation to about 2 percent (relative to baseline) and then counters any further short-term upward pressures on the exchange rate. In this case, the output losses are smaller than in the previous scenario and, in addition, the medium-term inflation outcome is relatively subdued due to the more rapid response of monetary policy. Both these simulations are suggestive of the trade-offs between output and inflation that will have to be faced when using the monetary policy instrument in response to EMU-related shocks.

Persistent portfolio preference shift

An alternative scenario considered here is one where the shift in investors' preferences in favor of assets denominated in Swiss francs is persistent. In this case, since Switzerland is a small open economy, the long-run adjustment effect would be borne entirely by the domestic interest rate, although a nominal interest rate floor could potentially complicate this adjustment process. Through its permanent effect on domestic interest rates and, hence, on capital accumulation, the long-term implications of a permanent asset preference shift are very different from those of a temporary shift. Consider a persistent shift in favor of financial assets denominated in Swiss francs modeled as a permanent reduction (of 0.01) in the residual term of the interest parity equation (Scenario 2A, Chart II-7). In this scenario, the increased preference for Swiss franc-denominated assets translates into persistently lower domestic interest rates and rates of return on real assets in Switzerland. The real exchange rate appreciates initially and then returns to baseline so that the long-run effect of this shift is transmitted entirely to the domestic interest rate.[28] The persistent decline in the interest rate is accompanied by a reduction in the cost of capital, leading to an investment boom, which results in a gradual increase in the capital stock and an increase in the rate of growth of potential output.

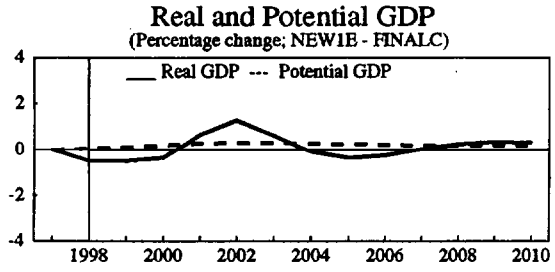
This simulation suggests that the Swiss economy would benefit from a persistent shift into Swiss denominated assets, particularly productive assets, since a persistent exogenous increase in the preference for Swiss franc-denominated assets feeds through into lower domestic interest rates and higher investment and increases potential output growth. All would not be well, however, from the Swiss point of view. The shift does have a contractionary effect on output in the short run. The real exchange rate appreciates, which

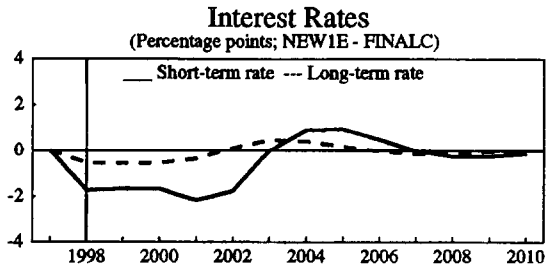
---

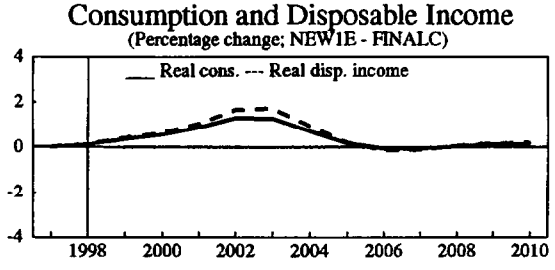
[28]Strictly speaking, this persistent shift is long-lived (over twenty years) but not permanent. Hence, the steady state is not affected and potential output returns to its baseline level in the very long run. For expositional purposes, the phrase medium term here refers to a horizon of about five to seven years, while the phrase long run refers to a longer time horizon but does not reflect the effects that are permanent.

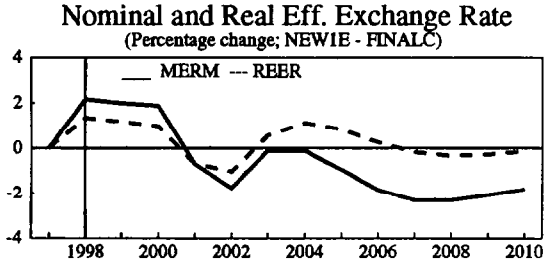
Switzerland

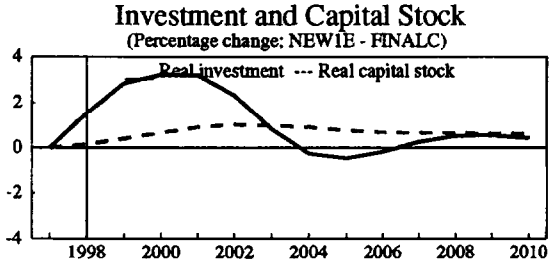
Chart II-6. Portfolio Preference Shift with a Temporary Exchange Rate Ceiling

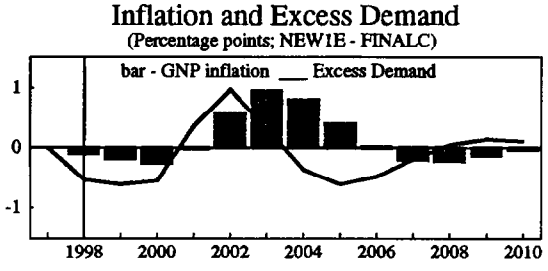


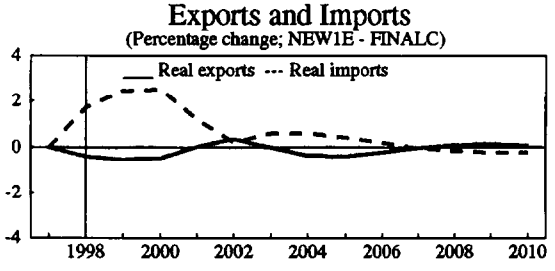


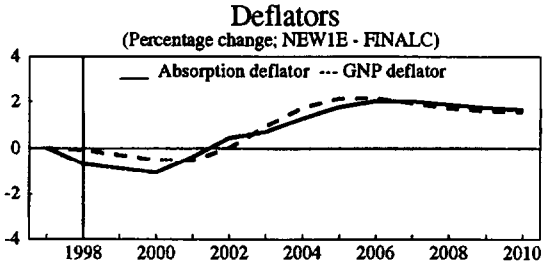


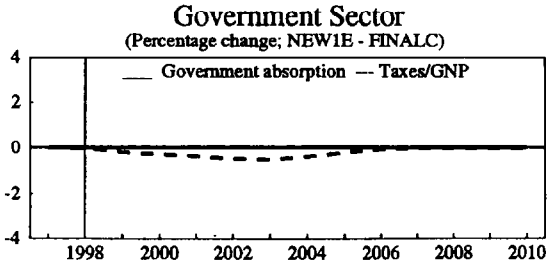


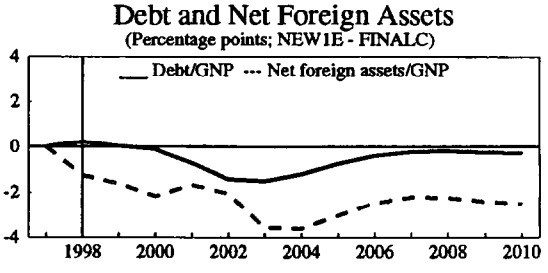








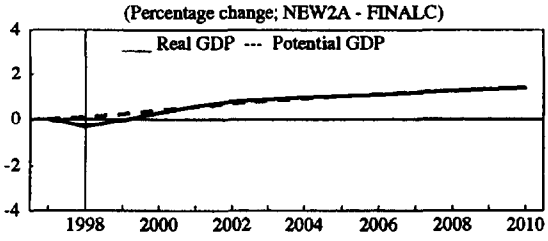




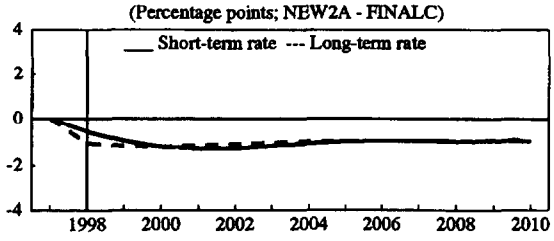
Switzerland

Chart II-7. A Persistent Portfolio Preference Shift Without Monetary Accomodation

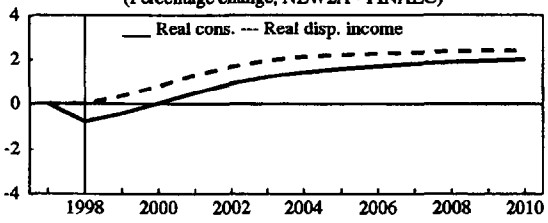
Real and Potential GDP
(Percentage change; NEW2A - FINALC)



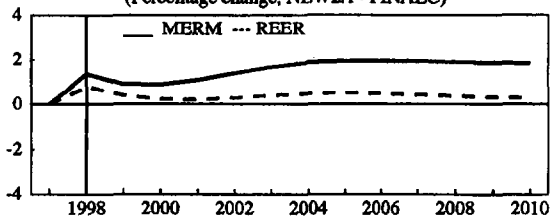
Interest Rates
(Percentage points; NEW2A - FINALC)



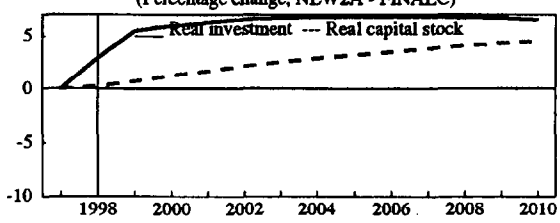
Consumption and Disposable Income
(Percentage change; NEW2A - FINALC)



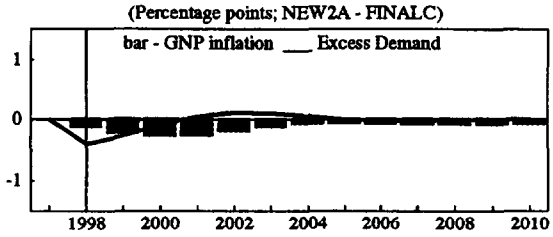
Nominal and Real Eff. Exchange Rate
(Percentage change; NEW2A - FINALC)



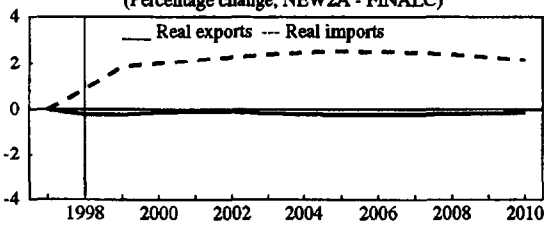
Investment and Capital Stock
(Percentage change; NEW2A - FINALC)



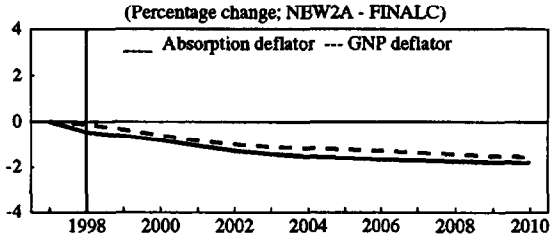
Inflation and Excess Demand
(Percentage points; NEW2A - FINALC)



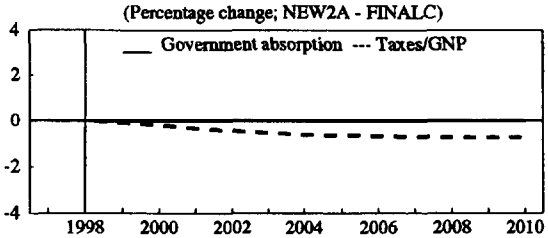
Exports and Imports
(Percentage change; NEW2A - FINALC)



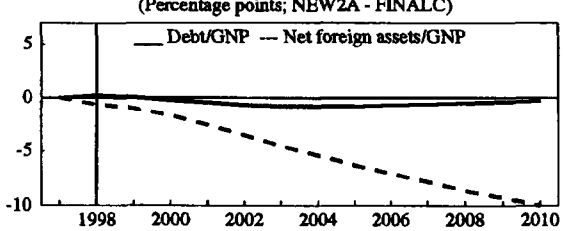
Deflators
(Percentage change; NEW2A - FINALC)



Government Sector
(Percentage change; NEW2A - FINALC)



Debt and Net Foreign Assets
(Percentage points; NEW2A - FINALC)



leads to a deterioration in the trade balance and, in addition, private consumption declines temporarily. Inflation declines in the short-run, although not by very much. Nonetheless, it does raise the specter of a deflationary economy as the current inflation rate is around 1 percent, which could impose significant real costs in the event of future adverse shocks to the economy.[29]

The short-run adverse consequences of this shift could be mitigated by an easing of monetary policy, as shown in Scenario 2B (Chart II-8) where the medium-term money supply target is increased by 1 percentage point relative to its baseline. The real effects in the long run are of course similar to those in Scenario 2A (Chart II-7) but the short-run real differences are striking. The exchange rate appreciation is now substantially smaller in the short run and the effect on exports is considerably muted. In addition, the decline in the short term interest rate towards its long-run level is achieved more quickly, slightly sharpening the short-run investment response. The negative short-run effect on aggregate output is now virtually zero and actual output tracks potential output very closely. Following an initial decline, the price level, as measured by either the GDP deflator or the absorption deflator, returns to its baseline level, unlike in Scenario 2A where the decline in the price level is more persistent. A notable feature of this simulation is that, despite the easing of monetary policy, the business cycle stabilization effects are achieved without a significant increase in inflation, although this relatively benign outcome should be viewed relative to the significant inflation reduction achieved in Scenario 2A.

These simulations indicate that, upon impact, an exogenous persistent increase in the preference of investors for Swiss franc-denominated assets could have beneficial long-term effects but negative short-run effects on the Swiss economy, although these short-run effects are more muted than in the case of a temporary asset preference shift. To minimize the initial output costs, the simulations suggest that monetary policy should be eased to mute the exchange rate appreciation and to provide support to the economy in the short run. As in the case of a temporary portfolio preference shift, countercyclical fiscal measures coupled with accommodative monetary easing could be even more effective in stabilizing output.

