

Monetary Policy with Overshooting Exchange Rates

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Précis: The advent of floating exchange rates has meant that international monetary theory has been subject to continuous testing. Using Switzerland as the example of a small open economy (SOE), three issues are considered. First, long-run propositions such as purchasing power parity are examined and found to be broadly supported by the evidence. Secondly, the overshooting of exchange rates is analysed and it is concluded that, while consistent with rational behaviour of money holders, it may be a serious problem for SOEs. Finally, the policy implications of recent experience are analysed.

I INTRODUCTION

Present-day monetary policy makers have the privilege of living in especially interesting times. Small open economies, in particular, are something like large-scale laboratories where the propositions, hypotheses and sometimes just conjectures of international monetary theory are subjected to continuous testing. As a consequence, both economic science and economic policy in this field have been making considerable progress. Earlier beliefs are becoming obsolete at a rather rapid rate, but at the same time (and fortunately) propositions which used to be doubtful are progressively confirmed. In this paper, I shall try to illustrate this process by the particular case of the small open economy I know best, namely, that of Switzerland. In talking about one particular case, I shall, however, put the emphasis on aspects of general significance.

Of course, within the confines of a short paper it is not possible to give a systematic and comprehensive discussion of the subject and it would be futile to try. Instead, I shall organise my thoughts around a number of graphs and tables, each of which is selected to convey one particular message. My paper could thus be given a sub-title borrowed from Mussorgsky, "Pictures from an Exhibition". Specifically, there are nine exhibits, arranged

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in three groups of three, three "triptychs", so to say. The subject of the first triptych is the long-run picture, the second theme will be the overshooting of exchange rates, while the last part will summarise the policy conclusions.

II THE LONG-RUN PICTURE

II.1 Purchasing-power Parity

My first subject is the purchasing-power parity doctrine. By purchasing-power parity the economist means the ratio between the purchasing power of two national currencies, particularly their power to purchase domestic, not internationally traded, goods. The doctrine of purchasing-power parity, then postulates that the monetary policies of the two countries produce no deviations of their exchange rate from purchasing-power parity. To use another piece of jargon, monetary policy has no effect on the real exchange rate, on the relative competitiveness of two countries. Movements in the foreign exchange rates parallel those in commodity prices, reflecting international differences in inflation rates.

Exhibit 1 shows how well the Swiss experience confirmed the purchasing-power parity doctrine. The upper curve graphs the fluctuations in the *nominal* rates of the Swiss franc relative to a basket of other currencies. It shows that these fluctuations were very large, the Swiss franc appreciating by about 100 per cent in five years. This means that the purchasing-power parity doctrine was put to a rather severe test. The lower curve graphs the corresponding fluctuations in the *real* exchange rate¹ — that is, the deviations of the exchange rate from purchasing-power parity. These curves illustrate three points:

- (1) Over the long run, the changes in the real exchange rate were small relative to those in the nominal exchange rate. During the five and a half years from the second quarter of 1973 to the fourth quarter of 1978 the real value of the Swiss franc in international markets appreciated by an average of about 3 per cent per annum, which is a small fraction of the underlying change in the nominal exchange rate. Overall, the purchasing-power parity doctrine has done remarkably well.
- (2) Even in the long run, however, real exchange rates cannot be expected to remain actually constant. This has two reasons. First, the purchasing-power parity doctrine relates to the consequences of monetary policies only. In the course of history, prices and exchange rates are, in fact,

1. Calculated as an export-weighted average of the Swiss franc rate in terms of the currencies of Germany, France, Italy, Japan, United Kingdom and the United States, deflated by the respective wholesale price indices.

affected by many non-monetary or "real" factors such as harvests, monopolistic practices (like those of OPEC), changes in tastes, technological progress and the like. It was always recognised by the proponents of the purchasing-power parity doctrine that such real factors may produce lasting deviations of exchange rates from purchasing-power parity. Secondly, the strict validity of the doctrine requires that government debt grows in proportion to the money supply. If it does not this may be another reason for lasting changes in real exchange rates.

- (3) The purchasing-power parity doctrine only applies to the long run, after the economy has fully adjusted to changes in monetary policy. In the short run, however, over periods of up to two or three years, the exchange rate may deviate strongly from purchasing-power parity. In the Swiss case, these short-run fluctuations were particularly pronounced. These disturbances will be the main topic of my later remarks.

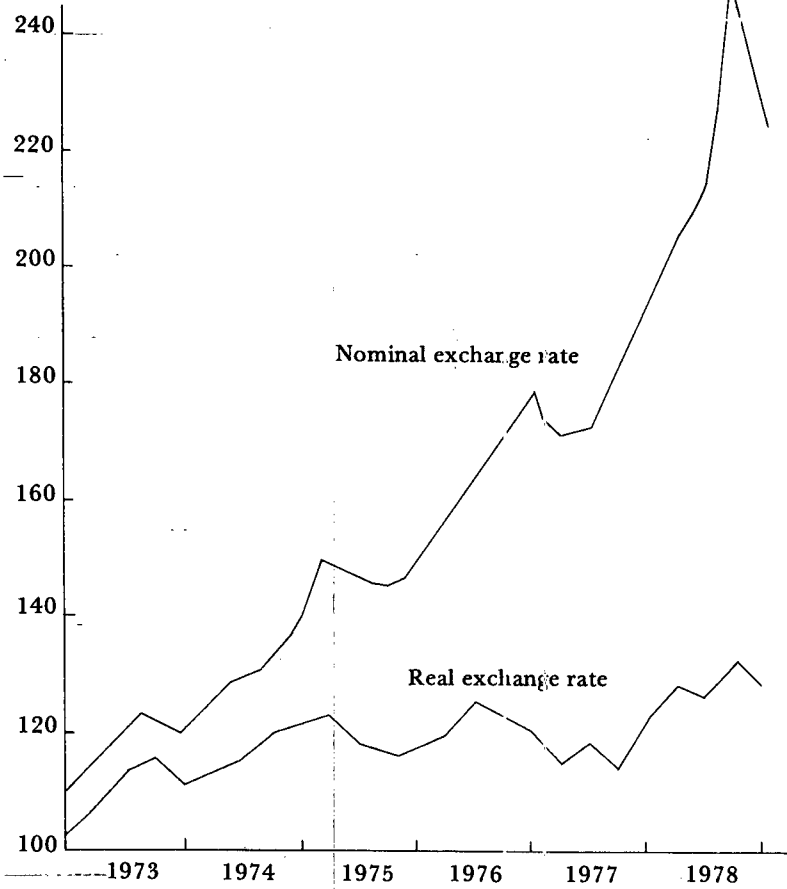
Overall, this evidence confirms that over the long run international differences in inflation rates are indeed reflected in exchange rates. As long as inflation rates differ, exchange rates cannot be expected to remain constant, and as long as several countries maintain fixed exchange rates, they have to accept similar inflation rates. The evidence also confirms that over the long run there is no need for monetary policy-makers to worry about the exchange rate. What we have to worry about is domestic inflation and deflation; the exchange rate can be left to itself. The short-run picture will, however, turn out to be considerably different.

