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Switzerland—Selected Background Issues

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SWITZERLAND

Selected Background Issues

Prepared by a Staff Team

Approved by the European I Department

February 9, 1996

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Introduction

This selected background issues paper consists of four chapters. The first chapter reviews a few monetary and exchange rate issues that have received attention recently, including questions related to the monetary policy framework and the assessment of recent monetary conditions and exchange rate developments. Its main objective is to supplement the background material that was provided in the staff report in order to facilitate the analysis of these issues, although in some instances it also includes a brief discussion of available policy options.

Chapter II examines the Swiss savings and investment levels from a welfare point of view, employing for this purpose some "golden rule" criteria of capital accumulation put forward in the academic literature. It finds that, with its unusually high levels of saving, Switzerland may be one of the few advanced industrialized countries that strictly fulfills the "golden rule" criteria and may therefore be seen as a country that does not "discount" at all the welfare of future generations. The analysis also suggests that the amount of capital that is accumulated within Switzerland may be excessive in the sense that the return on it may be too low to justify the foregone consumption possibilities. The chapter discusses briefly likely factors behind this high level of saving and domestic capital accumulation, such as a generous savings subsidization and the existence of large internationally under-diversified pension funds.

Chapter III examines some aspects of the very large Swiss net foreign asset position (over 100 percent of GDP) which has been built up as a consequence of the persistently high levels of savings and current account surpluses. It finds that the return on both assets and liabilities is lower in the case of Switzerland than in other countries. Furthermore, in contrast to other countries, the return that Switzerland "earns" on its foreign assets is higher than the return it "pays" on its foreign liabilities. This positive differential contributes significantly to the country's sizable net investment income and current account surplus. The chapter reviews a few potential explanations for international differences in rates of return on external assets and liabilities.

The last chapter analyzes existing non-tariff barriers to trade and discusses their possible impact on the price level and the large current account surplus. It reports in particular on some evidence of the significance of such barriers, which in Switzerland take the form mainly of technical norms and regulations, but recognizes that any effect they may have in restricting trade may not only be incidental but is also difficult to measure. The chapter then uses implicit price data from Germany's detailed trade returns to test whether prices of German exports to Switzerland are higher than to other destinations. Although the evidence is mixed, the hypothesis that NTBs contribute to comparatively high import prices cannot in some instances be rejected. The chapter also discusses whether non-tariff barriers have an impact on the trade balance. Theoretical considerations give little guidance on this issue, while empirical evidence based on import data does not indicate the presence of protective barriers.

I. Selected Monetary and Exchange Rate Policy Issues 1/

This note supplements the background material that was provided in the Staff Report for the 1995 Article IV Consultation with Switzerland (SM/96/14, 1/24/1996) to facilitate the discussion of three topical monetary and exchange rate policy issues. The first of these issues concerns the assessment of current monetary conditions and the second the framework for the conduct of monetary policy. The last issue relates to the real exchange rate of the Swiss franc.

1. Assessment of monetary conditions

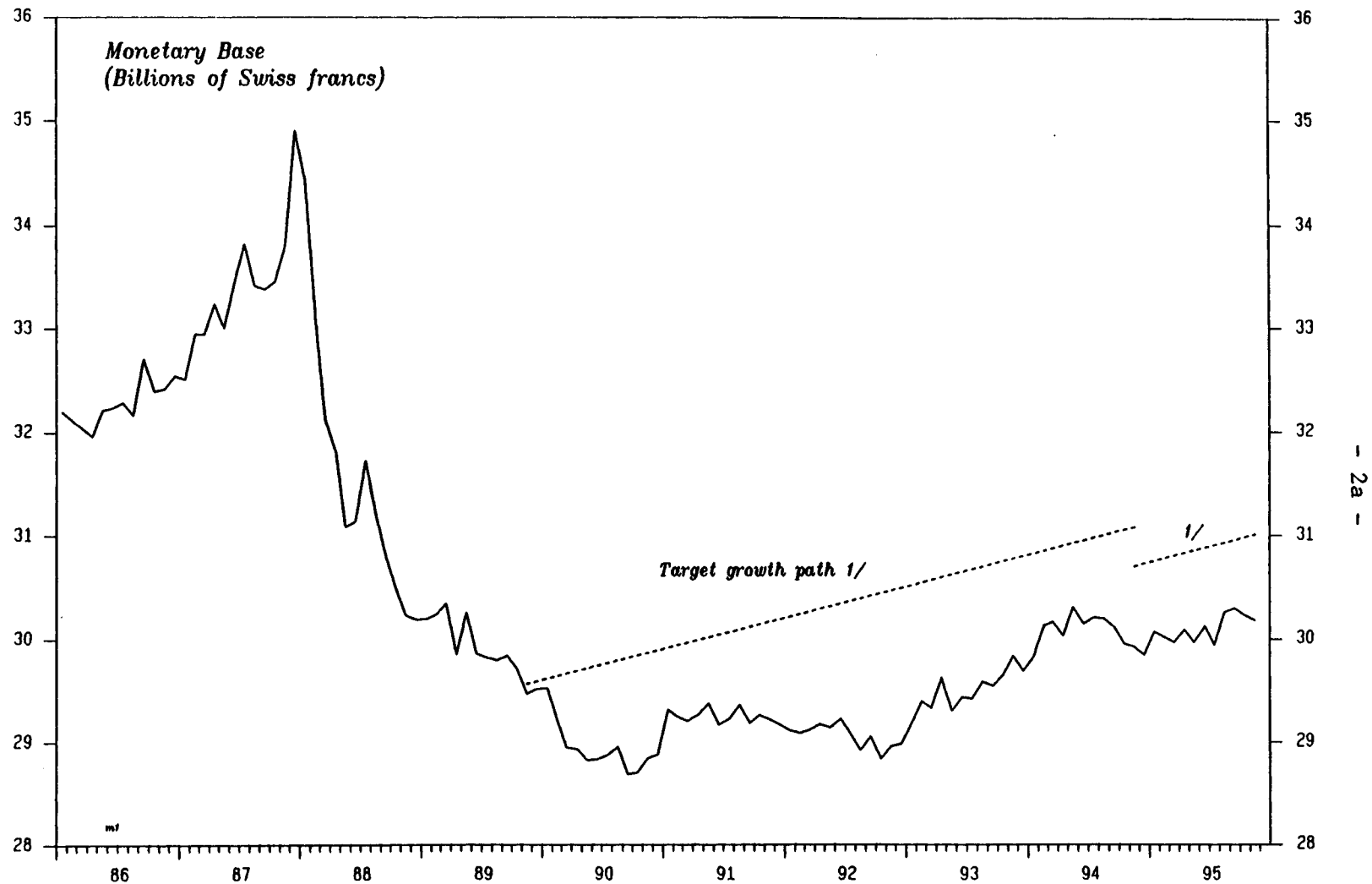
The monetary policy stance was eased progressively in the course of 1995 as it became evident that inflationary pressures remained subdued, notwithstanding the substantial effects on the price level stemming from the introduction of VAT at the beginning of the year, and that economic activity was considerably weaker than expected. This easing was reflected in a steep downward trend in money market rates which fell from about 4 percent in late 1994 to below 2 percent in late 1995. The discount rate of the Swiss National Bank was also lowered in four sizable steps (each equivalent to 50 basis points) to 1.5 percent by the end of 1995. 2/

An important policy question is whether the room for lowering interest rates, without endangering the authorities' main objective of maintaining price stability over the medium term, has by now been fully utilized. Not surprisingly, a review of conventional indicators of monetary conditions does not allow for an unequivocal answer. The evolution of the seasonally adjusted monetary base, which the National Bank continues to regard as its key policy variable, has been broadly in line with the Bank's quarterly forecasts during most of 1995, even though the growth in the main determinants of the demand for base money (prices and real GDP) has fallen well short of expectations when the forecasts were made (Chart I-1). Taken in isolation, this might be interpreted as an indication that the policy response to the unanticipated weakness of monetary demand has already been adequate. The growth of the broader monetary aggregates has also accelerated somewhat in recent months (Chart I-2), the yield curve has steepened considerably (Chart I-3) and real short-term interest rates have become negative. On the other hand, however, it is also relevant to observe that the monetary base remains substantially below its medium-term targeted path, that it has recently tended to slow rather than accelerate, and that the rates of growth of the broader aggregates are still modest if seen in the context of the recent steep fall in interest rates and well below levels

1/ This chapter was prepared by H. Vittas, and the annex by A. Lund.

2/ In the first two instances, the Swiss National Bank adjusted its discount rate after money market interest rates had already fallen. The third and fourth cuts, by contrast, were accompanied by explicit official efforts to lower money market rates further by supplying additional base money to the banks.

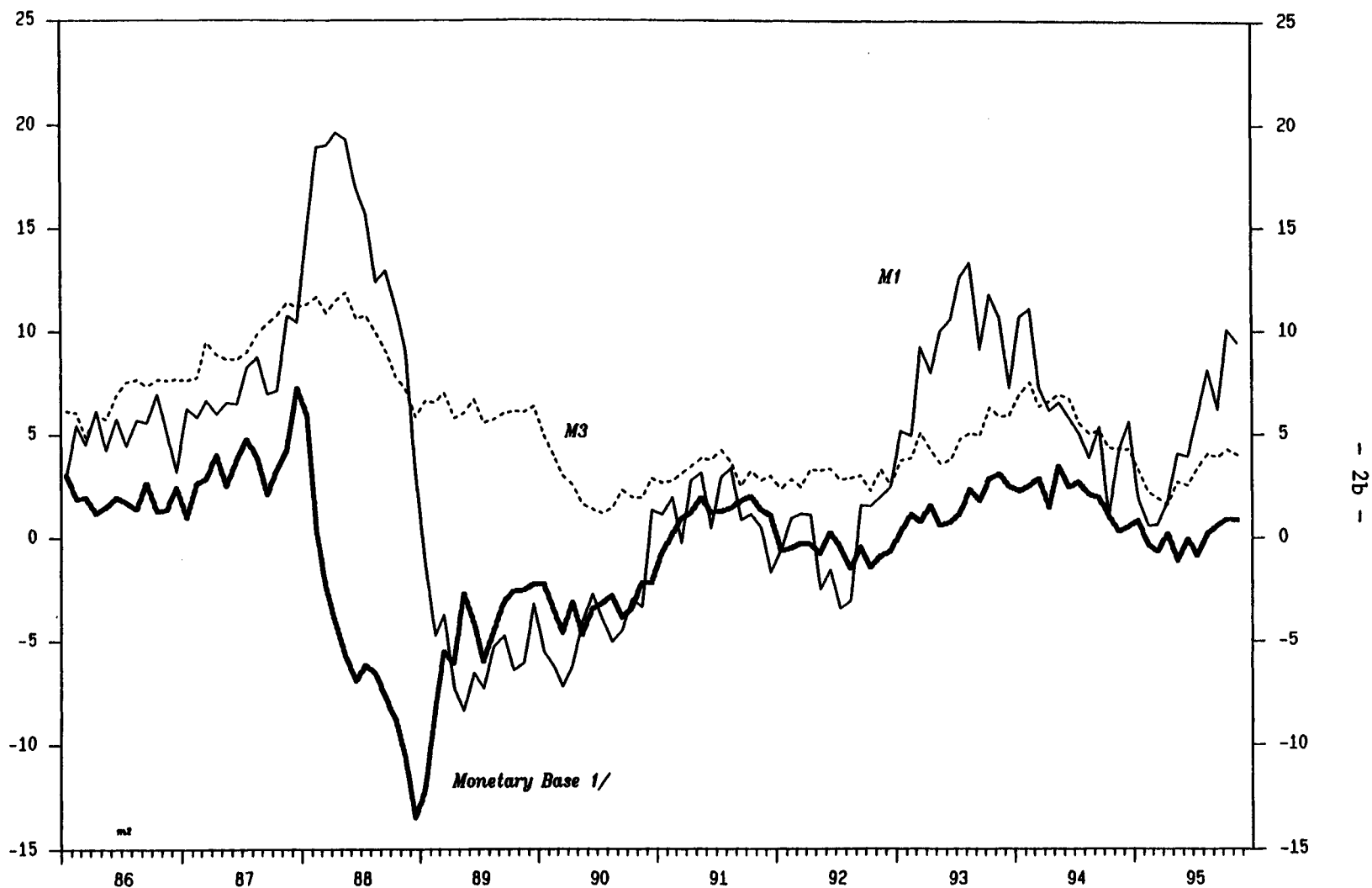
CHART 1-1
Switzerland
Monetary Base: Targeted Path and Actual Growth



Sources: Swiss National Bank.

1/ One percent per annum from 1989, fourth quarter, and 1994, fourth quarter, respectively.

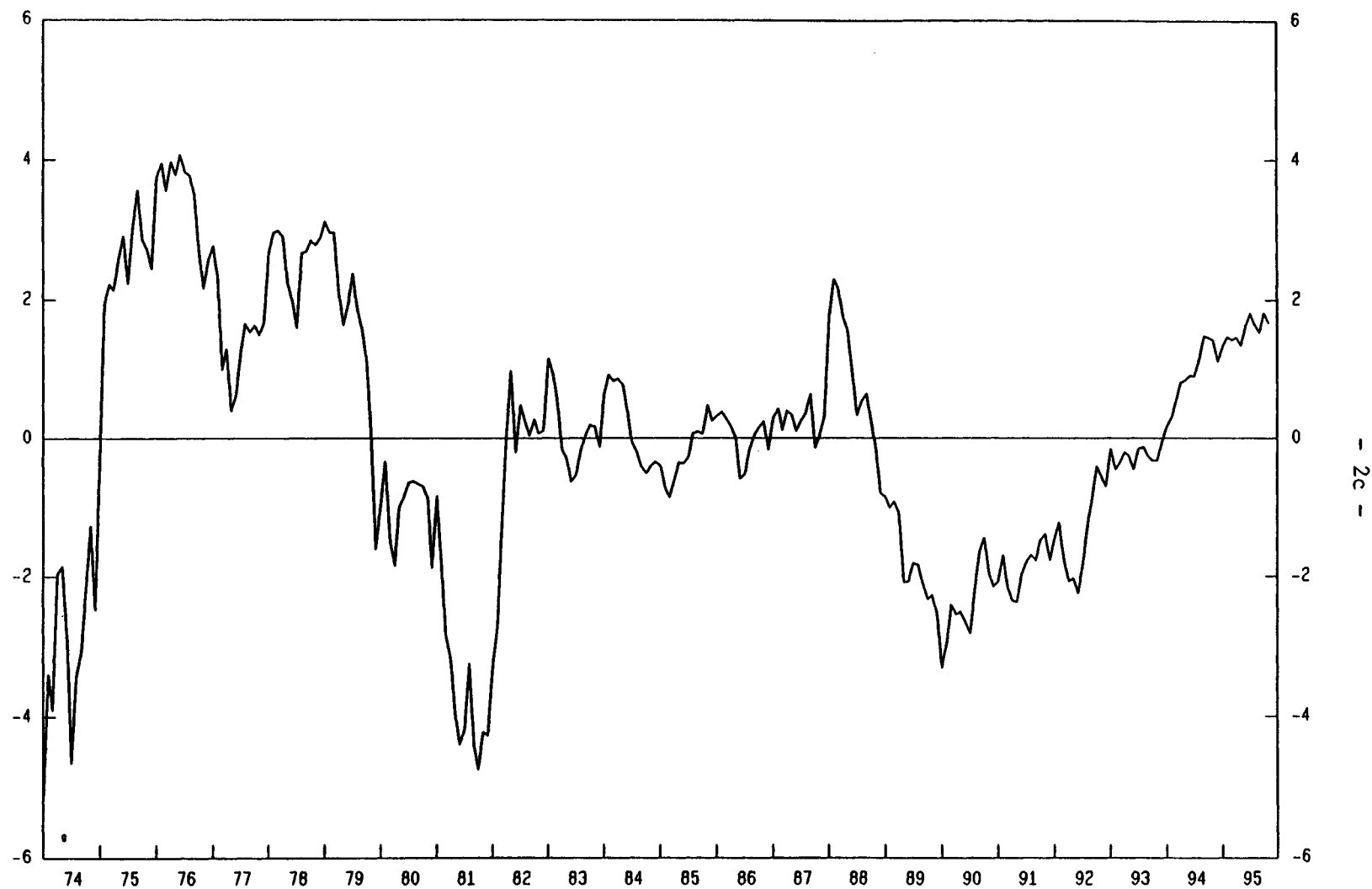
CHART 1-2
Switzerland
Monetary Developments
(12-month percent changes)



Sources: Swiss National Bank.

1/ Seasonally adjusted; in billions of Swiss francs. The fall in bank reserves and monetary base in 1988-90 was related to changes in reserve requirements and the payments system.

CHART 1-3
Switzerland
Gap (Bond Yield - Short Term Rate)



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

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that would signal the possible re-emergence of inflationary threats. 1/ Moreover, the steepening of the yield curve has not been associated with any firming of bond yields (which could have been expected to occur if the drop in short-term rates had gone beyond prudent levels). Last but not least, the Swiss franc has continued to display remarkable strength in the exchange markets and its appreciation during 1995 has offset much of the easing in monetary conditions suggested by other indicators. 2/

In view of the somewhat conflicting signals provided by the aforementioned conventional indicators, the staff has constructed a composite Monetary Conditions Index (MCI) for Switzerland, following closely methodology that has been developed and applied in other countries. The MCI combines information on the monetary stance emitted by real interest rates and the real exchange rate and has been found in some cases to be a better predictor of inflation and economic growth than the monetary aggregates or other partial indicators.

The approach employed and the results obtained are described in some detail in Annex I and the Index is plotted in Chart I-4. The MCI indicates that a very pronounced tightening of monetary conditions took place in the course of 1994, reflecting both a steep real appreciation of the Swiss franc and a substantial firming of real short-term interest rates. The latter was caused by declining inflation against the background of stable nominal interest rates. During 1995 the two components of the MCI moved mostly in opposite directions. Overall, the Index rose further during the first few months of the year and declined (erratically) thereafter, but at the end of 1995 it was only modestly lower than a year earlier. Taken at face value, this would seem to imply that monetary conditions were still rather tight at the end of 1995, lending further support to the view that the downward trend in interest rates may not have run its full course, as yet.

However, it is important to add several caveats. First, the ability of the MCI to predict inflation in the case of Switzerland has not been thoroughly tested; indeed some preliminary work by the staff in this regard

1/ By contrast to the monetary base (M0), the broader monetary aggregates, notably M1 and M2, are highly sensitive to changes in interest rates. Thus, the acceleration in their rate of increase in recent months is a direct reflection of the impact of falling short-term interest rates and does not, on the basis of historical experience, warrant any concern about future inflation. The growth of M3, the demand for which is not highly elastic with respect to changes in interest rates has remained subdued.