A change in the foreign interest rate

Finally, the baseline foreign interest rate could increase concurrently with a shift in investors' preferences toward Swiss franc-denominated assets. The appropriate benchmark foreign interest rate is presumably a composite of interest rates in major industrial economies including Germany and the United States. For the purposes of this paper, baseline U.S. interest rates are assumed to be unaffected by the announcement of the participants in stage 3

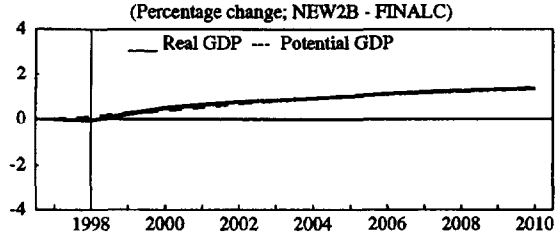
---

[29]Akerlof, Dickens and Parry (1996) argue that standard measurements understate the extent of actual nominal wage rigidity in the United States. Their analysis suggests that attempting to reduce inflation that is already at low levels could have significant real economic costs in terms of output and employment.

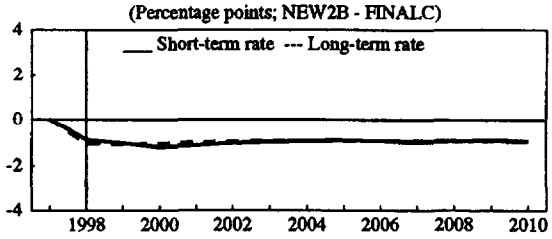
Switzerland

Chart II-8. A Persistent Portfolio Preference Shift With Monetary Accomodation

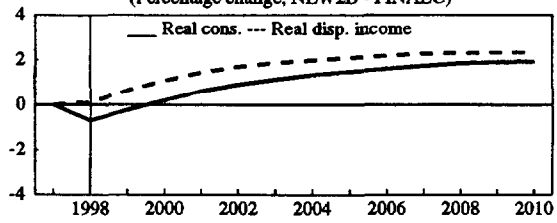
Real and Potential GDP
(Percentage change; NEW2B - FINALC)



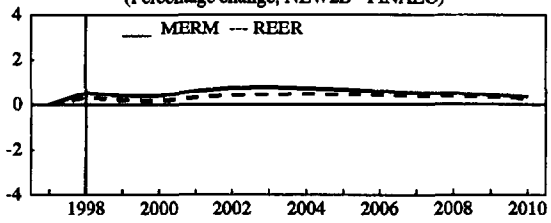
Interest Rates
(Percentage points; NEW2B - FINALC)



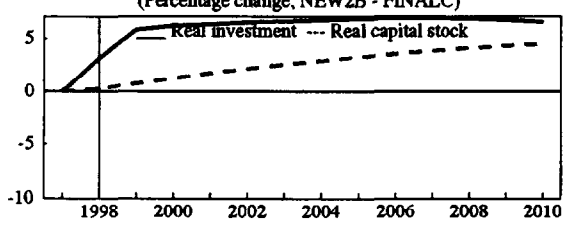
Consumption and Disposable Income
(Percentage change; NEW2B - FINALC)



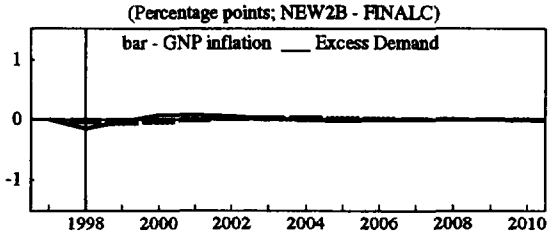
Nominal and Real Eff. Exchange Rate
(Percentage change; NEW2B - FINALC)



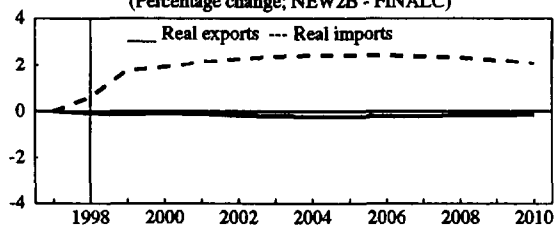
Investment and Capital Stock
(Percentage change; NEW2B - FINALC)



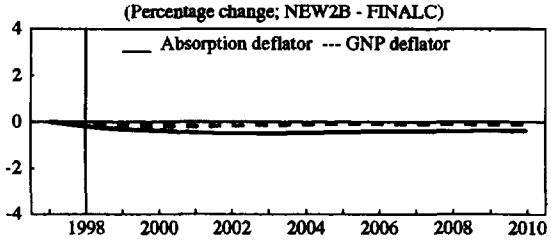
Inflation and Excess Demand
(Percentage points; NEW2B - FINALC)



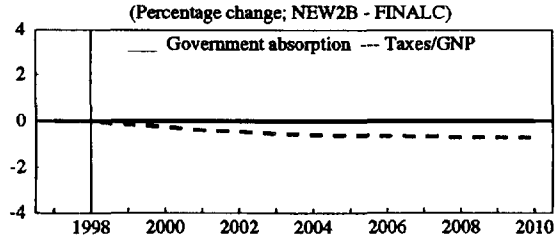
Exports and Imports
(Percentage change; NEW2B - FINALC)



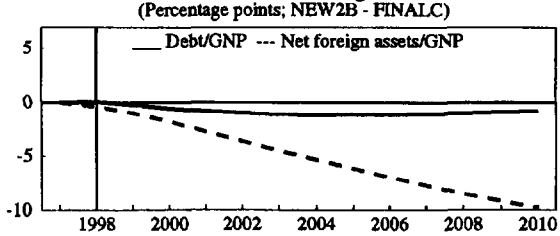
Deflators
(Percentage change; NEW2B - FINALC)



Government Sector
(Percentage change; NEW2B - FINALC)



Debt and Net Foreign Assets
(Percentage points; NEW2B - FINALC)



of EMU and, thus, the deutsche mark interest rate is the key foreign interest rate. However, with the entry of Germany into EMU, the deutsche mark interest rate will disappear and the relevant point of comparison will be the *euro* interest rate. Since Germany has lower long-term interest rates than many major countries that could be part of EMU in 1999, it is plausible that the initial *euro* interest rate could be higher than the baseline DM interest rate in the WEO. Moreover, investors may require a higher rate of return on *euro*-assets owing to the initial lack of credibility of the ECB and, more generally, to compensate for the higher risk associated with this new asset.

Although the premium paid by investors for Swiss franc-denominated assets could still increase relative to the baseline, the net impact on Swiss interest rates can not be determined ex ante. For illustrative purposes, the *euro* interest rate was raised permanently by 50 basis points relative to the present baseline German interest rate in the simulation, while the residual in the interest parity equation was also reduced permanently as in the previous scenario. Both changes are assumed to be persistent. The simulation results (Scenario 3, Chart II-9) are quite similar to the simulation for Scenario 2A (Chart II-7). Although the profiles are similar, the effects of this composite shock on domestic interest rates, the components of domestic demand, the real exchange rate, and external demand are more muted than in Scenario 2A. For instance, the change in the rate of growth of potential output relative to the baseline is smaller in Scenario 3 than in Scenario 2A and so is the short-run decline in aggregate output. Consequently, the policy implications are also similar, except in terms of magnitudes needed to offset the adverse short-run effects.

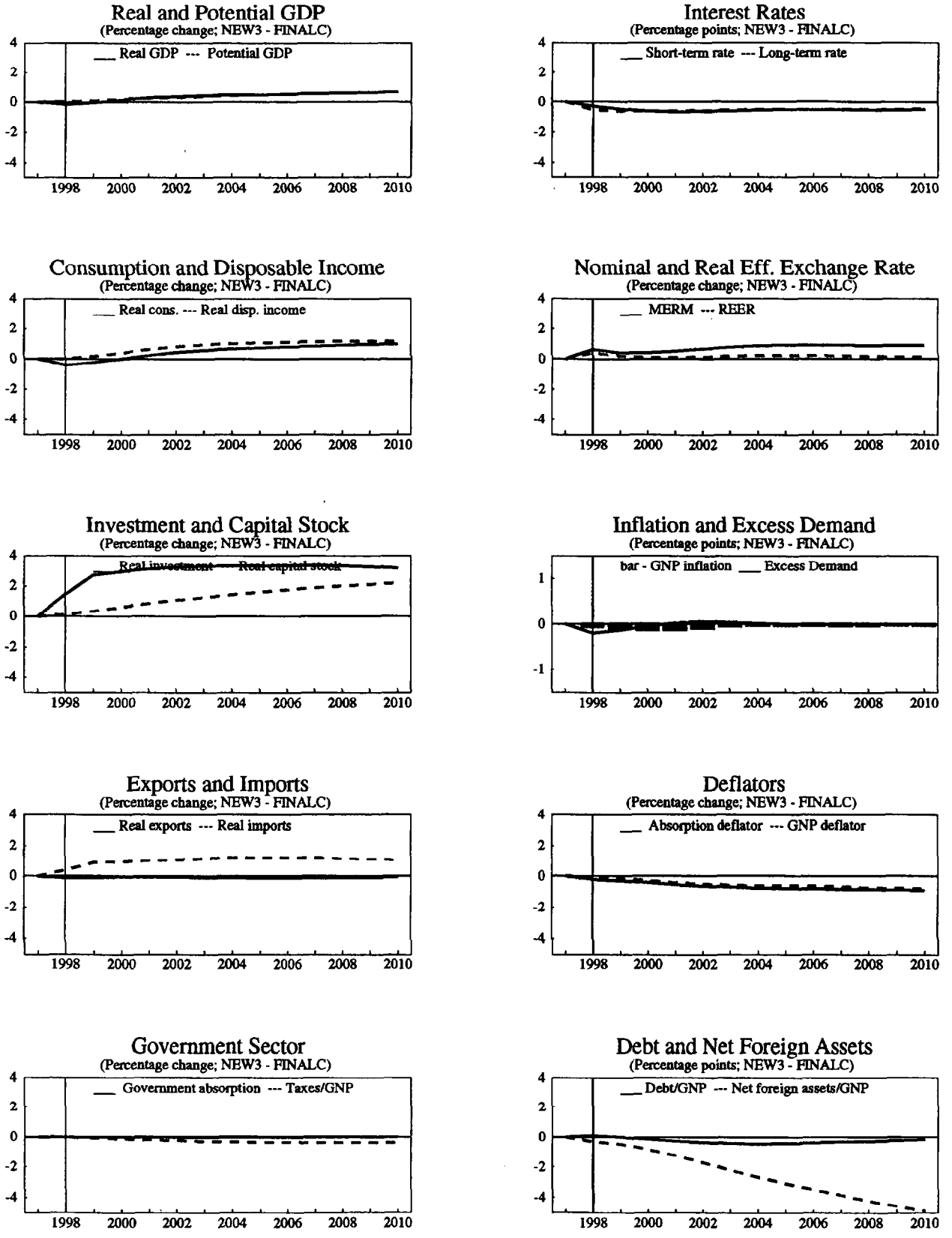
It should be recognized, of course, that the relative magnitudes of the changes in the foreign interest rate and the premium on Swiss franc-denominated assets are difficult to determine ex ante. In addition, as noted earlier, the relevant "foreign interest rate" is a composite of interest rates not just in Europe but also in the other major industrial economies including the United States. The effects of EMU on interest rates in these other economies have been abstracted from in this exercise but could be potentially important from the Swiss perspective.

D. Conclusions

European Monetary Union is likely to have a significant effect not just on its participants but also on some neighboring countries with close economic and financial links to the EMU countries. This paper has examined the possible effects of EMU on one such country, Switzerland. As the target date for EMU approaches, the uncertainties surrounding the creation of EMU may lead to a shift in investors' preferences towards assets denominated in hard currencies outside the EMU, including the Swiss franc. Using MULTIMOD, a number of illustrative scenarios were examined that suggest that the implications for the Swiss economy could range from being adverse to being quite beneficial. These simulations indicate that the magnitude and persistence of the shift in portfolio preferences could have an important bearing on the eventual outcome as would the policy response.

Switzerland

Chart II-9. A Higher Foreign Real Interest Rate



Determining the appropriate policy response is a difficult task that is further complicated by the current cyclical weakness of the Swiss economy. The effectiveness of expansionary fiscal policy is limited by the exchange rate implications; a fiscal expansion would have a positive impact on domestic demand in the short run, but at the cost of an appreciation in the real exchange rate, thereby dampening the net impact on aggregate output. On the other hand, a fiscal contraction would indeed induce a currency depreciation but the direct effects of reduced government consumption on domestic demand could outweigh the positive demand effects.

Thus, monetary policy appears to be a more effective tool for stabilizing output in response to the types of shocks analyzed in this paper, both through its effects on domestic demand and on the exchange rate. Even with an expansionary fiscal policy in the short run, monetary easing is required in order to dampen the adverse short-term output effects of these shocks. As indicated by the simulations, the inflationary consequences of a delayed monetary response to an asset preference shift could be larger than if the response were rapid and sufficiently large. The simulations also illustrated the additional risks posed by the constraints on monetary policy in responding to external shocks in an environment with low levels of domestic inflation and interest rates. In particular, over the next few years, monetary policy in Switzerland is likely to be faced with some difficult choices between short-run output losses and temporary but significant increases in medium-term inflation, although this trade-off could be mitigated by timely and forceful policy responses.

APPENDIX

RE-ESTIMATING THE MODEL EQUATIONS FOR SWITZERLAND

This appendix briefly describes the results of the re-estimation of the money demand equation and the main trade equations in the model for Switzerland. Except in the case of the money demand function, the regression specifications are identical to those used for all other countries in MULTIMOD. A detailed description and derivation of the specifications can be found in Masson, Symansky, and Meredith (1990). All regressions were estimated using annual data from 1971 to 1995 obtained from the OECD Analytical Database.

A. The Money Demand Equation

The standard money demand specification is linear in the interest rate. Given Switzerland's current low level of short-term interest rates, it was necessary to constrain the interest rate responses in the simulations from going below the nominal interest rate floor of zero percent. Hence, the following nonlinear specification was estimated:

$$\log(MB/PGNPNO) = \underset{(0.806)}{1.687} + \underset{(0.157)}{0.345}*\log(GDP) + \underset{(0.157)}{0.655}*\log(MB(-1)/PGNPNO(-1))$$

$$- \underset{(0.028)}{0.051}*\log(IR) - \underset{(0.008)}{0.017}*TREND;\ Rbarsq = 0.313,\ DW = 2.11$$

where MB is the monetary base, PGNPNO is the non-oil GNP deflator, IR is the annualized 3-month nominal interest rate, and TREND is a time trend. Standard errors are reported in parentheses below the estimated coefficients. The estimated elasticities appear reasonable and, when the equation was used in MULTIMOD, yielded acceptable model properties. Using the CPI instead of the output deflator did not change the results very much. However, given the limited span of the available data and the limited number of time periods with low levels of interest rates that could be used to identify nonlinearities, the results of this estimation should be treated with caution.

