TYÖVÄEN
TALOUDELLINEN
TUTKIMUSLAITOS

TUTKIMUSSELOSTEITA 19.1981

HANNU HALTTUNEN – SIXTEN KORKMAN

EXTERNAL SHOCKS AND ADJUSTMENT POLICIES IN FINLAND 1973–80

EXTERNAL SHOCKS AND ADJUSTMENT POLICIES IN FINLAND 1973 - 80

by

Hannu Halttunen
Bank of Finland,
Helsinki, Finland

and

Sixten Korkman
Labour Institute for
Economic Research
Helsinki, Finland

Paper presented at Colloquium on International Adjustment, the EMS and Small European Countries, March 12-14, 1981, Florence, Italy.
Views presented here are those of the authors, and do not represent any of the institutions.

ISBN 951-9281-29-0

ISSN 0357-9603

1. INTRODUCTION

The 1970s were a period of violent fluctuations. Oil prices multiplied, world markets were severely depressed, exchange rate regimes in a state of flux and international financial markets turbulent. For institutional reasons (relating mostly to Finnish foreign exchange policy), the direct macroeconomic effects of foreign financial developments were limited in the case of Finland. The real shocks, by contrast, were deceisive to the economy's performance.

In this paper we briefly describe macroeconomic developments in Finland in the 1973 - 1980 period. We also discuss the role played in the cyclical context by monetary and exchange rate policy.

In section 2 we review some major external shocks and domestic imbalances that formed the setting for policy choices. The Finnish experience is differentiated from that of most other market economies in Europe mainly by some consequences of its structure of foreign trade. Economic policies adopted to adjust the economy to external disturbances were of course also significant.

In section 3 we turn to the role played by monetary policy. In particular, we analyze the significance of developments in the balance of payments for the determination of the stance of monetary policy. We find that the "autonomy" of Finnish monetary policy has not been seriously hampered by interest sensitive capital flows (nor by difficulties in financing current account deficits). Nevertheless, monetary conditions were largely conditioned by developments in the balance of payments because of automatic and policy induced effects.

In section 4, finally, we intend to characterize and analyse the consequences of the active exchange rate policies pursued in Finland (since 1973 as well as before). Our assessment focusses particularly on the dynamic effects of exchange rate changes on competitiveness and inflation. In addition, we discuss the potential macroeconomic advantages of some currency standards alternative to the "currency basket standard" presently employed in Finland. For these purposes we partly draw on some simulations with a small macroeconomic model from an earlier study.[1] (The empirical model used in the simulations is compactly presented in an appendix to this paper.) Section 5 concludes with some brief reflections on the lessons for policy assignments in the Finnish context that the experiences of the 1970s in our view contain.

2. THE FINNISH ECONOMY IN THE 1970s: AN OVERVIEW

In the 1970s about 30 per cent of total Finnish output was exported. In many instances the domestic effects of external disturbances have been magnified by certain structural characteristics of the Finnish economy and by economic policy.

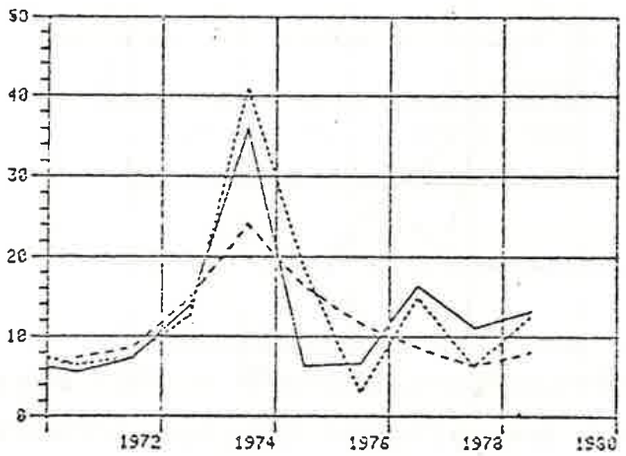
The major external impulses are changes in trade prices and variations in export demand. Due to the large share of timber, pulp and paper products in exports (about 50 per cent), price developments have been unstable and export earnings volatile, as the demand for these products is very sensitive and fluctuates much more than world trade on average. These fluctuations are illustrated in Figures 1 and 2 which show the development of foreign and domestic prices as well as foreign demand and domestic output respectively.

---

1. Halttunen - Korkman (1981).

Figure 1 demonstrates that Finnish export prices are highly correlated with (determined by) prices of competitors' exports (in domestic currency). Moreover, it indicates the role of foreign trade prices for domestic inflation: inflation in Finland seems basically to be determined by the rate of increase of foreign trade prices (i.e., by foreign inflation and exchange rate changes), though there is scope for temporary deviations due to gradual adjustment, changes in labour market conditions and in connection with comprehensive incomes policies.

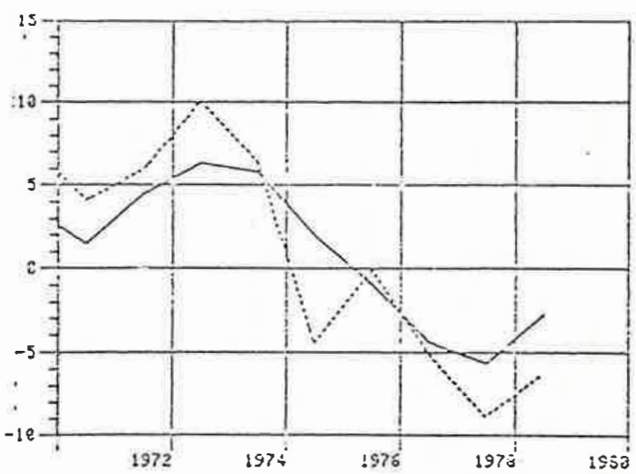
Figure 1. Finland's competitors' export prices, %-change - - - - -
(import prices in Finnish export markets)
Finland's export prices, %-change ————
GDP deflator, %-change — — — —



Weakening demand for Finnish exports is quickly transmitted into reductions in domestic output (and vice versa) through multiplier effects (Figure 2). The effects of foreign demand changes are aggravated by the fact that exports cannot be

replaced by domestic consumption of these goods. On the other hand, Finland has often been able to compensate weakening demand in western markets by increasing exports to the Soviet Union which presently buys 1/5 of Finland's exports. Moreover, approximately 2/3 of Finland's total oil imports is from the Soviet Union, and trade takes place on a bilateral basis. This means that Finland is somewhat less exposed to oil price changes than most other OECD economies, since bilateral trade has made it more easy to pay higher oil prices by increased exports.

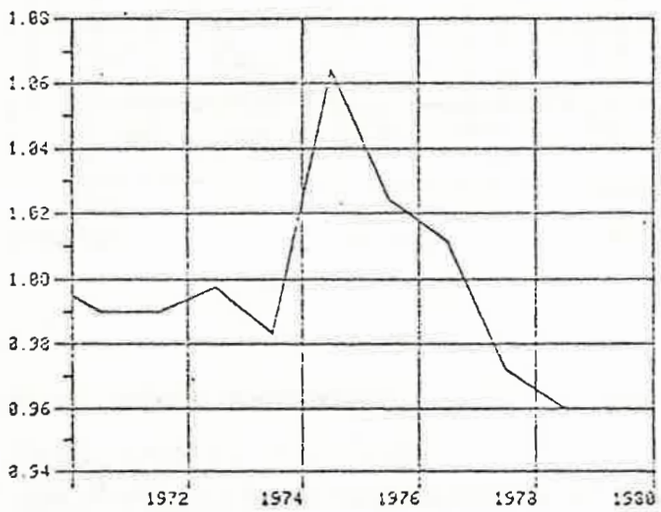
Figure 2. Trend deviation of real GDP in Finland ———— Trend deviation of import demand in Finnish export markets ----------



Another reason why Finland's economic performance has deviated somewhat from the general pattern relates to the development of the terms of trade. Whereas the average deterioration in the terms of trade in the OECD area (measured by export unit values relative to import unit values) was some 10 per cent in 1974, Finland's terms of trade worsened only slightly and