II.2 Interest Parity

While Exhibit 1 had to do with the relationship of exchange rates and commodity prices, Exhibit 2 concerns the relationship between exchange rates and interest rates. According to the purchasing-power parity doctrine, a difference in the inflation rates between two countries should be reflected, with the stated qualifications, in a change in the exchange rate in about the same proportion. If inflation in the United States is 10 per cent while in Switzerland it is only 2 per cent, then the Swiss dollar rate should depreciate by about 8 per cent per year. In the forward exchange market, where currencies are traded for future delivery, this should be translated into a forward discount on the dollar at a per annum rate of 8 per cent. At the same time inflation, if correctly anticipated, is reflected in a roughly (though not exactly) equal increase in interest rates. In the previous example US interest rates should thus be about 8 per cent higher than Swiss rates. Taking the two observations together, the forward discount on the dollar should equal the interest differential, both being approximately equal to the inflation differential.

Exhibit 2 shows that on April 25, 1979 this was actually the case. The

Exhibit 1: Trends of the nominal and real exchange rate for the Swiss franc (1965 = 100), 1973 - 1978.



Sources: 1973-1977 - "Monatsbericht" of the Swiss National Bank; Monique Dubois (1978). 1978 - "Monatsbericht" of the Swiss National Bank; Main Economic Indicators, OECD; Die Volkswirtschaft, Federal Department of Public Economy (Eidgenössisches Volkswirtschaftsdepartement).

Exhibit 2: *Trends of the Swiss inflation rate, interest rate and forward discount*

	US	Switzerland	Difference
Inflation rate (percentage change in Consumer Price Index, IV 77 – IV 78)	9.3	0.7	8.6
Interest rate (Eurodeposits, 3 months, April 25, 1979)	10.5	1.5	9.0
Forward discount (Sfrs/\$, 3 months, April 25, 1979)			8.7

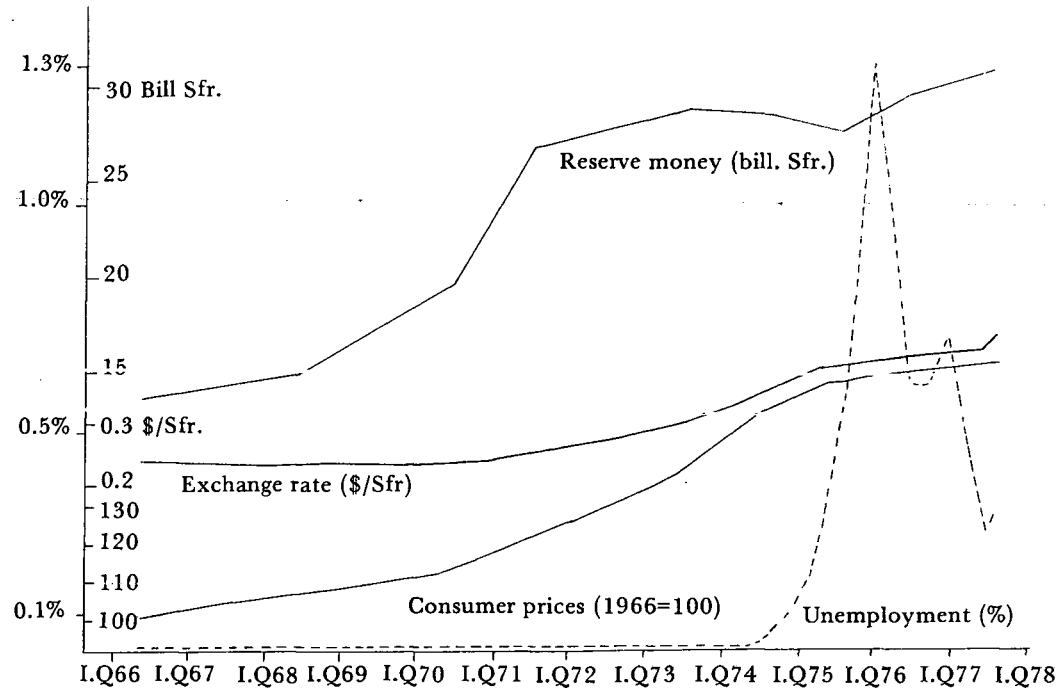
same could have been observed on just about any day during the recent past. As a matter of fact, the equality between the interest rate differential and the forward discount is maintained hour by hour, if not minute by minute, through currency arbitrage. Thanks to the highly efficient inter-bank Euro currency market, operating with very low transaction costs, the deviations of forward premia from interest parity have become practically invisible – so much so that some experts in the field have been driven to the (wrong) inference that the classical arbitrage mechanism is not even operating any more.