B. The Trade Equations

The trade equations were estimated using volumes and prices for exports and imports of manufactured goods. The volume equation for imports of manufactures is as follows:

$$\begin{aligned}\Delta\log(IM) = {} & IM0 + IM1*\Delta(IM7*\log(A) + (1-IM7)*\log(XM)) + \\ & IM2*\Delta(\log(PIMA/PGNPNO)) + IM3*\log(PIMA(-1)/PGNPNO(-1)) \\ + & \\ & IM4*(IM7*\log(A(-1)) + (1-IM7)*\log(XM(-1)) - \log(IM(-1))) + \\ & IM5*T + IM6*(T^2)\end{aligned}$$

where the operator del indicates the first difference, IM stands for imports of manufactures, A is real domestic absorption, XM is export volume, PIMA is the import price for manufactures, PGNPNO is the non-oil GNP deflator, T is a time trend, and IM0-IM7 are the parameters to be estimated.

This specification permits a short-run effect of the change in the log of absorption that differs from its long-run effect, which is constrained to have a unit elasticity.[30] The current change in relative prices is included, as well as its lagged ratio. Note that a weighted average of domestic absorption and of exports of manufactures is included to account for the fact that imported inputs are used in producing export goods and that an increase in the latter may therefore be associated with higher imports. The estimates are presented below, with the previous MULTIMOD estimates for the full block of smaller industrial countries (SIC) included for comparison.

---

[30]That is, for a given level of the real exchange rate, the share of imports in total domestic absorption is assumed to remain constant over the long run.

The estimation results indicate that the export volume equation for Switzerland does not differ substantially from the SIC parameters, although there are some differences (see Table II-1). For instance, the short-run effect of activity on imports is smaller than the SIC average. The estimates are generally quite plausible, with price and activity elasticities having the correct signs.

Next, we turn to the export volume equation. This equation incorporates an error-correction specification, uses weighted foreign absorption as an explanatory variable, and the price variable takes into account the price of exports relative to prices in the importer's home market, as well as competition in third markets. The equation also allows for lagged real exchange rate effects and is written as follows:

$$\text{del(log(XM))} = \text{XM0} + \text{XM1*del(REER)} + \text{XM2*del(log(FA))} + \text{XM3*log(XM(-1)/FA(-1))} + \text{XM4*REER(-1)} + \text{XM5*T} + \text{XM6*(T\^2)}$$

where XM stands for the volume of exports of manufactures, REER is the real effective exchange rate, FA is the weighted average of foreign absorption, T is a time trend and XM0-XM6 are parameters to be estimated. The estimation results for the export volume equation for Switzerland are also similar to the results for the SIC block as a whole (Table II-1). The short-run elasticity of imports with respect to foreign absorption is 1.8, compared with a long-run elasticity that is imposed to be unity. The short-run price elasticity of exports is smaller than the long-run elasticity and all coefficients have reasonable signs.

Finally, the export price equation was also re-estimated using Swiss data. In the specification of this equation, the rate of change of export prices is assumed to be a linear combination of the rates of change of domestic and foreign non-oil export and output prices. In addition, the specification includes a lagged difference between domestic and export prices, thereby forcing export prices to rise one for one with domestic output prices in the long run. The estimated equation is as follows:

$$\text{del(log(PXM))} = \text{PXM0} + \text{PXM1*del(log(PGNPNO))} + (1-\text{PXM1})\text{*del(log(PFM))} + \text{PXM2*log(PGNPNO(-1)/PXM(-1))}$$

where PXM is the export price for manufactures, PGNPNO is the domestic non-oil output deflator, and PFM is a weighted average of competitors' prices in foreign markets, and PXM0-PXM2 are parameters to be estimated. The coefficient estimates are presented in Table II-1, along with the estimates for the full SIC block.

Table II-1. Estimates of Trade Equations for Switzerland

Import Volume Equation			Export Volume Equation			Export Price Equation		
Coefficient	Switzerland	SIC	Coefficient	Switzerland	SIC	Coefficient	Switzerland	SIC
IM0	-0.757	-0.790	XM0	-2.861	-1.243	PXM0	0.001	-0.016
	(4.5)	(2.7)		(4.1)	(6.5)		(0.2)	(2.0)
IM1	1.977	2.104	XM1	-0.299	-0.242	PXM1	0.645	0.626
	(18.1)	(4.6)		(2.9)	(1.1)		(12.5)	(3.5)
IM2	-0.225	-0.670	XM2	1.795	2.003	PXM2	0.077	0.077
	(2.8)	(3.8)		(6.2)	(10.4)			(2.5)
IM3	-0.260	-0.597	XM3	0.772	-0.633			
	(3.0)	(2.9)		(3.9)	(8.8)			
IM4	0.483	0.511	XM4	-0.369	-0.447			
	(6.2)	(2.7)		(3.7)	(7.3)			
IM5	0.022	0.008	XM5	0.022	2.696			
	(4.1)	(1.6)		(3.4)	(2.0)			
IM6	0.000	0.000	XM6	0.000	-0.050			
	(5.5)	(0.0)		(2.8)	(1.4)			
IM7	0.760	0.770						
	(15.7)							
Rbarsq.	0.950	0.761	Rbarsq.	0.797	0.611	Rbarsq.	0.871	0.614
SER	0.015	0.035	SER	0.019	0.036	SER	0.018	0.036
DW	2.71	2.07	DW	2.03	1.94	DW	1.33	

Notes: Figures in parentheses are absolute t-ratios. The trade equations were estimated using annual data over the period 1971-95. SIC stands for the block of small industrial countries. The SIC equations were estimated using annual data over the period 1966-87 and represent pooled estimates across SIC and G-7 countries, with certain coefficients restricted to be the same across all countries. The regression diagnostics are from these pooled equations. The pooled coefficient estimate of 0.077 for PXM2 was used for Switzerland.

III. Recent Developments in the Banking Sector [31]

The banking sector is an important asset for the Swiss economy and is the basis for Switzerland's long-standing role as a major international financial center.[32] Although the banking sector accounted for only about 3 percent of Switzerland's total employment, it contributed around 8 percent to nominal GDP in 1995. The banking system has been a key channel for the export of domestic savings—Switzerland's current account surplus has been sizable and sustained over a long period of time. The Swiss banking system has also been a magnet for foreign financial savings, which have been reinvested abroad, and provides investment banking and foreign exchange and securities trading services on a significant scale. Swiss banks are also global market leaders in asset management. These various activities have established the banking sector as one of the country's most important export industries.

Since the early 1980s, the Swiss banking sector has been faced with serious pressures to restructure and consolidate in response to world-wide trends in financial deregulation, technological change, and integration of financial markets. Further pressures to restructure have been added by substantial over banking in the Swiss retail market, by the emergence of increasingly assertive shareholders demanding more competitive returns on their equity, and recent loan losses. The advent of stage 3 of EMU combined with Switzerland's decision not to join the EU, at least for the time being, presents the Swiss financial sector with new medium-term challenges but also new opportunities. Finally, the changing local and global environment linked with concerns about competitive distortions has raised renewed questions about the public sector's involvement in the banking sector as owners and/or guarantors, in particular in the case of the cantonal banks.

Switzerland's banking sector has been adversely affected by shifting domestic macroeconomic conditions over the last 10 years. In particular, an economic boom and exuberant property markets during the second half of the 1980s gave way to a protracted slump of the real economy and a collapse in property prices since 1991. Bank lending has followed this cycle and the quality of banks' loan portfolios has suffered, particularly mortgage and business loans. Smaller banks have been relatively harder hit because their income and loan portfolios were more heavily concentrated in mortgage and domestic business loans than in the case of the bigger banks. As a result, several small banks have been merged or taken over by other banks. The bigger banks have responded by engaging in massive provisioning and write-offs and by tackling with new urgency the task of restructuring.

---

[31]Prepared by Albert Jaeger and Wolfgang Merz.

[32]Developments in Swiss financial markets were last touched on in the paper on selected background issues (SM/95/2, Supplement 1; 1/11/95). Vibe (1986) is an earlier comprehensive staff study of Swiss financial markets.

Section A provides brief background information on the structure and regulatory environment of the Swiss banking sector. Section B describes the macroeconomic background and trends and policy issues in the banking sector, while Section C provides a summary.

A. Structure and Regulation of the Banking Sector

The structure of the Swiss banking system is characterized by the dominance of the so-called "big banks," the co-existence of privately and publicly owned banks, and a sizeable presence of foreign banks.[33] The three big banks—Union Bank of Switzerland (UBS), the Swiss Bank Corporation (SBC), and Credit Suisse (CS)—are privately owned; these three banks account for about 80 percent of the market capitalization of all listed Swiss banks.[34] In mid-1996, all three big banks were ranked among the 25 largest banks in the world and were considered by credit rating agencies to be among the world's soundest financial institutions, as reflected in international credit ratings (e.g., Standard and Poor's AAA for UBS and AA+ for SBC and CS).[35] In addition, in 1995 the big banks held 55 percent of total bank assets and employed almost the same proportion of total staff in the banking sector (Table III-1).[36] Since 1975, their share of total bank assets has risen by 9 percentage points.

The big banks are universal banks with highly diversified domestic and foreign operations. Some 50 percent of assets are invested abroad, and the banks provide services in foreign

---

[33]Comprehensive statistics on the Swiss banking system are published annually by the Swiss National Bank (SNB) for all banks operating under the Swiss *Banking Act*. The use and interpretation of Swiss banking statistics is subject to three important caveats. First, as regards business activities of Swiss banks abroad, the statistics cover only the activities of legally dependent offices. A substantial part of foreign business activities of Swiss banks, in particular in the case of the big banks, is carried out by legally independent offices abroad. Second, accounting regulations have been amended significantly over time, and, accordingly, comparisons of bank statistics through time must be interpreted cautiously. And third, while bank activities related to balance sheet and fiduciary transactions are reported in the banking statistics, there are no official statistics available on assets under management. According to estimates by the Swiss Bank Association, the Swiss financial sector keeps about Sw F 2,350 billion under management. Accordingly, managed assets could be double the size of banks' balance sheets assets at end-1995 or be equivalent to some 650 percent of Swiss nominal GDP.

[34]Kaufmann (1996, p. 9).

[35]Kaufmann (1996, p.7). Following the announcement in late 1996 of additional provisioning against loan losses, Standard and Poor downgraded the credit rating of UBS to AA+.

[36]The statistics report data on four "big banks". However, the fourth big bank, Swiss *Volksbank*, was acquired by CS in 1993.

Table III-1. Switzerland: Structure of the Banking Sector, End of 1995 1/

	Number of:			Assets (In percent of total)	Foreign Business (In percent of assets) 2/	Fiduciary transactions (In percent of total) 3/
	Banks	Branches	Staff			
Big banks 4/	4	943	61,735	55.2	53.0	21.9
Cantonal banks	25	759	18,863			
	19.8	5.3	2.8			
Regional and savings banks	127	427	5,224	5.5	1.0	0.4
Raiffeisen banks	1	1,034	2,762	3.8	0.0	0.0
Private bankers	17	20	2,602	0.5	24.3	8.3
Foreign banks	155	311	15,374	8.5	68.8	51.2
Other banks	84	277	8,496	6.7	40.0	15.4
Total	413	3,771	115,056	100.0	38.9	100.0

Source: *Les banques suisses en 1995* (SNB, 1996).

1/ Institutions subject to Banking Act.
2/ Share of assets placed abroad as a percent of total assets of respective banking group.
3/ Off-balance sheet deposits and loans held by banks for the account and risk of customers.
4/ Comprises Union Bank of Switzerland (UBS), the Swiss Bank Corporation (SBC), Credit Suisse Bank (CS), and Swiss *Volksbank* (SVB).

exchange and securities trading, investment banking, and asset management. While the domestic credit operations of the big banks were traditionally concentrated in company finance, over the last three decades they became increasingly involved in mortgage lending through their expanding domestic bank network. The big banks have a sizable share of the market for mortgages and business loans. Their share of the mortgage market rose to about 42 percent in 1995 from about 22 percent in 1975, while their share of business loans changed little over this period remaining near 50 percent. While these concentration measures are high, they are not out of line with those in other industrial countries. Indeed, the share of assets concentrated in the largest five and ten financial institutions in Switzerland in 1995 was less than the shares in Canada, Belgium, the Netherlands, Norway, Sweden, and Australia.[37]

The second largest bank group are the cantonal banks. These banks held about 20 percent of total banking sector assets in 1995 and accounted for about 16 percent of employment in the banking sector. Their share in total bank assets has fluctuated over the past 20 years, declining from 23 percent in 1975 to 18½ percent in 1985. The cantonal banks are a manifestation of Swiss federalism—each canton until recently had its own cantonal bank—and are often viewed as a counterweight to the otherwise dominant domestic market positions of the big banks. Of the 25 cantonal banks operating at the end of 1995, 19 were fully owned by cantons and their liabilities were fully protected by cantonal guarantees.[38] The remaining six cantonal banks were organized as stock companies, with the cantons as part-owners. With the exception of one of the six cantonal bank, the liabilities are at least partially guaranteed by the corresponding canton. Traditionally, the cantonal banks have specialized in raising funds through domestic savings deposits and bonds and in providing long-term mortgages and credit to businesses within the geographic area of their home canton. However, the size and the range of services of cantonal banks differ widely. For example, some cantonal banks have participated increasingly in portfolio management. Reflecting competitive pressures, the cantonal banks' share in the mortgage market has declined to 35 percent in 1995 from 45 percent in 1975.

The regional and savings bank group is almost exclusively oriented toward domestic business, in particular mortgage loans, but they have lately also offered other banking services. The Raiffeisen bank group comprises credit cooperatives located primarily in rural areas and their business consist mainly of mortgage, agricultural and small-business loans. Together, these two group of banks accounted for only 9 percent of total bank assets compared with 11½ percent in 1975. Banking statistics also highlight the significant presence of foreign

---

[37]Bank for International Settlements (1996, p. 86).