2/ Non-monetary indicators, such as the size and evolution of the output gap and the level and trend of the unemployment rate, also tend to suggest that there may still be some leeway for relaxing monetary conditions further without jeopardizing inflation objectives. However, it is not possible to draw firm conclusions about the appropriateness of the monetary policy stance from these indicators as they have to reflect the effects of the policy easing already implemented and as there is considerable uncertainty about the size of these effects and the length of the lags involved.

is not reassuring. Second, by the nature of its construction the MCI cannot distinguish between changes in interest and/or exchange rates that reflect policy actions and changes associated with exogenous "shocks" and underlying fundamentals (such as, for example, the trend appreciation of the Swiss franc). Third, and perhaps most important, the behavior of the index in the short run tends to be dominated by changes in the exchange rate which has displayed substantial volatility. It is questionable whether the authorities should seek to counterbalance such volatility through compensating changes in domestic interest rates. For all these reasons, the MCI can at best be regarded as a potentially useful supplementary indicator of monetary policy and not as a candidate for replacing other target variables.

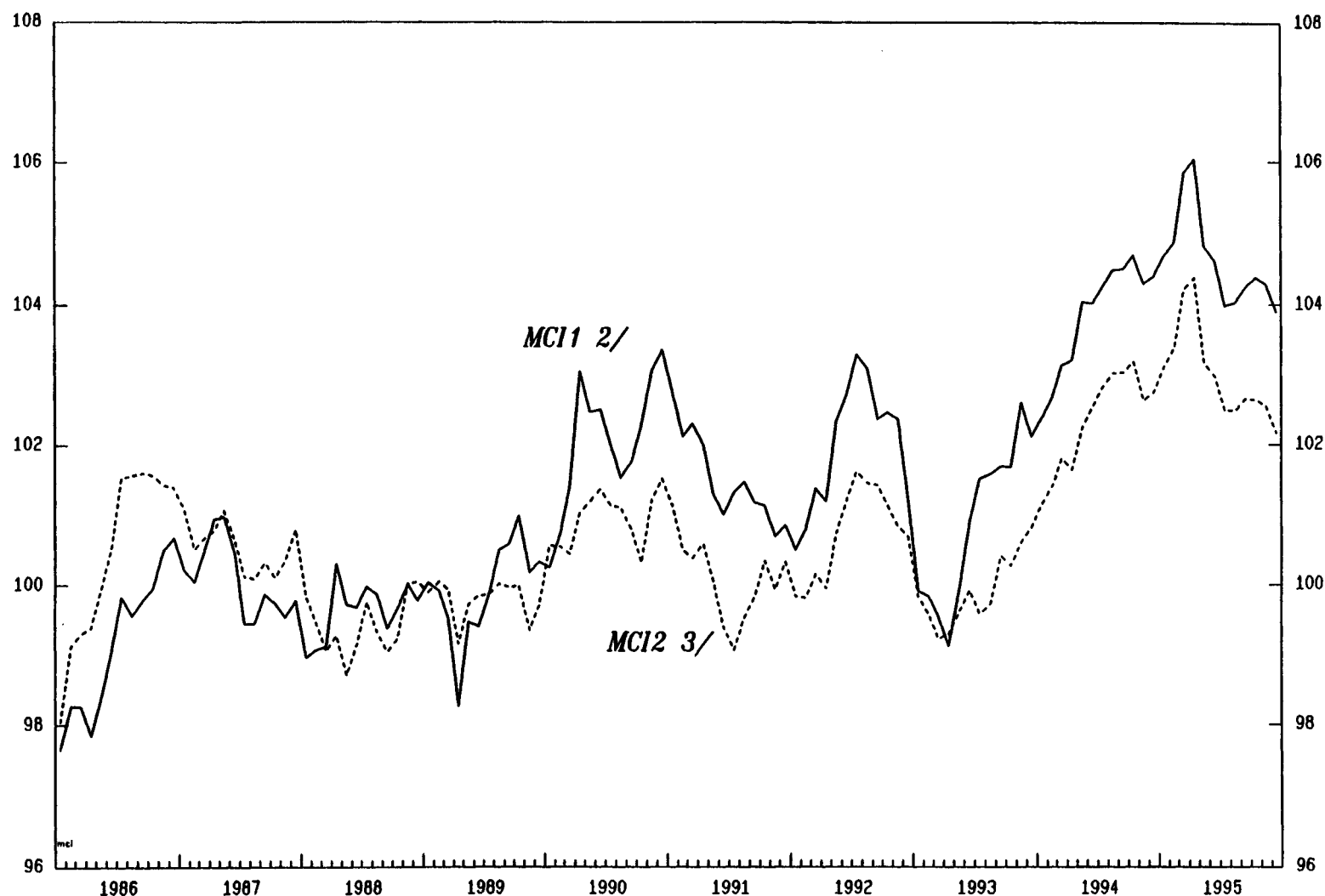
2. The policy framework

Over the past several years, the demand for base money (which remains the target variable) has turned out to be rather unpredictable. Initially, the instability resulted from the introduction of a new electronic interbank payments system and from changes in liquidity requirements (both in 1988) which lowered drastically the demand for bank reserves. However, technological innovations have continued to influence the behavior of base money even after the effect of these shocks had been absorbed and it is still not entirely clear whether a stable relationship between base money and inflation has been reestablished. In light of this, some observers have suggested that it might be preferable for the SNB to change its target variable or even to abandon altogether the present framework, for example in favor of targeting inflation directly.

The view of the staff on this issue is that the case for a change in the policy framework in Switzerland is neither particularly strong nor pressing. The recurrent signs of instability in the demand for base money are of course troublesome. However, the conduct of policy in practice has been pragmatic and has not been constrained by rigid adherence to the monetary targets. The authorities have continued to emphasize that they do not focus exclusively on the monetary base but do instead monitor closely and take into account a range of other indicators, including the broader monetary aggregates and the exchange rate of the Swiss franc. Thus, the framework has served mainly as a disciplining device that compels the authorities to not simply publish analyses of monetary developments but also to explain in detail the rationale for their policy decisions and for deviations from the monetary targets. In view of this emphasis on transparency and accountability and the authorities' good record in reining in inflation, the recent recurrent and persistent departures from the monetary rule have had no visible impact on policy credibility. Interest rate differentials even vis-à-vis Germany remain highly negative and the Swiss franc remains the currency of choice for many investors seeking refuge from more inflation-prone countries.

Nevertheless, frequent inability or unwillingness to meet the monetary target creates confusion and, if it persisted in the long run, would risk undermining the credibility of the framework. It is therefore useful to

CHART 1-4
Switzerland
Monetary Conditions Index (MCI) 1/
(Average Jan.1983-Sept.1995=100)



Source: IMF staff calculations.

1/ Index of the absolute change in the real short-term interest rate and percentage change in the real exchange rate compared to their average levels over the period January 1983 to December 1995.

A ratio of 3 to 1 is used between an increase in real interest rate and an appreciation of the exchange rate.

2/ Real effective exchange rate based on relative ULC.

3/ Real effective exchange rate based on relative consumer prices.

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keep the issue under review and to explore whether there are alternative approaches to monetary control that might prove superior.

As noted, one option that has been advocated by some critics of the present framework is direct inflation targeting. This has proven useful in many countries in recent years. However, almost invariably, these have been countries whose previous anti-inflation credentials were not strong and which, therefore, unlike Switzerland, needed to build policy credibility almost from scratch. Moreover, the usefulness of the approach in helping to keep inflation in check once it has been brought down to an acceptably low level has not yet been tested. It is also worth noting that, in principle, inflation targeting presupposes a reasonably stable (predictable) relationship between the target and the policy instruments available to the authorities. As the existence of such a relationship in the Swiss case has not been firmly established, the probability of missing policy targets could be even greater than under the present regime and the cost to credibility more damaging.

Another option would be to maintain the monetary targeting framework but change the target variable. In recent years, the velocity of the broader monetary aggregates appears to have been more stable than that of the monetary base (Chart I-5) and this seems to be supported by more rigorous analytical work by the Swiss National Bank. ^{1/} However, an important drawback of the broader aggregates is that they are far more sensitive to changes in interest rates than M0. This implies during periods of disinflation and falling interest rates, such as the present period, that the monetary targets would have to be set at levels that appear high to the casual observer, if undue monetary tightness is to be avoided. This problem would not be present if targets were set only for the medium term, but even then, the authorities would have the awkward task of trying to convince the markets and the public that substantial oscillations of monetary growth around the medium-term target would not necessarily be cause for concern.

A third option that deserves to be considered is targeting the exchange rate (explicitly or implicitly). Possible disadvantages include the risk of destabilizing capital inflows, which could undermine monetary control and longer-term inflation objectives, and the likelihood that Switzerland would gradually lose the benefit that it currently derives from its comparatively low interest rates (except insofar as these reflect differences in tax regimes and other nonmonetary factors). However, higher interest rates may have side effects, in terms of the capital intensity of production, that are not necessarily undesirable. Another potential advantage of pegging the exchange rate would be the increased predictability of the competitive environment in which Swiss firms operate.

^{1/} The SNB has found, in particular, that the demand for M2 is more stable from an econometric point of view than either M0 or M1 and M3.

3. The exchange rate of the Swiss franc

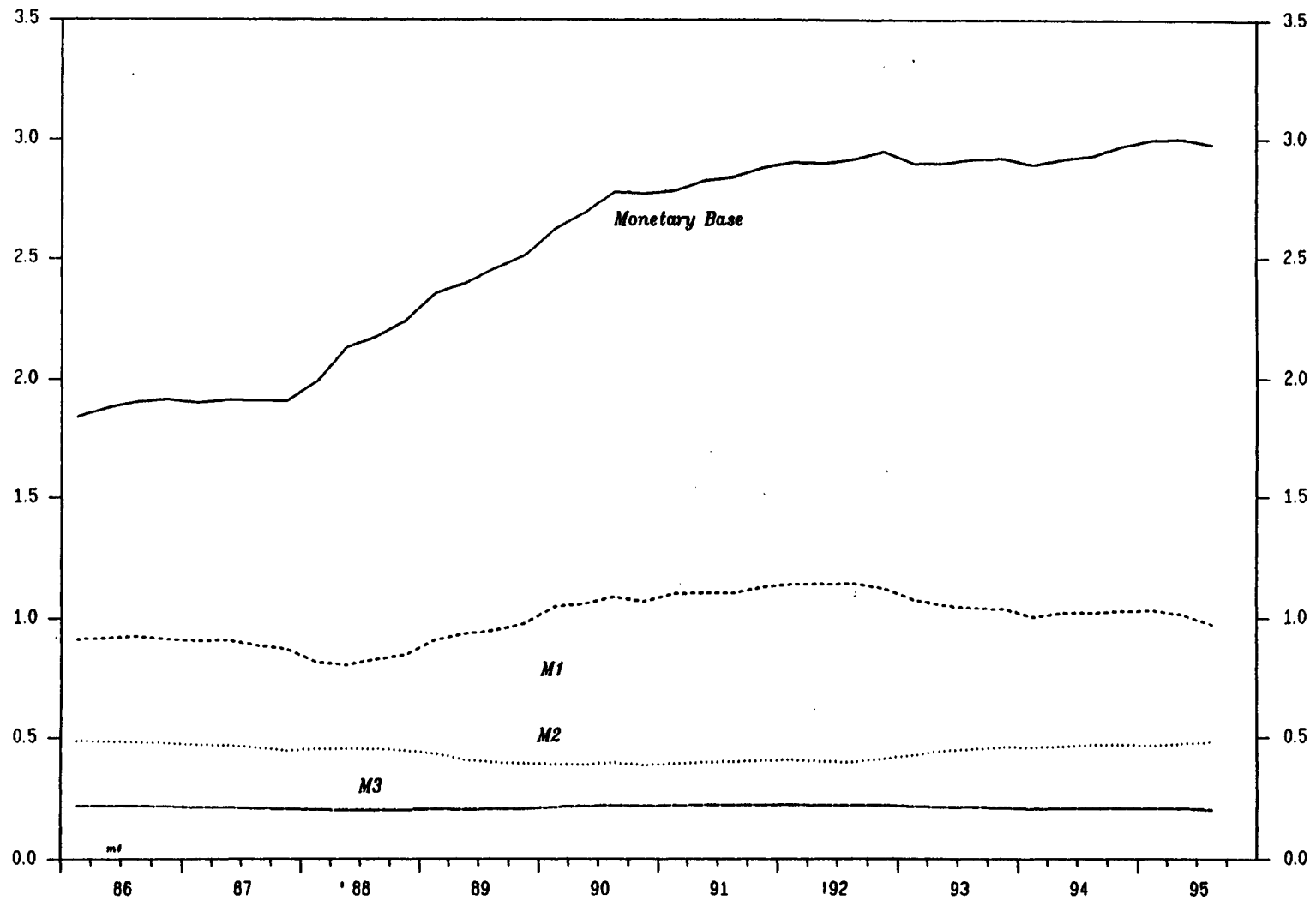
The Swiss franc has appreciated, almost continuously, since mid-1992 in both nominal and real effective terms. The cumulative real appreciation has been on the order of 20 percent (Chart I-6). As was noted in SM/96/14, this increase in the value of the Swiss franc was not as dramatic (in terms of either size or speed) as the one that Switzerland had experienced in 1977-78. Nevertheless, it has been sufficiently pronounced to take the real exchange rate of the franc clearly above its long-run trend line (which displays a gentle upward slope). It has also adversely affected the performance of both the export and the import-competing sectors of the economy, generating major concerns that the Swiss franc may have become overvalued.

The strength of the Swiss external current account position, however, makes it difficult to accept, without qualification, the view that the franc is overvalued. It is true that the current account surplus (estimated to have been about 6.5 percent of GDP in 1995) can be attributed in part to cyclical conditions (i.e., a somewhat larger output gap in Switzerland than on average in her main trade partners). It is also true that the effects of recent losses in competitiveness have not yet been fully reflected in trade and other current account flows. Nonetheless, staff estimates of the "underlying" current account surplus indicate that, at some 4 percent of GDP, it is at least as large as the surplus that is required to stabilize Swiss net foreign assets at their current very high level in relation to GDP (over 100 percent). ^{1/} It is not possible to tell if the present level of net foreign assets is optimal, as there is no operationally meaningful definition in this context. Nevertheless, the fact that Swiss net foreign assets (in relation to GDP) are much higher than those of any other advanced industrial country (see chapter 3 below) makes it difficult to think that they might be in some sense suboptimal. Moreover, it seems plausible to expect that the "need" for Switzerland to maintain a high level of net foreign assets may decline in the not too distant future as the demographic factors that contributed to the exceptionally high Swiss saving ratio begin to be reversed. If this view is accepted, then one might consider the real appreciation of the Swiss franc as part of the mechanism that will help bring about a gradual reduction in the stock of Swiss net foreign assets relative to GDP. ^{2/}

^{1/} The underlying current account surplus is derived from the actual surplus after adjusting for the effects of relative cyclical conditions as well as the effects of past exchange rate changes that are still in the pipeline.

^{2/} The fact that real bond yields in Switzerland are lower than in most other industrial countries can be interpreted as a sign that financial markets expect such a real appreciation over the long run. However, the implied rate of appreciation is much lower than that experienced over the past few years.

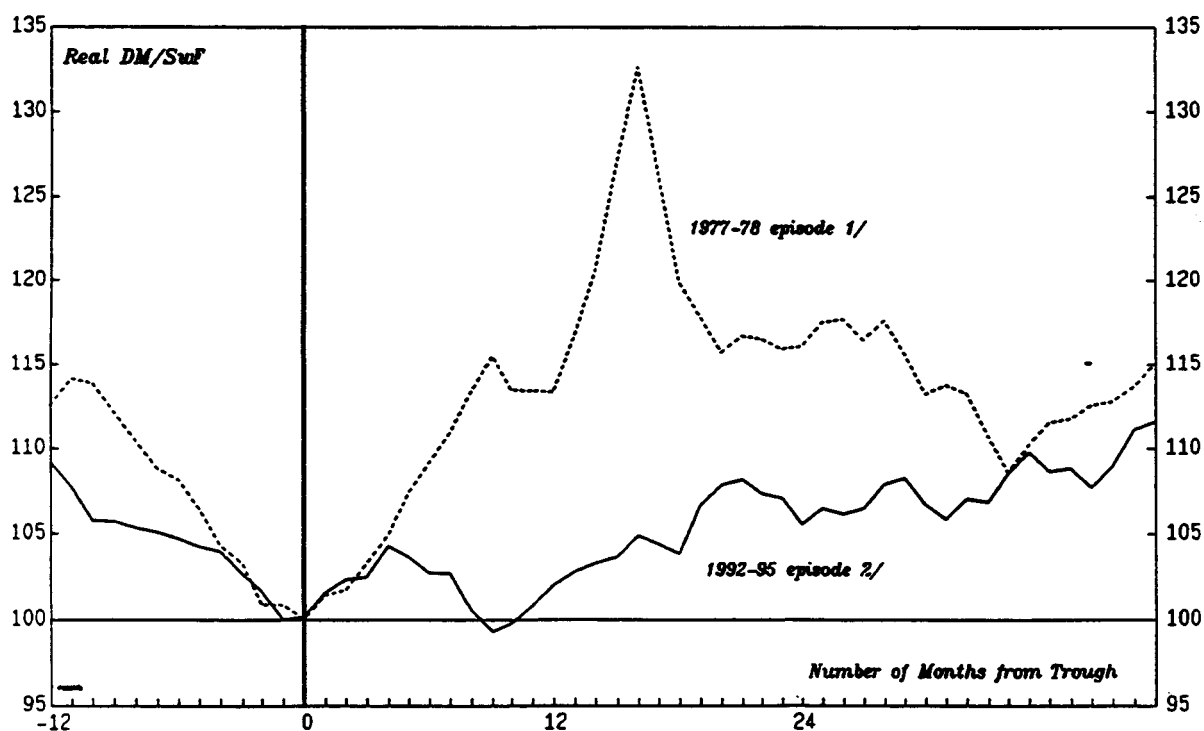
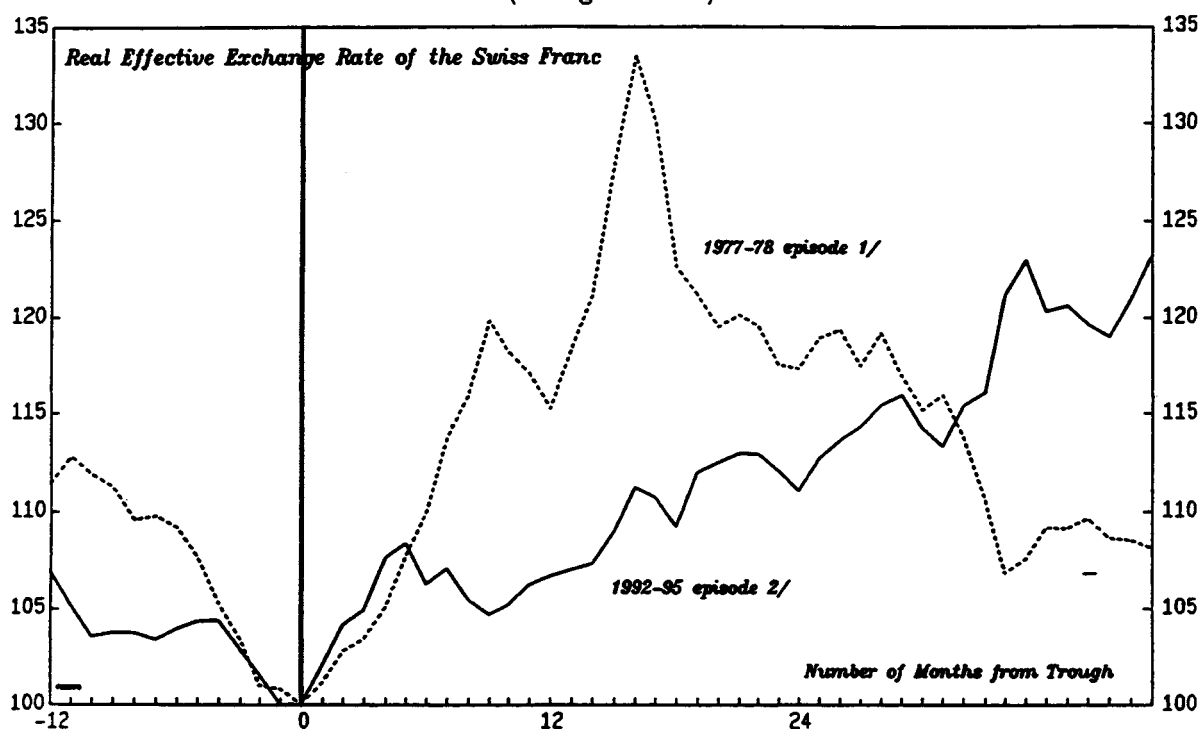
CHART 1-5
Switzerland
Velocity of Circulation of Various Monetary Aggregates



Source: Swiss National Bank.