The almost perfect correspondence between interest rate and forward premium (or discount) differentials means that the effective yields on different currencies are equalised by the market. The spot exchange rate between two currencies continuously moves in such a way that the change in this rate expected over some future period, after allowance for risk, just balances the difference in the two interest rates for the same period. It is important to note, however, that this applies only to expected exchange rate changes; actual fluctuations in exchange rates may be such that holders of one currency are later revealed to have made large profits at the expense of the holders of another currency. I shall later try to show that while the actual exchange rates often jump around in seemingly erratic fluctuations, they do so precisely as a result of money market developments which tend to keep the expected exchange rate movements at interest parity.

II.3 Quantity-theory Dynamics

Exhibit 3 focuses on the basic mechanism behind the purchasing-power parity doctrine, namely, the quantity theory of money. In particular, it illustrates the dynamics of this mechanism. The quantity theory of money says that in the long run, once all short-run adjustments have run their course, a change in the money supply has no effect on real output, employment and growth and also has no effect on the economy's need for liquidity.

Exhibit 3: Trends in reserve money, exchange rate, consumer prices and unemployment, 1966 to 1978



Sources: — International Financial Statistics, IMF; “Monatsbericht” of the Swiss National Bank; Die Volkswirtschaft, Federal Department of Public Economy; Wirtschaftsspiegel, Federal Office of Statistics.

As a consequence, a change in the money supply becomes translated into an equiproportionate change in prices. The purchasing-power parity doctrine simply adds that the prices of foreign moneys just move in step with commodity prices. The implication is that long-run inflation and deflation can be eliminated by an appropriate contraction or expansion of the money supply.

However, economists always knew (and by "always" I mean for at least 200 years) that these propositions are valid only in the long run, while during the adjustment process money can have powerful effects on output and employment. In particular, they knew that the elimination of inflation is not costless, the cost consisting in a recession. While this recession will be temporary, it may be severe.

The Swiss economy during the last decade offers a large-scale test of these traditional propositions (see Exhibit 3). During the last years of the Bretton Woods system, the consumer price index rose at an increasing rate. The driving force was the increase in the money supply as pictured in the curve for reserve money. There was nothing the central bank could do against this monetary expansion, since it was obliged to buy all the gold and dollars offered at the given parities. The accelerating inflation was accompanied by over-employment as the classical economist would expect.

With the breakdown of the Bretton Woods system, in which non-member Switzerland actually was the straw that broke the camel's back, the expansion of the money supply was retarded and finally even reversed. Naturally, the Swiss franc started to appreciate. Within a year, inflation began to slow down and after 2-3 years it appeared to be practically eliminated (for a qualification, see below). This was accompanied by a recession, reflected in a rapid increase in unemployment. However, this recession, while severe, was only temporary, and after a peak in early 1976 unemployment was back at 0.3 per cent in 1978. During the early phases of disinflation, inflation was associated with recession. "Stagflation", which was so baffling to some Keynesians, thus appeared as a normal phase in the disinflation process.

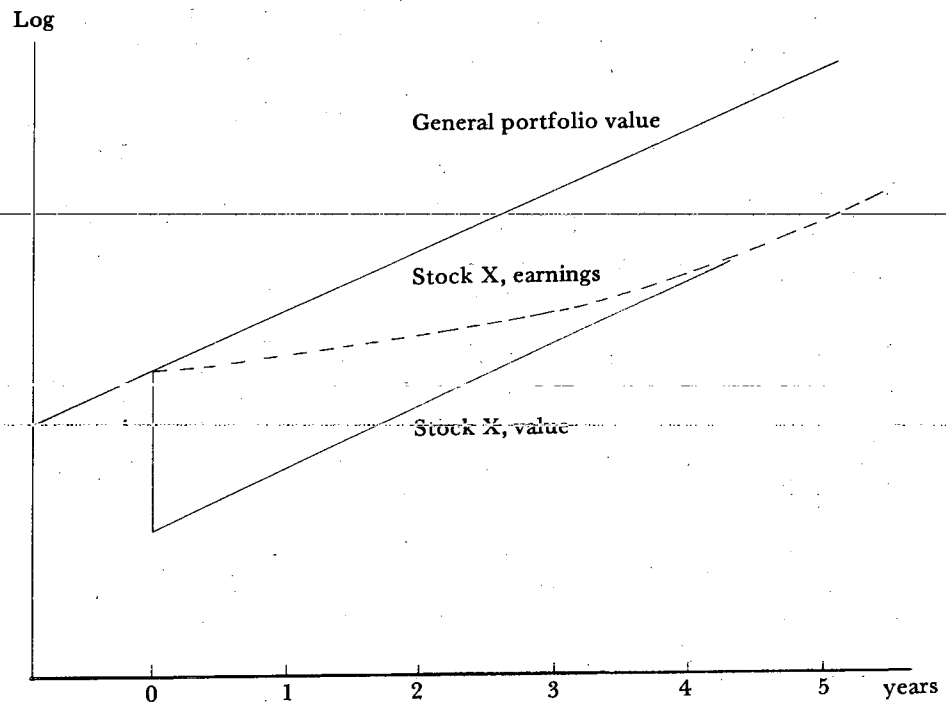
The conclusion from this large-scale experiment is reasonably clear. It is possible, in practice as well as in theory, to eliminate inflation by a restrictive monetary policy, though at the price of a temporary recession. Such a policy does not require terribly sophisticated economics; the important thing is that policy-makers obtain political support for relatively simple, but sensible, policies.

III THE OVERSHOOTING OF EXCHANGE RATES

III.1 The Effect of Expected Earnings on Asset Prices

The preceding discussion concentrated on long-run aspects. It was incom-

Exhibit 4: Trends in stock earnings and value over five years



plete in as much as it disregarded short-run disturbances in exchange rates. These will be the subject of the next part of my remarks, based on another triad of graphs.

About five years ago, foreign exchange theorists began to have doubts whether under the new regime of flexible exchange rates monetary policy was really working quite as described in the preceding discussion. One of the main sources of these doubts was the suspicion that the maintenance of interest rate parity might require very large adjustments in spot exchange rates. Seemingly small shifts in monetary policy could thus trigger large fluctuations in exchange rates. This was not a new discovery, for Gustav Cassel knew it 50 years ago. However, his insight, never fully articulated, was forgotten and needed to be rediscovered.