[38]This public guarantee of bank liabilities is unusual in Switzerland. The *Banking Act* provides savings deposits of up to Sw F 5,000 a privileged claim in the case of bankruptcy. Otherwise, depositors are protected by a private voluntary deposit insurance scheme among banks. Almost all banks (including the cantonal banks) participate in this scheme (Huang (1992) provides further details on deposit insurance arrangements in Switzerland).

banks, which include banks with more than 50 percent foreign ownership and branches of foreign banks in Switzerland; these banks held about 9 percent of total bank assets in 1995. The activities of foreign banks focus largely on foreign business including asset management, investment banking, and wholesale banking. The private bankers are characterized by their owners personal liability; these banks are mainly engaged in asset management and investment banking. The category "other banks" includes merchant banks and banks specialized in stock exchange and securities trading.

The overall regulatory framework of the Swiss banking sector is provided by the *Bank Act* of 1934, as amended over the years. The banking system is supervised by the Federal Banking Commission, an institution independent of both the SNB and the Federal Government, although it belongs administratively to the Ministry of Finance. Prudential regulations include rules on capital requirements, on the avoidance of excessive credit exposures, and minimum liquidity requirements.[39] Capital standards are based on the capital/risk asset approach, which differentiates capital requirements according to the risk associated with various assets. By contrast to the guidelines of the Basle capital standards, Swiss capital requirements for banks are not expressed by a minimum rate but by a comparison of required to available capital. As of end 1995, for the big banks and the cantonal banks as groups, available capital exceeded required capital by margins of 11 percent and 30 percent, respectively, while the excess margin for the overall banking sector amounted to 34 percent.[40] Estimates of capital adequacy ratios corresponding to the Basle guidelines indicate that all Swiss bank groups exceeded the minimum capital adequacy ratio of 8 percent by significant margins.[41] Banks are also required to be audited annually, although unannounced interim audits are to be carried out during the year. The auditors may be appointed by the bank, but the auditors must also be acceptable to the Federal Banking Commission.

The cantonal banks are presently granted three significant exemptions from the banking supervision provisions mandated by the *Banking Act*, all of which were preserved under the latest revision of the *Banking Act* in 1994. First, the operation of cantonal banks does not require a license from the Federal Banking Commission, and supervision by the Federal Banking Commission is not mandatory. Second, while the *Banking Act* requires banks to accumulate a reserve fund equivalent to 20 percent of equity, this requirement is waived in the case of the cantonal banks. And third, the regulations of the *Banking Act* mandate lower required capital funds (by 12.5 percent) for cantonal banks if their liabilities are fully covered by state guarantees. Cantonal banks are, however, subject to supervision by their canton, creating a potential conflict of interest between supervision and ownership.

---

[39]See Lindgren and others. (1996) for an international comparison of prudential regulations.

[40]*Les banques suisses en 1995* (SNB, 1996, p. 44).

[41]*Les banques suisses en 1995* (SNB, 1996, p. 46).

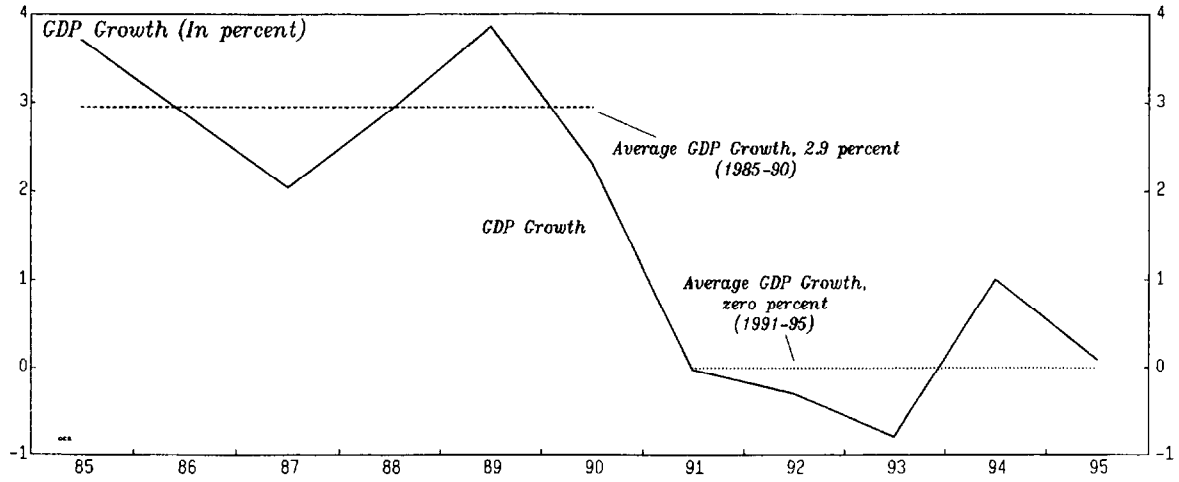
B. Economic Background and Developments in the Banking Sector

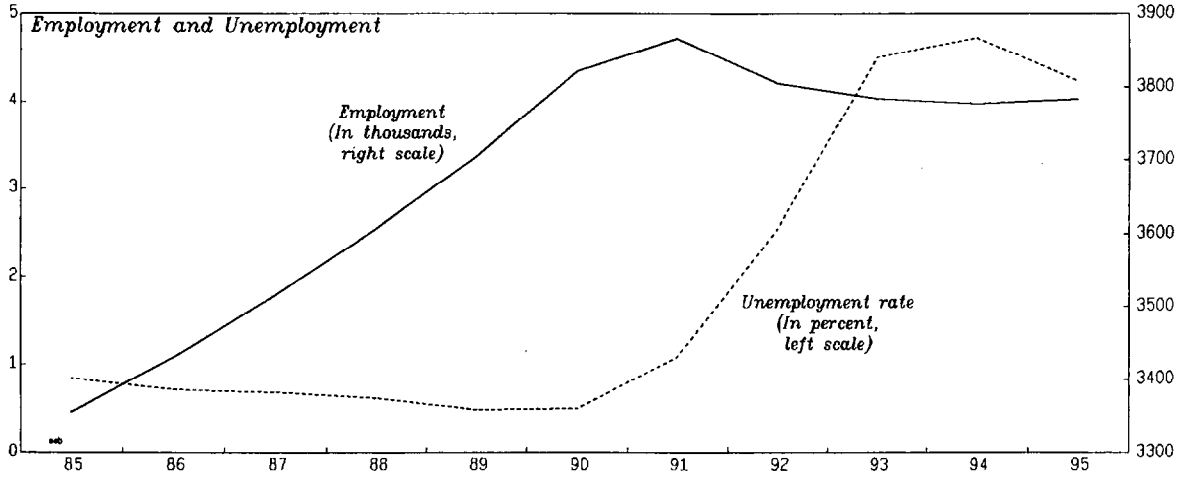
During the second half of the 1980s, real GDP expanded at a brisk average growth rate of almost 3 percent (Chart III-1), propelled by strong investment and export growth. Employment also expanded rapidly (2½ percent) during the same period, partly accommodated by an inflow of some 200,000 foreign worker (about 5 percent of the labor force) and a sharp increase in women's labor force participation rate. The registered unemployment rate remained below 1 percent throughout the period 1986-90. A boom in real estate prices fueled by strong demand for residential properties (partly reflecting the additional housing needs of foreign workers) and commercial properties was supported by rapid credit growth. The growth in mortgage loans was extremely strong, reaching 12-14 percent per annum in the late 1980s. With an overheating economy—actual output was well above potential—the inflation rate rose from about 1 percent in 1986 to more than 5 percent in 1990.

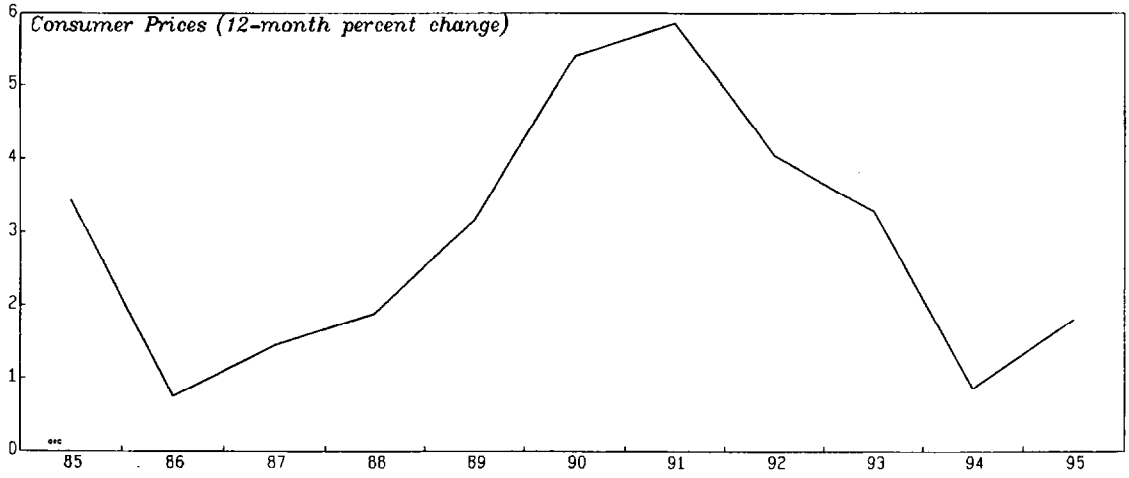
Following sharp increases in short-term interest rates and a yield curve that turned sharply inverse during 1989-90 (Chart III-2), the economic boom came to an abrupt end in 1991. Between 1990 and 1996, real activity and employment have been essentially flat. Construction activity was particularly hard hit by historic highs for mortgage rates during 1991-92 and by rising vacancy rates. The real effective exchange rate also appreciated during this period, placing pressure on exporters who, inter alia, responded by deferring domestic construction plans.

High financing costs and the slump in the real economy led to a collapse in property prices in the early 1990s, which was aggravated in the case of residential property prices by an over optimistic build-up of capacity during the economy's boom period. While data on property price developments in Switzerland are sketchy, the available information compared with property price data for selected industrial countries suggests that the collapse of residential property prices (which fell by 25 percent versus an unweighted average decline of 14 percent for all industrial countries during the period 1991-95) was particularly pronounced in Switzerland (Table III-2). At the same time, the drop in commercial property prices in Switzerland may have been less pronounced. (These prices fell by 30 percent versus an unweighted average decline of 42 percent for all industrial countries). The cantonal banks, the regional and savings banks, and the Raiffeisen banks were most exposed to this collapse in the real estate market, as more than half of their assets were mortgage loans (Table III-3).

CHART III-1
Switzerland
Output, Employment, and Inflation, 1985-95

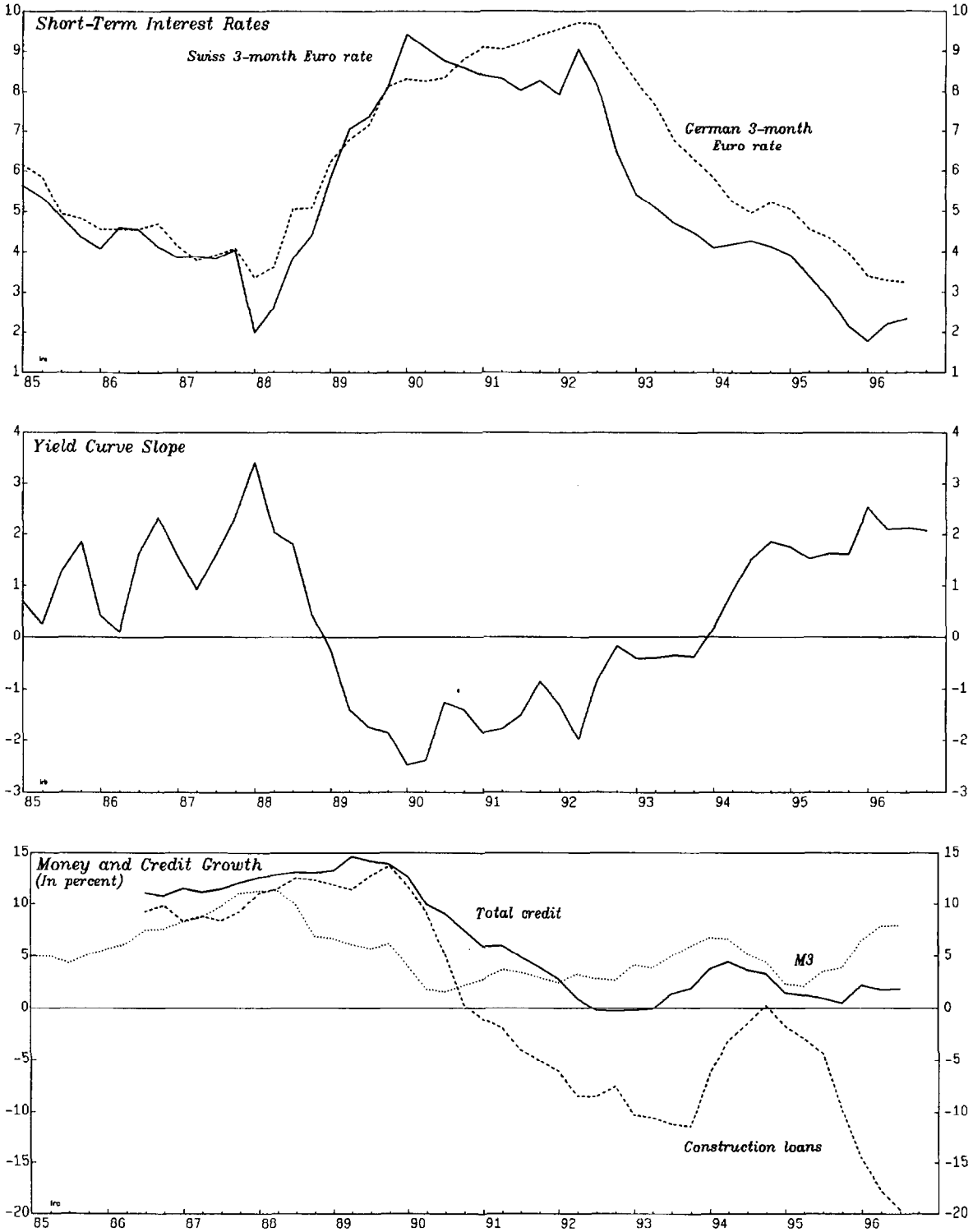






Sources: Swiss Institute for Business Cycle Research, data tape.