CHART 1-6
Switzerland

Real Exchange Rates of the Swiss Franc
During Two Periods of Strong Capital Inflows
(Trough = 100)



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

1/ The trough of the real exchange rate was in May 1977.

2/ The trough of the real exchange rate was in April 1992.

A conclusion that may be drawn from this analysis is that the level of the real exchange rate is not necessarily unsustainable from a medium-term perspective. Nevertheless, the pace at which the franc has strengthened over the recent past is a legitimate policy concern, as it risks aborting the still fragile recovery in business activity and probably overstretches the capacity of the economy to shift resources from the tradables to the nontradables sector in the short to medium term. In view of this concern, it would seem appropriate for the authorities to seek to moderate the franc's rise, through a judicious relaxation of domestic monetary conditions and through other measures that might ease constraints on capital exports or undue incentives for capital imports. However, it would also be important to speed structural reforms that would increase the flexibility and dynamism of the nontradable sectors and thereby reduce the economy's dependence on a thriving tradables sector.

ANNEX

A Monetary Conditions Index (MCI) for Switzerland

1. Introduction

Monetary policy in Switzerland is based on the premise that there is a stable long-run relationship between the Seasonally Adjusted Monetary Base (SAMB) and inflation. Since 1990 medium term targets for the SAMB have been set consistent with an inflation rate of about 1 percent over the medium term--which is the ultimate objective of monetary policy--and based on assumptions about potential GDP growth and trends in the velocity of SAMB. Since 1990 actual growth in SAMB has continuously undershot its targets while inflation objectives--at least in the latter part of the period--have been met. The reasons for the apparent weakness in the relationship between SAMB and demand/inflation--e.g., for unexpected changes in velocity--are innovations in payments technology, improved liquidity management by banks, and changes in banking regulation. The result is that SAMB has become less useful as an intermediate target for monetary policy. Other indicators may thus provide useful information about monetary conditions.

The broader aggregates M1, M2 and M3 may serve as such indicators. The improvements in the definitions of these aggregates in 1995, may have enhanced their usefulness. ^{1/} However, these indicators are also quantitative variables and thus in principle subject to the same weaknesses as regards the relationship with inflation, demand, and output as SAMB.

Alternatively, price variables like interest rates and exchange rates could be used as indicators of the monetary stance. Both interest rates and exchange rates have considerable impact on demand and inflation. An additional requirement for a variable to qualify as an indicator of monetary conditions is that policy action is easily reflected in the behavior of the variable. That is obviously the case for very short-term interest rates. Through the impact of short-term interest rates on capital flows monetary

^{1/} For details, see Fluri (1995).

policy actions should also fairly rapidly be reflected in the exchange rate as well.

2. The construction of an MCI for Switzerland

During the past few years several countries, mainly after having been forced to abandon a fixed exchange rate regime, have introduced an MCI to help assess the stance of monetary policy. 1/ The MCI is constructed as a weighted average of real short-term interest rates and the real effective exchange rate. The idea is that monetary policy, in particular in small open economies, works both through the interest rate level and the exchange rate. Accordingly an MCI has been constructed for Switzerland based on the following formula:

$$(1) \text{ MCI} = (r - r(\text{avg } 83-95) + 1/3(\text{reer}/\text{reer}(\text{avg } 1983-1995)) - 1) * 100$$

r = real short term interest rates. 3-month deposit rates deflated by the change in the consumer price index over the last three months, compared to the previous three months, at an annual rate. 2/

reer = real effective exchange rate based on relative consumer prices. 3/

Formula 1 implies that a one percentage point increase in the real interest rate is assumed to have 3 times as large an effect on demand conditions as a one percent appreciation of the real effective exchange rate. These are the weights most frequently used in the MCI for other countries. In those cases the weights have been based on estimates of the relationship between the indicators and demand conditions. Some preliminary attempts by the staff to estimate this relationship have not provided clear guidance as to what the weights should be. Nevertheless, it seems plausible that their relative importance should be about the same in Switzerland as in these other countries, in particular because foreign trade constitutes about the same share of GDP.

In principle also a nominal interest rate and a nominal effective exchange rate could be used in compiling the MCI. The main reason why the indicators constructed for other countries have used real variables, is because of their well founded effects on real demand and hence on the output

1/ Examples include Canada, Norway, Sweden, and the United Kingdom.

2/ The introduction of VAT from January 1, 1995 temporarily increased the measured rate of inflation. To avoid the subsequent drop in the real interest rate, new values for the consumer price inflation were constructed for the first half of 1995 by extrapolating the underlying growth rate from the second half of 1994.

3/ As the reer was available only through October 1995 it was extrapolated through December using the same growth rate as that of the nominal effective exchange rate.

gap and inflation. Anyway, a real and a nominal MCI would be highly correlated.

Mostly for practical reasons, a backward-looking indicator of inflation expectations is used to deflate the nominal interest rate. But backward-looking elements are also deemed to be important in price setting in Switzerland as nominal wages tend to be adjusted to past changes in prices. As a result of the use of a backward-looking indicator, however, there is a risk that monetary conditions may change without that being captured by the MCI in circumstances when inflation expectations change. Neither in the case of supply shocks will the MCI appropriately measure monetary conditions.

The changes in the components of the MCI are measured in relation to a base period. In formula 1 the average of the period 1983-1995 is used as a base period. One should not, however, attach much importance to the base period and thus to the level of the index. Changes in the equilibrium short-term real interest rates and the reer over time will make the level of the MCI hard to interpret. Changes in the equilibrium short-term real interest rate could, for instance, be caused by changes in the tax system that alter the gap between real and real after-tax interest rates or structural changes in the financial market that alter the relative importance of short- vs. long-term interest rates in lending and borrowing decisions. Similarly, the equilibrium reer could for instance be affected by a terms of trade shock. What is important is the change in the index over a short period of time, which in general should reflect a loosening or tightening of monetary policy.

3. How an MCI would affect the assessment of monetary conditions

In Chart I-7 the MCI for Switzerland is shown together with its components; the real short-term interest rate and the real effective exchange rate. In addition, inflation, SAMB, and the monetary aggregates M1 and M3 are shown. ^{1/}

After an initial tightening in 1986 the MCI shows an easing in monetary conditions through 1987 and 1988, in the latter year mainly because of depreciation of the exchange rate. Monetary conditions subsequently became tighter, but then fluctuated up to mid-1992 reflecting movements both in the real exchange rate and the real interest rate. Since mid-1992 the MCI has increased substantially, both because of higher real interest rates and a real appreciation of the Swiss franc. Real interest rates increased in 1993 and 1994 as nominal interest rates remained steady while inflation came down. In the first part of 1995 the continued appreciation of the currency increased the MCI. The exchange rate stabilized in the autumn of 1995 and

^{1/} The series in the graph are in accordance with the new definition. Consequently, they were not available and did not serve as guides to monetary policy prior to 1995.

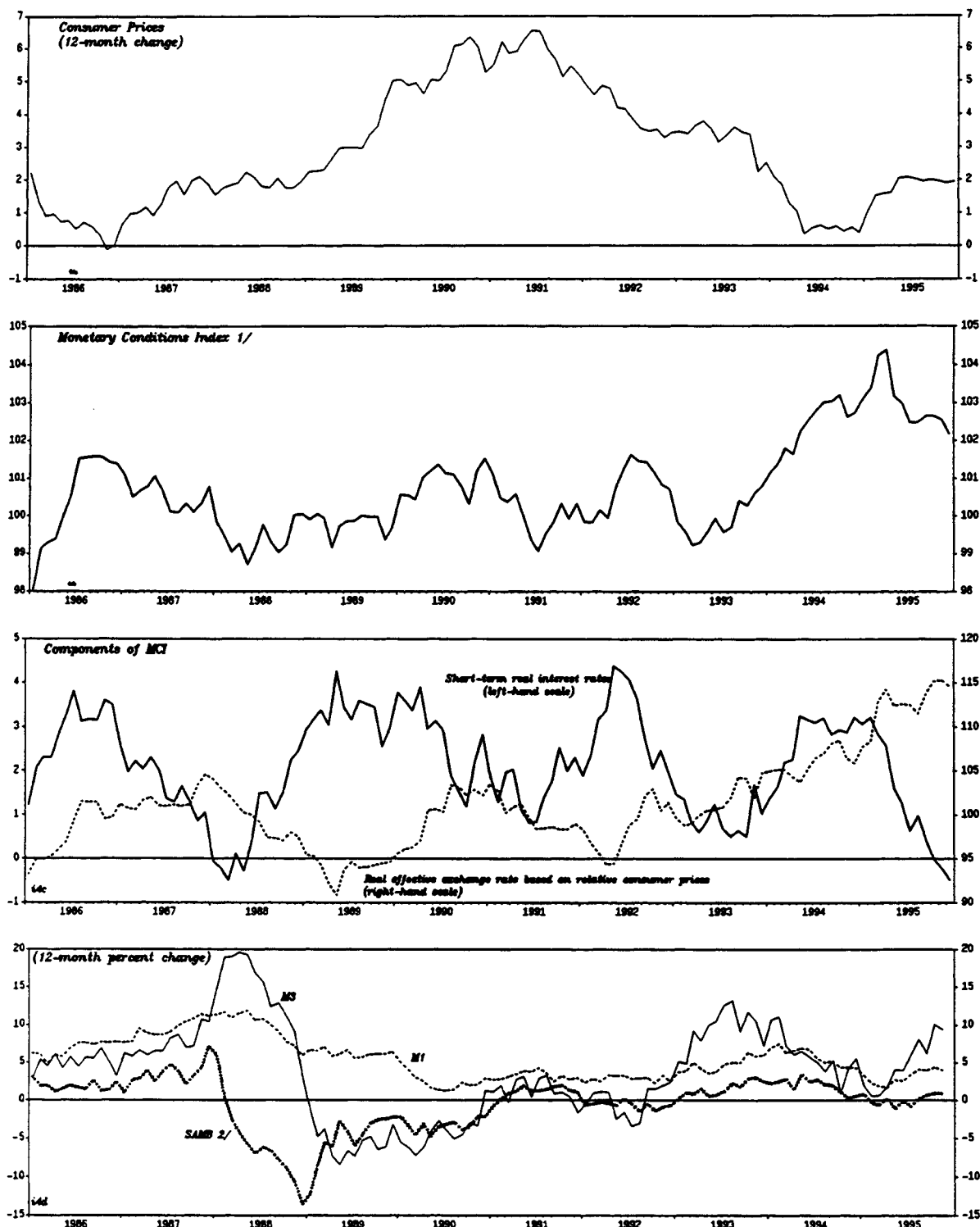
the fall in the MCI was brought about by a significant reduction in short-term interest rates.

The rise in inflation to over 6 percent in the beginning of the 1990s has been attributed to lax monetary policy in 1987 and 1988. In that period changes in the payments system and in bank reserve requirements had led to a sharp reduction in bank reserves and thereby seriously destabilized the monetary base as can be seen from Chart 1-7. In contrast to the confusing signals from the monetary aggregates, the MCI unambiguously signalled that monetary conditions were being relaxed in 1987 and 1988. With the benefit of hindsight it seems clear that the MCI could have provided useful information in that period and could have induced a tightening of policy earlier in 1988 than was actually the case.

Also during 1994 the MCI might have been helpful in the conduct of monetary policy. Changes in banks' liquidity management again made SAMB an unreliable indicator of monetary conditions. The broader aggregates M1 and M3 grew more rapidly than SAMB and while the pace of growth slowed during the year these indicators signalled, if anything, an even smaller need of a monetary relaxation than did the SAMB. Throughout 1994 the SAMB continued to undershoot its target as it had done since the medium-term target path was introduced in 1990. At the same time, inflation came down to below 1 percent and doubts about the reliability of the SAMB may have contributed to the authorities' reluctance to relax the monetary stance. The MCI, on the other hand, clearly indicated that monetary conditions were becoming tighter throughout 1994. If an MCI had been used under these circumstances it might have brought forward the easing of monetary policy that subsequently took place. However, it is fair to remember that the delay in easing monetary policy was not due to any lack of evidence that conditions were tight (after all SAMB was still well below its targeted path). Rather, it reflected the authorities' concern to ensure that the introduction of VAT at the beginning of 1995 would not lead to a wage-price spiral. Once it became clear that the risk of such a spiral had been averted, the policy stance was progressively eased.

CHART I-7
Switzerland

Inflation and Indicators of Monetary Condition



Source: Swiss Institute for Business Cycle Research, data tape; and IMF staff calculations.

1/ Index of the absolute change in the real short-term interest rate and percentage change in the real effective exchange rate compared to their average levels over the period January 1983 to December 1995.

A ratio of 3 to 1 is used between an increase in real interest rate and an appreciation of the exchange rate.

2/ Seasonally adjusted Monetary Base.

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II. Is Capital Being "Overaccumulated" in Switzerland? 1/

In saving and accumulating capital a country chooses to forego immediate consumption in order to increase consumption possibilities in the future. A balance thereby needs to be struck between the costs of curtailing consumption today and the benefits of increased consumption tomorrow. A very high consumption level today--and thus a very low level of savings and capital accumulation--cannot be viewed as optimal as it would not be sustainable in the future. By the same token, however, a very high level of savings and capital accumulation could be "too" high in the sense that--given decreasing returns to capital--the marginal return on capital may become too low to compensate for the present reduction of consumption. Even in a steady state overaccumulation can occur, in which case the consumption levels of the present and future generations are lower than they could be because too many resources are continuously being devoted to maintaining a too high capital stock. In this case the economy would not operate in a dynamically efficient way: both consumption today and in the future could be increased. The optimum level of capital would be reached when the long-run, sustainable level of consumption is maximized.

In this note, the criteria which the theory of optimal capital accumulation has brought forward to assess whether or not an economy is overaccumulating capital, are applied to the Swiss economy. Given different rates of return due to less than perfect international capital markets, the distinction is made between domestic investment and investment abroad. In the assessment of optimal capital accumulation, the social rate of time preference obviously plays a dominant role. The less weight a society attaches to the future--i.e., to the future consumption possibilities of the present generation as well as to those of future generations--the higher may be its consumption level today and the lower its level of savings. In many countries what is commonly perceived as too low a savings rate is rationalized as a reflection of a high social rate of time preference. 2/ Switzerland, judged by its savings behavior, seems to be close to having a zero social discount rate (on average). This could be regarded as the correct choice for a social discount rate, 3/ and hence the resulting savings behavior could be deemed as being optimal--even though rather unique by international standards. However, even assuming a social discount rate of zero, Switzerland appears to be accumulating capital domestically at a slightly excessive rate.

1. How much does Switzerland save?

Saving has been extraordinarily high in Switzerland throughout the postwar period. It allowed the Swiss economy to run a substantial current

1/ This chapter was prepared by C. Thimann.

2/ See, for example, IMF, World Economic Outlook, May 1995, Chapter V.

3/ The choice of social discount rates is often regarded as an ethical question. One of the earliest and best known proponents of a zero social discount rate, on the grounds that present generations have no right to discount future generations' welfare, was Ramsey (1928).

account surplus despite a comparatively high level of investment. Among the industrial countries, only Japan has had savings ratios which tended to be somewhat higher than those of Switzerland, with all other countries lying well behind, in terms of their ratio of savings to GDP (Chart II-1). In the 1980s, for example, the average gross savings/GDP ratio was 30 percent in Switzerland, topped only by Japan at 32 percent. The next highest saver, Germany, had an average savings ratio of only 22 percent, followed by Italy and France (21 percent), the U.K. (19 percent), and the U.S. (15 percent). The high rate of savings made Switzerland an important provider of capital even on a world-wide level: from 1989 to 1993 it has been the second largest supplier of net capital flows in the world, after Japan. ^{1/}

A particularly notable feature of national saving in Switzerland is the high level of public saving (Charts II-2 and II-3). Throughout the 1970s and 1980s public saving in relation to GDP has been broadly constant at 8 to 9 percent. This value lies far above other industrialized economies: in Japan, Germany, France and the U.K. the gross public saving ratio was around 4 percent on average in the 1970s and around 2 percent in the 1980s; in the U.S. and Italy public saving has been negative almost throughout this period. Furthermore, and unlike other industrialized economies, public saving in Switzerland has hardly been affected by cycles in the world economy or the two large oil crises. Only after 1990, when Switzerland slipped into a recession, has public saving actually fallen.

Some other indicators also point into the direction of a possible overaccumulation of capital. The investment rate has been very high in Switzerland, despite the absence of war destruction and hence the need to rebuild the capital stock. What is more, the return on capital has been comparatively low. Real interest rates have been considerably lower in Switzerland than in virtually all other major industrial countries. From 1979-94, for example, the average real interest rate differential in percentage points was 3.9 relative to France, 3.6 relative to Italy, 3.3 relative to the U.K., 2.2 relative to the U.S., 2.1 relative to Germany, and 1.9 relative to Japan.