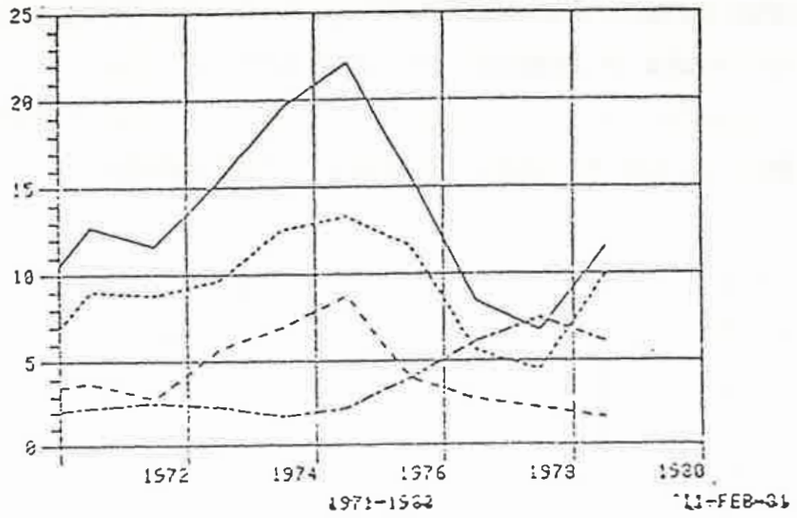
improved in 1975 (see Figure 3) due to favourable movements in the international price of paper, pulp and timber. In 1974 import prices went up by 41 per cent and export prices 38 per cent. Thus the behaviour of trade prices and their effects on the whole economy resembled that of a devaluation of the Finnish markka (Fmk) by some 40 per cent (though the Fmk was kept fixed against a basket of currencies).

Figure 3. Terms of Trade, index, 1970=100



A consequence of the (unforeseen) terms-of-trade behaviour was that the Finnish economy experienced a boom when most of the other OECD countries went into recession. As the economy was already approaching the capacity ceiling, the external shock in combination with initially expansionary policies soon led to overheating of the economy (in the course of 1974). This resulted in an acceleration of inflation (with e.g., wage-drift becoming almost as large as negotiated wage increases; see Figure 4), an erosion of relative cost positions and a substantial deficit in the current account.

Figure 4. Level of earnings, %-change ———
Negotiated wages, %-change ------
Wage drift, %-change — — — —
Unemployment rate, % —·—·—·



In 1975, Finland's exports were badly hit by the recession in the rest of the OECD area, although GDP growth was still positive due to the lagged reaction of domestic demand. As a first response to the growing external deficit (see Figure 5), a strong credit squeeze embracing both domestic credit expansion and capital inflows was introduced late in 1975[1] when the option of accelerated foreign borrowing was not considered to be available any longer. In the following year fiscal policy also became highly restrictive (Figure 6). For instance, the share of taxes in GNP increased by 4 percentage point. The tax increases were largely motivated by concern about the government's debt position.

---

1. In order to facilitate coordination of central bank measures regulating sources of finance to the private sector, the Bank of Finland started to make use of a financial framework or a "credit budget", in which the net inflow of foreign capital together with central bank lending are key variables.

Figure 5. Current account surplus relative to GDP, % _____
Indicator of monetary tightness (see below) - - - - - -

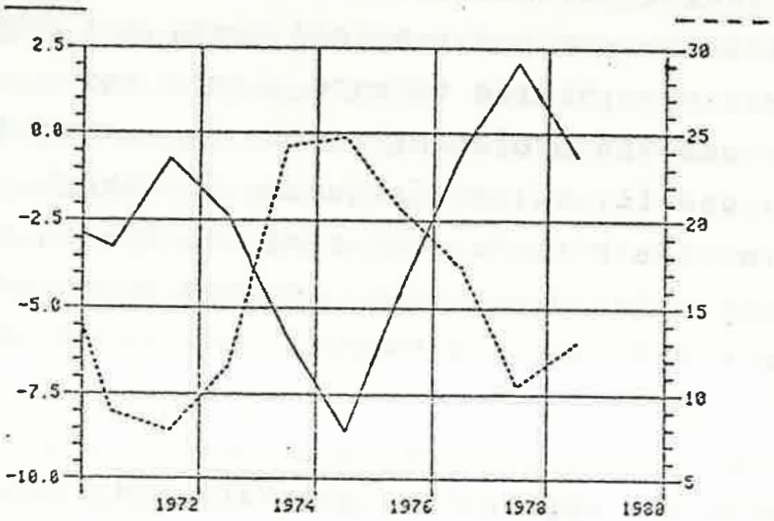
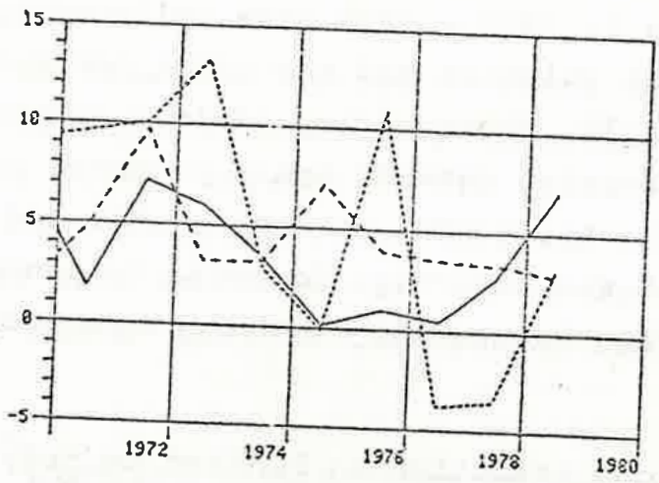


Figure 6. Real GDP, %-change _____
Real taxes, %-change - - - - - -
Real government expenditure, %-change _ _ _ _ _ _



In 1977 international markets did not recover to the extent expected and in 1978 the unemployment rate reached its post-war record (7 1/2 per cent). Since Finland's international price competitiveness had remained weak, the emphasis in the policy stance now shifted to more direct means of restoring competitiveness and profitability in the exposed sector (consisting chiefly of manufacturing industry). Three devaluations lowered the external value of the Fmk in 1977 and 1978 by a total of some 18 per cent. Incomes policies and fiscal measures were also used to support moderation in domestic cost increases.[1]

In retrospect the restrictive monetary and fiscal policies in 1975 - 1977 can be seen to have had sizable effects. For instance, inflation (in terms of consumer prices) decelerated in 1975 - 1978 from 18 to 8 per cent and the current account surplus improved from -8 to +2 per cent of GDP. On the other hand, the average annual growth of GNP in those years was only 1 per cent, total employment fell by 5 per cent and unemployment increased from 2 to 7 1/2 per cent (in spite of a reduction in the participation rate and increased emigration).

The devaluations in 1977 - 1978 were followed by more expansionary fiscal policies and the tight monetary policy was relaxed during 1978. These policy actions (in combination with the pick up in foreign demand) again produced strong if somewhat delayed effects; output growth in 1979 and 1980 was 7.2 and 5.5 per cent respectively. However, in connection with the second oil crisis the upswing in the international stock cycle

---

1. There is a long tradition in Finland to rely on incomes policies following big devaluations of the Fmk. For instance, the devaluation of the Finnish markka in the recession year 1967 was accompanied by stabilization measures, the aim of which was to cut the wage-price spiral. Broad indexation was abolished, labour market organizations agreed on "moderate" nominal wage increases, price control was imposed and the government implemented tax reliefs.

and in commodity prices was smaller than during the first oil crisis. Thus Finland's terms of trade weakened in 1980, which partly helped to dampen inflationary pressure. In spite of this and the revaluation of the Fmk by some 5 per cent in small steps in 1979 and 1980, domestic inflation accelerated. The external balance also deteriorated, but the weakening was partly cyclical and partly on bilateral basis with the Soviet Union. The compensating exports associated with the latter presently helps soften the effects of low demand in the OECD markets.

Exchange rate changes and monetary policy were an essential part of the economic policies through which the authorities have sought to adjust the economy to rapidly changing international conditions. In the following sections we discuss the implications for the Finnish business cycle of the link from external balance to the stance of monetary policy (the "monetary mechanism of adjustment") and the macroeconomic significance of some alternative strategies in exchange rate policy.