CHART III-2
Switzerland
Interest Rates, Money, and Credit



Sources: Swiss Institute for Business Cycle Research, data tape; IMF, Research Department.

Table III-2. Switzerland: Property Price Changes in Selected Industrial Countries

	Residential property prices		Commercial property prices 1/	
	Year of peak since 1980	Nominal price change from peak to 1995 (In percent)	Year of peak since 1985	Nominal price change from peak to 1995 (In percent)
United States	1995	0	1989	-42
Japan 2/	1990	-21	1990	-57
Germany 3/	1994	-1	1991	-40
France	1992	-3	1990	-48
Italy	...	...	1990	-43
United Kingdom	1989	-8	1988	-40
Finland	1989	-38	1989	-27
Sweden	1991	-15	1989	-47
Switzerland	1991	-25	1991	-30
Average 4/		-14		-42

Sources: Bank for International Settlements, *66th Annual Report*, 1996; and data on Switzerland from Kaufmann (1996, p. 18).

1/ Commercial property prices in major cities.
2/ For residential property prices, only land prices.
3/ For residential property prices, only four major cities.
4/ Unweighted average.

Table III-3. Switzerland: Exposure of Banks to Mortgage Lending, Averages for 1991-94 in Percent of Total Assets

	Mortgages	Other loans secured by mortgages	Total mortgage lending
		(In percent of total assets)	
Big banks	18.0	8.3	26.3
Cantonal banks	45.6	13.0	58.6
Regional and savings banks	56.2	10.3	66.5
Raiffeisen banks	66.8	2.8	69.7
All banks	26.2	8.0	34.2

Source: Staff estimates based on data from *Les banques suisses en 1995* (SNB, 1996).

The economic boom of the second half of the 1980s supported, and even encouraged, an expansion of the Swiss banking sector.[42] Indeed, the number of banks and bank branches in Switzerland rose until 1990 in contrast with developments in many other industrial countries (Table III-4). However, with the onset of an economic slump and the collapse of property prices, a bank restructuring and consolidation process was set in motion. The smaller banks—in particular the regional and savings banks and the cantonal banks—with almost exclusive exposure to domestic market conditions were particularly vulnerable to the sharp deterioration in the macroeconomic environment. Takeovers and mergers led to a substantial reduction in the number of banks and branches. Reported declines in the number of banks and branches were 35 percent and 14 percent, respectively, for the period 1990-95. While these data overstate the decline because of a change in reporting requirements, it has been estimated that the number of banks—mainly regional banks—declined by more than 80 (or 16 percent) during 1990-95. Employment retrenchment has been substantially less rapid (at about 5 percent). Most analysts still consider Switzerland to be overbanked, pointing to the high number of retail branches per inhabitant, which is almost twice the ratio in the United Kingdom or the United States.[43]

The number of cantonal banks declined from 29 in 1990 to 25 at the end of 1995, reflecting in part mergers in cantons with previously two cantonal banks. Two cantonal banks were taken over by big banks (the cantonal bank Solothurn in 1995 by SBC; and the cantonal bank Appenzell-Ausserrhoden in 1996 by UBS). In 1991, the cantonal bank Bern had to be rescued by its canton. About Sw F 6.5 billion in loans and Sw F 1 billion in capital were transferred to a trust company charged with winding up those debts over a 10-year period. In 1993, the canton of Bern provided almost Sw F 1 billion in reserves for this trust company, which was financed by a tax increase that was approved by referendum.[44] One cantonal bank (St. Gallen) is to be partly privatized within the next two years, and several other cantonal banks may follow this route. Takeovers and mergers reduced the number of regional and savings banks by some 40 percent (from 210 in 1989 to 127 in 1995).

---

[42]Switzerland's market share in international banking has, however, declined gradually over the last 20 years, from about 14 percent in 1975 to some 7 percent in 1994 (figures based on OECD (1987, p. 54) and Bank for International Settlements (November 1996, p. 32)).

[43]Kaufmann (1996, p. 17).

[44]In 1991, a small regional bank—the *Spar- und Leihkasse* Thun—collapsed, and taxpayers refused to pay for a rescue effort.

Table III-4. Switzerland: Indicators of Banking Sector Restructuring in Selected Industrial Countries

	Number of banks		Number of branches		Number of staff	
	Year of peak since 1980	Change from peak year to 1995 (In percent)	Year of peak since 1980	Change from peak year to 1995 (In percent)	Year of peak since 1980	Change from peak year to 1995 (In percent)
United States	1980	-34	1994	0	1987	-12
Japan	1980	-8	1994	0	1993	-1
Germany 1/	1980	-35	1985	-5	1994	0
France	1984	-43	1987	-2	1988	-5
Italy	1987	-15	1995	0	1993	0
United Kingdom	1983	-30	1985	-22	1989	-15
Finland	1985	-44	1988	-39	1989	-32
Sweden	1980	-81	1980	-27	1991	-5
Switzerland	1989	-35	1990	-14	1990	-5
Average 2/		-36		-12		-8

Source: Bank for International Settlements, *66th Annual Report*, 1996; and staff calculations for Switzerland.

1/ Data cover West Germany only.
2/ Unweighted average.

The adverse macroeconomic conditions since 1991 led also to a marked deterioration of bank profitability, in particular in the case of banks heavily involved in the domestic credit market. According to available indicators, bank profitability was reduced by a significant increase in the need for provisions and write-offs for unsound credits (Table III-5).[45] Between the two time periods 1988-90 and 1991-95, the cantonal banks more than doubled reported provisions/write-offs. For the big banks alone, cumulated provisions and write-offs for the period 1991-95 amounted to some 9 percent of GDP. In 1996, the big banks announced further provisions and charges equivalent to about 3¾ percent of GDP.

Additional pressures to restructure, in particular in the case of the big banks, have emerged from shareholders demanding more competitive returns on equity. The net interest margins of big banks were somewhat lower than those of their Swiss competitors in 1995, particularly in the categories foreign banks, private banks, and other banks (Table III-6). Comparisons of profitability indicators across selected industrial countries appear to indicate that the profitability of Swiss banks is comparatively low reflecting smaller net interest margins (Table III-7). Big Swiss banks, however, earn substantial non-interest income in gross income which contrasts with cantonal and regional banks and with the average non-interest share for selected industrial countries. At the same time, staff costs relative to gross income for Swiss banks are not out of line with such costs for banks in selected industrial countries. It has also been argued that the profitability of Swiss banks is not low if compared with the opportunity cost of bank capital in Switzerland, particularly the real yield on government long-term bonds or business capital, which are both well below the averages for industrial countries.

While the big banks initially took a cautious approach to restructuring, all the big banks announced in 1996 sweeping reorganization and restructuring plans, including, in particular significant cuts in the number of staff and branches. According to press reports, UBS, SBC and CS announced plans to close altogether about 235 branches (or by nearly 25 percent) and to reduce their Swiss work force by 6,000 positions (or by almost 10 percent). In their recent restructuring announcements the big banks have set ambitious targets for returns on equity in the range of 12-15 percent, to be achieved by the end of the decade. Restructuring has also led to changes in internal organization of big banks away from geographic/legal to product/client categories. In this connection, CS Holding made an overture in mid-1996, which was rejected, to merge with UBS. In January 1997, CS Holding began operating under its old name—Credit Suisse—and restructured itself into four core businesses, with one clearly devoted to retail banking in Switzerland, which should improve control and accountability.

---

[45]The figures on overall provisioning and write-offs in Table III-6 are based on the banks' income statements and should be interpreted as indicating rough orders of magnitude as they include several heterogenous components including depreciation. The figures also include provisioning and write-offs for foreign business activities.

Table III-5. Switzerland: Indicators of Provisioning and Write-Offs in Banking Sector, 1988-95

	1988-90	1991-95
	(In percent of gross income; average per annum)	
Big banks	17.7	28.2
Of which: Provisions for mortgage loans	...	7.7
Cantonal banks	19.0	40.9
Other banks	20.1	25.5
All banks	18.9	28.9
	(In percent of nominal GDP; average per annum)	
Big banks	0.8	1.6
Of which: Provisions for mortgage loans	...	0.4
Cantonal banks	0.2	0.6
Other banks	0.8	1.1
All banks	1.8	3.3

Sources: Swiss Federal Finance Administration; and staff estimates based on data on "total losses, depreciation, and provisions" as reported in income statements of the banking sector in *Les banques suisses in 1995* (SNB, 1996).

Table III-6. Switzerland: Profitability of the Banking Sector, 1995

	Net interest margin (In percent of total assets)	Non-interest income (In percent of gross income)	Staff cost (In percent of gross income)	Return on equity (In percent)
Big banks	1.09	65.5	35.9	6.6
Cantonal banks	1.21	35.6	33.0	6.2
Regional and savings banks	1.44	27.7	29.7	5.7
Raiffeisen banks	1.17	21.8	29.5	4.6
Private bankers	1.86	88.6	45.6	...
Foreign banks	1.49	68.5	35.5	...
Other banks	1.82	63.5	35.7	...
All banks	1.23	60.5	35.4	7.3

Source: Staff estimates based on balance sheet and income statements in *Les banques suisses en 1995* (SNB, 1996).

Table III-7. Switzerland: Profitability of Banking Sector in Selected Industrial Countries

	Net-interest margin (In percent of assets) 1994-95 1/	Non-interest income (In percent of gross income) 1992-94	Staff cost (In percent of assets) 1992-94	Return on equity 1985-94
United States	3.58	35	27	14
Japan	0.96	1	39	14
Germany 1/	1.70	29	39	15
France	1.57	46	44	9
United Kingdom	2.45	43	36	...
Finland	1.78	53	24	...
Sweden	2.37	44	22	...
Switzerland	1.12	51	33	10
Average 2/	1.94	38	33	12

Sources: Bank for International Settlements, *66th Annual Report*, 1996; and data for return on equity from Kaufmann (1996, p. 15).

1/ Major banks only.
2/ Unweighted average.

Also, the CS group sold part of its holdings in an electric utility (Watt AG), retaining 15 percent and was expected to sell some of its stake in Elektrowatt. These sales were part of CS's effort to concentrate its efforts on core financial activities and to raise capital. This movement followed a similar action by UBS, which sold its 40 percent stake in a utility holding company (Motor Columbus). As for the SBC, in order to strengthen its capabilities abroad and in the faster growing segments of the financial markets, it has acquired a derivatives house (O'Connor Partners), an investment bank (S.G. Warburgs), and a fund manager (Brinson Partners). To increase profitability, the big banks are also aiming to increase their comparatively low net interest margins, in particular by aligning interest rates charged on loans more closely with assessed borrower risks.

As regards the cantonal banks, their financial difficulties, a perception of undue political influences on business decisions in some cantonal banks, but also other banks' concerns about competitive distortions have triggered a discussion on the future role of the cantonal banks in the Swiss banking system. A revision of the *Banking Act* in 1994, which became effective at the beginning of February 1995, permitted cantons to bring their cantonal bank under the full supervision of the Federal Banking Commission. The recent discussions have focussed on the rationale for the remaining banking supervision exemptions for the cantonal banks (which were detailed in section A) and for continued state ownership and guarantees. In the wake of the problems experienced by the cantonal bank Bern, the appropriate balance between taxpayer and depositor protection has come under renewed scrutiny.

In 1995, the Cartel Commission and the Federal Council both submitted recommendations on the future status of the cantonal banks. The Cartel Commission's report recommended the elimination of most remaining exemptions from banking supervision and urged measures to minimize political influences on the banks' business decisions. The Cartel Commission also recommended a review of restrictions imposed on the operations of cantonal banks. As regards the issue of state guarantees and public ownership, the Cartel Commission's report took a cautious line, essentially arguing for a case-by-case approach and pointing out that some cantons already limited their guarantees and/or operate their cantonal banks as stock companies. The Cartel Commission also noted that wholesale privatization of the cantonal bank system could lead to an increased concentration in the banking sector. The Federal Council's report underscored that the decisions on the future status of specific cantonal bank system are the responsibility of the authorities at the cantonal level. However, the Council's report clarified that the *Banking Act* legally restricts the term "cantonal bank" to banks that have a full cantonal guarantee of their liabilities. Privatization per se would, accordingly, not oblige a cantonal bank to change its name so long as the guarantee remained in place. This left open the question whether a cantonal bank could retain its name if it no longer was owned by a canton or had a full cantonal guarantee. Some have argued that a name change would promote consumer protection from a "truth-in-labeling" perspective, and lessen the risk of implicit guarantees. In the event, a new commission on the status of the cantonal banks was formed at the federal level in May 1996 to investigate possible revisions of the *Banking Act* that would provide enhanced flexibility to restructure cantonal banks with the option of reducing or eliminating full cantonal guarantees without endangering the legal status of the

cantonal bank. The commission is expected to submit a report to the Federal Council by mid-February 1997.

The implications of EMU for the Swiss banking sector are, at this point, difficult to assess. Uncertainties about the future strength of the *euro* could lead to portfolio preference shifts in favor of the Swiss franc, which would provide additional business opportunities for the Swiss banking sector, but also potentially pose serious challenges for short-term macroeconomic stabilization (see the analysis in Chapter II on the latter issue). Also, in view of their foreign branch networks and their well-established market position, the big banks appear well-positioned to benefit from the completion of a single financial market in the EU in the areas of investment banking, securities trading, and asset management. At the same time, the introduction of the *euro* is likely to reduce the banks' net income from trading in spot derivative and option markets for currency and interest rates. Swiss banks like other banks will be faced with the need to decide on the balance of their trading operations to be located in London and Frankfurt. Access of Swiss banks to the planned Trans-European Automated Real-Time Gross-Settlement Express Transfer (TARGET) system is currently unresolved. TARGET will be designed as a payment transfer system to facilitate fast and efficient cross-border payments in *euros* and less than full access could put some Swiss banks at a competitive disadvantage.

There were two important developments regarding the regulatory framework and the issue of bank secrecy and money laundering. First, new regulations on the presentation of financial statements, which came into force in early 1995, required banks to improve accounting methods and disclosure practices by the end of 1996. The new regulations prohibit hidden reserves and the offsetting of assets and liabilities and income and expenses. Banks are now also obliged to supplement the publication of balance sheet and income statements with a cash flow statement and an interim report.