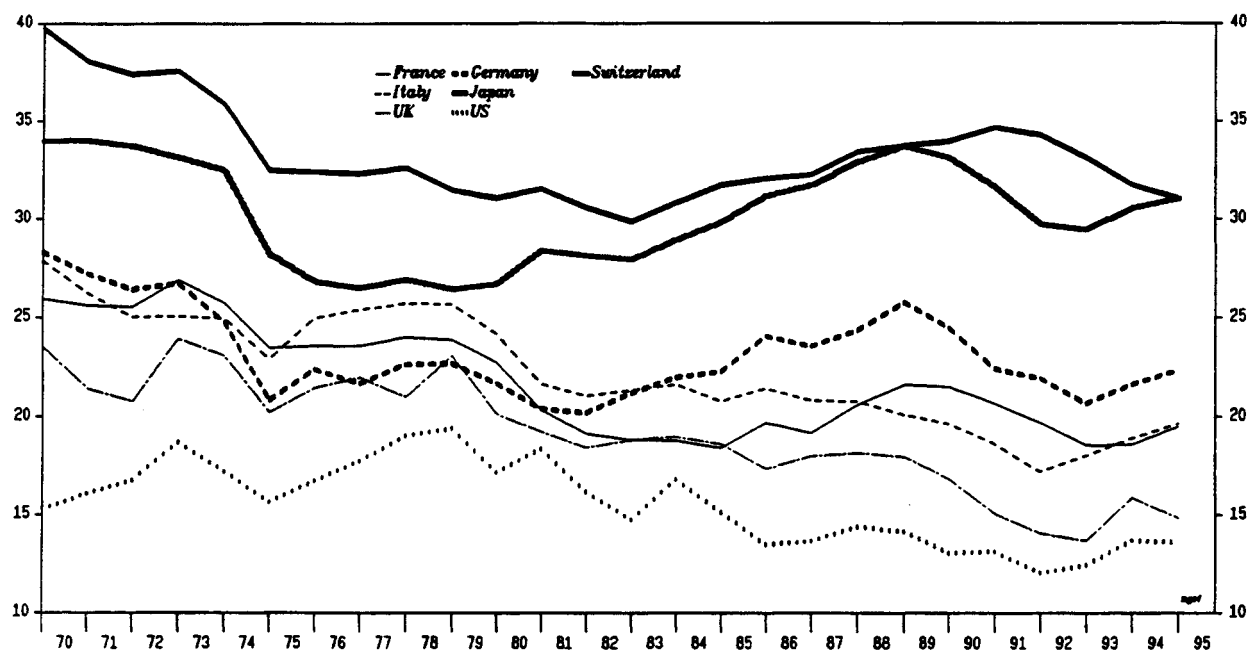
2. Rules for optimal capital accumulation

The theory of optimal capital accumulation was developed in the 1960s and is based on a model of neoclassical growth. It is a normative theory that provides criteria to determine the optimal level of saving and capital accumulation in the steady state of an economy. The main criterion for the "golden rule" of capital accumulation, which maximizes steady-state per-capita consumption, is that the return to capital r should equal the sum of population growth rate n and technical progress g :

$$(1) \quad r(K) = n + g$$

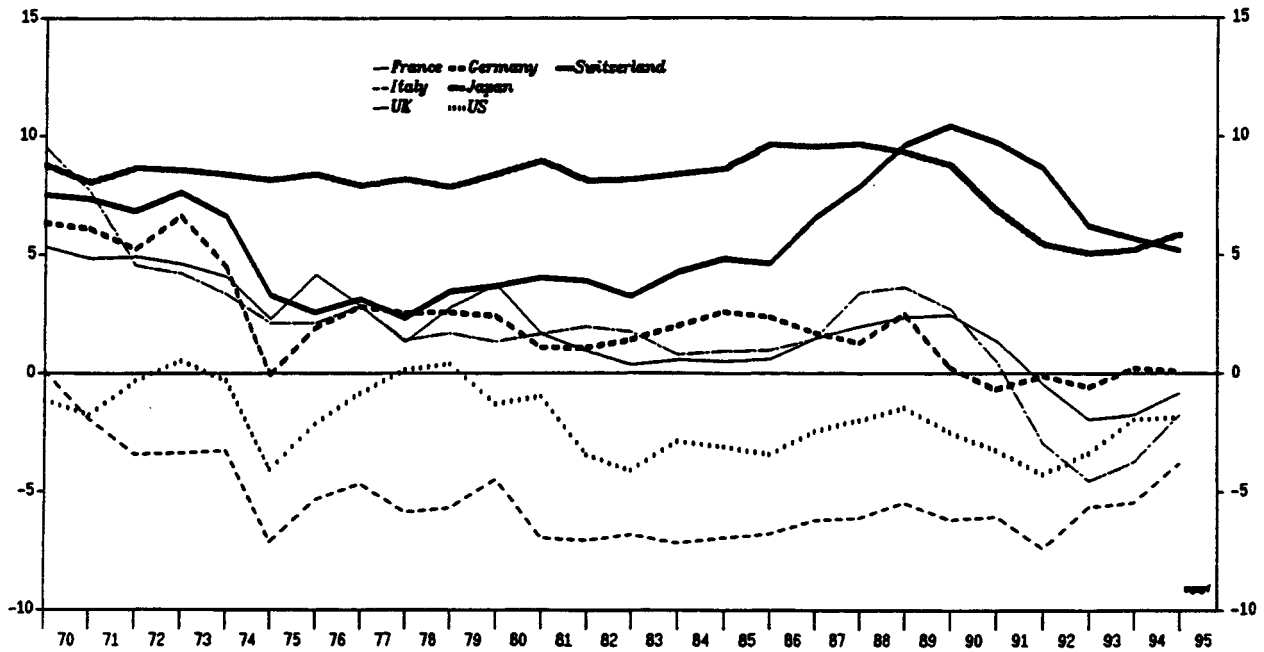
^{1/} IMF, World Economic Outlook, May 1995, p. 83.

CHART II-1
Switzerland
Gross National Savings
(In percent of GDP)



Source: IMF, World Economic Outlook database.

CHART II-2
Switzerland
Gross Public Savings
(In percent of GDP)

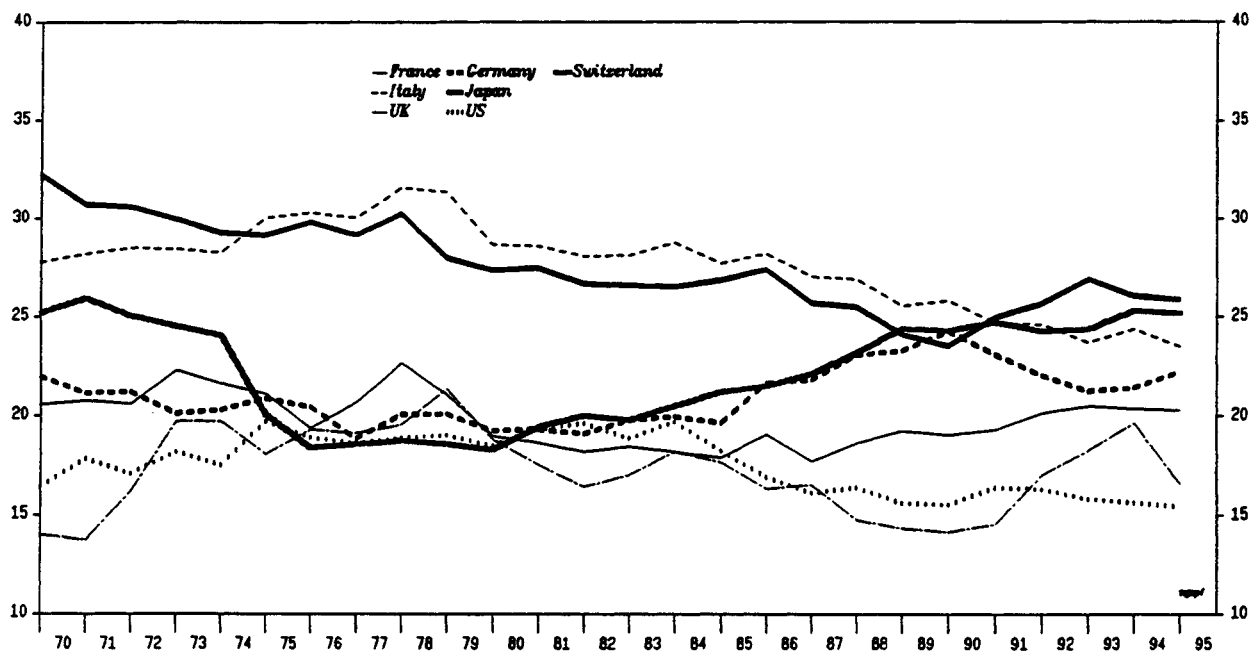


Source: IMF, World Economic Outlook database.

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CHART II-3
Switzerland

Gross Private Savings
(In percent of GDP)



Source: IMF, World Economic Outlook database.

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To see why this is optimal, assume that the capital stock is increased by a small amount, dK . The benefit is the additional output, deriving from the return on this incremental capital unit, $r \cdot dK$. At the same time, however, also more resources must be devoted to keep the larger capital stock ($K+dK$) growing at the steady state rate of the economy, i.e., to account for the growing population and for technical progress. In the new steady state, more investment of $(n+g) \cdot dK$ units is needed than before. In the optimal steady state these additional costs just balance with the additional return $r \cdot dK$ and hence $r=n+g$. If the return falls below $n+g$, due to decreasing marginal returns, the additional output does not compensate for the additional cost and capital is actually overaccumulated.

There is no discounting of future consumption included in these arguments, the golden rule being the one that maximizes per-capita consumption for all generations. ^{1/}

The golden rule as stated in (1) is, however, difficult to test for because of the nonobservability of the marginal return to capital. Therefore, often a second criterion, which can be derived from the criterion mentioned above (see annex), has been used to test for the golden rule. This criterion compares the inflows to, and outflows from, the capital stock. If the capital stock has the optimal size, the outflows (profits) from it will equal the inflows (investment) to it. The capital stock will neither be a "sink," where permanently more resources are devoted to it than received from it, nor will it be a "spout," where the current generation takes out more than it puts into it. In a dynamically inefficient context where investment exceeds profits, more is put into the capital sector than what flows out of it, and the capital sector is actually a "sink," i.e., a net burden to the economy.

3. Application of the golden rule criteria to Switzerland

The first golden-rule criterion consists of a comparison of the real rate of interest in the economy with the economy's growth rate, which is, in the steady state, equal to the sum of population growth and technological progress. If the real rate of interest lies below the economy's growth rate, the economy would overaccumulate capital and be actually dynamically inefficient. In Switzerland, the real rate of interest, measured by the return on short- or long-term bonds net of inflation, has in fact been for many years lower than the economy's growth rate (Table II-1). This has been particularly true in the years until 1989. From 1984 to 1989 the real interest rate was roughly one percentage point lower than the economy's growth rate. In the years thereafter, the central bank had to raise short-term interest rates sharply to control rising inflation. At the same time, the economy experienced a recession so that the real interest rate in the post-1989 period exceeded GDP growth by a significant margin.

^{1/} A modified golden rule, which attaches greater weight to the present generation by discounting future generations' consumption, is discussed in section 4.

Table II-1. Rates of Growth and Rates of Return in Switzerland

	Popu- lation	Employ- ment	Tech progr	Real GDP	Real int.rate short	Real int.rate long	Dyn.eff. short	Dyn.eff. long
	(1)	(2)	(4)-(2)	(4)	(5)	(6)	(5)-(4)	(6)-(4)
1984	0.3	1.0	0.8	1.8	1.0	1.2	-0.8	-0.6
1985	0.5	1.9	1.8	3.7	1.2	1.0	-2.5	-2.7
1986	0.5	1.4	1.5	2.9	3.9	4.0	1.0	1.1
1987	0.8	1.2	0.8	2.0	2.2	2.5	0.2	0.5
1988	0.6	1.2	1.7	2.9	0.8	1.7	-2.1	-1.2
1989	0.9	1.1	2.8	3.9	3.4	1.6	-0.5	-2.3
1990	1.1	1.3	1.0	2.3	3.5	1.1	1.2	-1.2
1991	0.9	-0.1	0.1	0	2.4	0.6	2.4	0.6
1992	1.9	-2.2	1.9	-0.3	3.6	2.3	3.9	2.6
1993	0.4	-2.6	1.7	-0.9	1.8	1.6	2.7	2.5
1994	0.6	-1.0	3.1	2.1	3.3	4.2	1.2	2.1
1995	0.5	1.0	1.0	2.0	1.8	3.5	-0.2	1.5
84-89	0.6	1.3	1.6	2.9	2.1	2.0	-0.8	-0.9
84-95	0.8	0.4	1.5	1.9	2.4	2.1	0.5	0.2

Sources: IMF, WEO Database; OECD Database; IMF staff calculations.

However, even if the real interest rate for some years lies below the economic growth rate one cannot readily conclude that overaccumulation has occurred. For one thing, the real interest rate, measured by the return on government bonds net of inflation, is a safe return and may therefore be lower than the uncertain return on capital. Furthermore, only in a fully competitive economy is the real interest rate equal to the marginal return on capital. Hence the constellation of the real interest rate being lower than the economy growth rate is as such no proof of dynamic inefficiency. In fact, the same constellation has been found in many industrial countries which were otherwise deemed as dynamically efficient (see, for example Abel et al., 1989).

Given these problems, the second criterion mentioned above--the cash-flow comparison of investment and profits--is commonly used to assess the optimality of capital accumulation. This criterion does not suffer from the real interest rate being only a proxy for the return of capital. Rather, the profit figures are directly compared with the investment flows. Table II-2 gives the results for Switzerland. A distinction is made between the domestic balance (balance of capital accumulation and capital income within Switzerland) and the global balance (balance of capital accumulation and capital income domestically and abroad, by Swiss nationals).

It can be seen that over the past ten years more resources have been invested to augment the capital stock in Switzerland than have been received from it. If the economy is regarded as being in a steady state, this implies that capital has actually been overaccumulated. By this criterion, on average 0.9 percent of GDP (approximately Sw F 2.5 billion in 1994 prices) have been overaccumulated each year during the past ten years.

Table II-2. Capital Income, Capital Accumulation, and Dynamic Efficiency: the Swiss Case

	Domestic Capital Income in % of GDP (1)	Domestic Investment in % of GDP (2)	Domestic Efficiency [for in % of GDP (1)-(2) (4)]	Global Capital Income in % of GNP (5)	Global Invest- ment in % of GNP (6)	Global Effici- ency in % of GNP (5)-(6)
1983	23.6	23.3	0.3 [-1.1]	28.1	26.0	2.1
1984	23.9	23.4	0.6 [0.0]	29.0	26.6	2.5
1985	24.3	23.8	0.5 [1.0]	29.3	27.6	1.7
1986	24.4	24.2	0.2 [2.0]	28.8	28.0	0.8
1987	24.0	25.3	-1.3 [1.6]	28.4	28.4	-0.1
1988	23.3	26.6	-3.3 [2.4]	28.5	29.9	-1.5
1989	23.8	27.5	-3.7 [2.2]	28.9	29.9	-1.0
1990	23.7	26.9	-3.2 [1.9]	28.6	29.5	-0.9
1991	23.2	25.6	-2.4 [1.1]	28.1	29.0	-0.8
1992	23.1	23.7	-0.6 [0.7]	27.7	28.9	-1.2
1993	23.0	22.5	0.5 [1.3]	27.7	29.5	-1.7
1994	24.7	22.6	2.1 [1.9]	29.1	28.9	0.3
1983-94	23.7	24.6	-0.9 [1.5]	28.5	28.5	0.0

Sources: Swiss National Bank, Monthly Report, September 1995; IMF, WEO Database; IMF staff calculations. Figures may not always add up due to rounding.

No other industrial country has experienced inflows into the capital sector exceeding outflows over such a long time period. For comparison, the figures for Germany, providing the balance of domestic profits and investment, are also given in Table II-2. They show that, over the same time horizon, annual profits in Germany exceeded annual investment by 1.5 percent of GDP (on average). Even in Japan, which is sometimes seen as a country that may have exceeded the optimal rate of capital accumulation, profits exceeded investment by 1.1 percent of GDP (on average) over the same period (see Miranda, 1995).

The amount of overaccumulation in Switzerland can be expressed not only in relation to GDP (which makes international comparisons easier), but also in relation to the level of investment itself ((investment-profits)/investment). This indicates that, given the level of domestic profits, inflows into the capital sector exceeded outflows by 3.3 percent, i.e., domestic investment over the 10-year period 1983-84 was on average 3.3 percent "too high."

The picture looks different on a global level: if one compares investment and profits by Swiss nationals domestically as well as abroad, one comes to the conclusion that the right balance has been struck, with capital income being equal to investment on average. This indicates that, as far as global capital accumulation and saving behavior is concerned, Switzerland strikes the optimal balance of the golden rule. The difference between the results on the domestic and the global level can mainly be attributed to the higher return on investment abroad. The large supply of Swiss savings does not affect the global return to capital, given that Switzerland is a small economy, but it drives down the returns within Switzerland.

4. Modified golden rule: the role of the discount rate

The previous section assumed that society does not discount the utility of consumption in the future. Commonly, however, it is assumed that a society, just as a single individual, attaches a higher value to present than to future consumption. This leads to the modified golden rule, according to which the intertemporal allocation is optimal if the marginal product of capital equals the sum of population growth n , technological progress g and the social rate of time preference p : ^{1/}

$$(2) \quad r(K) = n + g + p$$

If p is positive rather than zero, the marginal product of capital should be larger than before, implying a lower level of capital stock, hence less capital accumulation, and a higher level of consumption: the present generation sacrifices future consumption to increase present consumption.

Usually, the rate of time preference is assumed to be a given parameter of the preference structure of an individual or a society as a whole and is exogenous, just as the rate of population growth n and the rate of technological progress g . From this background, equation (2) determines the optimal level of the capital stock K . However, the social rate of time preference is not observable. Therefore, two interpretations of the modified golden rule are possible: a normative interpretation would assume a rate of time preference p , say zero, and judge the actual savings behavior against that rule. If a rate of zero is assumed, Switzerland saves actually the right amount but accumulates too much capital domestically, while all other economies save too little. A positive interpretation would assume that the individual economies have optimized their savings behavior given the underlying rate of time preference, and thereby would be able to infer this rate from the behavior observed. Both approaches represent the two sides of the same coin, but even so the positive approach also yields some insights into the savings behavior of individual economies by allowing inferences about the underlying rate of time preference.

The serious difficulty with the positive approach, however, is related to data measurement. Estimation of the capital stock, the share of capital income in total income, the depreciation rate and the rate of technical progress all face difficult statistical measurement problems. Hence, it is only possible to obtain some rough and suggestive indications of cross-country differences in social discount rates based on this framework.

Rather than working with (2), which includes the difficult to measure return on capital, a steady-state condition of the modified golden rule shall be used which includes the level of the capital stock and the profit share directly. ^{2/} In the steady state, for the level of capital stock to be optimal, it must hold that the capital-output ratio equals the share of

^{1/} See, for example, Blanchard and Fischer (1989) p.45.

^{2/} See Miranda (1995) or Evans (1992).

capital income in total income α , divided by the sum of the rates of population growth n , technological progress g , and time preference p (for the derivation see annex):

$$(3) \quad \frac{K}{Y} = \frac{\alpha}{n+g+d+p}$$

Given the necessary information on all observable data in (3), the underlying social rate of time preference p can be inferred. Because reasonably reliable capital stock and share of capital income are available for the business sector only (total economy excluding the government sector), all variables refer to this part of the economy. Table II-3 displays the results for different OECD countries. ^{1/}

Table II-3. Capital stock, Capital Income and Inference about the Underlying Rate of Time Preference

	Capital/ output ratio K/Y	Capital income share α (%)	Popula- tion growth n (%)	Techn. progress g (%)	Depre- ciation d (%)	Underlying rate of time pref. p (%)
Switzerland	2.54	21.03	0.62	1.5	6.0	0.2
United Kingdom	3.19	30.15	0.25	1.5	6.0	1.7
Austria	3.23	33.99	0.36	1.5	6.0	2.7
France	2.79	33.55	0.52	1.5	6.0	4.0
Belgium	2.72	31.99	0.17	1.5	6.0	4.1
Germany	2.79	34.54	0.44	1.5	6.0	4.4
Italy	2.74	36.84	0.07	1.5	6.0	5.9
Japan	2.23	31.23	0.52	1.5	6.0	6.0
United States	2.13	33.08	0.96	1.5	6.0	7.1

Legend: Data are 1980-1992 averages; g and d are each assumed to be identical across countries.