3. MONETARY POLICY AND THE BALANCE OF PAYMENTS

The Finnish financial system is characterized by the dominant position of deposit banks,[1] by the rigidity of nominal interest rates[2] and by the strategic role (from the point of view of the financial position of the private sector) of capital imports as well as commercial bank borrowing at the central bank. The banks' debt to the central bank is used not only as

---

1. Other financial institutions as well as the security market are macroeconomically of minor significance only. See the articles in the Bank of Finland Monthly Bulletin, 1978.

2. As a consequence, equilibration of the bank loan market takes place through quantitative credit rationing variations rather than via price and interest rate changes. See Oksanen (1977) and Tarkka (1979).

a major way of absorbing temporary liquidity changes, but also as a permanent source for financing bank lending. The importance of monetary policy is enhanced by the effective (regulative) means at its disposal as well as by its exceptional independence vis-a-vis the government.

The intermediate target of monetary policy has mostly been to control total credit expansion by influencing capital flows and the amount of central bank debt of banks. The instruments employed include relatively strict regulations of capital flows and manipulations of the terms at which commercial banks are permitted to borrow at the central bank. From data on the latter we have constructed a time series for the "marginal interest rate" (the marginal cost) of central bank finance[1], which is in the following used as an indicator of "monetary tightness".

The ultimate targets of monetary policy undoubtedly vary according to a lot of circumstances. Nevertheless, the relation between monetary tightness and external balance is particularly strong: a "deterioration" in external balance has almost invariably induced monetary tightness and vice versa. For instance, in Halttunen - Korkman (1981) the following (reduced form) equation was estimated for the marginal cost of central bank lending in 1961 - 1979 (R2 = coefficient of determination adjusted for degrees of freedom, DW = the Durbin-Watson statistic, t-values in brackets):

---

1. The banks' borrowing facility has typically been such as to imply an increasing (average and marginal) interest rate cost for each bank (or group of banks) according to the extent to which borrowing has exceeded a certain basic quota (within which the discount rate applies). In 1975 the Bank of Finland instituted an official (interbank) call money market. The interest rate on the call money market could then be regarded as measuring the marginal cost of finance for banks. Since 1980, however, the Bank of Finland has regulated the call money market and the system is again characterized by bank-specific quotas, penalty rate of interest for borrowing in excess of quotas etc.

$$(1)\quad r = \underset{(4.69)}{-.55(B/M)} \; \underset{(2.62)}{-.13(CB/M)} \; \underset{(2.50)}{+.68r^*} \; \underset{(2.58)}{+9.8D67}$$

$R2 = .72$

$DW = 2.25$

where r = the marginal interest rate, r* = the foreign interest rate (three month Eurodollar rate), B = current account surplus, CB = cumulative current account surplus, M = value of total imports and D67 = dummy for devaluation expectations in 1967. The (volatile) behaviour of our indicator of monetary tightness would thus seem to be largely determined by the current account (cf. also figure 5 on p. 7 above) and by the foreign interest rate (affecting capital flows).

This link between external balance and monetary conditions is essential to the cyclical behaviour of the Finnish economy. Before discussing it, however, we shall report a very crude attempt at quantitative assessment of the relations involved in the determination of monetary tightness.

For this purpose we assume that the portfolio relevant for liquidity behaviour of the private sector (including private banks) can be taken to consist of commercial bank borrowing from the central bank (net of the banks' placements in the call money market) and short term foreign debt.[1] The portfolio decision of interest in this context thus concerns the allocation of the total (net) short term debt of the private sector as between central bank and foreign debt. This allocation will of course depend on the foreign interest rate and the (marginal) cost of central bank finance and possibly on the level of income.

---

1. Long term capital flows are strictly regulated. At times, short term capital movements have also been affected by central bank regulations.

We thus assume that the portfolio behaviour focussed upon may be characterized as follows:

(2) $Z = H(Z,r,r^*,Y) + F(Z,r,r^*,Y)$,

where $Z = H + F$, H = stock of central bank borrowing, F = stock of net short term debt of the private sector and Y = level of income. (In view of the central bank's balance sheet and considering that base money is aggregated into H, the counterpart to variations in H are changes in foreign exchange reserves).

Next, define $f = F/Y$, $z = Z/Y$ and $b = B/Y$ and assume that the H- and F-functions are homogenous (of degree one) so that F may be specified as

(3) $f = f(z,r,r^*)$.

Our a priori expectations are $0 < f_z < 1$, $f_r > 0$ and $f_{r^*} < 0$.

Finally, assume that the foreign interest rate is exogenous and that the supply of central bank lending may be specified as follows:

(4) $r = \phi(h,b) = \phi(z-f,b)$,

for which $\phi_h < 0$ if the supply curve is rising[1], while $\phi_{b_2} < 0$ reflects our assumption about monetary policy reactions.[2]

---

1. This follows from the institutional arrangements which have normally prevailed. Cf. note 1 on p. 10.

2. We have experimented with many other conceivable target variables - like unemployment and inflation - as well. The results were uniformly negative. Observe that since the balance of payments automatically affects monetary tightness (r is an increasing function of the net domestic assets of the central bank, i.e. a decreasing function of its net foreign assets), it is in practice not possible to identify "discretionary" monetary policy reliably.

Linearizing and substituting, equations (3) and (4) may then be solved for r and f in terms of r^*, b and z:

$$(5) \quad f = \frac{1}{\alpha}[(f_z+\phi_h f_r)z + f_{r^*} r^* + \phi_b f_r b]$$

$$(6) \quad r = \frac{1}{\alpha}[\phi_h(1-f_z)z - \phi_h f_{r^*} r^* + \phi_b b]$$

$$\alpha = 1 + \phi_h f_r \ .$$

As the system (5) - (6) is exactly identified, we estimated the equations by ordinary least squares (sample period 1961 - 1979). The results were as follows (Δ = difference operator; an additional dummy was introduced to count for the devaluation speculation at the end of 1977):

$$(7) \quad \Delta f = \underset{(7.31)}{.62\Delta z} - \underset{(3.62)}{.0020\Delta r^*} - \underset{(0.79)}{.060\Delta b} - \underset{(1.60)}{.005\Delta D67} - \underset{(3.45)}{.01\Delta D77}$$

$R2 = .93$

$DW = 1.59$

$$(8) \quad r = \underset{(1.55)}{89.0z} + \underset{(2.52)}{0.80r^*} - \underset{(1.66)}{117.1b} + \underset{(2.73)}{11.4D67} + \underset{(0.76)}{3.9D77}$$

$R2 = .64$

$DW = 1.64$

Some of the estimates are not significant; in particular, strong multicollinearity between Δz and Δb is a source of difficulty. The implied structural coefficients are, however, all of "right" sign and of "reasonable" magnitude.[1]

---

1. Estimation using the Cochrane-Orcutt autocorrelation correction gave very similar results. The structural coefficients implied by (7) and (8) are as follows: $f_r = 0.00055$, $f_{r^*} = -0.00248$, $f_z = 0.72$, $\phi_h = 393.4$ and $\phi_b = 142.4$. It may be observed that f might depend on b also directly because of commercial credits associated with trade flows. If this is the case, our estimate of $|f_r|$ and $|f_{r^*}|$ may be too large.

According to the estimates, the marginal cost of central bank lending increases by approximately 2 percentage points for a 1 billion increase in central bank lending (in Fmk), and by 1 percentage point for a 1 billion increase in the current account deficit (GNP in 1981 is something like 200 billion Fmk). Since the liquidity position of the private sector and the current account usually deteriorate simultaneously (both reflecting private investment in excess of saving), it stands to reason that fluctuations in monetary tightness are considerable (and closely related to the cyclical situation).

Another implication of the estimates is that a 1 per cent increase in the foreign interest rate (for a given r) will induce a capital outflow (stock shift) of approximately 500 million Fmk, while a 1 per cent increase in the marginal interest rate on central bank lending will induce only a 100 million inflow. This assymmetry is understandable in view of the fact that the marginal interest rate on central bank lending is not an "interest rate" in the usual sense. In particular, it affects the public mainly through the credit rationing behaviour of banks.[1]

Our estimate of the effect of a change in the foreign interest rate on capital imports is fairly high[2], though it is reduced somewhat when the induced effect on domestic monetary tightness is allowed for. Seldom, however, has Finnish monetary

---

1. An increase in the marginal interest rate will often also induce the banks to raise the premium on forward exchange. This will diminish incentives for the non-bank public to increase its (covered) foreign debt even though the domestic credit market is getting tighter.

