TYÖVÄEN TALOUDELLINEN TUTKIMUSLAITOS
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Some reflections on the Finnish experience

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Some reflections on the Finnish experience

Paper presented by Jukka Pekkarinen at the Third Annual Conference of the Confederation of European Economic Associations, Brussels, May 23–24, 1985 and by Pekka Sauramo at the Marstrand Meeting, Hirtshals, May 30–June 2, 1985.

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Contents

I Introduction

The small open economies of the Nordic type (Sweden, Norway and Finland, in particular) have close similarities as far as their economic structure and institutions are concerned. They are all heavily dependent on foreign trade; their exports are quite highly concentrated and cyclically sensitive; the labour market partners are well organized and the wage-setting institutions are fairly similar; economic policy priorities are also rather close to one another, with heavy emphasis on employment, growth and external balance.

Against this background of structural similarities, one cannot help but notice that there are clear systematic and persistent differences in the economic policy mixes adopted by these countries. Notwithstanding the fact that these differences are partly explained by different political coalitions, different traditions of economic policy thinking etc, it is worth analyzing the contents of these differences as such and assessing their effects on the economic performance of different Nordic countries. This is what the present paper attempts to do from a certain restricted perspective. In particular, it highlights the peculiarities of the Finnish policy mix.

Our focus is on exchange rate policy, one of the central prerequisites of which is a peculiar feature of the Nordic economies. These are very open economies as far as their commodity trade is concerned, yet at the same time their financial markets have been relatively closed and subject to exchange control. This fact has made it possible, at least until quite recently, to control the exchange rate independently of monetary policy for a considerable period of time. At times this possibility has resulted in discussion of using revaluations as an anti-inflationary weapon influencing directly the foreign trade prices in domestic currency. On the other hand big devaluations and beggar-thy-neighbour policies in the struggle for market shares have been an open option for boosting employment. Indeed, the very existence of this option of changing the exchange rate discretely may have affected the behaviour of economic agents in a way that is not grasped by the standard open economy macro models with fixed or flexible exchange rates. Such situations are also difficult to analyze.

Traditionally, however, most of the Nordic countries have opted for a policy regime of fixed exchange rates. For example, up till the end of the 1970´s,

Sweden adhered to a policy mix - reflected in the well-known Scandinavian model of inflation - in which a fixed exchange rate was used to link domestic inflation rate to the international rate while cost competitiveness and profits were supposed to be maintained by the labour market partners. Finally, domestic demand management was left to take care of employment. (On this, cf. **Calmfors** (1984)).

The Swedish model began to disintegrate in the late 1970´s. In 1976, Sweden implemented the first in a series of devaluations. By 1982, the Swedish krona had been devalued five times by approximately 50 % in all. These devaluations were primarily aimed at restoring the cost competitiveness of Swedish industry, which had deteriorated sharply in the aftermath of the first oil crisis. Yet, especially the most recent devaluation of 16 % in October 1982 was also at least partly motivated by beggar-thy-neighbour arguments for revitalizing Swedish industry and capturing market shares from competitors. Devaluations have been used by other Nordic countries as well. In 1976-1982, the Norwegian and the Danish krone were devalued six times by about 25 % in all.

At the same time, the interest of Nordic economists was drawn to the Finnish experience of and debate on exchange rate policy. It was realized that Finland had utilized a different kind of policy mix throughout the entire post-war period.[1] In this policy mix, the option of altering the exchange rate was kept open all the time. The role of big, aggressive devaluations was stressed in the improvement of the cost competitiveness of the manufacturing sector. The Finnish markka was devalued a total of twelve times in the period 1945-1982. Particularly the big devaluations of 1957 and 1967 (39 and 31 % respectively) were deliberately exaggerated by cost parity standards and were designed as bold actions to boost growth and structural change in the economy.

In the traditional Finnish policy mix, exchange rate policy (devaluations) was conceived as the means to enhance the competitiveness and market shares of the open sector. In so doing, it was supposed to take care of employment. The role of domestic demand management was secondary. The labour market partners, in turn, were assigned the responsibility of controlling domestic inflation, given the exchange rate.

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1 In fact Finland had pursued the most extreme kind of beggar-thy-neighbour policies as early as the 1930´s (cf. **Eichengreen - Sachs** (1984)).

In the course of the 1970´s, this Finnish model of growth and employment policy was subjected to ever-increasing criticism by Finnish economists. It was argued that it did not, in fact, increase growth and employment in the long run, but rather that it aggravated cyclical instability and boosted the rate of inflation. This led gradually to a reappraisal of exchange rate policy. (In fact there was a small revaluation in 1979.)