Source: OECD, Economic Outlook and Analytical Database, 1995; IMF staff calculations.

^{1/} For simplicity the rate of technical progress and depreciation are assumed to be identical across countries and are set at average levels derived in other studies. Since we are only interested in an international comparison of rates of time preference and not their levels themselves, the levels of technical progress and depreciation are not important as such.

The results seem to confirm those of the previous section: Switzerland has a rate of time preference significantly below that one in other industrial economies. Table II-3 also shows what brings about this result. It is not the high, by international standards, level of the capital stock, but rather the unusually low share of capital income. Even though this capital income share is difficult to measure with precision (because rough adjustments have to be made for self-employed, whose labor input would otherwise be attributed to capital income), the magnitude of variation in the underlying social discount rates is remarkable, and the rate in Switzerland is clearly one of the lowest.

5. Possible factors underlying the high capital accumulation

The previous section provided one possible explanation for the high level of saving and capital accumulation: a low rate of time preference. This produces high savings and hence a low interest rate and a high level of investment. If, however, one is reluctant to accept that rates of time preference vary so much across countries, one has to search whether there are other factors that could provide some additional explanation for the high level of capital accumulation in Switzerland.

6. Conclusions

The claim, often heard in recent years, of inadequate saving and excessive consumption by present generations at the expense of future generations almost certainly does not apply in the case of Switzerland. If the golden rule criteria of optimal saving and capital accumulation provide a useful benchmark, then Switzerland, which is perhaps the only industrial country that strictly fulfills these criteria, appears to take future generations fully into consideration and does not discount their well-being. Nevertheless, the analysis in this paper suggests that too much capital may be accumulated within Switzerland. This seems to have been the case at least during the period from 1983 to 1994, when more resources have flown into the domestic capital stock, than have been received from it by way of profits, with the gap averaging almost 1 percent of GDP or 3.3 percent of investment.

The persistence of high domestic investment rates in Switzerland in the face of comparatively low returns on capital may be explained in part by widely-held expectations of a (trend) real appreciation of the Swiss franc against other currencies and by safe haven considerations for acquiring higher yielding assets abroad. Another possible explanation is related to the generous incentives for saving in Switzerland. As is well known, Switzerland has a very comprehensive pension system, which includes not only a public pay-as-you-go scheme (the so-called first pillar) but also a system of fully-funded, and compulsory, occupational pension schemes (the so-called second pillar). Furthermore, the state provides substantial fiscal incentives--in the form of tax deductions--for additional saving for pension purposes (the third pillar). One effect of the generous arrangements for saving, given imperfect capital mobility across countries, is to lower the cost of capital, relative to labor, in Switzerland. This, in turn,

contributes to a highly capital-intensive structure of production. In fact, Switzerland is one of only a few advanced industrialized countries where the capital-output ratio has not remained relatively constant in the past but has instead displayed a monotonically increasing trend (Chart II-4). It may be concluded from this analysis that any steps that would help correct the distortion in relative factor prices, for example through measures that would dampen excessive incentives for saving, would not necessarily be harmful to longer-term economic growth but might rather stimulate it. At any rate, such measures should contribute to curbing the observed tendency towards an increasing capital intensity of production and to that extent raise the demand for labor.

ANNEX

Derivation of Criteria for Optimal Capital Accumulation

The theory of optimal capital accumulation was initiated by Phelps (1961) and Diamond (1965) and uses the neoclassical Solow-Swan model of economic growth. Its main contents can be summarized as follows. Let output be given by a linear homogenous production function $Y=F(K,L)$ with inputs capital K and employment in efficiency terms L . Employment in efficiency terms is employment adjusted for labor augmenting technical progress, which is assumed to take place at rate g . In a closed economy output is either consumed or invested I in capital accumulation K' :

$$(A1) \quad Y = F(K,L) = C + I = C + K'$$

If the employment ratio is fixed, employment grows proportional to population at rate n . Normalization in per-worker terms (lower-case letters) gives the behavior of the per-worker capital stock $k=K/L$, which is proportional to the per-capita capital stock as

$$(A2) \quad dk/dt = k' = \left(\frac{K}{L}\right)' = \frac{K'L - L'K}{L^2} = \frac{I}{L} - (n+g)\frac{K}{L} = f(k) - c - (n+g)k$$

and in the steady state it holds that

$$(A3) \quad k' = 0 : i = (n+g)k$$

In the steady state, investment per worker, $i=f(k)-c$, must equal the capital stock times the sum of the growth rate of population and the rate of technical progress so as to ensure that the capital stock grows in line with population (employment) growth and technical progress. This is true for any steady state and does not yet determine the optimal level of the capital stock. The desired level of capital stock is the level that maximizes the level of consumption. From $c=f(k)-(n+g)k$ this is obviously the one for which holds:

ANNEX

$$(A4) \quad f'(k) = n + g$$

To derive the implications of this rule for the level of savings, express total savings S as a fraction σ of the level of profits, which are given by the return to capital r times the capital stock:

$$(A5) \quad S = \sigma rK$$

The question then is: how high should total savings be in relation to profits, what is the optimal value of σ ? Since savings equals investment and hence the change in the capital stock K' , the growth rate of the capital stock will be equal to $\sigma r - K'/K$. In order to be in a steady state the capital stock has to grow at a $K'/K = n + g$. Combining these two conditions yields $\sigma r = n + g$, from which, together with (4), it follows that $\sigma = 1$ in the optimal, consumption maximizing steady state. This provides the second criterion for the golden rule: savings and hence investment should equal profits.

The criterion in section 4 is derived as follows. The return to capital r is given by the total return to capital (capital income over capital employed) net of depreciation d : $r = \alpha Y/K - d$. Since, under the modified golden rule, the net return equals the sum of population growth n , technological progress g and time preference rate p , it follows that $K/Y = \alpha/(n+g+p+d)$.

III. Some Aspects of the International Investment Position
and Investment Income in Switzerland:

A Comparison with Other Countries 1/

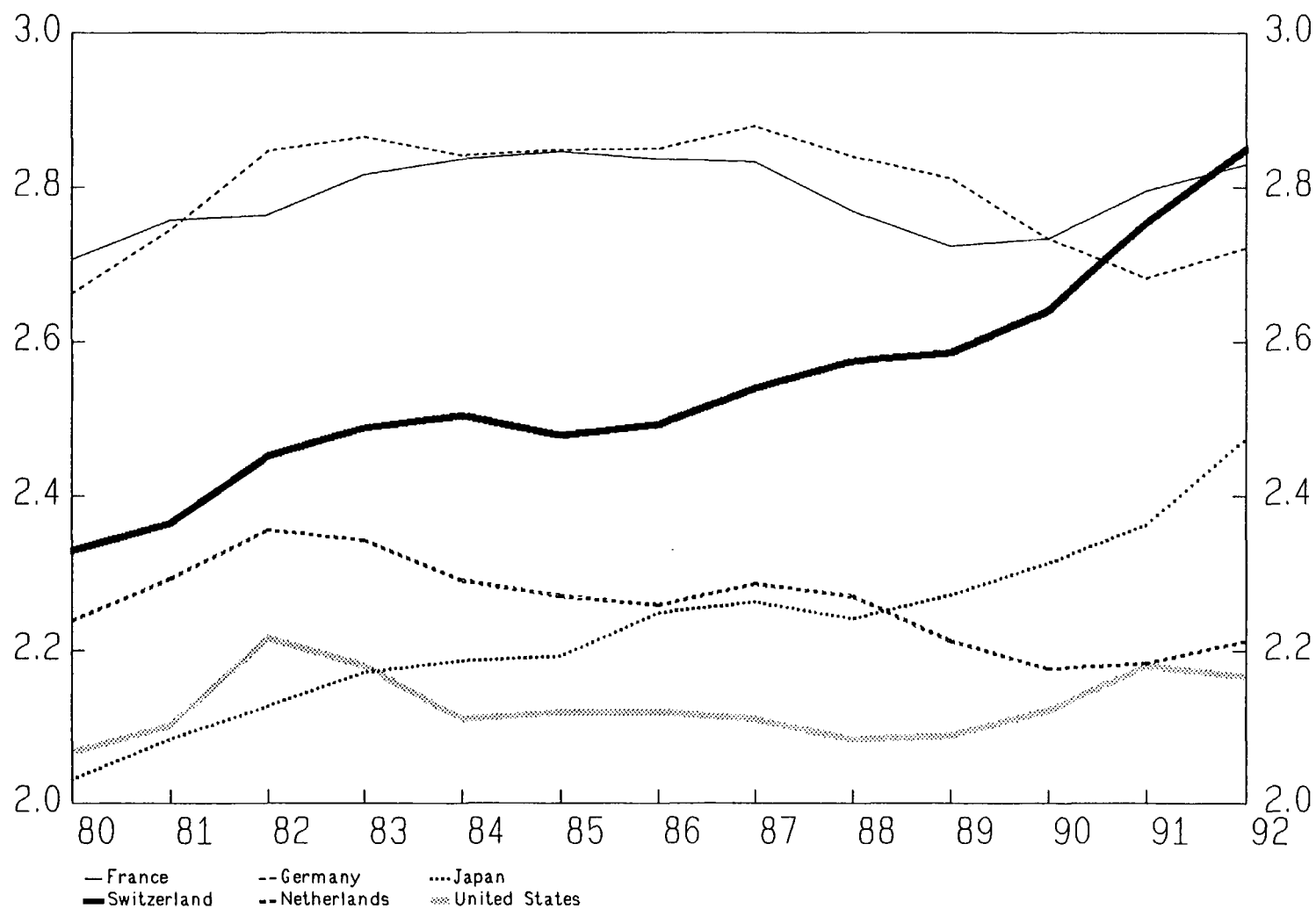
1. Introduction

Large and persistent current account (CA) surpluses have enabled Switzerland over the years to build a positive international investment position (gross external assets minus gross external liabilities). By the end of 1994, the net position exceeded 106 percent of GDP, with gross assets at 287 percent and gross liabilities at 181 percent of GDP (Table III-1). Net investment income has also reached a very high level. On average over the last 10 years, it constituted 6.6 percent of GDP, exceeding the average size of the CA surpluses (5.4 percent of GDP).

The aim of this note is to investigate if there are any features of the Swiss capital account and the composition of external assets and liabilities that help explain the size and persistence of net investment income. To this end, Swiss external stocks and flows are compared with those of some

1/ This chapter was prepared by A. Lund.

CHART II-4
Switzerland
Capital-Output Ratios in Selected OECD Economies



Source: OECD Analytical Database; staff calculations.

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other countries. ^{1/} The main findings are: (a) that the rate of return on both assets and liabilities has been lower in Switzerland than in the other countries, but (b) that, in contrast to the other countries in the sample, the return that Switzerland earns on foreign assets has been significantly larger than the return it pays on liabilities.

Table III-1. Switzerland: External Assets and Liabilities
(In percent of GDP)

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	Avg. 85-94
Gross assets											
USA	32.3	34.7	36.1	36.4	37.7	37.3	37.2	35.6	37.7	36.8	36.2
UK	185.1	188.3	187.5	166.9	181.6	178.2	174.5	168.6	216.6	214.4	186.2
Japan	32.6	36.6	44.5	50.7	61.7	63.4	59.9	55.7	52.0	52.8	51.0
Germany	55.2	56.6	60.1	57.8	73.0	67.3	66.6	59.7	66.9	70.5	63.4
Canada	24.8	27.2	28.5	29.6	30.1	32.0	33.8	33.5	37.5	...	27.9
Switzerland	273.3	252.0	263.4	238.0	268.1	249.9	255.2	243.3	278.8	287.4	258.0
Gross liabilities											
U.S.	29.0	33.6	36.3	39.2	42.5	41.8	43.4	44.1	46.3	46.9	40.3
U.K.	163.0	162.2	171.0	153.3	171.4	179.3	174.8	167.6	214.5	211.7	176.9
Japan	22.8	27.5	34.4	40.6	51.4	52.1	48.4	41.6	37.4	37.8	39.4
Germany	46.7	45.7	44.9	40.3	50.3	45.9	47.7	45.0	54.3	60.1	48.1
Canada	60.0	64.5	65.5	64.7	65.0	68.6	72.8	73.9	80.3	...	66.9
Switzerland	154.7	154.6	150.5	136.2	163.5	153.6	153.1	145.7	174.1	180.8	154.0
Net Assets											
U.S.	3.3	1.1	-0.2	-2.7	-4.8	-4.5	-6.2	-8.6	-8.6	-10.1	-4.1
U.K.	22.1	26.0	16.5	13.6	10.2	-1.1	-0.4	1.0	2.1	2.7	9.3
Japan	9.7	9.1	10.0	10.1	10.3	11.2	11.5	14.1	14.6	15.0	11.6
Germany	8.5	10.9	15.2	17.5	22.7	21.4	18.9	14.7	12.6	10.4	15.3
Canada	-35.2	-37.3	-37.1	-35.1	-34.9	-36.6	-39.0	-40.4	-42.8	...	-37.6
Switzerland	118.5	97.5	112.8	101.8	104.6	96.3	102.1	97.6	104.7	106.6	104.0

Source: Unless otherwise noted the source is International Monetary Fund, Balance of Payment Statistics. For the U.S., U.S. Dept. of Commerce and for Germany, Bundesbank.

^{1/} The countries in the sample are: the United States, the United Kingdom, Germany, Canada, and Japan. They are chosen mainly because of the availability of data, but they also have some important features in common with Switzerland such as large and open capital markets.

2. Composition of gross external assets and liabilities

As can be seen from Table III-1, Switzerland's net external assets relative to GDP are far above the levels in comparable countries. Even in gross terms, assets and liabilities are in general larger than in the other countries, but the differences are less pronounced.

The decomposition of assets and liabilities in Chart III-1 is not very detailed due to lack of data. However, on the assets side it appears that the share of both gold and FDI is higher in Switzerland than in the other countries. On the liability side, Switzerland has--somewhat surprisingly--a higher share of FDI than the majority of the other countries. Among the other countries Japan stands out as having a very small share of FDI. The U.K. has a very large share of loans among both its assets and liabilities. ^{1/}

3. Rate of return on gross external assets and liabilities

The size of net external assets is not the only factor determining net investment income. In the U.S., for instance, net investment income is positive in spite of a negative net investment position. Consequently, it is necessary also to compare the relative earnings from the various components of gross assets and liabilities.

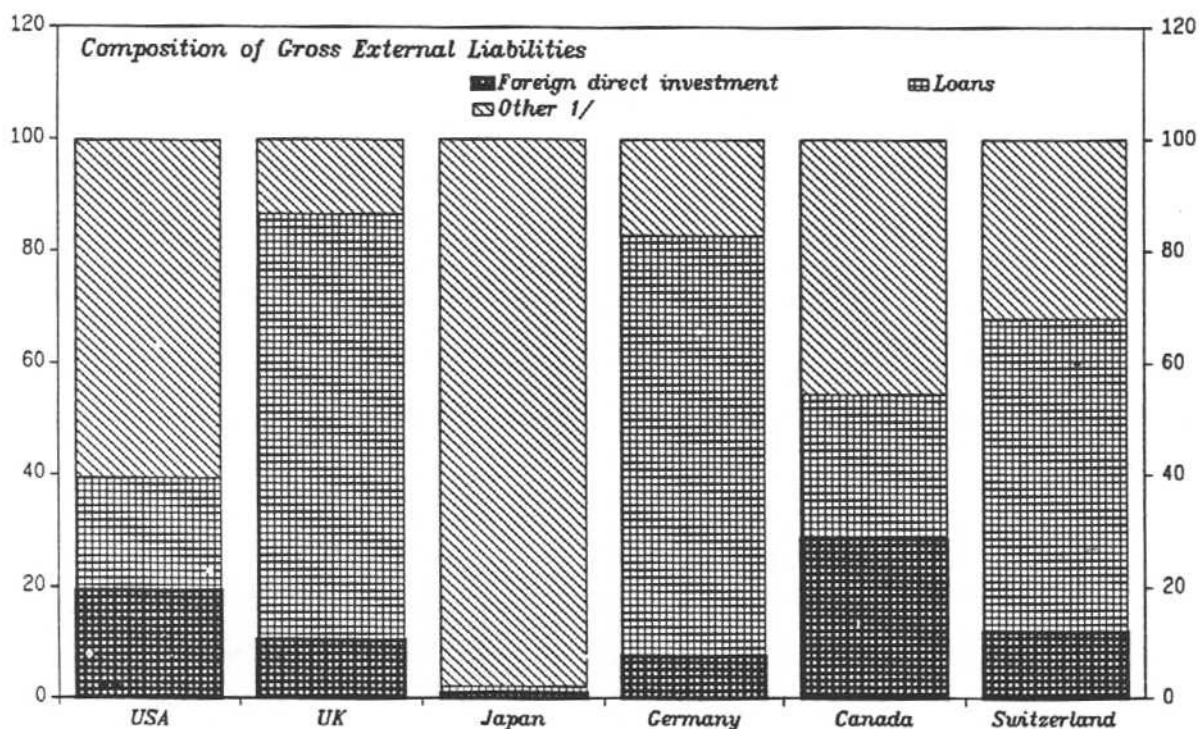
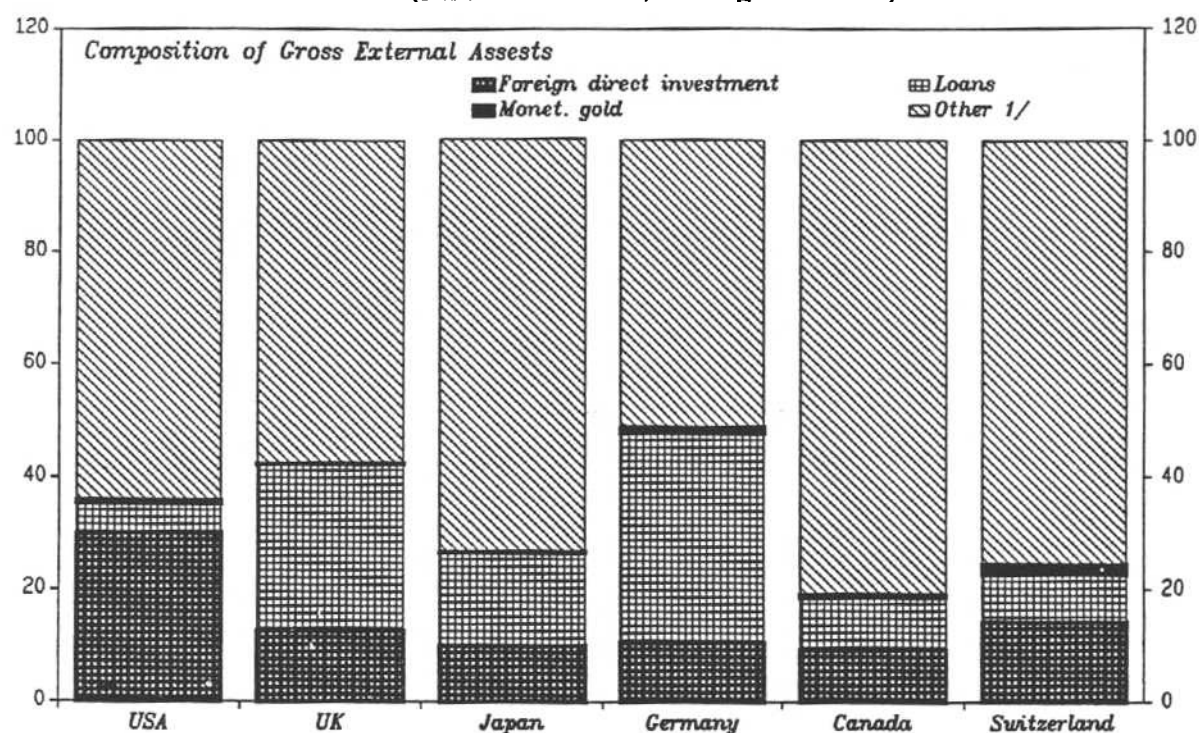
Simple ratios of investment income credits and debits, to gross external assets and liabilities, respectively, are presented in Table III-2. The stocks of assets and liabilities are averages of the amounts outstanding at the end of the current and the previous year, in order to avoid (to a large extent) the potential problem of exchange rate changes biasing the results. Also, since gold earns no return and the level of gold varies substantially between countries, reserve holdings of gold are excluded from total assets in this calculation. A comparison of gold reserves is presented in Annex 1.