The Swiss bank secrecy provisions mandate criminal prosecution of breaches of the secrecy provisions (if not warranted by official investigations involving criminal activities).[46] Despite international pressure, the Government has consistently opposed changes in bank secrecy provisions, pointing out that they provide no protection for funds originating from crime or criminal transactions. However, a new draft law on money laundering aims at bringing Swiss regulations more in line with the recommendations of the Financial Action Task Force on Money Laundering (FATF). This draft law was submitted to Parliament in June 1996. The new draft law would extend diligence duties, such as identification requirements and record keeping, to nonbank financial institutions and would mandate (instead of allowing as stipulated by the present law) the reporting of suspicious transactions would apply to banks and nonbank financial institutions. The first chamber of Parliament is expected to approve the draft law in March 1997, while the second chamber is likely to follow the first chamber's decision by the end of 1997.

---

[46]See Klauser (1995).

C. Summary

The prolonged economic slump since 1991 and the collapse of property prices has set in motion a sustained process of restructuring and consolidation. Some smaller banks with substantial exposure to the domestic market could still face serious financial difficulties. While the big banks have been less affected by these adverse domestic market developments, in view of the significant scale of their foreign and non-credit operations, they have nevertheless announced sweeping structural reorganization and consolidation plans. As in the case of the banking industry in other countries, restructuring reflects medium-term competitive pressures but also efforts to increase the profitability of banking operations to raise shareholder returns. The announced restructuring measures include internal reorganizations of business activities according to product/client categories, substantive cuts in the number of staff and branches, and more risk-oriented loan policies. While the Swiss banking sector appears to be well-positioned to benefit from the evolving EMU process, there are uncertainties regarding the impact of revenue losses from foreign exchange trading and the ability of Swiss banks to access the planned new European cross-border payments system.

The balance sheets of several cantonal banks and other smaller banks with a domestic market focus appear to have been weakened significantly by the adverse economic developments since 1990, although there is considerably uncertainty about the magnitude of the problems involved. Simultaneously, the status and operations of the cantonal banks have come under close scrutiny. The cantonal banks have been granted various exemptions from banking supervision rules. In addition, cantonal ownership and guarantees may have tilted the playing field in favor of the cantonal banks. The Swiss Cartel Commission has called for eliminating the main remaining exemptions from banking supervision rules granted to cantonal banks, in particular the exemptions regarding licencing, reserve accumulation targets, and capital adequacy standards, and to bring the cantonal banks under the full and mandatory supervision of the Federal Banking Commission. The recent experience of several cantonal banks also led to suggestions to strengthen internal control mechanism and to take measures to limit undue political influences on lending decisions. Finally, the examples of several cantonal banks appears to suggest that full public ownership and/or guarantees may not be necessary preconditions for cantonal banks to operate profitably.

Table A1. Switzerland: Real GDP Developments

(Percentage changes at 1980 prices) 1/

	1992	1993	1994	1995	1995				1996		
					1st qtr.	2nd qtr.	3rd qtr.	4th qtr.	1st qtr.	2nd qtr.	3rd qtr.
Private consumption	-0.2	-0.6	0.9	0.7	0.6	1.6	0.8	-0.1	0.5	0.0	-0.3
Public consumption	-0.1	-1.2	1.3	-0.1	0.0	0.1	-0.5	-0.2	-0.5	-0.5	0.2
Gross fixed investment	-5.0	-2.5	7.2	2.3	7.2	1.4	0.9	0.6	0.7	1.3	2.9
Construction	-2.3	-1.8	5.2	-4.3	-2.8	-3.5	-4.7	-5.9	-4.5	-2.9	-2.5
Machinery and equipment	-9.6	-3.7	11.0	14.1	21.7	10.3	12.2	12.5	6.7	8.0	12.1
Final domestic demand	-1.5	-1.2	2.6	1.0	2.2	1.3	0.7	0.1	0.4	0.3	0.7
Inventory accumulation 2/	-1.9	-0.7	0.9	0.9	3.3	0.1	-0.6	0.9	-1.3	-1.7	-0.0
Total domestic demand	-3.3	-1.8	3.5	1.9	5.5	1.3	0.1	0.9	-0.9	-1.3	0.6
Exports of goods and nonfactor services	3.4	1.6	3.4	3.0	2.1	5.4	3.3	1.3	3.4	1.3	0.7
Imports of goods and nonfactor services	-3.8	-0.8	8.9	6.6	11.0	7.7	3.7	4.3	2.5	-0.6	3.3
Foreign balance 2/	3.1	1.1	-2.6	-1.9	-4.2	-1.5	-0.4	-1.5	0.3	0.9	-1.4
GDP	-0.3	-0.8	1.0	0.1	1.3	-0.0	-0.3	-0.6	-0.6	-0.5	-0.7

Source: Swiss Institute for Business Cycle Research, data tape.

1/ For quarterly data, growth rates are with respect to the same quarter of the previous year.

2/ Contribution to growth of GDP.

Table A2. Switzerland: Components of Nominal GDP

(In millions of Swiss francs, at current prices)

	1992	1993	1994	1995
Private consumption	198,070	203,005	206,970	212,135
Public consumption	49,320	49,705	50,625	51,350
Gross fixed investment	20,094	19,255	20,361	20,585
Construction	53,180	51,200	54,610	52,205
Machinery and equipment	27,195	25,820	26,835	30,135
Final domestic demand	327,765	329,730	339,040	345,825
Inventory accumulation	-980	-4,175	-2,535	1,900
Total domestic demand	326,785	325,555	336,505	347,725
Exports of goods and nonfactor services	122,170	125,300	127,430	127,545
Imports of goods and nonfactor services	110,190	108,005	111,015	113,265
Foreign balance	11,980	17,295	16,415	14,280
GDP	338,765	342,850	352,920	362,005

Source: Swiss Institute for Business Cycle Research, data tape.

Table A3. Switzerland: Components of Real GDP

(In millions of Swiss francs, at constant prices)

	1992	1993	1994	1995
Private consumption	128,065	127,330	128,485	129,400
Public consumption	30,105	29,745	30,125	30,080
Gross fixed investment	57,640	56,210	60,275	61,650
Construction	37,440	36,750	38,670	37,000
Machinery and equipment	20,200	19,460	21,605	24,650
Final domestic demand	215,810	213,285	218,885	221,130
Stockbuilding	-1,455	-2,825	-1,045	810
Total domestic demand	214,355	210,460	217,840	221,940
Exports of goods and nonfactor services	88,890	90,340	93,430	96,210
Imports of goods and nonfactor services	94,545	93,755	102,145	108,845
Foreign balance	-5,655	-3,415	-8,715	-12,635
GDP	208,700	207,045	209,125	209,305

Source: Swiss Institute for Business Cycle Research, data tape.

Table A4. Switzerland: Implicit Price Deflators

(Percent changes)

	1992	1993	1994	1995	1996 QI-III 1/
Gross domestic product	2.6	2.0	1.9	2.5	0.2
Total domestic demand	3.5	1.5	-0.1	1.4	0.3
Private consumption	4.2	3.1	1.0	1.8	1.1
Public consumpion	5.9	2.0	0.6	1.6	0.9
Gross fixed investment	-0.2	-1.7	-1.4	-1.2	-3.6
Construction	-2.5	-1.9	1.4	-0.1	-2.6
Machinery and equipment	4.0	-1.4	-6.4	-1.6	-4.0
Exports of goods and nonfactor services	1.3	0.9	-1.7	-2.8	-0.1
Imports of goods and nonfactor services	2.1	-1.2	-5.7	-4.3	0.9
Memoranda items:					
Final domestic demand	3.4	1.2	0.2	0.9	-0.3
Total demand	2.7	1.2	-0.6	0.2	0.1

Source: Swiss Institute for Business Cycle Research, data tape.

1/ Change over QI-III 1995.

Table A5. Switzerland: Household Disposable Income and Savings

(Percent change, unless otherwise indicated)

	1992	1993	1994	1995
National income	2.1	1.6	1.9	2.6
Income from property and entrepreneurship	0.4	3.4	4.1	3.2
Gross income from dependent employment	3.4	1.0	1.1	2.4
Personal income from property and entrepreneurship	-0.6	-1.7	0.9	2.2
Transfers to households	12.0	10.7	3.7	3.1
Government	9.5	4.7	9.1	-0.2
Social security funds	12.6	12.0	2.6	1.4
From abroad	0.0	0.0	1.3	2.6
Taxes and transfers paid	5.8	5.4	3.9	2.1
Direct taxes	6.7	0.6	6.4	2.4
Social security contributions	5.2	9.4	2.3	4.2
Transfers to government	8.0	5.0	7.2	2.8
Transfers abroad	2.1	-1.1	0.4	2.6
Household disposable income	3.6	1.2	0.4	2.9
Saving	1.2	-8.0	-11.8	6.4
Saving ratio (in percent)	12.7	11.5	10.1	10.5
Private consumption, nominal	4.0	2.5	2.0	2.5
Private consumption deflator	4.2	3.1	1.0	1.8
Private consumption, real	-0.2	-0.6	0.9	0.7

Source: Swiss Institute for Business Cycle Research, data tape.

Table A6. Switzerland: Labor Market

(In millions)

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Population	6.57	6.62	6.67	6.72	6.80	6.87	6.94	6.99	7.04	7.08
Labor force	3.46	3.54	3.63	3.72	3.84	3.91	3.90	3.95	3.95	3.94
Employment	3.43	3.52	3.61	3.70	3.82	3.87	3.80	3.78	3.78	3.78
Unemployment	0.03	0.02	0.02	0.02	0.02	0.04	0.09	0.16	0.17	0.15
Unemployment rate (In percent)	0.7	0.7	0.6	0.5	0.5	1.1	2.5	4.5	4.7	4.2
Standarized unemployment rate 1/	...	...	...	...	...	1.8	2.8	3.8	3.7	3.2

Source: Swiss Institute for Business Cycle Research, data tape; Federal Statistical Office.

1/ Survey-based. Schweizerische Arbeitskraefte-Erhebung (SAKE).

Table A7. Switzerland: Prices, Wages, and Productivity

(Percentage changes) 1/

	1993	1994	1995	1995		1996		
				3rd qtr.	4th qtr.	1st qtr.	2nd qtr.	3rd qtr.
Wholesale price index	0.2	-0.3	0.0	-0.3	-0.9	-1.9	-2.3	-2.9
Raw materials prices	-11.4	3.5	10.2	0.7	2.1	0.9	0.8	9.2
Consumer price index	3.3	0.9	1.8	2.0	1.9	1.1	0.8	0.6
Goods	1.7	0.2	0.3	0.2	0.0	-0.1	0.2	-0.0
Services	4.6	1.4	3.0	3.4	3.4	2.0	1.3	1.1
Gross wage income per employed person	1.6	1.3	2.2	...	...	...	...	...
Hourly wages 2/	4.9	2.9	1.4	...	...	...	...	...
Real hourly wages 2/ 3/	1.0	-0.3	0.5	...	...	...	...	...
Real GDP per employed person	-0.2	1.2	-0.1	0.2	-0.3	-0.2	-0.8	...
Unit labor cost, economy-wide	1.8	0.1	2.3	...	...	...	...	...
Export prices 4/	0.6	-2.1	-3.7	-2.2	-2.7	-1.3	0.3	0.5
Import prices 4/	-1.3	-5.8	-4.2	-3.0	-4.5	0.4	2.0	-0.5

Sources: Swiss Institute for Business Cycle Research, data tape; IMF, World Economic Outlook database.

1/ For quarterly data, growth rates are with respect to the same quarter of the previous year.

2/ Gross wages per employee, economy-wide.

3/ Deflated by consumer price index.

4/ Deflators for goods.

Table A8. Switzerland: Federal Government Finances

(In billions of Swiss francs)

	1993	1994	1995	1996 Budget	1996 Estimate	1997 Budget
Expenditure 1/	40.6	41.3	40.5	44.0	44.1	44.2
(In percent of GDP)	(11.8)	(11.7)	(11.2)	(12.0)	(12.1)	(12.1)
Current expenditure	34.0	35.9	37.6	39.5	...	38.5
(In percent of GDP)	(9.9)	(10.2)	(10.4)	(10.7)	...	(10.2)
Personnel	4.8	5.0	4.9	5.0	...	4.7
Goods 2/	5.3	5.4	5.7	5.4	...	5.2
Interest	2.5	3.1	3.3	3.5	...	3.3
Transfers	21.4	22.4	23.7	25.7	...	25.4
Cantons Municipalities	6.1	8.1	7.8	9.2	...	9.7
Social security and other	15.3	14.4	15.9	16.5	...	15.5
Capital expenditure 3/	6.6	5.5	2.9	4.5	...	5.5
Revenue (excl. pension fund surplus)	31.4	34.6	36.1	39.0	38.7	38.5
(In percent of GDP)	(9.2)	(9.8)	(10.0)	(10.6)	(10.5)	(10.2)
Taxes	28.6	31.4	32.1	35.1	34.6	34.6
Other	2.8	3.2	4.0	3.9	4.1	3.9
Fiscal balance (cash basis)	-9.2	-6.7	-4.5	-5.0	-5.4	-5.8
(In percent of GDP)	(-2.7)	(-1.9)	(-1.2)	(-1.4)	(-1.5)	(-1.6)
Railway loans	0.5	0.6	1.0	1.0	1.0	0.0
Fiscal balance (adjusted)	-9.4	-7.4	-5.5	-6.0	-6.4	-5.8
(In percent of GDP)	(-2.7)	(-2.1)	(-1.5)	(-1.6)	(-1.7)	(-1.6)
Memorandum item:						
Pension Fund surplus	1.4	1.6	1.2	0.9	...	1.0
Defense expenditure	5.8	5.9	6.0	5.7	...	5.5
(In percent of GDP)	(1.7)	(1.7)	(1.6)	(1.5)	...	(1.5)

Source: Federal Ministry of Finance.

1/ Up to 1996 excluding railway loans.
2/ Includes military procurement.
3/ Includes loans to unemployment insurance fund.