2. Provided that the relations are linear, an increase of the foreign interest rate by 10 percentage points would wipe out much of the foreign exchange reserves of the Bank of Finland (presently amounting to 7 - 8 billion Fmk). Our estimate is somewhat higher than those arrived at in most Finnish studies of capital flows.

autonomy been compromized by capital mobility.[1] The main reasons for this are probably as follows.

First, variations in the foreign interest rate have usually been rather small (at least on an annual level). Second, long term capital imports are of substantial size and strictly regulated by the Bank of Finland. Third, the foreign interest rate is positively correlated with the Finnish business cycle (both lagging somewhat with respect to the foreign business cycle). The effects of the foreign interest rate have therefore often been more than offset by the consequences for capital imports of the substantial fluctuations in private sector overall indebtedness.[2]

The relation between external balance and monetary tightness has definite cyclical implications. In particular, the link between the balance of payments and domestic monetary conditions in combination with the time lag between changes in the stance of monetary policy and their ultimate effects on output and external balance has tended to magnify cyclical fluctuations.

The mechanism at work may be set out most simply by abstracting from other influences and assuming both that monetary

---

1. A major exception is the large capital outflow associated with devaluation speculations in 1977, which forced the central bank to maintain a much higher interest rate on the call money market than deemed desirable on purely domestic grounds.

2. The covariation which has prevailed in the past need not repeat itself in the future. A high foreign interest rate (or devaluation speculations) in a situation in which the private sector is highly liquid might then strain the central bank's foreign exchange reserves and enforce an undesired credit squeeze. In face of this eventuality, it would seem desirable to develop a short term money market through which monetary policy might more directly affect the liquidity behaviour of firms (to increase f_r).

policy reacts on the balance of payments on current account with a lag and that it affects demand and output with a lag. The behaviour of the resulting system may then be described by Figure 7. The $\bar{Q}$-curve shows the equilibrium dependence of the level of output Q on monetary tightness r, and the horizontal arrows show the direction of its gradual adjustment. The $\bar{r}$-curve correspondingly shows that a high level of income is in equilibrium associated with tight money (because the current account is negatively associated with the level of demand and output). As is seen, the equiliubrium of the

Figure 7.

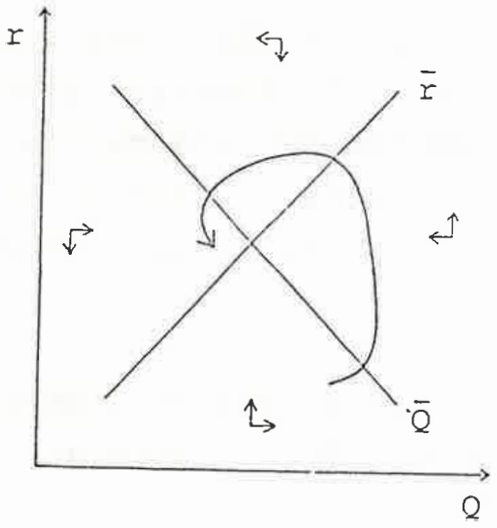
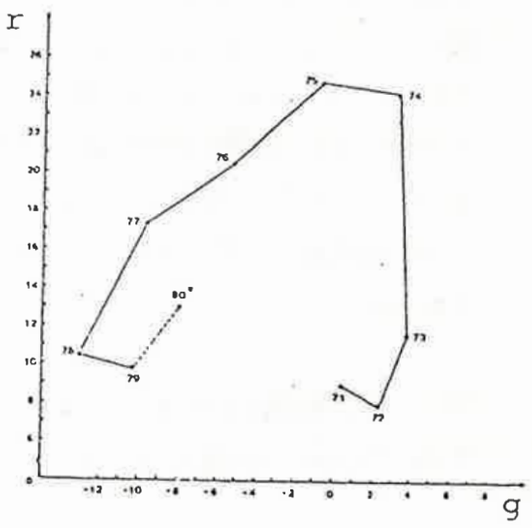


Figure 8.



system is likely to be approached (if at all) in an oscillatory manner. The data for r and g (the logarithmic trend deviation of GNP) in Figure 8 agree well with our reasoning (though the sequence could, of course, be due to other factors as well).

In an economy subject to exogenous shocks and with other endogenous feed-backs, the dynamic element just described need not be destabilizing. Simulations that we made with our empirical model indicate, however, that the externally oriented monetary policy in Finland has been cyclically destabilizing in the sense of increasing the variance of GDP (as compared to a policy of holding r constant; cf. Halttunen - Korkman (1981, pp. 52 - 54)).[1]

In sum, interest rate effects on capital flows have not - so far - seriously hampered the autonomy of Finnish monetary policy. This reflects the limited size of the effects, capital

---

1. The interaction between monetary conditions and the Finnish business cycle can be characterized crudely as follows: The (export led) upswing is initially associated with an improved balance of payments, which puts downward pressure on the interest rate (within the same year). The effects of the fall in the interest rate strengthens the boom (in the following year), during which, on the other hand, the current account swings into deficit and the interest rate rises. This rise in the interest rate would be stabilizing if the export boom were "long enough" or if the time lag between the rise in the interest rate and its demand dampening effect were "short enough". In actual fact, however, the economy is typically hit by an export led recession at approximately the same time as the contractive effects of the rise in the interest rate are gradually being felt. Later in the recession, a cyclical improvement of the current account occurs and the interest rate is lowered. This would be stabilizing, were it not for the fact that the fall in the interest rate typically adds to domestic demand primarily at the stage when a new export led upswing is already well under way. The destabilizing effect is thus the outcome of export led booms and recessions in combination with lagged monetary policy effects.

controls and the cyclically rather advantegous covariation between interest rates on the Eurodollar market and the Finnish business cycle. Nevertheless, developments in the balance of payments have largely determined monetary conditions - with often unfavourable cyclical consequences - because of their automatic money-market effects as well as the policy reactions that current account imbalances induce.

4. EXHANGE RATE POLICY, COMPETITIVENESS AND INFLATION

Freely floating exchange rates are not a feasible or practical alternative for a country which has chosen to maintain extensive regulations of capital flows and foreign exchange transactions. The exchange rate is then an instrument of policy and some decisions about the use of it have to be made. In small economies the most common choice has been to peg to another currency or to a basket of other currencies.

The Finnish currency, the markka (Fmk), was tied to the dollar until February 1973 (until December 1971 within the par rate system and 1971 - 1973 within the central rate system). Since then the regime adopted by the Bank of Finland has been to stabilize (within narrow margins) the external value of the Fmk in terms of a trade-weighted basket of foreign currencies.[1] Within this new regime there

---

1. The concept of the currency index based on foreign-trade weights was introduced already early in 1973 but received "official" status only in November 1977 through a renewal of legislation concerning exchange rate policy. At this occasion the government fixed upper and lower limits to the currency index such that the band was 4 1/2 per cent wide. The width of the band was increased to 6 per cent in September 1978. At present, 18 countries and 15 currencies (for Poland, Iran and Saudi-Arabia the U.S. dollar is used) are used to calculate the index with the following) weights in the basket: US$ (9.2), £ (13.9), SKR (17.5), NKR (3.9), DKR (3.8), DM (13.4), HFL (3.8), FB (2.2), SFR (2.2), FF (4.2), LIT (2.3), ÖS (1.3), PTAS (1.0), YEN (2.2) and RBL (19.1).

have, however, already occurred a number of discretionary de- and revaluations (see Figure 9). The development of five most important bilateral rates is shown in Figure 10.

Figure 9.