^{1/} The relatively high share of inward FDI in Switzerland--which would have been even higher if measured in percent of GDP--runs counter to the view that obstacles to imports and to the establishment of foreign firms impede direct investment in Switzerland. The lower share of loans in Switzerland than in the other European countries in the sample is also a bit surprising as Switzerland is considered to be an international banking center.

CHART III-1
Switzerland

Composition of Gross External Assets and Liabilities

(Percent of total, average 1985-94)



Source: IMF, Balance of Payment Statistics; IMF, International Financial Statistics;
US Department of Commerce; and Bundesbank.

1/ Comprises portfolio investments, other investments excluding loans and monetary reserves excluding gold.

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Table III-2. Switzerland: Total Investment Income Credit and Debit in Percent of Gross External Assets and Liabilities

	1986	1987	1988	1989	1990	1991	1992	1993	1994	Average 86-94 ^{1/}
Income credit in percent of gross external assets										
USA	6.7	6.5	7.6	8.2	8.0	6.6	5.6	5.3	5.7	6.7
Japan	5.0	5.5	5.9	6.3	6.7	7.3	7.0	7.0	6.7	6.4
UK	7.3	6.7	7.5	8.3	8.6	7.7	6.9	5.8	5.7	7.1
Germany	5.2	4.9	4.8	5.4	6.2	6.2	6.6	6.0	5.4	5.6
Canada	5.5	6.8	6.4	5.9	5.5	4.7	4.3	3.9	7.9	5.7
Switzerland	5.0	4.4	4.5	4.9	5.5	4.7	4.4	4.0	3.8	4.6
Income debit in percent of gross external liabilities										
USA	6.1	5.9	6.5	6.7	6.1	5.1	4.2	3.9	4.8	5.5
Japan	4.6	4.7	5.4	5.9	6.6	7.2	6.7	6.9	6.9	6.1
UK	7.5	6.9	7.5	8.4	8.7	7.7	6.5	5.6	4.9	7.1
Germany	4.9	5.4	5.6	5.6	6.3	6.3	6.9	6.2	5.7	5.9
Canada	8.4	9.0	9.5	8.9	7.8	6.2	5.9	6.5	...	7.8
Switzerland	3.4	3.1	2.8	3.8	4.5	3.6	3.3	2.7	2.8	3.4
"Interest rate margins"										
USA	0.6	0.6	1.1	1.5	1.8	1.5	1.4	1.3	0.9	1.2
Japan	0.4	0.7	0.5	0.4	0.2	0.1	0.3	0.1	-0.2	0.3
UK	-0.2	-0.2	0.0	-0.1	-0.1	-0.0	0.4	0.1	0.7	0.1
Germany	0.3	-0.5	-0.8	-0.1	-0.1	-0.1	-0.3	-0.2	-0.4	-0.2
Canada	-2.9	-2.2	-3.2	-3.1	-2.3	-1.6	-1.5	-2.6	...	-2.1
Switzerland	1.6	1.3	1.7	1.1	1.0	1.1	1.1	1.3	0.9	1.3

Source: IMF Staff calculations.

^{1/} 1986-1993 for Canada.

There are two striking features about the numbers in Table III-2:

--The rate of return on both assets and liabilities is significantly lower in Switzerland than in the other countries. ^{1/}

--The return on assets is significantly higher than the return on liabilities while in the other countries, except the U.S., this net return is very small or even negative.

Differences in the currency distribution and in other risk factors in the various assets and liabilities are presumably the main factors behind the differences in the measured rates of return. In the following we investigate further the importance of differences in: currency composition, FDI, and international banking activity. We also discuss statistical problems.

a. Currency composition

Assets and liabilities consist of assets denominated in both domestic and foreign currencies. Intuitively one might think that external liabilities are more likely to be denominated in domestic currency while external assets are more likely to be denominated in foreign currencies. The major exception is loans. Domestic banks' loans to foreigners--external assets--are likely to be denominated in domestic currencies while domestic residents' loans from foreign banks--external liabilities--are most likely denominated in foreign currencies. As can be seen from Chart III-1, the share of loans in total assets and liabilities, respectively, varies considerably among these countries, with loans constituting a comparatively large share of liabilities and a small share of assets in Switzerland.

It is well documented that the real interest rate, real rate of return in the business sector, and nominal interest rates are lower in Switzerland than in other countries. According to last year's report (Switzerland--Selected Background Issues, SM/95/2 Supplement 1), over the period 1979 to 1994 Swiss interest rates have been lower than would be implied by uncovered interest parity. An investment in Swiss francs, for instance, would have earned on average 1.06 percent less per year than an investment in deutsche mark over this period when measured in a common currency. This differential was even bigger when the Swiss franc was compared to other currencies. If assets denominated in Swiss franc are dominant on the liability side, the fact that the average rate of return on Swiss liabilities over the period 1986 to 1993 was 3 percentage points lower than the unweighted average of

^{1/} Reflecting the high level of net assets, the low rate of return on both assets and liabilities in Switzerland tends--other things being equal--to reduce net investment income. Keeping in mind that the net investment position is about 100 percent of GDP, a 1 percentage point higher return on both assets and liabilities would have raised net investment income--and the CA surplus--by about 1 percent of GDP.

the return to liabilities in the other countries would be consistent with the observed lower interest rate level in Switzerland.

The numbers in the tabulation below confirm that this is the case. Estimates of the currency composition of external assets and liabilities by the Swiss National Bank show that 61.6 percent of liabilities and 28 percent of assets are denominated in Swiss francs.

Currency Composition of Swiss External
Assets and Liabilities

(In percent, at end-1994)

	<u>Assets</u>	<u>Liabilities</u>
Swiss franc	28.0	61.6
Deutsche mark	12.3	6.5
U.S. dollar	30.6	17.4
Other	29.1	14.5

Source: Swiss National Bank.

As far as the external assets are concerned, there is little reason a priori to believe that local currency interest rates should have a stronger influence than other currencies' interest rates. The return on gross external assets would be expected to be determined mainly by international interest rates. Well diversified portfolios both among countries and among assets would hence imply less variation in the return on gross assets than in the return on gross liabilities. This seems to be confirmed by the numbers in Table III-2. Also, the difference between Switzerland and the other countries is less on the return on assets than on the return on liabilities.

b. Foreign direct investment (FDI)

Investment in equities is considered more risky than other investment alternatives and should thus on average yield a higher return. The fact that book values rather than market values are used in the statistics on stocks of FDI would only increase this tendency further. Book values are based on historical cost and may significantly underestimate the market value of the stock. Consequently, the return calculated based on these book values would overestimate the real return on FDI and large stocks of FDI,

both inward and outward, would on that ground be expected to be associated with high rates of return on both assets and liabilities. 1/

However, on average, outward FDI as a share of total external assets is only slightly higher in Switzerland than in the other countries. For the U.S. the share is much higher. The same pattern holds true for inward FDI and its share of total liabilities. 2/

Even though the shares of inward and outward FDI in Switzerland are not very different from those in other countries, the return on FDI could be different among countries, thus helping to explain differences in the measured rate of return on overall assets and liabilities. In Tables III-3 and III-4 we have repeated the same exercise as in Table III-2 but this time total assets and liabilities are split between FDI and other investment. It is shown that the return on Swiss FDI assets is not significantly lower relative to other countries than the return on other external assets.

c. International banking activity

By virtue of its role as an intermediary of international capital flows, one would expect Switzerland to experience large gross inflows and outflows of financial capital. As banks earn more on loans than they pay on deposits net investment income would be larger the larger the gross flows through the banking system. This intermediation "spread" could even be higher in Switzerland than in other countries as many investors might be willing to accept lower deposit rates than elsewhere due to the secrecy laws in Swiss banking. However, as shown in Chart III-1, loans--which mainly exist in the form of bank loans--are not a particularly large part of assets or liabilities in Switzerland. This is not necessarily inconsistent with the perception that Swiss banks play a major role in international financing as the BOP statistics register only those international banking transactions that relate to claims between residents and non-residents. A large part of

1/ In the U.S., which publish data on FDI both at current cost (book value) and market value, the latter exceeded the former by almost 40 percent in 1993.

2/ That the outward FDI of Swiss companies should be smaller than that of other countries contradicts the common impression of Switzerland as a country with large multinationals and corresponding large flows of foreign direct investments. But the observed shares are small only when measured as a share of gross flows and stocks of capital. In relation to GDP outward FDI is larger than in the other countries. However, to explain the return on Swiss external assets and liabilities it is the share of FDI in the stock of foreign assets and liabilities that is relevant, not its share in GDP.

Table III-3. Switzerland: Investment Income from Foreign Direct Investment, Credit and Debit
in Percent of Foreign Direct Investment, Assets and Liabilities

	1986	1987	1988	1989	1990	1991	1992	1993	1994	Average 86-94 <u>1</u> /
Foreign direct investment income credit in percent of foreign direct investment assets										
USA	7.7	8.5	10.1	10.2	10.0	8.3	8.0	9.0	9.2	9.0
Japan	5.2	5.3	4.0	3.5	2.7	2.9	3.3	3.3	3.6	3.8
UK	10.4	12.9	14.2	14.2	13.1	9.7	10.3	10.3	12.5	12.0
Germany	6.8	6.4	4.2	6.1	5.9	4.7	3.5	2.6	2.9	4.8
Canada	5.2	8.3	6.6	5.6	4.4	3.7	4.2	3.9	7.8	
Switzerland	2.6	3.0	5.5	4.9	3.0	1.9	0.9	2.9	...	3.1
Foreign direct investment income debit in percent of foreign direct investment liabilities										
USA	2.8	2.6	3.4	1.6	0.6	-0.7	0.1	1.0	4.1	1.7
Japan	22.4	20.0	20.6	23.4	23.8	18.9	13.4	11.4	10.9	18.3
UK	11.0	11.9	12.0	10.1	6.7	3.6	4.5	8.2	7.0	8.3
Germany	11.4	14.2	14.3	13.5	11.6	9.8	10.9	4.1	1.4	10.1
Canada	8.3	10.6	11.5	8.8	4.9	1.4	1.6	4.9	...	
Switzerland	3.7	2.1	0.1	3.8	3.4	1.9	0.5	1.4	...	2.1
Net										
USA	4.9	5.9	6.7	8.6	9.3	9.0	7.9	8.0	5.2	7.3
Japan	-17.2	-14.7	-16.6	-19.9	-21.1	-15.9	-10.1	-8.1	-7.2	-14.5
UK	-0.6	0.9	2.2	4.1	6.5	6.1	5.8	2.1	5.4	3.6
Germany	-4.7	-7.9	-10.1	-7.4	-5.7	-5.1	-7.4	-1.5	1.5	-5.4
Canada	-3.1	-2.3	-4.9	-3.1	-0.5	2.3	2.6	-1.0	...	...
Switzerland	-1.1	0.8	5.4	1.1	-0.4	0.0	0.4	1.6	...	1.0

Source: IMF Staff calculations.

1/1986-1993 for Canada and Switzerland.

Table III-4. Switzerland: Investment Income from Other Investment than FDI, Credit and Debit
in Percent of Stocks of Other Investments Assets and Liabilities

	1986	1987	1988	1989	1990	1991	1992	1993	1994	Average 86-94 <u>1</u> /
Other investment income credit in percent of other investment assets										
USA	6.2	5.7	6.5	7.3	7.1	5.8	4.5	3.7	4.1	5.7
Japan	5.0	5.5	6.0	6.5	7.2	7.8	7.5	7.5	7.1	6.7
UK	6.9	5.9	6.5	7.4	7.9	7.4	6.3	5.1	4.7	6.5
Germany	5.0	4.8	4.9	5.3	6.3	6.4	6.9	6.5	5.7	5.8
Canada	5.8	5.5	6.2	6.1	6.3	5.4	4.5	3.9	8.0	5.7
Switzerland	5.2	4.9	4.7	5.3	6.2	5.5	5.3	4.4	...	5.2
Other investment income debit in percent of other investment liabilities										
USA	6.8	6.7	7.2	7.9	7.5	6.5	5.2	4.6	5.0	6.4
Japan	4.4	4.6	5.2	5.8	6.5	7.1	6.7	6.8	6.8	6.0
UK	6.1	5.3	5.6	6.6	7.1	6.5	5.3	4.4	3.9	5.6
Germany	3.7	3.9	4.2	4.2	5.0	5.1	5.6	5.6	5.3	4.7
Canada	8.5	8.3	8.7	9.0	8.9	8.1	7.4	7.0	...	8.3
Switzerland	3.3	3.4	3.4	4.1	4.8	4.0	4.0	3.1	...	3.8
Net										
USA	-0.6	-1.0	-0.7	-0.6	-0.4	-0.7	-0.7	-0.9	-0.9	-0.7
Japan	0.6	0.9	0.8	0.8	0.7	0.7	0.9	0.7	0.3	0.7
UK	0.8	0.6	0.8	0.8	0.9	1.0	1.0	0.7	0.8	0.8
Germany	1.3	0.8	0.7	1.1	1.3	1.4	1.4	0.9	0.4	1.0
Canada	-2.7	-2.7	-2.5	-3.0	-2.6	-2.7	-3.0	-3.1	...	-2.5
Switzerland	1.9	1.5	1.3	1.2	1.3	1.4	1.3	1.3	...	1.4

Source: IMF Staff calculations.

1/1986-1993 for Canada and Switzerland.

the financial flows involving Swiss banks is in the form of so-called fiduciary funds or it takes place in branches located outside Switzerland. 1/

Fiduciary funds are funds managed by the banks on behalf of their clients and at the clients' risk. The funds are off the banks' balance sheets. Foreigners have large amounts invested in these funds but it is only to the extent that the funds invest in assets issued by Swiss residents that the Swiss capital account is influenced. 2/

d. Statistical problems

A potentially important, but not easily quantifiable, factor behind the differences in the calculated returns is statistical problems. Measuring stocks of foreign assets and liabilities is associated with many problems and many countries do not provide these numbers at all.

In Switzerland the statistics on external assets and liabilities are compiled through a comprehensive survey of financial institutions and non-financial enterprises and are considered to be very accurate. On the other hand, however, there are known shortcomings in the statistics on the corresponding investment flows as indicated by the under-reporting of the return on FDI liabilities. A large part of investment income in the category other assets and liabilities is not recorded.

Due to this bias in the quality of the underlying statistics the calculated returns most likely underestimate the true return on both assets and liabilities in Switzerland. There is no reason to believe that the same bias exists--to the same extent--in other countries.

4. Conclusions

Switzerland's external assets and liabilities earn a lower rate of return than is the case in other countries, but Switzerland's net rate of return is positive and larger than that of any other country. The latter fact can be attributed to the historically low level of interest rates in Switzerland and a much lower share of Swiss franc denominated assets on the asset side than on the liabilities side. The difference relative to other countries in the rate of return on liabilities can be attributed in part to a comparatively low rate of return on FDI in Switzerland. This in turn may

1/ At the end of 1993 Swiss banks had foreign assets equal to Sw F 440 billion according to the banking statistics. (Fiduciary accounts are not included in this number.) At the same time, Swiss banks' foreign assets amounted to 191 billion Swiss francs according to the Balance of Payments Statistics, implying that a significant part of lending took place through branches abroad.

2/ By the end of 1994 total balances in these funds equalled Sw F 270 billion or 74 percent of GDP. But only a very small portion of the total was in the form of liabilities of Swiss residents.

reflect to some extent statistical problems, in particular an under-reporting of nonresidents' earnings from FDI in Switzerland. At any rate, the low Swiss interest rates and FDI do not account for all of the observed cross-country differences in the rate of return on foreign assets and liabilities. The remaining differences are not due to different levels of gold reserves and probably not linked to Switzerland's position as a banking center. They may, however, be explained in large part by a statistical bias whereby data on the stock of external assets and liabilities are more accurate than data on the corresponding investment income flows. This implies that the rate of return on both assets and liabilities in Switzerland may be underestimated.

ANNEX

Comparison of Gold Holdings

Table III-5 shows some measures of gold holdings in Switzerland compared to the other countries. In relation to GDP the Swiss gold reserves are substantially higher than in the other countries. This is less pronounced when seen in relation to total external assets. Neither of these countries value gold at market prices but the Swiss gold reserves on the national valuation are more undervalued relative to market prices than is the case in most of the other countries.

If gold were measured at market prices and converted into interest earning assets this would, in the case of Switzerland, have a substantial impact both on the size of the assets and on the investment income. It is fairly easy to see that if all the Swiss gold holdings had been converted into assets yielding 5 percent nominal interest rate (measured in swiss franc) in 1981, net investment income would have increased by 0.8 percent of GDP. However, as the stock of gold also would have been converted into a market value more than 6 times its national valuation, the effect on the measured rate of return would have been negative.