This apparent "overshooting" is not restricted to exchange rates. In fact, it is a very general characteristic of asset prices. I shall thus try to explain the underlying mechanism by an example from the stock exchange. Every day the prices of different stocks will tend to move in such a way that the expected yields, including capital gains, are equal after allowing for differences in risk. This general market yield could be measured by the expected annual increase in the value of a diversified portfolio with continuous reinvestment of all dividends. In Exhibit 4 the expected portfolio value is represented by the top curve and the market yield is measured by the slope of this curve. Now suppose on a given day there is bad news about one particular stock, say, McDonnell-Douglas. This particular piece of news is estimated to mean that earnings will be depressed for, say, 4 years, while afterwards the firm will have fully recovered. In the graph this is illustrated by the broken earnings curve. But the expected yield of McDonnell-Douglas stock, with all dividends reinvested, cannot be lower than the general market yield. As a consequence, its price will at once decline to such an extent that its expected yield is again at the market level as expressed by the bottom curve. The stock price has to fall in order to produce the expectation of a future capital gain large enough to compensate the shareholder for the temporary loss of earnings. If earnings are expected to be reduced from 10 per cent to 5 per cent for 4 years, the instantaneous price decline would have to be about 17 per cent — that is, 4 times 5 minus the compounding effect. The instant capitalisation of future earnings losses thus produces the impression of magnification.

This is essentially what happens in the foreign exchange market. If money holders begin to expect a weaker, more inflationary policy of the United States, the expected real yield on dollar holdings at the previous exchange rate declines, since interest rates will take time to catch up with the newly expected inflation. International arbitrage, however, does not tolerate differences in yields. As a consequence, the dollar will instantly depreciate

to such an extent that currency holders have reason to expect a future appreciation of the dollar. This is the apparent "overshooting". It must be large enough so that the expected future appreciation of dollars just compensates their holders for the temporary loss in real interest.²

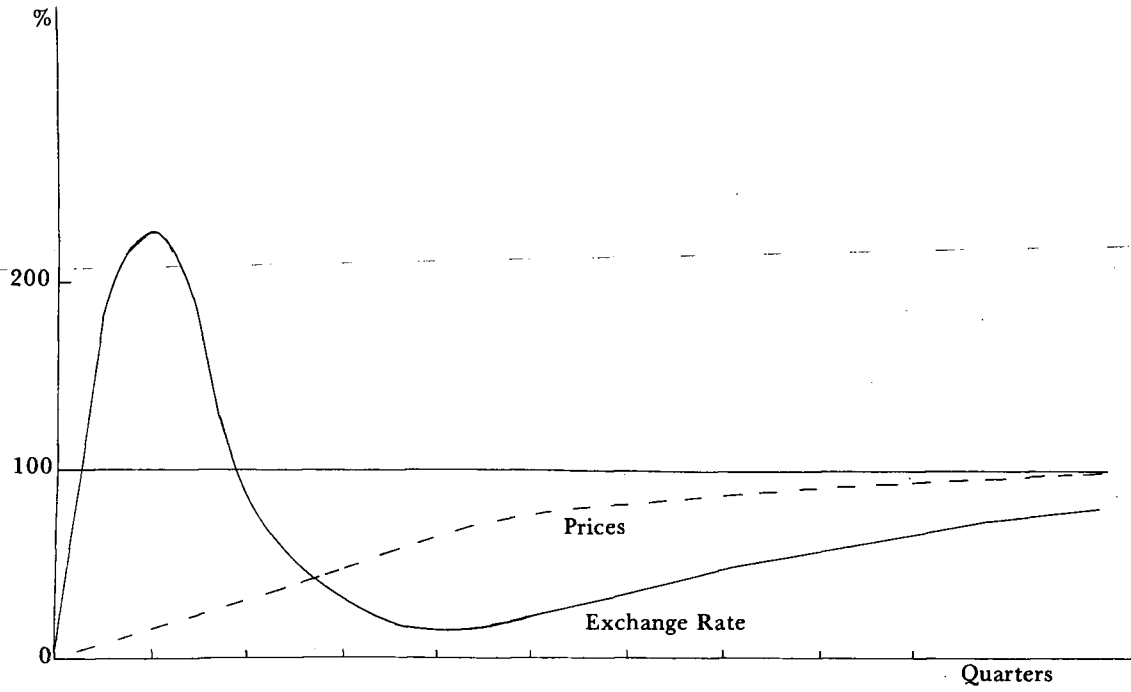
This is the mechanism by which small shifts in monetary policy are translated into sudden and seemingly excessive fluctuations in exchange rates. The main point is that overshooting of the exchange rate is not necessarily caused by "irrational" or "pathological" speculation, but may be the result of the sober calculations of perfectly rational money holders. As a corollary it may be noted that even the perfect understanding of this mechanism offers no opportunities for profitable speculation, since at every point speculative profits or losses are just neutralised by differences in interest rates.

III.2 The Example of the Swiss Dollar Rate

The preceding argument about overshooting was couched in general, and perhaps somewhat abstract, terms. The question is whether exchange rates actually behave this way. The behaviour of the Swiss dollar rate offers evidence that they do. Evidence of a rather broad historical nature can be found in the experience of the last two years; more about this will be said below. Evidence of a more technical nature is provided by recent econometric studies of the Swiss dollar rate under flexible rates, among them a study by Driskill (1978). Driskill tried to find out to what extent the behaviour of Swiss and American prices and the behaviour of the franc price of the dollar since the collapse of Bretton Woods could be explained by changes in the relative money supplies. The main result (from the present point of view) is summarised in Exhibit 5. It shows how relative prices and the exchange rate are found to adjust to a once-over increase in the US money supply. Along the vertical axis, the 100 per cent mark indicates the level to which both prices and exchange rates should eventually move according to the quantity theory of prices and the purchasing-power parity theory of the exchange rate. The broken curve shows that prices used to approach this long-run level gradually and slowly. This is exactly why during the transition period money policy can have such a strong effect on output and employment. The exchange rate, on the other hand, tended to overshoot its long-run level by more than 100 per cent in the first quarter. This was followed by a reaction in the other direction, and the eventual equilibrium value was gradually

2. Both interest rates and exchange rates can be expressed either in real terms, corrected by expected inflation, or in nominal terms. Analytically it does not matter which approach is used, provided it is used consistently. The verbal exposition, however, is less simple in terms of nominal magnitudes. In particular, in terms of nominal exchange rates downward overshooting may be followed by a further nominal decline as long as this decline is smaller than the simultaneous shift in relative prices. The argument in the text must be interpreted in terms of real exchange rates.