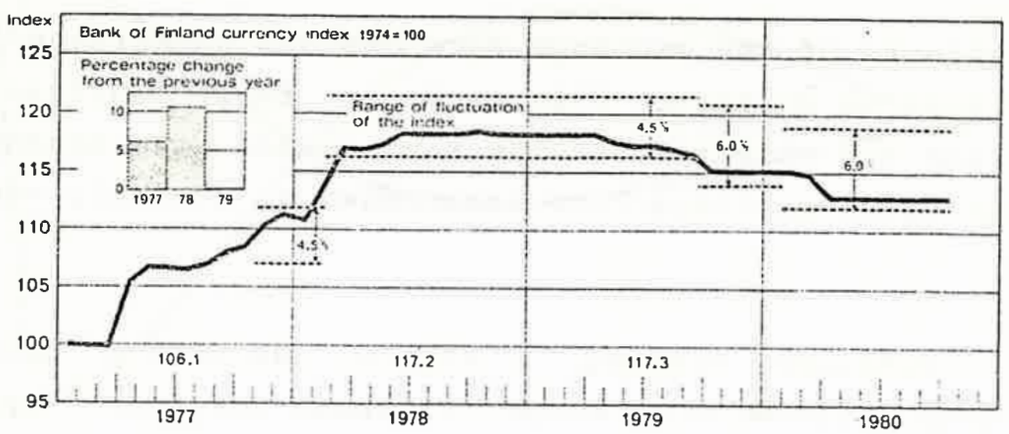
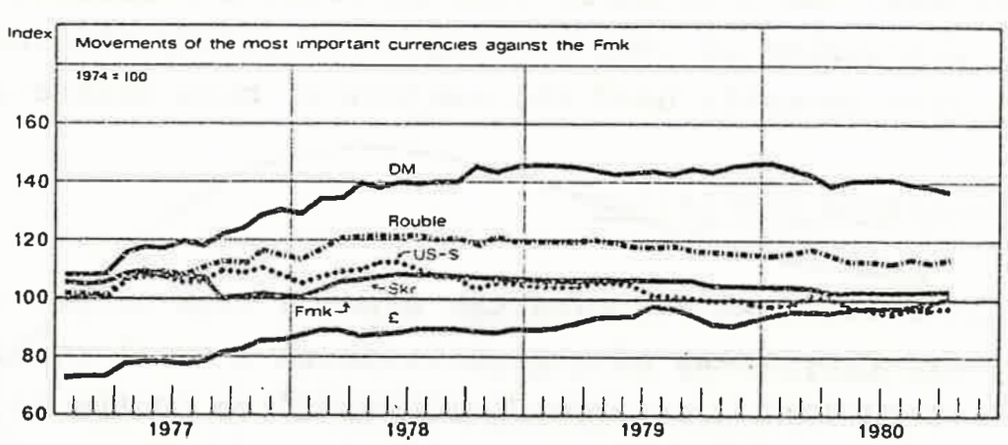


Figure 10.



The index remained rather stable through the years 1974 - 1976 but in 1977 the Fmk was devalued twice (in April by 5.7 % and in September by 3.0 %) and again in February 1978 by 8.0 %. In May - September 1979 by contrast the Bank of Finland strengthened the external value of the Fmk by some 3 %, and in March 1980 by another 2 %.

The effects of the exchange rate changes undertaken are difficult to evaluate. This is due to their manifold short and long run effects. For the same reason, the appropriateness of different exchange rate strategies is a highly controversial issue.

The conventional strategy in Finland has been to devalue the Fmk when international competitiveness has been "fundamentally out of line" in order to restore probitability and competitiveness of the exposed sector and to boost investment and growth (as in 1977 - 1978). Incomes policies have been seen as the means to prevent sharp increases in profits from being shifted into domestic costs. Arguably, however, the occasional and large devaluations have caused a "devaluation cycle", which will be illustrated in this section by means of a simulation experiment. The simulation also provides a reference point for a discussion of some exchange rate policy alternatives which have recently been the subject of much debate in Finland.

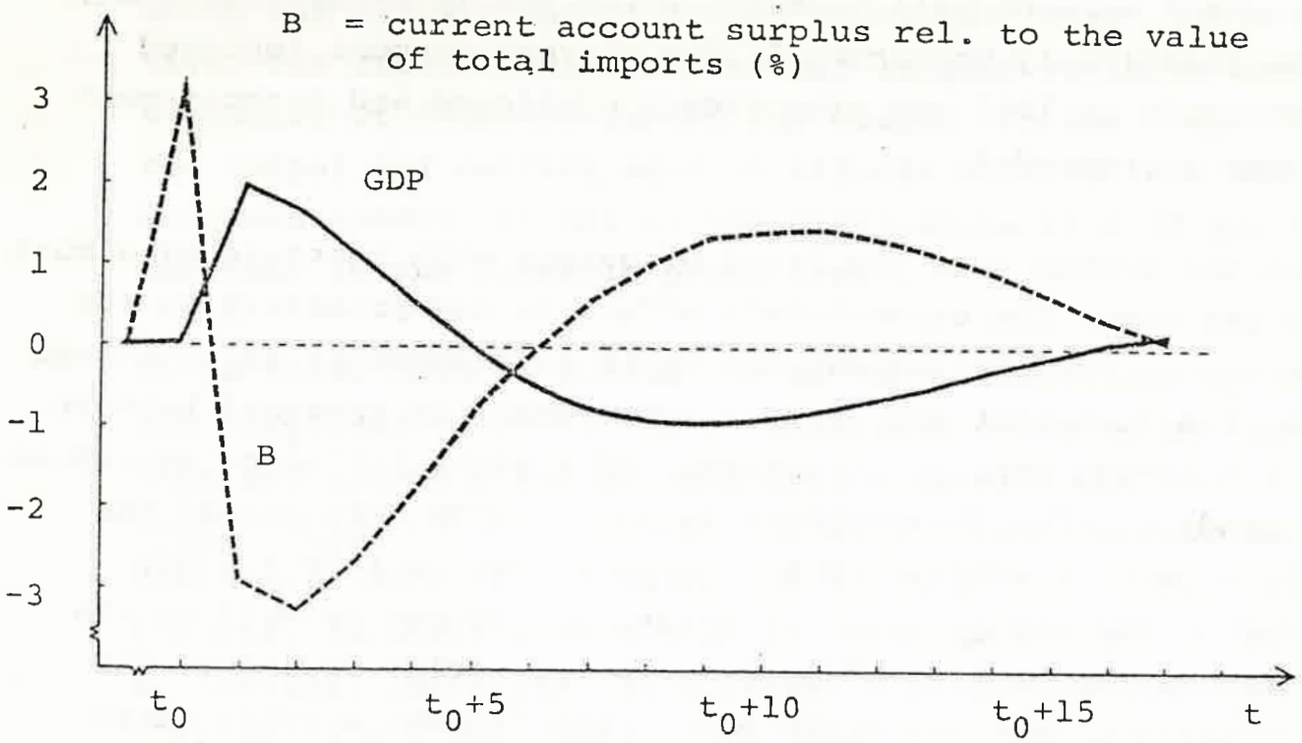
A Devaluation Simulation

In this section we describe the effects of a 10 per cent devaluation by means of a simulation of a small empirical model of Finland (see appendix). According to the simulation, the sequence of events initiated by the devaluation is broadly as follows (cf. Chart 11 and 12):

Figure 11: Dynamic effects of a 10 % devaluation at time t_0 on output and current account