ANNEX

Table III-5. Switzerland: Gold Reserves

	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
In millions of fine Troy ounces														
U.S.	264.1	264.0	263.4	262.8	262.7	262.0	262.4	261.9	261.9	261.9	261.9	261.8	261.8	261.7
U.K.	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	18.9	18.9	18.6	18.4	18.4
Japan	24.2	24.2	24.2	24.2	24.2	24.2	24.2	24.2	24.2	24.2	24.2	24.2	24.2	24.2
Germany	95.2	95.2	95.2	95.2	95.2	95.2	95.2	95.2	95.2	95.2	95.2	95.2	95.2	95.2
Netherlands	43.9	43.9	43.9	43.9	43.9	43.9	43.9	43.9	43.9	43.9	43.9	43.9	35.0	34.8
Canada	20.5	20.3	20.2	20.1	20.1	19.7	18.5	17.1	16.1	14.8	13.0	9.9	6.1	3.9
Switzerland	83.3	83.3	83.3	83.3	83.3	83.3	83.3	83.3	83.3	83.3	83.3	83.3	83.3	83.3
Valued at market gold price in billions of US\$														
U.S.	121.4	99.2	111.3	94.7	83.3	96.3	117.2	114.5	99.9	100.4	94.9	89.9	94.2	100.6
U.K.	8.7	7.1	8.0	6.9	6.0	7.0	8.5	8.3	7.2	7.3	6.8	6.4	6.6	7.1
Japan	11.1	9.1	10.2	8.7	7.7	8.9	10.8	10.6	9.2	9.3	8.8	8.3	8.7	9.3
Germany	43.8	35.8	40.2	34.3	30.2	35.0	42.5	41.6	36.3	36.5	34.5	32.7	34.2	36.6
Netherlands	20.2	16.5	18.6	15.8	13.9	16.2	19.6	19.2	16.8	16.9	15.9	15.1	12.6	13.4
Canada	9.4	7.6	8.5	7.3	6.4	7.3	8.3	7.5	6.1	5.7	4.7	3.4	2.2	1.5
Switzerland	38.3	31.3	35.2	30.0	26.4	30.6	37.2	36.4	31.8	31.9	30.2	28.6	30.0	32.0
At national valuation in billions of US\$														
U.S.	11.2	11.1	11.1	11.1	11.1	11.1	11.1	11.1	11.1	11.1	11.1	11.1	11.1	11.1
U.K.	7.3	4.6	5.9	5.5	4.3	4.9	5.8	6.5	5.5	5.2	5.0	4.8	4.6	5.3
Japan	1.0	0.9	0.9	0.8	0.9	1.0	1.2	1.1	1.1	1.2	1.2	1.2	1.2	1.2
Germany	6.1	5.8	5.0	4.3	5.6	7.1	8.7	7.7	8.1	9.2	9.0	8.5	7.9	8.8
Netherlands	5.2	4.9	4.2	8.7	11.1	14.1	15.5	13.8	14.4	14.7	14.5	13.7	7.6	8.5
Canada	0.8	0.8	0.7	0.7	0.8	0.8	0.9	0.8	0.7	0.7	0.6	0.5	0.3	0.2
Switzerland	6.6	6.0	5.5	4.6	5.7	7.3	9.3	7.9	7.7	9.2	8.8	8.2	8.0	9.1
At market value in percent of GDP														
U.S.	4.0	3.2	3.3	2.5	2.1	2.3	2.6	2.3	1.9	1.8	1.7	1.5	1.5	1.5
U.K.	1.7	1.5	1.7	1.6	1.3	1.2	1.2	1.0	0.9	0.7	0.7	0.6	0.7	0.7
Japan	1.0	0.8	0.9	0.7	0.6	0.4	0.4	0.4	0.3	0.3	0.3	0.2	0.2	0.2
Germany	6.4	5.5	6.2	5.6	4.9	3.9	3.8	3.5	3.1	2.2	2.0	1.7	1.8	1.8
Netherlands	14.1	11.8	13.7	12.5	10.9	9.0	9.0	8.3	7.3	5.9	5.5	4.7	4.1	4.1
Canada	3.2	2.5	2.6	2.1	1.8	2.0	2.0	1.5	1.1	1.0	0.8	0.6	0.4	0.3
Switzerland	40.7	32.4	36.2	33.1	28.5	22.6	21.8	19.8	17.9	14.1	13.1	11.9	12.9	12.4

Source: International Monetary Fund, International Financial Statistics.

IV. Non-Tariff Trade Barriers, the Price Level and the External Current Account 1/

1. Introduction

There are significant structural rigidities in the Swiss economy that hamper economic growth and increase the price level. These rigidities mainly affect the domestic economy, although in some areas they have the incidental effect of restricting foreign trade. Trade restrictions are normally broken down into tariffs and non-tariff trade barriers (NTBs). 2/ As in other industrialized countries, tariffs in Switzerland are low. The focus of this paper is, thus, on NTBs. Although they are by their nature difficult to quantify, some measures of their significance are given in the first part of this chapter.

In most cases, trade barriers create a wedge between the final price and the production costs of a good. In the case of tariffs, this wedge would represent revenues for the government, but in the case of an NTB, its specific type determines who receives the rent or more precisely how it is split between foreign suppliers (exporters) and domestic importers of the good.

Normally, foreign suppliers would be expected to be in a position to capture part of the rents that NTBs give rise to, by charging higher prices to the restricted market than elsewhere. The second part of this chapter seeks to analyze whether and to what extent NTBs induce German exporters to discriminate in their pricing policies against Switzerland. Contrary to expectations, the analysis--which is based on a sample of 21 goods--does not indicate that German exporters charge significantly higher prices to Switzerland than to other destinations.

It is also claimed at times that NTBs contribute to the large current account (CA) surpluses in Switzerland. The last part of the chapter considers this issue. Theoretical considerations do not give a clear answer as to how NTBs affect the CA.

1/ This chapter was prepared by A. Lund.

2/ NTBs comprise, among others, Voluntary Export Restraints (VER), import quotas, local content requirements, technical specifications that are out of line with standards elsewhere, or any other measures that have the effect of reducing the imported quantity of any good.

2. Evidence of trade barriers in Switzerland

Apart from agriculture ^{1/}--which is not covered by the analysis in this paper--tariffs are not common in Switzerland. Most industrialized goods enter duty free under the EFTA agreement and Switzerland's free trade agreement with the EU from 1972. ^{2/}

The most important form of NTBs in Switzerland consists of technical norms and regulations. Many of these are in line with international standards but a large number differ from the equivalent norms and regulations in the EU or other countries. The more stringent standards and approval procedures that Switzerland applies have originally been set for reasons of health and consumer protection, but subsequent developments may have made many of them obsolete. The Cartel Commission (Bundesamt für Konkurrentfragen, 1994), has documented significant differences in standards and approval procedures for a number of goods, such as household appliances, bathroom appliances, cars, trucks and buses, telecommunications equipment, building equipment and materials, pharmaceutical and medical equipment, toys, measuring instruments, agricultural inputs (seeds, fertilizer, feedstuffs) and many food and beverage items.

In addition, relatively high barriers to entry into wholesale and retail trade--through building and planning regulations, rules on shop opening hours, public need requirements, etc.--have also contributed to shielding established traders from newcomers. Such restrictions have facilitated the operation of cartels--which are not prohibited according to the Swiss cartel law--and other price collusive practices across wide sectors of the economy. Lex Friedrich, the law that restricts foreign ownership of real estate for purposes such as agriculture, industry, trade, banking and insurance also discourages foreign competition. In 1994 a bill was passed in parliament that would have relaxed Lex Friedrich and facilitated foreign ownership, but the bill was rejected in a referendum in 1995.

It follows from their often somewhat obscure and very mixed nature that aggregate measures of the extent of NTBs and their effects on trade flows and price levels are not easily available. This is even more so in the case

^{1/} The agriculture sector in Switzerland is one of the most heavily protected and subsidized in the world. The OECD estimated the net producer subsidy equivalents (PSEs) for Switzerland at 75 percent in 1992. That was the second highest among the OECD countries--in Norway the PSE was estimated at 77 percent--and compared to an OECD average of only 44 percent. Clearly, deregulation in the agricultural sector would increase the trade deficit in agricultural products.

^{2/} In 1994, 81 percent of merchandise imports was from EU and EFTA countries. In 1988, the simple average ad valorem tariff equivalent was less than 3 percent according to a report by the GATT secretariat (GATT 1991).

of Switzerland where NTBs mainly exist in the form of technical norms and regulations and barriers to entry.

UNCTAD has created a Data Base on Trade Measures which contains information on the coverage of Non-Tariff-Measures (NTM) ^{1/} for most OECD countries and 80 developing countries (Laird and Yates, 1990). The data base provides information on each individual NTB, its nature, countries imposing the restriction, exporting countries affected by it, and the official source of information on the measure. Table IV-1 shows the incidence of NTBs in various OECD countries. The frequency ratio measures the number of goods and services affected by NTBs as a percentage of the total number of traded goods, while the trade coverage ratio measures the share of import value affected by NTBs. The frequency ratio for Switzerland in the 1980s was lower and the trade coverage ratio somewhat higher than for the other countries. Table IV-2 shows the trade coverage rate distributed by groups of exporting countries in 1981 and 1986. Switzerland differed from the other countries with more NTBs on exports of socialist countries and less on exports of developing countries. Overall, based on these numbers Switzerland appears to have neither more nor less NTBs than the average industrialized country.

However, one must be careful not to interpret these findings as quantitative indications of the economic impact of trade measures as the data in Tables IV-1 and IV-2 do not capture the various NTBs' effectiveness in restricting trade. In order to do that one would need to translate the individual NTBs into ad valorem tariff equivalents. The diverse nature of these measures makes such a quantification difficult, if not impossible. Another, potentially more serious weakness with these data is that they are derived only from hard core non-tariff measures. Consequently, barriers like technical standards, health and sanitary regulations and minimum price regulations--among which we probably find the preponderant types of trade barriers in Switzerland--are excluded.

Another piece of evidence on the existence of NTBs is provided by a study of the impact on Swiss industry of the internal EU market. (Mettler, et al in EFTA Occasional Paper No. 38, 1990). In this study, the authors conducted a survey among Swiss enterprises in order to ascertain their perceptions of NTBs and how they affect their activities. The survey confirms that technical norms and standards are considered to be the most important NTBs. For exports, border control was also seen as a major NTB.

^{1/} The term "measure" is wider than "barrier" since it encompasses all trade instruments which may be used as barriers, although their restrictive effects, if any, may vary between countries, or even at different points of time in a specific country. Moreover their restrictiveness may lie in the way the measure is applied rather than in the basic properties of the measure itself. In this analysis we will not distinguish between the two measures and will continue to use the term NTB.

Table IV-1. Switzerland: Frequency Ratios and Nontariff Measure
Trade Coverage Ratios for Individual OECD Countries

Importer	Frequency ratio				Trade coverage ratio			
	1981	1983	1986	1981-86 Change (points)	1981	1983	1986	1981-86 Change (points)
Belgium-Luxembourg	8.4	8.7	8.6	0.2	12.6	15.4	14.3	1.7
Denmark	9.0	9.1	9.2	0.2	6.7	8.0	7.9	1.2
Germany, Fed. Rep.	11.1	11.2	12.5	1.4	11.8	13.6	15.4	3.6
France	13.5	14.4	14.1	0.6	15.7	18.8	18.6	2.9
Greece	10.4	11.1	10.6	0.2	16.2	21.0	20.1	3.9
Great Britain	10.1	10.1	8.1	-0.2	11.2	13.4	12.8	2.4
Ireland	6.3	6.5	6.5	0.2	8.2	9.7	9.7	1.5
Italy	18.1	18.6	18.3	0.2	17.2	18.7	18.2	1.0
Netherlands	11.0	11.2	11.1	0.1	19.9	21.4	21.4	1.5
EEC (10) ^{1/}	11.4	11.7	11.5	0.1	13.4	15.6	15.8	2.4
Switzerland	9.7	9.7	9.7	0.0	19.5	19.6	19.6	0.1
Finland	3.4	3.4	3.4	0.0	7.9	8.0	8.0	0.1
Japan	12.7	12.8	12.5	-0.2	24.4	24.5	24.3	-0.1
Norway	19.8	19.6	17.4	-2.4	15.2	14.7	14.2	-1.0
New Zealand	45.0	45.0	38.8	-6.2	46.4	46.4	32.4	-14.0
United States	4.8	5.2	6.5	1.7	11.4	13.7	17.3	5.9
All above	12.2	12.5	12.0	-0.2	15.1	16.7	17.7	2.6

Source: Yeates and Laird (1991).

^{1/} Excludes EEC intra-trade.

Table IV-2. Switzerland: Analysis of the Incidence of OECD Country
Nontariff Measures on Different Groups of Exporting Countries

Importer	1981 trade coverage				1986 trade coverage			
	Developed	Developing	Socialist	World	Developed	Developing	Socialist	World
Belgium-Luxembourg	12.7	12.4	11.8	12.6	14.9	13.2	11.8	14.3
Denmark	4.3	20.9	4.7	6.7	6.1	20.9	4.7	7.9
Germany, Fed. Rep.	7.3	24.3	8.5	11.8	11.5	28.6	9.2	15.4
France	14.5	15.5	27.9	15.7	18.0	17.4	28.1	18.6
Greece	16.0	12.5	24.9	16.2	22.6	12.3	25.2	20.1
Great Britain	9.8	25.4	1.2	11.2	12.9	24.7	1.1	12.8
Ireland	6.8	15.6	14.7	8.2	8.6	15.8	14.7	9.7
Italy	15.6	21.2	14.2	17.2	17.3	21.3	14.1	18.2
Netherlands	17.4	27.0	12.1	19.9	19.7	27.1	12.1	21.4
EEC (10) ^{1/}	11.3	21.7	8.3	13.4	14.4	23.2	8.5	15.8
Switzerland	19.6	18.1	25.2	19.5	19.6	18.1	25.2	19.6
Finland	5.2	15.3	22.2	7.9	5.2	15.9	22.2	8.0
Japan	29.5	17.4	13.1	24.4	29.4	17.4	13.1	24.3
Norway	13.2	46.9	13.0	15.2	12.5	41.2	12.3	14.2
New Zealand	47.8	35.3	30.2	46.4	32.9	29.1	26.0	32.4
United States	9.7	15.5	4.4	11.4	16.6	19.1	12.1	17.3
All above	14.3	18.8	9.3	15.1	17.5	20.6	9.8	17.7

Source: Yeates and Laird (1991).

^{1/} Excludes EEC intra-trade.

Overall, NTBs were considered to be more important for exports than for imports indicating that the domestic producers did not feel much protected by the NTBs. This sentiment was also confirmed by the fact that the producers considered the common market (European Economic Area) much more as an opportunity than as a risk or a danger.

In principle, the best way to approach the present issue would be to study the barriers on individual goods and compare the situation in Switzerland with that in other countries. Such a comprehensive study which would involve quantifying the trade restricting effects on a large number of goods in several countries is, however, beyond our means. We will instead try to measure the NTBs by their effects on the prices of traded goods.

3. Can price data provide information on the existence of NTBs?

There are many varieties of NTBs and their economic impact may differ. In general, as with most quantitative distortions, an NTB gives rise to economic rents. Exporters will try to capture all or part of that rent by requiring a higher price from the market with the barrier than from other markets. With homogeneous products and efficient competition between exporters all of the rents could in principle be captured by the importers and the exporters' prices would be unaffected by the NTB. However, purely homogeneous products are a rarity as is a perfectly competitive market. In most cases, exporters will be able to "price to market" and capture part of the rent. ^{1/} Thus, in general the effect of the NTB would be to increase the export price fob as well as the domestic sales price.

A study of export prices has the advantage over a comparison of domestic wholesale or retail prices--which in principle also could be used in a search for NTBs--that they are not affected by distribution costs due to distance etc, in the importing country.

In principle, it is information on the prices of individual goods that could provide information on the existence of "pricing to market" behavior. Aggregation will make it difficult to distinguish between price differences due to NTBs and price differences due to the composition of the aggregate. We will thus need sufficiently disaggregated data to detect the price differences we are interested in. German data on exported value and quantity of goods--at the 7-digit SITC level--to individual countries are as close as one can get to meeting that requirement. Based on these values and quantities, unit values for individual goods to specific destinations can be

^{1/} Tariffs, on the other hand, do not ration quantity or give rise to economic rents. It is a priori hard to say how exporters will change their prices in response to a tariff. That will depend on elasticities of demand and the exporter's perception of those elasticities. If NTBs work like tariffs they may be difficult to detect from the pricing behavior of exporters. Neither will it be possible to detect NTBs if the exporter captures the rents from an NTB by increasing the market share rather than the price.

calculated. 1/ Export values and quantities are measured at the border of the exporting country so that differences in transportation, distribution and other costs in the importing country should not influence the numbers. Out of several thousands of goods exported by Germany a sample of 21 was selected. Some of the goods were chosen because barriers were known to exist for these goods in Switzerland. Otherwise the choice was purely random, but contingent on the requirement that the export to all the countries studied should be significant. This severely restricted the number of goods.

4. Empirical model and results

The following equation was used to estimate systematic differences in German export prices:

$$(1) \quad p(i,t) = a(i) + b(t) + e(i,t)$$

where $i=1, \dots, N$ and $t=1, \dots, T$ index the destination market for exports and time respectively, and p is the destination specific export price. 2/

The interpretation of this equation is that the $a(i)$ parameters capture all unobservable factors that are constant over time but vary over destinations while $b(t)$ capture all the unobservable factors that vary over time but are constant over destinations. The primary factor underlying the time factor $b(t)$ is the marginal cost of the exporter. One can also think of other factors included in the time factor like exchange rate changes and demand and income effects in the various markets.

Our interest focuses on $a(i)$. These parameters will capture institutional features of the destinations of exports and can be thought of as representing the "competitiveness" (Knetter, 1995) of the export market or the average level of markup over costs. NTBs are potentially important factors behind differences in this markup.

For each good, the equations for all destinations are estimated jointly. Dummy variables are used to represent both the country and time effects. To avoid the dummy variable trap (perfect multicollinearity) one time effect had to be left out. The estimated coefficients are reported in

1/ Denmark, France, Italy, Japan, the Netherlands, Sweden, the UK, and the US were chosen as export markets. The countries were chosen partly because of their importance as Germany's trading partners and partly because of their similarities with Switzerland regarding market size and distance from Germany.

2/ For our purposes it is the question of whether the export price to a specific destination deviates from the export price to Switzerland that is of interest. We have thus normalized the price variables so that they measure export prices relative to the export prices to Switzerland and the test is whether these relative prices deviate from 0.

Table IV-3, ^{1/} while Table IV-4 provides average German export prices of the 21 goods to the various destinations in relation to the average German export prices of the same goods to the Swiss market. As can be seen from Table IV-3, only for sanitary equipment are German export prices to Switzerland significantly higher than the prices to all the other markets. For wine, automobiles and electric model railways, there is also a clear tendency for prices of German exports to Switzerland to be higher than prices of German exports to other markets. On the other hand, prices of German exports to Switzerland tend to be lower than prices to other destinations for both varnish and built-in refrigerators.

Comparing the results for the sub-period 1981-1987 with the results for the whole period reveals that price differentials in general have been reduced, but also that the parameters are not very stable. If anything, such a comparison could be taken to indicate diminishing use of NTBs over this period, a finding that runs counter to the common belief that the use of NTBs has increased over time to compensate for the reduction in tariffs.

Both the U.S. and Japan stand out as markets where German export prices generally are higher than to the other destinations, for 14 of the 19 goods for which data are available. German export prices to Japan are significantly higher than those to Switzerland. The opposite holds for none of the goods in the sample. Thus the data used in this paper support the findings of similar studies (Knetter, 1995), documenting the existence of NTBs in Japan. German export prices to the U.S. are also for most of the goods in the sample significantly higher than those to European countries. Based on the data in Table IV-1, however, NTBs should be equally or less frequent in the U.S. than in the European countries studied. The findings for the U.S., therefore, raise the issue of whether German exports measured fob are really unaffected by the distance to markets.