Exhibit 5: Trends in prices and the exchange rate



Source: Robert A. Driskill, (1978).

approached from below. During the first 6 months, the Swiss economy would suffer from a large competitive disadvantage, but later there would be a lengthy period of a moderate advantage.

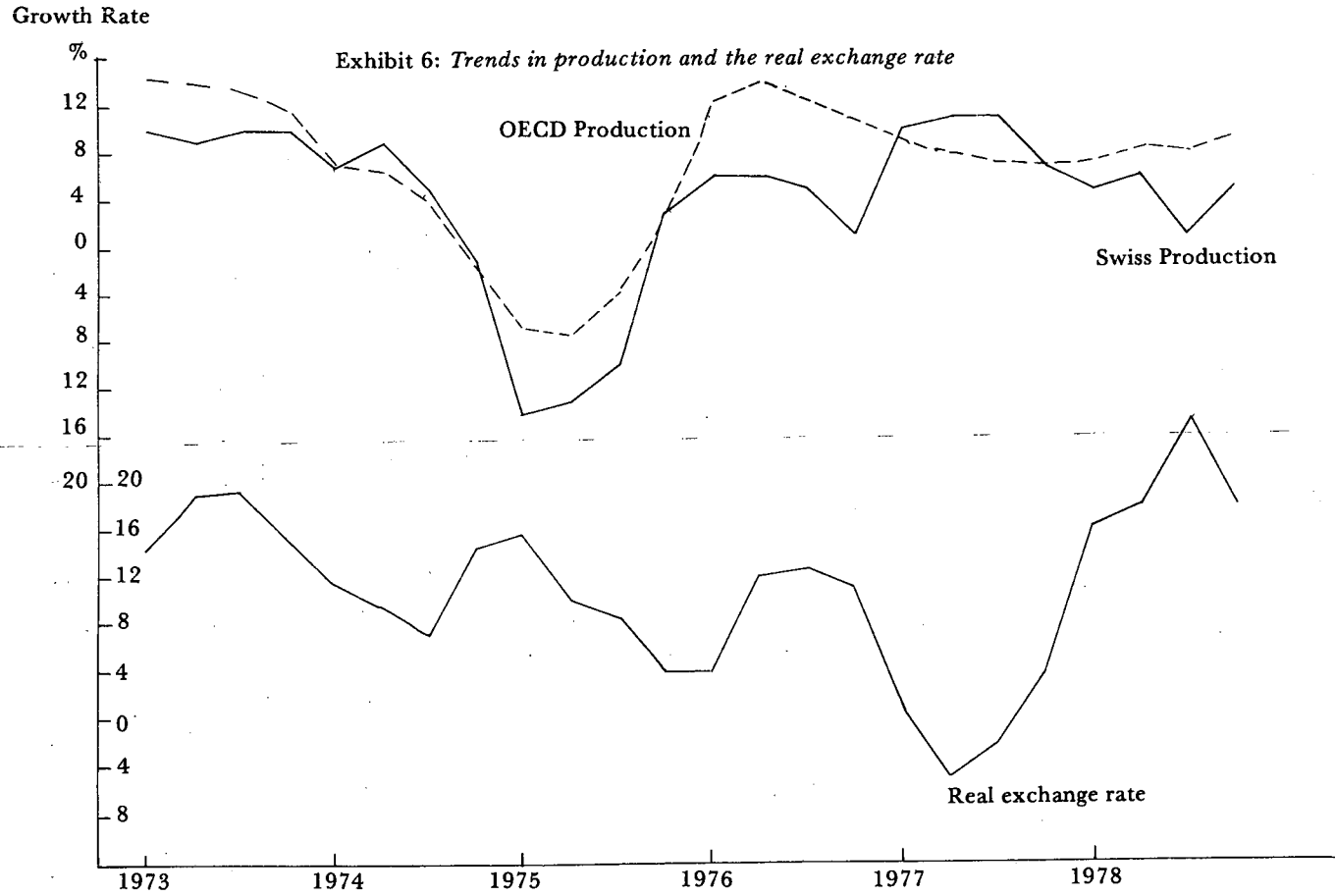
Of course, economic history will hardly ever offer us the test-tube case of a long period of monetary calm interrupted by a single "dose" of monetary expansion. Rather what we observe are the overlapping effects of successive shifts in monetary policy. As a consequence, the actual fluctuations of exchange rates and prices cannot be expected to follow such smooth curves. Driskill's econometric estimates mean that the seemingly irregular movements of the last few years look as if they had largely been produced by the continuous working of the simple mechanism graphed in Exhibit 5. It must be added that these estimates cannot yet be taken as conclusive; they are not the last word, but rather one of the first words on this problem. They indicate, however, that the basic idea of overshooting is not only analytically convincing, but also realistic.

III.3 The Economic Effects of Overshooting

Because of the overshooting of exchange rates, shifts in monetary policy may be accompanied by large short-run shifts in the competitiveness of the economies concerned. In the non-inflating country exports are stimulated and domestic production obtains additional protection. In the inflating country imports become cheaper while exports are less competitive. Gustav Cassel believed that the resulting disturbances could be serious. Was he right? Again, I shall try to give an answer, however tentative, in the light of recent Swiss experience. This discussion will be based on the results obtained by Zenger (1979) in an ongoing study of exchange rate effects.