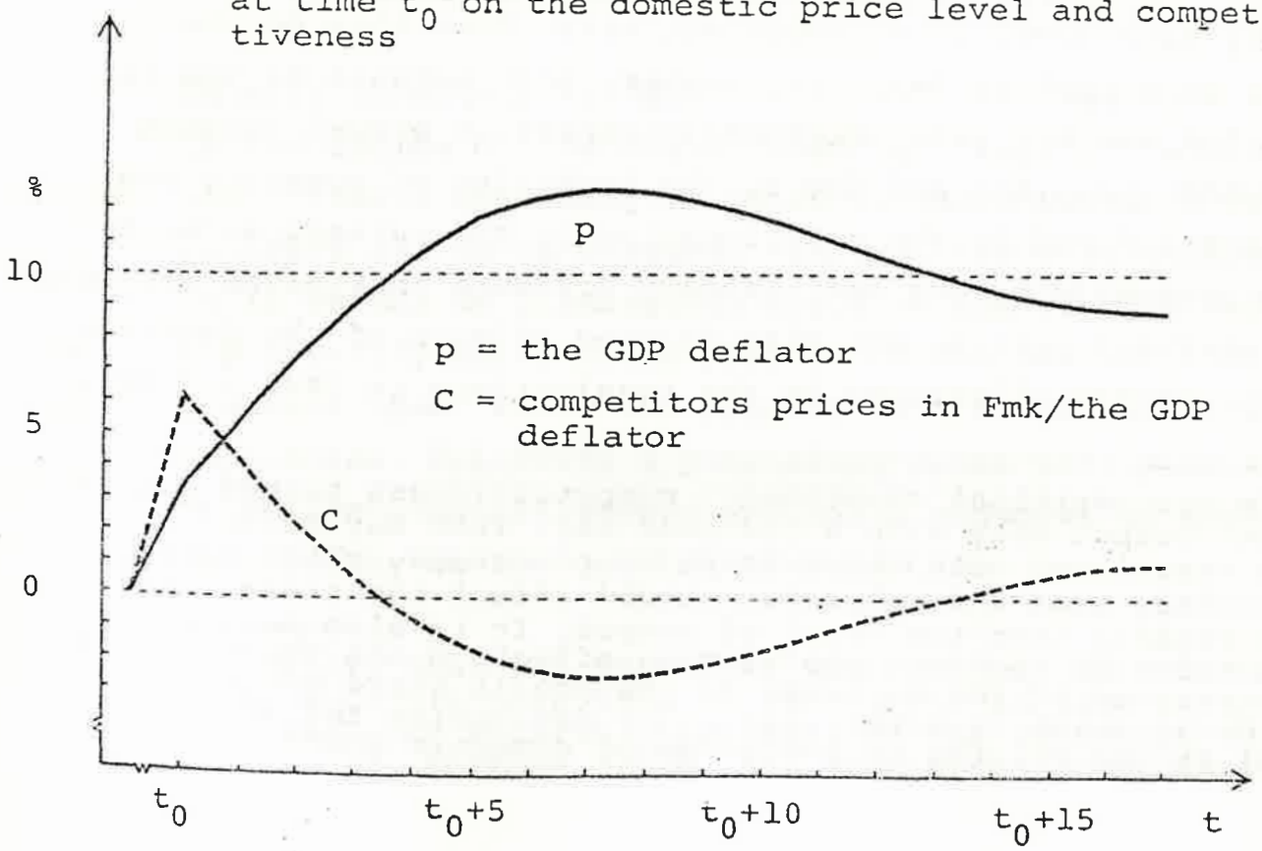
GDP = log.trend deviation of real GDP

B = current account surplus rel. to the value of total imports (%)



GDP and B measure the devaluation effect as the absolute difference between the devaluation run and the control solution, while p and C measure the effect in terms of the %-difference.

Figure 12: Dynamic effects of a 10 % devaluation at time t_0 on the domestic price level and competitiveness



In the year when the devaluation is undertaken, the domestic price level will increase by 3.5 per cent and the relative current account will improve, while the level of output will be practically unchanged.[1] (The current account improved strongly in 1978 but slow growth continued and unemployment even increased.)

In the second year the level of output will increase by almost 2 per cent. The expansionary effect is due primarily to the improved competitiveness but it is also somewhat strengthened by the fact that the initial improvement in external balance will reduce monetary tightness and thereby influence aggregate spending. (The devaluations in 1977 - 1978 were one of the main factors explaining the rapid growth in 1979 - 1980). Due to the higher level of demand and output as well as the partial restoration of original price ratios caused by the increasing domestic price level, the current account turns into a deficit.

In the third year the domestic price level already has increased by the full amount of the devaluation, but continues to rise more rapidly than foreign prices because of the relatively high level of economic activity. From this on the level of output is falling, however, both because of the fact that the earlier gain in competitiveness is eroded through domestic inflation and due to the tightning of monetary conditions induced by the deterioration in the current account. (The presently strong inflationary pressure in Finland reflects not only oil prices, but also delayed effects of the devaluations, partly alleviated by the revaluations in 1979 - 1980.)

---

1. In our empirical experiments competitiveness turned out to effect output only with a one year lag. This may reflect time lags associated with the multiplier processes, which make it reasonable that a devaluation should affect the trade balance more rapidly than the level of output. It is also possible that the expansionary substitution effect in the short run is counteracted if the increase in the profit share caused by the devaluation is deflationary (by decreasing the share of total income devoted to purchases of domestic goods).

Since the model is cyclical, there then emerges a phase during which the price level "overshoots" its equilibrium level, while the dynamic output effect (somewhat later) turns negative. The relative current account largely reflects the evolution of domestic demand and output. In the "long run" the output and current account effects will be zero and the only sustainable effect of the devaluation is a 10 per cent increase in the domestic price level.

While these results should not be taken too literally (they are "stylized facts"), the main message conveyed by the simulation may nevertheless be relevant: A devaluation will temporarily change relative prices and will therefore have expansionary effects in the medium term. In the longer run, however, relative prices will be restored through a process of internal inflation. In a larger perspective the main outcome of the devaluation may thus turn out to be a permanently higher price level as well as the emergence of a relatively long cyclical movement associated with the devaluation.[1]

4.2. Alternative Norms for Exchange Rate Policy

Equally important as "discretionary" exchange rate policies is the choice of the basic "norm" or "regime", which specifies the criteria according to which ordinary exchange rate policies are to be pursued. (Indeed, the distinction referred to is seldom an unambiguous one.) In the Finnish debate one may identify three principles or guidelines that have been focussed upon. These are pegging to a basket of other currencies, following a purchasing-power-parity rule to stabilize competitiveness and the assignment of exchange rate policy to the control of inflation.

---

1. Observe that the length of the cycle of output would seem to be a little more than 10 years. The simulation thus agrees well with the Finnish literature on the so-called "devaluation cycle"; cf. Korkman (1978) and references given there.

4.2.1. The Currency Basket

With generalized floating of the currencies of the large countries, the obvious solution for many small countries has been to peg the currency to a basket of other currencies (thus stabilizing the average price of foreign exchange).

The problem with such "fixed on the average" exchange rates is of course that the economy will be highly vulnerable to foreign price disturbances. Such shocks are an important source of macroeconomic fluctuations in economies in which raw materials occupy an important position in both exports and imports (as in Finland). For such economies changes in the price of tradeables may well be rapid and approximately balanced in the sense that major shifts in the terms of trade are not involved. A rapid increase in foreign prices will improve competitiveness, lower the real wage and initiate a process of domestic inflation which gradually restores original price and cost ratios (cf. Figure 10 and 11 above, which indicated not only the effects of a devaluation but the effects of a 10 % increase in all foreign prices as well). The converse will happen in the case of a fall in foreign prices or a sudden reduction in foreign inflation (with the possible modification that downward price and wage rigidity may increase the real effects).

The problem of imported inflation can, of course, to some extent be diminished by increasing the weight given to "hard" currencies in the currency basket pegged to.[1] The trade weights presently employed in Finland rest on the consideration that domestic price competitiveness should be protected against foreign exchange rate actions. Apart from the

---

1. Cf., Handler (1978). For an analysis of the effects of the choice of currency weights see, e.g., Branson and Papaefstratiou (1978).

arbitrariness of the trade weights (even on competitiveness grounds), it may be argued that this gives too much weight to short run considerations of competitiveness as compared to the longer run consequences for the trend rate of inflation.

Tying to a "hard" currency country may help to bring down the trend rate of inflation. It does not, however, alleviate the problem of price instability associated with large fluctuations in foreign trade prices (like, for instance, the increase in export and import price in 1974). Indeed, tying to a hard currency (setting ambitious targets for the trend rate of inflation) may not be feasible if foreign trade prices fluctuate strongly. This is arguably the case if rapid foreign price rises induce rapid domestic inflation while foreign price reductions do not correspondingly reduce domestic inflation (if there is downward rigidity of wages and prices). Pegging to a hard currency is then no substitute for occasional discrete revaluations to offset the domestic effects of sudden shifts in foreign trade prices.