Table A9. Switzerland: Federal Government Tax Revenue

(In billions of Swiss francs)

	1992	1993	1994	1995	1996 Budget	1996 Estimate	1997 Budget
Direct federal tax	8.3	7.9	9.0	8.2	9.4	9.0	9.4
Withholding tax	4.0	1.9	3.5	2.1	4.1	3.8	3.0
Stamp duties	2.0	2.2	2.0	1.7	1.8	1.9	1.9
Turnover tax/VAT 1/	9.8	9.4	9.4	12.4	11.7	12.0	12.5
Fuel taxes	3.3	4.0	4.3	4.3	4.6	4.4	4.2
Other	3.1	3.3	3.3	3.4	3.5	3.5	3.6
Total	30.4	28.6	31.4	32.1	35.1	34.6	34.6
(In percent of GDP)	(9.0)	(8.3)	(8.9)	(8.9)	(9.5)	(9.4)	(9.1)

Source: Federal Ministry of Finance.

1/ VAT was introduced at the beginning of 1995.

Table A10. Switzerland: Federal Government Assets and Liabilities

(End-of-period; in billions of Swiss francs)

	1990	1991	1992	1993	1994	1995
Assets	46.4	50.9	60.8	74.8	83.4	94.8
Financial assets	13.5	14.5	19.7	25.0	26.5	33.0
Administrative and other	15.5	15.8	16.5	19.0	20.3	20.2
Balancing item 1/	17.5	20.6	24.6	30.9	36.6	41.6
Liabilities	46.4	50.9	60.8	74.8	83.4	94.8
Gross financial debt	40.9	45.8	55.6	69.8	78.3	89.2
(In percent of GDP)	(13.0)	(13.8)	(16.4)	(20.3)	(22.3)	(24.6)
Current payables	5.0	3.7	3.8	5.1	6.9	...
Short-term debt	4.5	9.2	13.5	17.6	19.3	...
Medium- and long-term debt	14.8	14.4	18.3	26.1	29.8	...
Other 2/	16.6	18.6	20.0	20.9	22.4	...
Valuation adjustments	3.0	3.0	3.3	3.6	3.8	...
Other	2.6	2.1	1.8	1.4	1.2	...
Memorandum item:						
Net financial debt 3/	27.4	31.3	36.0	44.9	51.8	56.3
(In percent of GDP)	(8.7)	(9.5)	(10.6)	(13.1)	(14.7)	(15.5)

Source: Federal Ministry of Finance.

1/ Amount by which liabilities exceed all other assets.
2/ Largely deposits of federal pension fund (EVK) with the federal government.
3/ Difference between gross financial debt and financial assets.

Table A11. Switzerland: General Government Finances

	1990	1991	1992	1993	1994	1995	1996 Budget	1996 Estimate	1997 Budget
					(In billions of Swiss francs)				
Federal government 1/									
Revenue	30.8	31.5	32.8	31.4	34.6	36.1	39.0	44.1	38.5
Expenditure	31.6	35.5	37.8	40.6	41.3	40.5	44.0	38.7	44.2
Balance	-0.8	-4.0	-5.0	-9.2	-6.7	-4.5	-5.0	-5.4	-5.8
Cantons									
Revenue	39.3	41.8	44.2	47.0	48.8	50.1	52.6	...	53.4
Expenditure	41.1	45.6	48.3	52.4	52.5	52.1	55.2	...	56.5
Balance	-1.9	-3.8	-4.2	-5.4	-3.7	-2.0	-2.6	-2.0	-3.1
Communes									
Revenue	29.4	31.1	33.3	35.9	37.0	37.4	38.5	...	39.2
Expenditure	30.2	33.2	36.0	37.1	37.9	38.2	39.3	...	39.7
Balance	-0.8	-2.2	-2.6	-1.2	-0.9	-0.8	-0.8	-0.3	-0.5
Territorial authorities									
Revenue	83.2	86.3	91.1	94.5	100.2	103.2	106.6	...	106.8
Expenditure	96.6	96.3	103.0	110.2	111.5	110.4	114.9	...	115.9
Balance	-3.5	-10.0	-11.8	-15.8	-11.3	-7.2	-8.3	-7.7	-9.4
Social security									
Revenue	29.7	32.2	33.8	38.1	38.8	41.1	...	...	...
Expenditure	26.4	29.3	33.8	35.0	37.4	40.4	...	...	...
Balance	3.3	2.9	0.0	3.1	1.4	0.7	0.8	0.8	0.3
General government									
Revenue	105.0	109.9	115.7	122.3	127.8	132.7	...	...	...
Expenditure	105.1	117.0	127.5	135.0	137.7	139.1	...	...	...
Balance	-0.1	-7.1	-11.8	-12.7	-9.9	-6.4	-7.6	-6.9	-9.1
Gross debt									
Federal government	38.5	43.9	55.3	66.0	73.3	79.9	85.5	85.5	90.9
Cantons	30.5	35.0	40.8	47.0	51.6	53.4	56.0	56.0	59.0
Communes	29.0	31.0	33.8	35.0	36.0	36.8	37.5	37.5	38.0
General government debt (gross)	98.0	109.9	129.8	147.9	160.9	170.1	179.0	179.0	187.9
					(In percent of GDP)				
Federal government 1/									
Revenue	9.8	9.5	9.7	9.2	9.8	10.0	10.8	12.1	10.6
Expenditure	10.1	10.7	11.2	11.8	11.7	11.2	12.2	10.7	12.1
Balance	-0.2	-1.2	-1.5	-2.7	-1.9	-1.2	-1.4	-1.5	-1.6

Table A11 (concluded). Switzerland: General Government Finances

	1990	1991	1992	1993	1994	1995	1996 Budget	1996 Estimate	1997 Budget
Cantons									
Revenue	12.5	12.6	13.0	13.7	13.8	13.9	14.6	...	14.7
Expenditure	13.1	13.8	14.3	15.3	14.9	14.4	15.3	...	15.5
Balance	-0.6	-1.1	-1.2	-1.6	-1.1	-0.5	-0.7	-0.6	-0.9
Communes									
Revenue	9.4	9.4	9.8	10.5	10.5	10.3	10.7	...	10.8
Expenditure	9.6	10.0	10.6	10.8	10.7	10.5	10.9	...	10.9
Balance	-0.3	-0.6	-0.8	-0.3	-0.3	-0.2	-0.2	-0.1	-0.1
Territorial authorities									
Revenue	26.5	26.1	26.9	27.6	28.4	28.5	29.6	...	29.3
Expenditure	27.6	29.1	30.4	32.2	31.6	30.5	31.9	...	31.8
Balance	-1.1	-3.0	-3.5	-4.6	-3.2	-2.0	-2.3	-2.1	-2.6
Social security									
Revenue	9.5	9.7	10.0	11.1	11.0	11.4	...	...	...
Expenditure	8.4	8.9	10.0	10.2	10.6	11.2	...	...	...
Balance	1.1	0.9	0.0	0.9	0.4	0.2	0.2	0.2	0.1
General government									
Revenue	33.4	33.2	34.1	35.7	36.2	36.7	...	...	...
Expenditure	33.5	35.3	37.6	39.4	39.0	38.4	...	...	...
Balance	-0.0	-2.1	-3.5	-3.7	-2.8	-1.8	-2.1	-1.9	-2.5
Debt									
Federal government	12.3	13.3	16.3	19.2	20.8	22.1	23.7	23.7	25.0
Cantons	9.7	10.6	12.0	13.7	14.6	14.8	15.5	15.5	16.2
Communes	9.2	9.4	10.0	10.2	10.2	10.2	10.4	10.4	10.4
General government debt (gross)	31.2	33.2	38.3	43.2	45.6	47.0	49.6	49.6	51.6
Memorandum items:									
General government interest payments	1.5	1.6	1.9	2.0	2.2	2.2	2.3	2.3	2.3
Pension fund surplus	0.6	0.6	0.6	0.4	0.5	0.3	0.3	0.3	0.3
Railway loans	0.4	0.3	0.2	0.0	0.2	0.3	0.3	0.3	0.3
Defense expenditure	1.9	1.8	1.8	1.7	1.7	1.6	1.6	1.6	1.5

Source: Federal Ministry of Finance.
1/ Excluding cash surplus of the civil servant pension fund from 1997 onwards including railway loans.

Table A12. Switzerland: Interest Rates and Equity Prices

	3-month Euromarket rates		Return on federal bonds	Stock market index
	Sw F	DM		
1990	8.83	8.38	6.45	721.49
1991	8.12	9.15	6.24	732.39
1992	7.78	9.38	6.40	841.92
1993	4.82	7.16	4.55	1,054.97
1994	4.04	5.23	4.96	1,266.05
1995	2.95	4.38	4.52	1,340.42
1993				
I	5.32	8.16	4.99	938.77
II	4.99	7.54	4.68	999.70
III	4.61	6.70	4.43	1,059.37
IV	4.35	6.24	4.11	1,222.06
1994				
I	3.99	5.76	4.31	1,359.65
II	4.06	5.15	4.91	1,275.10
III	4.14	4.87	5.30	1,219.38
IV	4.00	5.14	5.32	1,210.09
1995				
I	3.78	4.95	5.18	1,215.59
II	3.25	4.45	4.72	1,282.80
III	2.75	4.26	4.41	1,379.76
IV	2.02	3.88	3.78	1,483.51
1996				
I	1.63	3.31	4.08	1,631.40
II	2.07	3.21	4.19	1,758.17
III	2.18	3.14	4.02	1,728.46
1995				
Jan.	3.96	4.98	5.28	1,205.05
Feb.	3.77	4.95	5.23	1,248.19
Mar.	3.62	4.92	5.04	1,193.54
Apr.	3.36	4.52	4.81	1,230.18
May	3.32	4.43	4.66	1,293.98
June	3.07	4.40	4.69	1,324.25
July	2.78	4.42	4.57	1,347.24
Aug.	2.81	4.30	4.46	1,389.94
Sep.	2.66	4.04	4.19	1,402.11
Oct.	2.15	3.97	3.96	1,423.88
Nov.	1.97	3.88	3.64	1,496.84
Dec.	1.95	3.81	3.73	1,529.82
1996				
Jan.	1.64	3.46	4.12	1,537.58
Feb.	1.60	3.21	4.07	1,601.28
Mar.	1.66	3.25	4.04	1,755.33
Apr.	1.70	3.19	3.94	1,762.36
May	2.00	3.16	4.33	1,724.74
June	2.51	3.27	4.31	1,787.42
July	2.52	3.26	4.20	1,661.96
Aug.	2.21	3.17	4.05	1,743.86
Sep.	1.80	3.00	3.81	1,779.56
Oct.	1.55	3.01	3.71	1,771.36
Nov.	1.85	3.08	3.75	...

Source: Swiss Institute for Business Cycle Research, data tape.

Table A13. Switzerland: Monetary Aggregates

(Percentage changes over a year earlier)

	1990	1991	1992	1993	1994	1995	1996 October
Banknotes	-2.1	2.2	0.1	1.5	1.9	0.7	2.5
Sight deposits with SNB	-13.5	-6.2	-9.9	3.9	1.0	-4.0	24.7
Monetary base	-3.4	1.3	-0.9	1.7	1.8	0.3	4.4
Sight deposits	-5.3	0.5	-0.3	13.2	7.9	6.3	...
M1	-5.1	1.9	2.0	10.5	5.6	6.8	10.4
Saving deposits	-10.6	1.4	3.6	21.5	14.2	3.4	10.1
M2	-8.0	1.7	2.8	16.1	10.2	4.9	10.3
Time deposits	26.0	4.4	0.9	-17.5	-7.5	-5.8	-2.1
M3	2.0	2.7	2.1	3.9	5.1	2.2	7.6
Domestic credit	8.9	3.9	2.4	3.6	3.5	2.8	3.3
Public sector	12.0	8.6	6.6	27.5	3.9	1.5	6.9
Private sector	8.7	3.6	2.2	1.8	3.5	2.9	3.0

Sources: Swiss Institute for Business Cycle Research, data tape; IMF, International Financial Statistics database.

Table A14. Switzerland: Exchange Rate Developments

	Sw F/$	DM/Sw F	FF/Sw F	Sw F/£	Nominal Effective Exchange Rate 1/	Real Effective Exchange Rate 2/
1989	1.6359	1.1493	3.9007	1.0006	95.0	93.3
1990	1.3892	1.1648	3.9248	0.7860	100.0	100.0
1991	1.4340	1.1577	3.9360	0.8158	98.5	99.5
1992	1.4062	1.1112	3.7671	0.8022	96.6	98.1
1993	1.4776	1.1189	3.8332	0.9857	99.8	100.6
1994	1.3677	1.1867	4.0609	0.8948	106.3	105.3
1995	1.1825	1.2125	4.2237	0.7493	113.3	112.0
1996	1.2360	1.2183	4.1422	0.7915	111.6	...
1993						
I	1.5059	1.0858	3.6836	1.0210	97.2	98.3
II	1.4613	1.1073	3.7351	0.9518	98.4	99.7
III	1.4774	1.1357	3.9356	0.9825	100.9	101.6
IV	1.4670	1.1470	3.9784	0.9874	102.5	103.0
1994						
I	1.4534	1.1864	4.0335	0.9772	104.8	104.4
II	1.4089	1.1795	4.0369	0.9375	104.8	103.9
III	1.3120	1.1907	4.0807	0.8463	107.6	106.6
IV	1.2965	1.1904	4.0924	0.8183	107.9	106.5
1995						
I	1.2431	1.1910	4.1606	0.7860	110.4	109.4
II	1.1549	1.2090	4.2582	0.7232	113.9	112.7
III	1.1809	1.2127	4.1907	0.7506	113.0	111.9
IV	1.1506	1.2375	4.2853	0.7374	116.1	114.0
1996						
I	1.1903	1.2338	4.2303	0.7774	114.4	111.8
II	1.2429	1.2249	4.1506	0.8155	111.8	108.7
III	1.2230	1.2248	4.1655	0.7869	112.2	109.0
IV	1.2870	1.1896	4.0225	0.7861	107.8	...
1995						
Jan.	1.2870	1.1907	4.1137	0.8172	108.6	107.4
Feb.	1.2711	1.1815	4.1137	0.8088	108.8	108.1
Mar.	1.1714	1.2008	4.2543	0.7320	113.7	112.8
Apr.	1.1380	1.2131	4.2582	0.7075	115.0	114.0
May	1.1685	1.2047	4.2712	0.7360	113.2	112.1
June	1.1581	1.2091	4.2451	0.7262	113.4	112.1
July	1.1575	1.2003	4.1749	0.7259	112.8	111.7
Aug.	1.1958	1.2085	4.1574	0.7621	112.0	110.9
Sep.	1.1895	1.2293	4.2398	0.7639	114.3	113.1
Oct.	1.1458	1.2343	4.3123	0.7258	116.1	114.2
Nov.	1.1425	1.2398	4.2771	0.7306	116.4	114.3
Dec.	1.1634	1.2384	4.2664	0.7559	115.6	113.4
1996						
Jan.	1.1796	1.2391	4.2436	0.7709	115.1	112.8
Feb.	1.1953	1.2265	4.2169	0.7782	113.9	111.3
Mar.	1.1959	1.2356	4.2303	0.7831	114.3	111.3
Apr.	1.2175	1.2370	4.1938	0.8035	113.4	110.3
May	1.2541	1.2226	4.1394	0.8281	111.4	108.1
June	1.2569	1.2151	4.1185	0.8150	110.7	107.6
July	1.2340	1.2196	4.1275	0.7943	111.6	108.4
Aug.	1.2032	1.2324	4.2054	0.7764	113.3	110.1
Sep.	1.2317	1.2226	4.1636	0.7899	111.8	108.5
Oct.	1.2586	1.2142	4.1051	0.7941	110.3	107.2
Nov.	1.2746	1.1860	4.0137	0.7666	107.7	104.4
Dec.	1.3276	1.1686	3.9486	0.7977	105.3	...