One of these results relates to new orders from abroad in manufacturing industries. It is plausible to suppose that these reflect the effect of exchange rate changes most promptly and most clearly. Zenger found that during the period I/1974 to IV/1978 an increase of 10 per cent in the real exchange rate at given levels of OECD production was indeed associated with a simultaneous decline in new export orders by 7.4 per cent. For actual exports the effect is somewhat smaller, which is not surprising in view of sometimes large and certainly unequal delivery lags. It is more surprising that the (unlagged) decline was still almost 3 per cent.

Of more general importance than export effects are the effects of exchange rate fluctuations on production, employment and incomes. It turned out that since the transition to flexible rates, about five-sixths of the total variation in industrial output could be statistically explained in terms of OECD production and the real exchange rate. The three series are graphed in Exhibit 6. It shows pronounced opposite movements of the growth rate of industrial production and of the percentage change in relative exchange



Sources: Production, up to June 1979 – Christoph Zenger, 1979; June 1979 – Main Economic Indicators (OECD), Die Volkswirtschaft (Federal Department of Public Economy). Real exchange rate – see sources of Exhibit 1.

rates. In particular, the marked appreciation of the Swiss franc during 1977/78 was accompanied by a relapse of production growth into negative values. In numerical terms, an appreciation in the real exchange rate by 10 per cent, with given OECD output, tended to be associated with a decline in industrial output by 3.7 per cent.

The series of foreign orders, exports and industrial production are the dry statistical expressions of sometimes dramatic swings in the general mood of the economy. In the third quarter of 1978 the future looked bleak indeed. Some managers and workers' representatives were near the panic point; a battle for survival seemed to be ahead. The correction in the exchange rate in the fourth quarter was enough to restore confidence. The implication is that for a small open economy the overshooting of exchange rates may indeed be a vital problem.

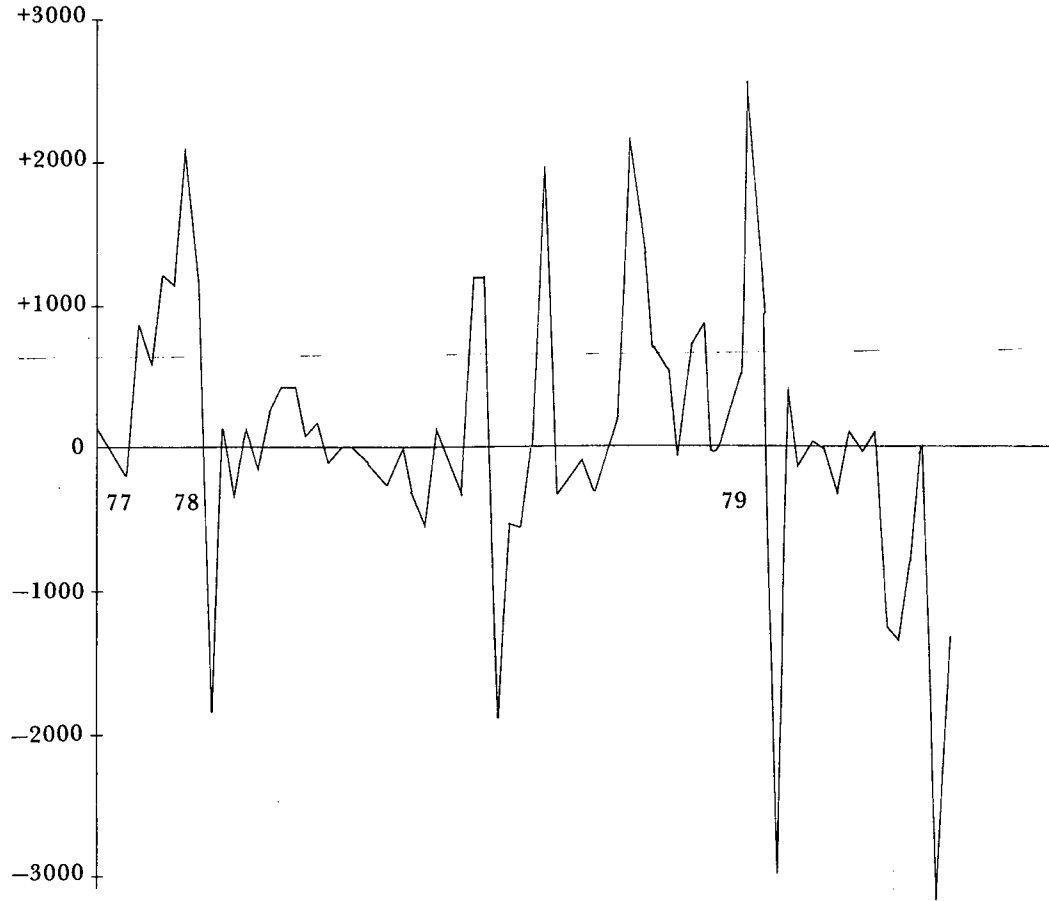
IV POLICY CONCLUSIONS

IV.1 Exchange Rates as a Short-term Target

The recent experience with overshooting exchange rates forced a growing number of central banks to revise and modify their monetary policies. They had to do this largely without the help of monetary theorists, who were still busy fighting rearguard actions in the battles of the 'sixties between "Keynesianism" and "monetarism". Once more, policy making was ahead of academic research. In the last part of this paper I shall try to illustrate this evolution by the particularly illuminating case of the Swiss National Bank.