4.2.2. Competitiveness

Obviously, a fixed exchange rate economy is not only vulnerable to foreign inflation but to the harmful consequences of domestic inflation in excess of foreign as well. Rapid domestic cost increases and loss of competitiveness will lower profitability and market shares and sooner or later induce a deflationary process associated with unemployment etc. Because of the high costs of deflationary policies, it has often been suggested that exchange rate policy be geared to the maintenance of price competitiveness at an appropriate level. In particular, following a purchasing-power-parity rule[1] in

---

1. Cf. the discussion in Thygesen (1978).

exchange rate setting would imply that accelerations of foreign inflation would induce revaluations of the exchange rate (and thus not be transmitted to the domestic economy), while domestic inflation in excess of foreign would correspondingly induce devaluations (to safeguard competitiveness).

The basic rationale for a purchasing-power-parity rule in exchange rate setting resembles the case for indexing of money wages to prices.[1] The basic problem is also similar: any policy which (rigidly) stabilizes a central price ratio is open to the objection that it will thereby inhibit desirable adjustments[2] if underlying conditions are changing (as they always are). Exchange rate policy according to a competitiveness norm might therefore result in an endless inflationary or deflationary process. (A particularly obvious case arises if there is "real wage resistance" and if the real wage is above the level which is compatible with the level of competitiveness aimed at in exchange rate policy.)

4.2.3. The Commodity Basket

It is widely acknowledged that a revaluation is an appropriate means of (and practically the only means of) protecting the economy against the consequences of unexpected (and undesired) shifts in the price level of foreign goods.[3] This argument

---

1. In the former case competitiveness is fixed and this has definite consequences for the real wage; in the latter case the real wage is fixed with implications for competitiveness. Both systems would prevent an increase in the price level of foreign goods from having real effects: the former by inducing an appreciation of the currency and the latter by causing (speeding up) domestic inflation so as to re-establish the real wage and relative prices.

2. The OPTICA proposal meets this objection because of the asymmetry of the intervention rule; cf. Basevi and DeGrauwe (1977).

3. The role of exchange rate policy for inflation has been much debated by Swedish economists; see, e.g., Lundgren et.al. (1974) and Bentzel et.al. (1980).

can be generalized into the proposition that exchange rate setting should be tied to a commodity basket (rather than a currency basket) and used to stabilize the domestic currency development of foreign trade prices (fixing their level or rate of increase). Such an "inflation norm" would then constitute a useful benchmark for domestic wage and price setting, and thus enhance the achievement of stable and predictable inflation.

We have tried to illuminate the consequences of such a policy by an exchange rate policy simulation. In this simulation exchange rate policy was assumed to react to variations in trade prices (average of import and export prices) since 1974 by revaluing and devaluing the exchange rate so that the average of import and export prices in domestic currency develops steadily and so that trade prices and the exchange rate in 1979 were at the same level as in the real world.[1] In addition, the domestic rate of interest was varied so that the "real" rate of interest was unaffected by the choice of the exchange rate policy rule.

Given the foreign price developments actually experienced during this time period, the assumed policy would have implied the following percentage changes in the exchange rate (actual changes of the exchange rate index are given within brackets):

---

1. Observe that there are in this context two different issues that should be separated. First, more or less continuous revaluations might be used to bring down the trend rate of inflation. During the transition period such a policy may have undesirable real effects, but in the longer run the only sustainable effect is likely to be a reduced average rate of inflation. Second, exchange rate changes might be used to even out fluctuations in the domestic currency development of foreign prices and thus to help stabilize the rate of inflation for any given trend rate. This may well be considered useful since it is probably unexpected changes in the rate of inflation which account for much of the costs of inflation. Our simulation focusses only on the second issue.

1974	-30	(-3)	1977	5	(6)
1975	8	(1)	1978	14	(10)
1976	4	(-3)	1979	1	(0)

The main difference is that the hypothetical policy would have caused a considerable revaluation in 1974 (to offset the extraordinary foreign price shock which at that time impinged upon the Finnish economy) and some devaluation of the exchange rate already in 1975 - 1976.

Figure 13.

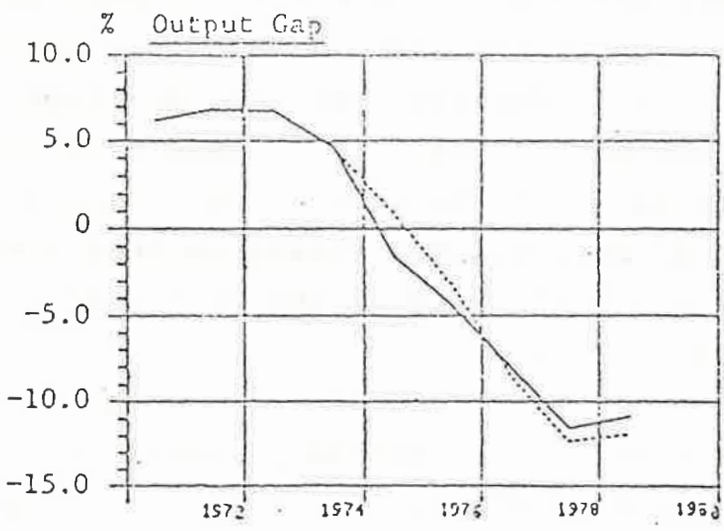
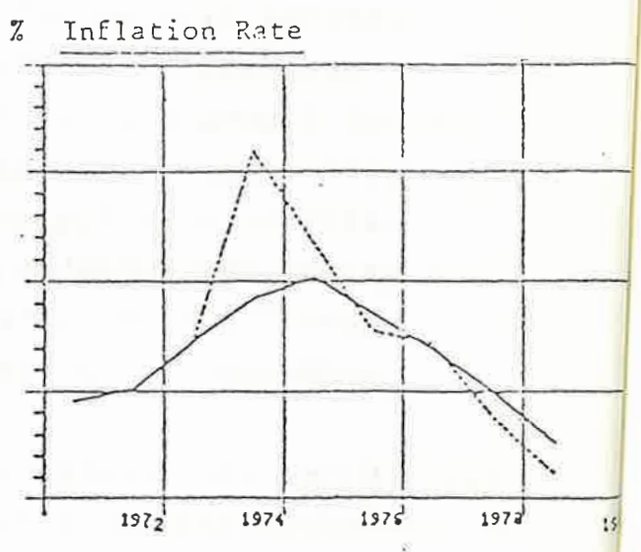


Figure 14.



The effects on output and inflation are shown in Figures 13 and 14. The broken line (----) refers to the control solution value of each variable and the solid line (——) is the inflation norm solution. As can be seen, the exchange rate policy assumed would have increased prise stability considerably. It would have had a harmful effect on output mainly in 1975 (due to the large appreciation of the Finnish markka in 1974 induced by the assumed policy rule). Actually, domestic prices

would have been at a lower level in 1979 and thus the competitive position of the economy would have been better within this (restricted) time horizon. Thus exchange rate policy according to an inflation norm would seem to be beneficial as a means of stabilizing inflation if price disturbances originate externally, as they did in Finland during the period under consideration.[1]

While inflation oriented exchange rate policy would insulate the economy from foreign price level fluctuations, it would in other respects be much like fixed exchange rates. In particular, it would do nothing to offset the harmful effects of excessive domestic cost inflation or the consequences of fluctuations in the level of foreign demand. In case of import price rises associated with a falling terms of trade, the suggested exchange rate policy would even aggravate problems by leading to an appreciation of the exchange rate.[2]

---

1. Our spesifications impose a restriction according to which the domestic price level is equivalently affected by equiproportionate changes in foreign prices and in the exchange rate. There are, however, some reasons to think that the speed of adjustment of domestic prices with respect to devaluations may have been slower than with respect to changes in foreign prices (in foreign currency), because incomes policy measures aimed at curbing inflation and safequarding the positive effects on international competitiveness were implemented after the two big devaluations in 1957 and 1967 and also after the devaluations in 1977 and 1978. Consequently, a revaluation may dampen domestic inflation more rapidly (than implied by our estimates) and its real effects might be smaller.

2. The obvious conclusions is that prices of imported raw materials (lacking domestic substitutes) should be excluded from the index of foreign prices that exchange rate policy is geared to. The foreign trade price index should also include only tradeable goods the prices of which reflect world market conditions (exogenous to the economy) rather than domestic costs.