Source: IMF, International Financial Statistics database.
1/ Against the 21 most important trading partners.
2/ Against the 10 most important trading partners and based on relative consumer prices.

Table A15. Switzerland: Balance of Payments

(In billions of Swiss francs)

	1991	1992	1993	1994	1995
Current account balance	15.2	21.3	28.8	24.4	25.0
Merchandise trade balance	-8.5	-1.4	2.5	2.2	1.0
Exports	91.0	95.4	96.8	99.4	99.9
Imports	99.5	96.8	94.4	97.2	98.8
Non factor services balance	14.7	15.1	16.8	16.1	14.9
Exports	28.4	29.6	31.7	31.4	30.9
Of which: Tourism	11.0	11.5	11.3	11.4	11.2
Imports	13.7	14.5	14.9	15.3	16.0
Of which: Tourism	8.2	8.7	8.8	8.8	9.1
Factor services balance	12.7	11.7	13.5	10.8	14.0
Capital services balance	20.3	19.2	20.7	17.7	20.8
Capital income	38.2	35.6	35.6	35.3	35.9
Capital payments	18.0	16.4	14.9	17.6	15.1
Labor services balance	-7.6	-7.5	-7.2	-6.9	-6.9
Labor income	1.2	1.3	1.4	1.5	1.5
Labor payments	8.8	8.8	8.5	8.3	8.3
Net unrequited transfers	-3.7	-4.2	-4.1	-4.7	-4.9
Memorandum item:					
Gross domestic product	331.1	338.8	342.9	352.9	362.0
Capital account balance	-17.1	-22.8	-30.5	-22.5	-21.1
Foreign direct investment	-5.6	-7.4	-13.1	-10.2	-11.7
Abroad	9.4	8.0	13.0	14.8	14.0
Into Switzerland	3.8	0.6	-0.0	4.6	2.3
Portfolio investment	-17.2	-8.6	-26.4	-24.8	-5.2
Abroad	25.2	13.6	44.8	26.1	11.0
Into Switzerland	8.0	5.0	18.5	1.3	5.9
Banking sector	8.0	-8.7	14.1	14.8	-1.1
of which:					
Increase in credit claims	-2.6	6.8	3.6	26.3	-11.2
Increase in credit liabilities	2.7	-1.0	6.0	41.4	1.9
Net increase in fiduciary funds	2.8	0.8	14.7	-0.5	7.6
Enterprises	-0.8	0.1	1.0	-2.0	1.7
Increase in claims	0.3	4.3	0.8	11.9	0.8
Increase in liabilities	-1.1	4.4	0.2	9.8	0.9
Other private sector	-1.1	2.1	-6.0	-0.1	-5.1
Other public sector	-0.4	-0.2	-0.1	-0.1	0.2
Changes in national bank reserves (- = increase)	-3.1	-6.9	-1.4	0.9	3.7
Revaluation of national bank reserves (- = increase)	1.7	0.7	0.8	-2.3	-3.5
Errors and omissions	3.3	7.8	2.5	-0.3	-3.9

Source: Swiss National Bank.

Table A16. Switzerland: Volumes and Values of Merchandise Trade 1/

	1990	1991	1992	1993	1994	1995	1996 QI-III	
	(In billions of Swiss Francs unless otherwise indicated)							
Exports								
Volume (at 1980 prices)	68.7	67.7	70.7	71.1	74.6	77.7	58.3	
Percent change	4.5	-1.4	4.3	0.6	4.9	4.2	1.9	2/
Unit value index 3/	130.7	132.0	132.8	133.6	130.7	125.9	126.0	
Percent change	0.2	1.0	0.6	0.6	-2.1	-3.7	-0.2	2/
Value	89.8	89.4	93.9	95.0	97.5	97.9	73.5	
Percent change	4.7	-0.4	5.0	1.2	2.6	0.4	1.8	2/
Imports								
Volume (at 1980 prices)	90.6	88.9	85.3	84.2	92.2	98.1	74.0	
Percent change	3.2	-1.8	-4.1	-1.3	9.5	6.3	1.4	2/
Unit value index 3/	109.9	109.9	111.5	110.0	103.6	99.2	99.8	
Percent change	-1.4	0.0	1.4	-1.3	-5.8	-4.2	0.6	2/
Value	99.6	97.8	95.2	92.6	95.6	97.3	73.9	
Percent change	1.8	-1.8	-2.6	-2.7	3.2	1.8	2.1	2/
Terms of trade index 4/	118.9	120.1	119.1	121.4	126.2	126.9	126.2	
Percent change	1.6	1.0	-0.8	1.9	3.9	0.6	--	2/

Source: Swiss Institute for Business Cycle Research; data tape.

1/ On a national accounts basis.

2/ Relative to QI-QIII 1995.

3/ Value divided by volume.

4/ Export unit value divided by import unit value.

Table A17. Switzerland: Composition of Foreign Trade

(In billions of Swiss francs, current prices)

	1992	1993	1994	1995
Exports, total	86.1	86.7	90.2	92.0
Agriculture	3.4	3.4	3.6	3.5
Energy	.1	.1	.1	.1
Textiles	4.6	4.3	4.3	4.0
Paper	2.3	2.2	2.3	2.5
Leather, rubber, plastics	2.6	2.7	2.9	2.9
Chemicals	21.3	22.3	23.5	23.6
Minerals	.7	.7	.7	.7
Metals	7.7	7.4	7.8	8.3
Machinery	25.4	24.8	26.1	27.3
Vehicles	2.1	1.8	1.7	1.9
Precision instruments, watches	14.5	15.3	15.5	14.9
Other	1.6	1.6	1.7	1.6
Imports, total	86.7	83.8	87.3	90.8
Agriculture	8.0	7.9	8.3	8.1
Energy	3.9	3.4	3.0	2.7
Textiles	8.8	8.5	8.4	7.9
Paper	3.8	3.7	3.9	4.2
Leather, rubber, plastics	3.5	3.4	3.6	3.6
Chemicals	11.5	11.9	12.5	13.0
Minerals	1.9	1.9	2.0	2.0
Metals	7.7	7.3	7.9	8.9
Machinery	18.2	18.0	19.0	20.5
Vehicles	9.9	8.4	9.2	10.6
Precision instruments, watches	5.8	5.9	5.8	5.6
Other	3.7	3.5	3.6	3.7
Exports, total	86.1	86.7	90.2	92.0
Raw materials and semi-finished products	25.7	25.0	26.5	27.0
Energy	.1	.1	.1	.1
Equipment goods	31.1	30.1	31.3	33.3
Consumption goods	29.3	31.4	32.3	31.6
Imports, total	86.7	83.8	87.3	90.8
Raw materials and semi-finished products	26.8	25.7	27.4	28.7
Energy	3.9	3.4	3.0	2.7
Equipment goods	22.4	21.2	22.3	26.0
Consumption goods	33.6	33.4	34.5	33.4

Source: *Die Volkswirtschaft.*

REFERENCES

Chapter I

Akerlof, George A., William T. Dickens, and George L. Perry, 1996, "The Macroeconomics of Low Inflation," *Brookings Papers on Economic Activity: 1*, (Washington: Brookings Institution), pp. 1-76.

Blanchard, Olivier Jean, and Danny Quah, 1989, "The Dynamic Effects of Aggregate Supply and Demand Disturbances," *American Economic Review*, Vol. 84, pp. 655-73.

Clark, Peter, Douglas Laxton, and David Rose, 1995, "Asymmetry in the U.S. Output-Inflation Nexus: Issues and Evidence," IMF Working Paper No. 95/76 (Washington: International Monetary Fund).

Cochrane, John H., 1994, "Permanent and Transitory Components of GNP and Stock Prices," *Quarterly Journal of Economics*, Vol. 109 (February), pp. 241-65.

Federal Statistical Office, 1992, *Les Scénarios de l'Évolution Démographique de la Suisse, 1991-2040* (Bern: Federal Statistical Office).

Harvey, Andrew C., 1989, *Forecasting, Structural Times Series Models and the Kalman Filter* (Cambridge: Cambridge University Press).

Harvey, Andrew C., and Albert Jaeger, 1993, Detrending, Stylized Fact, and the Business Cycle, *Journal of Applied Econometrics* No. 8, September, pp. 231-47.

Lüscher, Barbara, and Eveline Ruoss, 1996, "Entwicklung der potentiellen Production in der Schweiz," *Geld, Währung und Konjunktur*, Quarterly Bulletin No. 14 (1), (Zürich: Swiss National Bank, March), pp. 61-74.

Marty, Rudolf, 1996, "Wachstumstrend, Produktionspotential und Output-Lücken," *Konjunktur* No. 59 (July/August), (Zürich: Konjunkturforschungsstelle der ETH Zürich), pp. 15-26.

Organization for Economic Cooperation and Development, 1996, *OECD Economic Surveys 1995-96: Switzerland* (Paris: OECD).

Swiss National Bank, "Swiss Monetary Policy in 1995," *Geld, Währung und Konjunktur*, Quarterly Bulletin No. 12 (4) (December), (Zürich: Swiss National Bank), pp. 272-74.

Chapter II

Akerlof, George A., William T. Dickens, and George L. Perry, 1996, "The Macroeconomics of Low Inflation," *Brookings Papers on Economic Activity* 1, 1-76.

Chadha, Bankim, and Daniel Tsiddon, 1996, "Inflation, Nominal Interest Rates, and the Variability of Output," *IMF Working Paper* 96/109 (Washington: International Monetary Fund).

Debelle, Guy, and Douglas Laxton, 1996, "Is the Phillips Curve Really a Curve? Some Evidence for Canada, the United Kingdom, and the United States," *IMF Working Paper* 96/111 (Washington: International Monetary Fund).

Komission für Konjunkturfragen (KfK), 1996, "Die Schweiz und die Europäische Wirtschafts- und Währungsunion," Report of Working Group on EMU, Supplement in: *Die Volkswirtschaft*, 12/96.

Laxton, Douglas, Guy Meredith, and David Rose, 1995, "Asymmetric Effects of Economic Activity on Inflation," *Staff Papers*, International Monetary Fund, Vol. 42, 344-374.

Organization for Economic Cooperation and Development, 1996, *OECD Economic Surveys 1996: Switzerland* (Paris: OECD).

Masson, Paul, Steven Symansky, and Guy Meredith, 1990, "MULTIMOD Mark II: A Revised and Extended Model," *IMF Occasional Paper* 71 (Washington: International Monetary Fund).

Mauro, Paolo, 1995, "Current Account Surpluses and the Interest Rate Island in Switzerland," *IMF Working Paper* 95/24 (Washington: International Monetary Fund).

Zurlinden, Mathias, 1992, "Stabilitätspolitik in einem Mehrländermodell: Simulationsergebnisse für die Schweiz," *Geld, Währung und Konjunktur*, Quartalsheft No. 3, 269-88 (Zürich: Swiss National Bank, September).

Chapter III

Bank for International Settlements, 1996, *66th Annual Report* (Basle: Bank for International Settlements, June).

Bank for International Settlements, 1996, *International Banking and Financial Market Developments* (Basle: Bank for International Settlements, November).

Christensen, Benedicte Vibe, 1986, *Switzerland's Role as an International Financial Center*, Occasional Paper No. 45 (Washington: International Monetary Fund, July).

Fairlamb, David, 1996, "Tense Times in Switzerland", *Institutional Investor,* September.

Federal Council, 1995, *Stellung der Kantonalbanken, insbesondere Beschränkung der Staatshaftung sowie Privatisierung,* Report by the Federal Council (Bern: Federal Councial, March).

Henry, S.G.B., and others, 1995, *Switzerland—Selected Background Issues,* SM/95/2 (Washington: International Monetary Fund).

Huang, Scilla, 1996, *Bankenregulierung und Wettbewerbsfähigkeit: Eine komparative Analyse der Schweiz und der EG,* Bank und Finanzwirtschaftliche Forschungen, Band 165 (Stuttgart: Verlag Paul Haupt).

Kaufmann, Hans, 1996, *Swiss Banks on the Way to Global Leadership,* Sector Study (Zürich: Bank Julius Baer, November).

Klauser, Peter, 1995, Das schweizerische Bankgeheimnis und die Bekämpfung der Geldwäscherei, *Geld, Währung und Konjunktur*, Quartalsheft No. 4, December, pp. 361-70.

Lindgren, Carl-Johan, Garcia, Gillian, and Matthew I. Saal, 1996, *Bank Soundness and Macroeconomic Policy* (Washington: International Monetary Fund).

Organization for Economic Co-Operation and Development, 1987, *OECD Economic Surveys Switzerland 1986/87* (Paris: OECD, February).

Swiss Cartel Commission, 1995, *Stellung der Kantonalbanken im Bankgewerbe,* Publications of the Swiss Cartel Commission (Bern: Cartel Commission).

Swiss National Bank, *Les banques suisses en 1995*, 1996, Nr. 80 (Zürich: Swiss National Bank).