After the transition to floating rates, the Swiss National Bank had adopted a policy of announcing annual money supply targets. In so doing, it became just about the most faithful adherent of the Friedman Rule among central banks. While it lasted, this policy was, by and large, an outstanding success. Within a few years, inflation was practically eliminated while unemployment was again negligible. In the Fall of 1977, however, the experience with overshooting forced the Swiss National Bank to abandon this policy, and a year later the annual targets were discontinued. From a policy of steady annual money growth the central bank switched to a policy of massive intervention in foreign exchange markets. This is illustrated in Exhibit 7. It shows that since the Fall of 1977 weekly purchases or sales of foreign exchange — consisting mostly of dollars — had often been in the range of 1-3 billion Swiss francs, sometimes for several weeks in a row. This must be seen against the background of foreign exchange holdings of less than 20 billion Swiss francs in late 1977. In the short run, the principle of a steady expansion of the money supply was sacrificed to the dampening of overshooting in exchange rates.

Exhibit 7: Foreign exchange purchases (+) and sales (-) of the Swiss National Bank, weekly (in mill Sfr.)



MONETARY POLICY WITH OVERSHOOTING EXCHANGE RATES

Source: "Ausweis" of the Swiss National Bank (weekly).

In a wider sense, though, the Swiss National Bank still followed the spirit of the Friedman Rule. This rule is based on the notion that the demand for money is relatively stable. If it were subject to marked fluctuations, the logic of Friedman's argument would require that these fluctuations be neutralised by compensating variations in the money supply. Friedman recognised this implicitly by his treatment of bank reserves which he regards as volatile. By insisting that his rule is meant to apply to the supply of money to the non-bank sector and not to the monetary base, he gave the central bank the implicit mandate to neutralise fluctuations in the demand for bank reserves. By the same token, once there were strong indications that the non-bank demand for money was subject to rapid shifts, the central bank should, in the Friedman spirit, try to offset them. If this were not done, a marked increase in the demand for Swiss francs would threaten the economy with strong deflationary pressure. The increased demand would be brought in line with the immutable supply, first by a contraction of output and ultimately by a decline in wages and prices. The policy error would be of the same kind as Churchill's effort to stabilise the pound at the pre-war gold parity in 1925. By abandoning annual targets and accepting large short-term fluctuations in the money supply, the Swiss National Bank avoided this error.

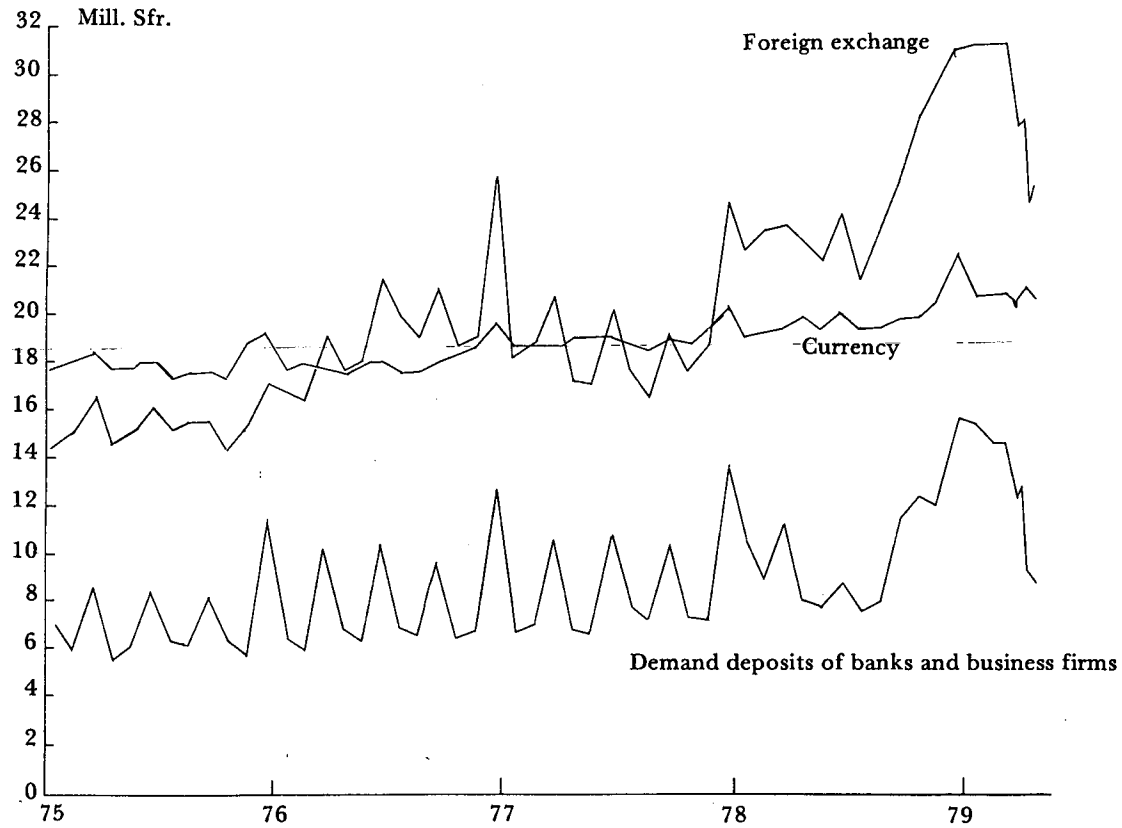
The new policy indeed achieved a drastic reduction in exchange rate fluctuations. Under the spell of the money supply targets monetary policy had become virtually powerless in influencing exchange rates, since every purchase of dollars could be relied upon to be promptly matched by a corresponding sale, thus giving the speculators a free ride. With the new policy, the central bank regained its ability to assert its power in the foreign exchange market. What is more important, the new policy was also successful in bringing the economy through the last two years without a relapse into recession.

At the same time, the long-run orientation of monetary policy remained unchanged. It is clearly recognised that in the long run the stabilisation of exchange rates is not a sensible objective, as long-run exchange rates tend to follow purchasing power parity. The avoidance of long-run inflation and deflation thus remains the basic long-run objective. Over periods of several years, it may well turn out that this requires expansion of the money supply roughly in line with the Friedman Rule.