Problems might also arise if price developments in the tradeable sector are very uneven. A revaluation barely cutting "excess profits" in one sector may then create a "profitability crisis" in another. Considerations like these are not, however, necessarily arguments against the assignment of exchange rate policy to the control of inflation, but reflect rather the well-known fact that one instrument will (at best) solve one problem.

5. SOME CONCLUSIONS

The alternations between rapid growth and total stagnation experienced in Finland in the 1970s clearly were not only a consequence of external shock, but were also due to the unfortunate timing of economic policies. Simplifying, somewhat, fiscal policy was generally passive,[1] monetary policy reacted to the balance of payments and exchange rate policy was mainly geared to competitiveness. Inflation was hoped to be held in check by incomes policies. These "assignments" were often unsuccessful.

In particular, some conclusions with respect to exchange rate policy suggested by the experience reviewed above seems to us to be as follows. The devaluations improved competitiveness in the short run and increased growth and employment in the medium term. However, with domestic inflation sooner or later catching up (the speed of adjustment depending on the success of incomes policies), exchange rate policy will in the longer run mainly regulate the rate of inflation. In the conditions that prevailed in the 1970s in Finland, exchange rate policy might usefully have contributed to price stability (in addition

---

1. This is particularly true of fiscal policy in the traditional demand management sense. Tax reductions and subsidies to strengthen competitiveness and increase firms' profitability were, however, an essential part of the strategy adopted in 1977.

to lowering average inflation) by offsetting the consequences of rapid movements in the foreign currency prices of tradeables. In general, exchange rate changes have relatively stronger effects on the price level than on output (as compared to monetary policy). A case for inflation oriented exchange rate policy may therefore be made on the basis of the comparative advantage of instruments.

REFERENCES

Basevi, G. and DeGrauwe, P. (1977), Vicious and virtous circles: A theoretical analysis and a policy proposal for managing exchange rates, European Economic Review, Vol. 10, No. 3.

Bentzel, R., et al. (1980), Stabiliseringspolitik for 80 talet, Konjunktursrådets rapport 1980 - 1981.

Branson, W.H. and Papaefstratiou, L. (1978), Income instability, Terms of Trade and the Change of Exchange Rate Regimes, Center Discussion Paper No. 277, Economic Growth Center, Yale University.

Halttunen, H. and Korkman, S. (1981): Central Bank Policy and Domestic Stability in a Small Open Economy, Bank of Finland, publication series, D:47.

Korkman, S. (1978): The Devaluation Cycle, Oxford Economic Papers, Vol. 30.

Lundgren, E., Lundgren, N., Mathiessen, L. and Ohlin, G. (1974): Kris eller Konjunkturuppgång? Konjunkturrådets rapport 1974/75 (Stockholm, SNS, 1974; processed).

Oksanen, H. (1977), Bank Liquidity and Lending in Finland, Helsinki.

Tarkka, J. (1979), A Test of Credit Rationing in Finland: An Experiment with the Data of 1967 - 1977, University of Helsinki, Department of Economics Discussion Papers, No. 130.

Thygesen, N. (1978), Inflation and Exchange Rates: Evidence and Policy Quidelines for the European Community, Journal of International Economics, Vol. 8.

APPENDIX: A SMALL REDUCED FORM MODEL OF THE FINNISH ECONOMY

This appendix briefly describes the structure and estimated equations of a reduced form model of the Finnish economy, which was used in the simulations discussed above.[1]

The model is basically a conventional demand oriented model which focusses on the role of central bank policy (monetary and exchange rate policy). The sectoral aggregation of the model makes a distinction between the central bank, the rest of the domestic economy and the rest of the world (the foreign sector). The domestic non-central bank sector finances its expenditures by its disposable income (GNP) or by net borrowing from the central bank and/or from abroad. With respect to commodity aggregation it is assumed that the economy produces only one commodity, which may be either consumed or invested domestically (in addition to imports) or exported abroad.

The reduced form of the model (which was estimated) contains equations for the output gap (the logarithmic trend deviation of real GDP), the rate of inflation, the relative current account (the current account surplus relative to the value of total imports) and the marginal rate of interest on central bank finance. The model is recursive and was estimated equation by equation using the ordinary least squares. Annual data for the period 1961 - 1979 was used except for the price equation which uses the period 1956 - 1979. The estimated equations are as follows:

---

1. A more detailed description of the model can be found in Halttunen - Korkman (1981).

(I) Output gap

$$g = \underset{(6.46)}{.459}\, g_{-1} + \underset{(8.44)}{.456}\, g^* - \underset{(4.55)}{.141}\, r_{-1} + \underset{(2.30)}{.184}\, \Delta logp_{-1}$$

$$- \underset{(4.87)}{.185}\, logp_{-1} + \underset{(4.55)}{.173}(logp^*_{-1} + loge_{-1})$$

$\bar{R}^2 = .966$ DW = 2.027

(II) Inflation rate

$$\Delta logp = \underset{(5.50)}{.352}\, .5(\Delta logp^* + \Delta loge) + .5(\Delta logp^*_m + \Delta loge)$$

$$+ \underset{(7.27)}{.611}\, \Delta logp_{-1} + \underset{(2.85)}{.285}\, g_{-1}$$

$\bar{R}^2 = .803$ DW = 1.911

(III) Relative current account

$$b = \underset{(6.27)}{-2.670}\, logy + \underset{(4.45)}{1.472}\, logy^*$$

$$- \underset{(2.89)}{.573}(logp - logp^* - loge) + \underset{(2.03)}{.024}\, time + \underset{(5.68)}{14.2}$$

$\bar{R}^2 = .675$ DW = 1.914

(IV) Marginal cost of central bank finance

$$r = \underset{(4.69)}{-.553}\, b - \underset{(2.62)}{.131}\, z + \underset{(2.50)}{.682}\, r^* + \underset{(2.58)}{.098}\, D67$$

$\bar{R}^2 = .718$ DW = 2.252

The endogenous variables are

g = $\log y - \log \bar{y}$;

y = real gross domestic product,

$\bar{y}$ = exponential trend of GDP (annual rate of growth = 4.8 per cent)

$\Delta \log p$ = domestic inflation rate ;

p = implicit GDP deflator

b = current account relative to the value of total imports

r = marginal rate of interest on central bank lending[1]

The exogenous variables are

g^f = $\log y^* - \log \bar{y}^*$;

y^f = volume index of Finlands export markets (a weigthed average of import volumes of Great Britain, Sweden, the Federal Republic of Germany, France, United States with 1974 export shares as weights),

$\bar{y}^*$ = exponential trend of y^* (annual rate of growth = 6.7 per cent)

$p*$ = competitors' prices in foreign currency (a weighted average of import prices of five OECD countries important for Finland's exports with 1974 export share as weights)

p_m^* = price index of imports of goods and services in foreign currency (calculated by dividing import prices in local currency by the currency index)

e = exchange rate index (domestic/foreign currency, calculated as a weighted average of five important bilateral rates with 1974 export shares as weights)

r^* = three month Eurodollar rate

D67 = dummy variable (1967 = 1, otherwise zero) for devaluation expectations in 1967.

The output gap equation (I) is a reduced form equation for the demand for domestic output by domestic and foreign residents. These demands are related positively to total domestic and foreign demands and negatively to the domestic price relative to the foreign price. The interest rate variable, the marginal rate of interest on central bank lending, as well as the "expected inflation rate" (actual inflation lagged one year), enter the output gap equation through their effects on total domestic demand.

Equation (II) gives the domestic inflation rate as a function of the foreign inflation rate (measured as an average of competitors' inflation rates and Finland's relative import price changes adjusted for changes in the exchange rate), the domestic inflation rate and output gap lagged one year. The sum of the coefficients of the "foreign inflation rate" and the lagged domestic inflation rate is approximately one implying long run homogeneity. The (almost) full amount of an external price shock or of a change in the exchange rate is felt in the domestic price level within four of five years.

The current account equation (III) is a reduced form equation based on export and import equations where the export market share and the import share (out of GDP) respond to relative prices as well as to foreign and domestic demand pressures. The equation for the marginal interest rate (IV) is explained in the text (p. 11). In addition, the model contains a few technical relations.