If, in order to avoid this difficulty, we exclude Japan and the U.S. from the comparisons and just compare Switzerland's experience with the other European countries in the sample, we find that there is a somewhat clearer tendency for German prices to be higher for exports to Switzerland than for exports to the other countries. This tendency is less clear when the whole sample is used in the estimation than in the estimation based on the first period alone. In the period 1981-1987 prices are significantly higher for exports to Switzerland than for exports to all the other European countries for five of the goods in the sample (sanitary equipment, buses, two types of cars and electric model railway). The opposite holds true for none of the goods in the sample. When the estimation period is extended to 1993, there is only one good for which prices of German exports to Switzerland are significantly higher than for exports to all the other European countries. When assessing these results, one must also bear in mind that the five goods mentioned above were specifically chosen because there are known barriers to trade for these goods.

^{1/} The data sample cover the period 1981-1993 but data for 1988 were not available. For white wine, sanitary equipment, and built-in refrigerators data were also not available for 1993.

Table IV-3. Switzerland: Estimated Country Coefficients Based on Equation 1

	1981 - 1987								1981-1993 1/							
	France	Nether- lands	Italy	UK	Denmark	Sweden	USA	Japan	France	Nether- lands	Italy	UK	Denmark	Sweden	USA	Japan
White wine, betw. 12-21% alcohol content	-0.165* 0.038	-0.287* 0.038	-0.117* 0.038	-0.272* 0.038	-0.257* 0.038	0.125- 0.038	0.053 0.038	1.260- 0.038	-0.267* 0.036	-0.428* 0.036	-0.275* 0.036	-0.446* 0.036	-0.403* 0.036	-0.029 0.036	-0.083* 0.036	0.148- 0.036
Aluminum oxide	0.924- 0.313	0.606- 0.313	0.905- 0.313	1.665- 0.313	1.072- 0.313	0.876- 0.313	2.435- 0.313	4.419- 0.313	-0.274 0.260	-0.545* 0.260	-0.376 0.260	0.110 0.260	-0.109 0.260	-0.235 0.260	1.015- 0.260	2.800- 0.260
Aluminum hydroxide	-0.402 0.284	-0.525* 0.284	-0.606* 0.284	0.362 0.284	0.957- 0.284	-0.826* 0.284	2.627- 0.284	3.835- 0.284	-0.341 0.310	-0.552* 0.310	-0.503 0.310	0.211 0.310	0.411 0.310	-0.715* 0.310	1.815- 0.310	3.065- 0.310
Acetone	-0.274 0.239	-0.338 0.239	-0.260 0.239	-0.333 0.239	-0.223 0.239	-0.002 0.239	-0.242 0.239	1.055- 0.239	-0.036 0.237	-0.105 0.237	-0.005 0.237	-0.107 0.237	0.075 0.237	0.193 0.237	-0.007 0.237	1.190- 0.237
Vitamin A	-0.542 0.749	-0.742 0.749	-0.747 0.749	-0.843 0.749	1.148 0.749	-0.875 0.749	-0.263 0.749	-0.216 0.749	-0.053 0.508	-0.223 0.508	-0.186 0.508	-0.350 0.508	1.078- 0.508	-0.376 0.508	0.266 0.508	0.427 0.508
Potassium chlorate	2.049- 0.361	-0.353 0.361	-0.103 0.361	-0.532 0.361	-0.096 0.361	-0.391 0.361	0.116 0.361	-0.247 0.361	1.290- 0.304	-0.410 0.304	-0.242 0.304	-0.548* 0.304	-0.043 0.304	-0.491 0.304	-0.195 0.304	-0.402 0.304
Varnish	-0.088 0.072	-0.101 0.072	0.040 0.072	0.015 0.072	0.326- 0.072	0.074 0.072	0.146- 0.072	0.202- 0.072	-0.006 0.088	0.110 0.088	0.244- 0.088	0.182- 0.088	0.407- 0.088	0.247- 0.088	0.268 0.088	0.394- 0.088
Glaciers putty	-0.205 0.218	-0.662* 0.218	0.260 0.218	0.299 0.218	-0.028 0.218	-0.220 0.218	0.186 0.218	1.739- 0.218	-0.101 0.172	-0.403* 0.172	0.214 0.172	0.238 0.172	-0.051 0.172	-0.091 0.172	0.410- 0.172	1.624- 0.172
Glaciers putty other	-0.029 3.430	-0.743 3.430	13.661- 3.430	12.474- 3.430	2.163 3.430	8.443- 3.430	9.756- 3.430	24.178- 3.430	-3.307 2.529	-3.936 2.529	8.283- 2.529	6.138- 2.529	-1.502 2.529	3.044 2.529	6.634- 2.529	12.862- 2.529
Sanitary equipment made of china	-0.646* 0.056	-0.493* 0.056	-0.569* 0.056	-0.396* 0.056	-0.381* 0.056	-0.152* 0.056	...	...	-0.509* 0.065	-0.381* 0.065	-0.461* 0.065	-0.324* 0.065	-0.388* 0.065	-0.120* 0.065	...	...
Built-in refrigerator	0.116- 0.053	0.021 0.053	0.088 0.053	0.035 0.053	-0.075 0.053	0.230- 0.053	...	...	0.086- 0.045	0.028 0.045	0.117- 0.045	0.013 0.045	-0.015 0.045	0.232- 0.045	...	...
Multi-phase AC motors >750 watts	0.501- 0.287	-0.102 0.287	0.831- 0.287	0.520- 0.287	0.045 0.287	-0.160 0.287	0.807- 0.287	0.721- 0.287	-0.110 0.213	-0.524* 0.213	0.202 0.213	-0.125 0.213	-0.464* 0.213	-0.499* 0.213	0.253 0.213	0.405- 0.213
Coal electrode	0.032 0.092	0.068 0.092	0.182- 0.092	0.153- 0.092	0.195- 0.092	-0.056 0.092	-0.093 0.092	0.080 0.092	-0.008 0.068	0.055 0.068	0.078 0.068	0.031 0.068	0.098 0.068	-0.079 0.068	-0.147* 0.068	-0.016 0.068
Busess between 2.5- 2.8 liter engine	-0.325* 0.099	-0.436* 0.099	-0.246* 0.099	-0.108* 0.099	-0.508* 0.099	-0.318* 0.099	0.008 0.099	0.482- 0.099	-0.141 0.095	-0.217* 0.095	-0.076 0.095	0.036 0.095	-0.181* 0.095	-0.048 0.095	0.036 0.095	0.449- 0.095
Autos 1 - 1.5 liter engine	-0.182* 0.085	-0.231* 0.085	-0.015 0.085	-0.110 0.085	-0.279* 0.085	-0.198* 0.085	0.655- 0.085	0.134 0.085	-0.008 0.081	-0.025 0.081	0.127 0.081	0.115 0.081	-0.102 0.081	-0.011 0.081	0.937- 0.081	0.244- 0.081
Autos 1.5 - 3 liter engine	-0.097* 0.032	-0.195* 0.032	-0.064* 0.032	-0.065* 0.032	-0.307* 0.032	-0.177* 0.032	0.649- 0.032	0.207- 0.032	-0.097* 0.051	-0.221* 0.051	-0.091 0.051	-0.023 0.051	-0.349* 0.051	-0.184* 0.051	0.488- 0.051	0.271- 0.051
Autos >3 liter engine	-0.358* 0.028	-0.430* 0.028	-0.392* 0.028	-0.341* 0.028	-0.524* 0.028	-0.432* 0.028	-0.197* 0.028	-0.256* 0.028	-0.162* 0.047	-0.228* 0.047	-0.159* 0.047	-0.162* 0.047	-0.309* 0.047	-0.256* 0.047	-0.116* 0.047	-0.049 0.047
Kitchen furniture (woods)	-0.153* 0.089	-0.450* 0.089	-0.065 0.089	-0.058 0.089	-0.349* 0.089	-0.044 0.089	0.263- 0.089	-0.096 0.089	-0.075 0.084	-0.305* 0.084	0.035 0.084	-0.033 0.084	-0.253* 0.084	-0.004 0.084	0.274- 0.084	0.069 0.084
Dining/living room furniture (woods)	-0.128 0.099	-0.044 0.099	0.635- 0.099	0.380- 0.099	-0.358* 0.099	-0.056 0.099	-0.176* 0.099	0.055 0.099	-0.070 0.113	0.082 0.113	0.656- 0.113	0.756- 0.113	-0.108 0.113	-0.088 0.113	-0.091 0.113	0.348- 0.113
Pens with replace- able refill	1.035- 0.262	0.150- 0.262	0.667- 0.262	1.140- 0.262	0.182- 0.262	0.180- 0.262	1.460- 0.262	2.777- 0.262	0.070 0.259	-0.734* 0.259	0.291 0.259	-0.049 0.259	-0.667* 0.259	-0.627* 0.259	0.554- 0.259	2.195- 0.259
Electric model- railway	-0.214* 0.046	-0.337* 0.046	-0.554* 0.046	-0.389* 0.046	-0.468* 0.046	-0.530* 0.046	-0.601* 0.046	-0.179* 0.046	0.035 0.063	-0.104 0.063	-0.441* 0.063	-0.073 0.063	-0.247* 0.063	-0.297* 0.063	-0.451* 0.063	0.181- 0.063

Source: Staff calculations.

1/ Data for 1988 not available. For 1993 data not available for white wine, sanitary equipment, and electric model railway.

*Prices are significantly lower than to Switzerland at the 5 percent level.

-Prices are significantly higher than to Switzerland at the 5 percent level.

Table IV-4. German Export Prices to Various Destinations,
Average 1981-1993

(Weighed over 21 goods: Switzerland = 1)

	Weighted according to German exports to Switzerland in 1992	Equal weights
EU	0.838	0.928
France	0.941	1.063
Netherlands	0.816	0.847
Italy	1.120	1.568
UK	1.129	1.417
Denmark	0.749 ^{1/}	1.080
Sweden	0.949	1.204
Switzerland	1.000	1.000
USA ^{1/}	1.500	1.792
Japan ^{1/}	1.469	2.329

Source: "Statistische Bundesamt", Germany and staff calculations.

^{1/} Only 19 goods.

Calculating average price differentials over all the goods and all years also gives a very mixed picture. In Table IV-4 these averages are presented with two different sets of weights for the goods. Exports of cars with engine between 1.5 and 3 liters get a very large weight if the values of German exports of the respective goods to Switzerland are used as weights. Hence, we have also added a column based on the arithmetic averages of the prices. The latter weighing method shows prices of exports to Switzerland to be even lower than prices of exports to all the other countries, except to the Netherlands.

Only a small number of goods were studied. Besides, there are other factors than NTBs in the importing country that could influence price setting by exporters and which need to be taken into consideration. First, even though the data are very disaggregated they could still contain destination-specific quality differences that would affect unit prices. ^{1/} Second, average unit prices might decrease as the quantity exported increases due to some form of economies of scale. Third, exchange rate changes would most likely affect the exporters' mark-up. Part of the

^{1/} One export category--cars with between 1.5 and 3 liter engines--illustrates the problem with aggregated data. German exports of these cars are large to all markets. But at the same time this category consists of very different cars with very different prices. Clearly, the measured price differentials could very well be due to quality differences.

observed price differentials could thus be due to differences in the evolution of bilateral deutsche mark exchange rates. We have not investigated this last possibility further.

On the first point one would expect that the quality of a country's export of a particular good is higher, the higher the importing country's per capita income. The per capita income level in Switzerland is clearly above the average of this group of countries. Hence, the quality of goods exported to Switzerland would be expected to be higher than of exports to other countries. If anything, correcting for quality differences would result in lower prices for exports to Switzerland.

On the second point, the data as far as they go do not seem to indicate correlations between unit prices and export quantities. Sweden and the Netherlands, two of the smallest markets, also have the lowest unit prices.

The sample of goods selected for this analysis does not confirm that NTBs play a more important role in Switzerland than in the other countries. Where trade barriers are known to exist the prices of exports to Switzerland are higher than prices of exports to other countries. However, trade barriers are present in most countries. If the sample of goods were chosen based on known trade barriers in other countries we may well have found similar results for them. As mentioned earlier, this analysis is confined to measuring the existence of NTBs only to the extent that they affect the prices of exporters. NTBs may well exist without showing up in higher import prices in cases where importers manage to capture all of the rents. The major NTBs in Switzerland are most likely technical norms and regulations for which one would assume that lack of information makes it more difficult for exporters to capture the rent, than for other, quota-based NTBs.

Neither do these results exclude that distortions and structural rigidities have a stronger impact on the price level in Switzerland than in other countries. But if they do, their impact would seem to work through costs and domestic distortions that raise the price of nontradables directly and affect the prices of tradable only indirectly through higher distribution costs. That prices of non-tradable are higher in Switzerland, relative to the prices of tradable than in other countries has been confirmed by other studies. ^{1/}

5. NTBs and the current account

If the purpose of NTBs is the protection and promotion of domestic production at the expense of imports, aggregate data for exports and imports of manufacturing goods might give an indication of the extent to which that

^{1/} See SM/95/2 Supplement 1.

purpose is achieved. 1/ These are very rough indications, however, as many other factors influence a country's competitiveness and its ability to produce tradable. The numbers presented in Table IV-5 hardly indicate strong protective effects of NTBs in Switzerland. 2/

Table IV-5. Imports and Exports of SITC Goods 5-9
(In percent of GDP)

	Imports			Exports		
	1975	1985	1990	1975	1985	1990
Switzerland	17.70	25.76	26.31	22.50	27.93	27.04
Austria	18.01	23.16	26.48	17.31	23.16	23.93
Belgium	31.06	45.23	47.96	37.33	53.63	52.00
Canada	15.26	18.22	17.11	9.95	15.61	14.83
Denmark	18.37	20.99	18.89	13.11	16.75	17.64
Finland	18.02	15.83	15.76	15.63	20.22	17.08
Netherlands	23.52	30.13	32.55	21.97	28.30	30.20
Sweden	17.38	19.95	19.39	19.01	24.87	21.48

Sources: International Monetary Fund, World Economic Outlook Database; and OECD.

Trade in manufactures as a ratio to GDP is about the same as in the other countries. 3/ Moreover the development of these ratios since 1975 does not point in the direction of a high degree of import protection in Switzerland. It is also not obvious, on purely theoretical considerations, how NTBs may affect the trade balance. A devaluation is normally considered to improve the trade balance if export and imports are sufficiently price elastic. 4/ While NTBs do not have identical effects on the trade balance

1/ As mentioned earlier, the main form of NTBs in Switzerland, i.e. technical norms and regulations, were introduced for reasons of consumer and health protection. Their effects in discouraging imports and protecting domestic producers were of an incidental nature.

2/ One must bear in mind that it is the magnitude of NTBs in Switzerland relative to their magnitude in other countries that is relevant for their impact on the current account.

3/ The exceptions are Belgium and the Netherlands where significant transit trade influences the numbers.

4/ The Marshall-Lerner condition states that the sum of the import and export price elasticities must be larger than 1 for a devaluation to improve the trade balance. This condition is normally considered to be fulfilled.

as a devaluation, an analysis of the partial effects of price and income changes--as is typically done to study the effects of a devaluation--can serve as a starting point for a discussion of how NTBs might affect trade.

In contrast to a devaluation, NTBs do not directly affect export conditions. The NTBs increase the prices and thus the profitability in production of those importables affected by the NTBs. As long as the price elasticity of demand is lower than 1, the import value of goods for which there is no domestic competition will increase as a result of an NTB. For goods for which domestic production competes with imports, the domestic supply response to the introduction of an NTB will also have to be taken into consideration. For such goods, import values are more likely to fall when NTBs are applied. Overall, the effect on imports from price changes alone is thus ambiguous.

As to the income effects, there are several channels through which they work. Per se, the higher price level resulting from NTBs will reduce real income. This income reduction will be partly compensated for by a lowering of saving. As the current account per definition is the difference between saving and investment this lowering of income will worsen the current account. This could be considered the principal income effect if all the rents associated with the NTBs are collected by foreign exporters and if there is no domestic production of the affected imported goods.

If domestic producers or importers acquire the rent--which the German export price data seem to indicate--the income distribution will be affected in a way that will most likely increase savings and thus improve the current account. The point is that those who gain from the NTBs (producers and importers) have a higher income level and thus a higher marginal propensity to save than those who only face the higher import prices (wage-earners).

The total effect on investment is also ambiguous. The protected producers or those who acquire the rents will increase their income. If they consider the NTBs to be of a lasting nature, profit prospects will also have improved and one would expect investments in the protected sector to increase. Producers in other sectors will face reduced demand and higher costs as a result of the NTBs and may thus be inclined to lower their investment. But again, if foreigners manage to capture the rents and if there are no domestic substitutes total investments will certainly fall as a result of the NTB. Additional complications arise if the efficiency losses deriving from the NTBs were taken into account.

To fully capture all the effects from the introduction or removal of NTBs or other rigidities one would ideally need a general equilibrium model. Antille, Carlevaro, and Schmitt (1991) have used such a model and found that removing NTBs on industrial products alone would raise real imports by more than 5 percent and exports by less than 2 percent (Table IV-6). In addition to weakening the foreign balance, removal of NTBs was found to have a significant positive impact on real investment, on household consumption and income and on GDP. However, their calculations circumvented the difficulty

of quantifying the NTBs and were instead based on some arbitrary assumptions about their tariff equivalents.

Table IV-6. Switzerland: General Equilibrium Evaluation
of Gains Due to the Removal of Barriers to Trade

	Scenario 1	Scenario 2
Real GDP	0.25	0.26
Real exports	1.58	1.77
Real imports	5.57	6.01

Source: Antille, Carlevaro, and Schmitt (1991).

Scenario 1: Removal of nontariff barriers to imports.

Scenario 2: Removal of nontariff barriers to imports and exports.

6. Conclusion

The data sample used in this study does not clearly indicate that German exporters charge higher prices to Switzerland than to other destinations. From this evidence, one cannot reject the hypothesis that NTBs are more important in Switzerland than in comparable countries. They could very well be if domestic producers and importers rather than the foreign exporters capture the rents that are associated with the NTBs. As most of the NTBs in Switzerland are technical standards and regulations and entry barriers, it is probably more difficult for exporters to capture the rent than if the NTBs were more directly quantitative restrictions.

A comparatively large size of the tradable sector in Switzerland (relative to GDP) could conceivably be an indication of the presence of protective barriers but there are no signs of protection in the import figures. Theoretical considerations give little guidance to the issue of what effect NTBs may have on the trade or current account balance.

Over the last few years, the Swiss authorities have taken action to address several of the structural rigidities in Switzerland. A new cartel law has been imposed and since the rejection of the EEA agreement in 1991 a process of harmonizing Swiss technical regulations with those in major trading partners has been initiated. A law on technical barriers to trade which will enter into force in 1996 is intended to ensure continuation of this process. The effect of these new provisions on import prices and even on the trade balance may allow further inferences to be drawn on how important the NTBs have been.

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