IV.2 Self-correction of the Money Supply

The foreign exchange purchases of the Swiss National Bank since the middle of 1978 increased foreign exchange holdings by almost 50 per cent within half a year and central bank deposits doubled (see Exhibit 8). This was money creation on an unprecedented scale. Observers, particularly

Exhibit 8: Central Bank Balance Sheet



Source: "Monatsbericht" of the Swiss National Bank.

monetarist observers, were understandably alarmed. Yet, within another six months the additional dollars and central bank deposits had disappeared, leaving the central bank balance sheet essentially as it was a year before or even three years before. The important point is that this was not the result of deliberate and painful contraction. It happened silently, as if by magic.

Of course, the monetarist critics of the central bank attributed this normalisation to undeserved good luck. I believe it was more than that, namely, a brilliantly successful test of the overshooting diagnosis. The dollars flowed out of the central bank under the irresistible pull of the same interest-parity mechanism that had brought them in. By convincing the market that it would not tolerate a dollar rate much below 1.70 Sfr. in the near future, the central bank made dollars an irresistible investment. By moving into dollars, the owner of Swiss francs could increase his yield by about 8 per cent with only a small risk of exchange loss. In other words, with a forward discount of about 8 per cent, stable spot rates could not be an equilibrium situation. Thus francs poured into the central bank and dollars flowed out. In May, the central bank decided this had gone far enough. Its president announced that liquidity would not be allowed to get tight. At the same time, the market expects that in the foreseeable future the dollar will again resume its long-run downward course as prescribed by purchasing-power parity. Around the middle of June, a rate of about 1.73 seemed to balance the interest differential against the risk of a future dollar depreciation.

Events have thus proved the central bank right: (1) it is indeed possible to dampen violent overshooting of the exchange rate by foreign exchange operations, (2) the stability of the domestic economy may gain from such a policy, and (3) if the diagnosis is correct, this policy will leave no lasting inflationary overhang.

Under the given circumstances, neither M_1 , M_2 , M_3 nor the monetary base would have been an appropriate monetary target. Perhaps it would have been better, in the Swiss case, to apply the Friedman Rule to currency alone. While bank deposits fluctuated violently, currency circulation, as Exhibit 8 shows, was relatively inert, seemingly unaffected by the overshooting of the exchange rate. But the currency curve also reveals the long-run problem of Swiss monetary policy; from February 1975 to February 1979 it increased at an annual rate of 3.8 per cent. During a period of recession and recovery with little, if any, overall growth, this was still somewhat inflationary, leaving the economy with a basic inflation of 2-3 per cent. This will be the subject of my last set of remarks.

IV.3 The Reappearance of Inflation

In 1978, inflation seemed to have disappeared from the Swiss economy. Wholesale prices had been declining for some time, and in the second half of

the year consumer prices began to decline, too. This changed when the central bank shifted its policy, and in the Spring of 1979 consumer prices were again rising at a rate of 2.3 per cent. The question is whether this was indeed, as the bank's critics argued, the effect of monetary expansion along quantity-theory lines. On the basis of the available evidence I believe that it was not.

This evidence is summarised in Exhibit 9. The top line shows the national income deflator for domestic demand. It seems to indicate declining inflation rates from 1974 to 1978 and a sudden reappearance of inflation in 1979. In part, however, these price changes were due to fluctuations in import prices; their contribution to the domestic demand deflator is given on line 2. (Of course, this is just a statistical contribution and thus may differ from the causal contribution.) Subtracting the import contribution from the total price change, one obtains an implicit deflator for the domestic demand for domestic products (line 3). The same domestic deflator could have been derived by starting from the deflator for the net domestic product (line 5) and subtracting the contribution of exports (line 4).

Exhibit 9: *Components of inflation (per cent p.a.)*

	1974	1975	1976	1977	1978	1979
Domestic demand	8.7	5.6	1.3	1.3	0.7	3.5
Import contribution	4.5	-3.8	-4.7	1.3	-8.0	1.1
Domestic prices	4.2	9.4	6.0	0.0	8.7	2.4
Export contribution	2.7	-2.3	-3.3	0.3	-5.2	-0.2
Domestic product	6.9	7.1	2.7	0.3	3.5	2.2
Monthly earnings	16.7	6.6	1.9	1.5	1.9	
Industrial production (1963 = 100)	159	139	140	148	148	

Sources: — Der Wirtschaftsspiegel, Federal Office of Statistics (ESTA)
 — "Revidierte Reihen der Nationalen Buchhaltung der Schweiz 1948-1976", Federal Office of Statistics (ESTA).
 — Die Volkswirtschaft, Federal Department of Public Economy (Eidgenössisches Volkswirtschaftsdepartement).

The point is that domestic inflation as measured on line 3 reached its low point in 1977, long before the recent monetary expansion, and stood again at more than 8 per cent when this expansion set in. It may be that this series overstates the fluctuations in domestic prices, but the series for the domestic product deflator (line 5) tells essentially the same story. The low point of domestic inflation, associated with the low point of wage increases (line 6), was reached about 2 years after manufacturing output (line 7) had passed

its trough. This confirms that the long-term trend of monetary policy had still been somewhat inflationary throughout. The rapid decline in import and export prices due to the overshooting of exchange rates had, for a time, been stronger than this domestic inflation, resulting in stable or even falling consumer prices. With the elimination of overshooting, domestic inflation reasserted itself, for a time even accentuated by the temporary depreciation of the franc. Later on in 1979 it was, of course, further aggravated by the rise in oil prices. If this is taken into account, it seems fair to conclude that the large, but temporary, increase in the money supply left no noticeable impact on the economy. If it only compensated for a shift in the demand for money, this is what would be expected.

The emerging policy framework for a small open economy under floating exchange rates can perhaps be summarised in what I like to call the "three-frequency approach". Set the long-run trend of the money supply for price stability, permit medium-term deviations from this trend to counteract fluctuations in output and employment, and use short-term interventions to dampen overshooting of the exchange rate. The traditional short-run function of the central bank as a lender of last resort thus seems to have shifted from the offsetting of domestic banking crises to the offsetting of overshooting in the foreign exchange markets.

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