The final results of this reappraisal are still to be seen. Anyhow, at present it would seem that, while Sweden has begun to become "finlandisized" during the past few years, the Finns are making attempts to break away from the old cycle. At the same time, Swedish economists critical of the present policy orientation have used the Finnish experience and the interpretation of it made by Finnish economists as a warning againts devaluations (**Calmfors** (1984), **Lybeck** (1985)).

These debates are of more general interest from the point of view the economic policy alternatives of small open economies. This raises the questions: What is the Finnish experience of devaluations? How has it been interpreted? What evaluation of devaluation policy might this give rise to? These questions are discussed in the following sections of this paper. The Finnish debate on devaluations is put into historical perspective in the next section. Section III presents a supply-oriented model for analyzing the effects of devaluations. This model is used in Section IV to analyze the phenomenon of the devaluation cycle experienced in Finland. In the final section some concluding comments are made.

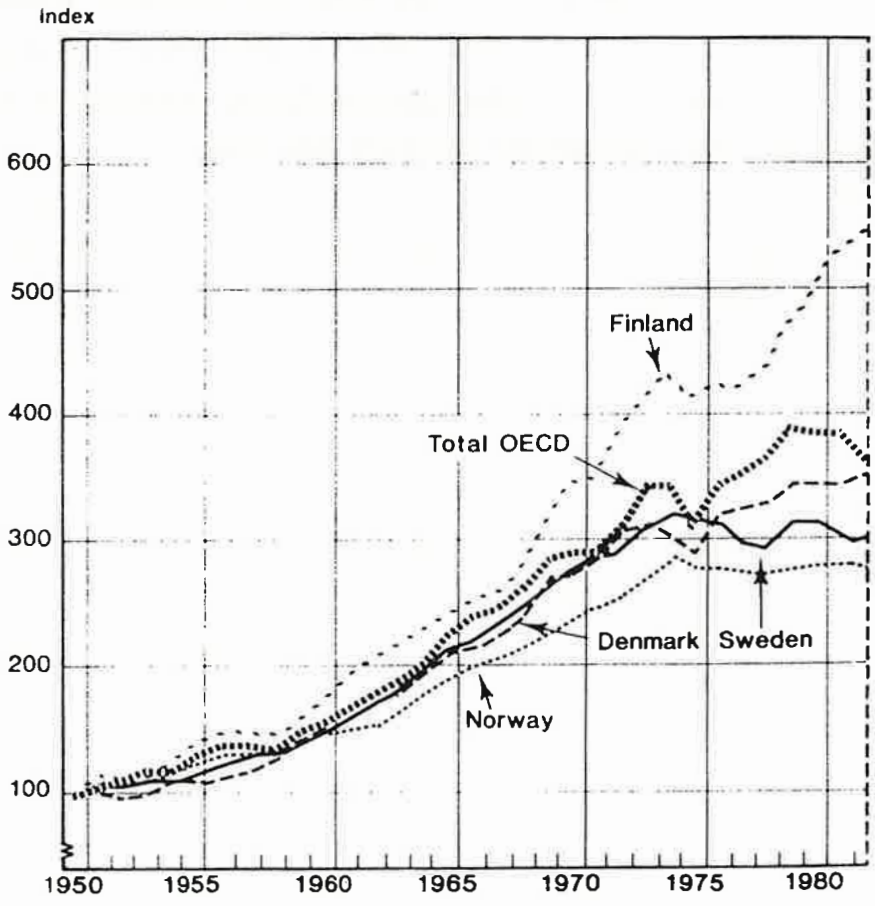
II The Finnish Experience in a Nutshell

Finnish economic development in the post-war period has been characterized by the following special features:

1) The rate of economic growth has been relatively rapid in Finland. In 1950-73, the average annual rate of growth of the volume of GDP was 4.2 % in Finland while the (unweighted) average of 16 industrialized OECD countries was 3.8 % (**Maddison** (1982), Table 3.1.). In 1973-79, Finland's real GDP growth rate was 2.3 % per annum, which was a little lower than the weighted average for the OECD-area (2.7 %). But, again in 1979-82, the Finnish growth rate (3.3 %) clearly exceeded the OECD-average (0.9 %) (OECD (1984), Table 3.1.).

The relatively good growth performance of the Finnish economy is especially striking in manufacturing, as is revealed by the comparison with other Nordic countries and the total OECD area in Figure 1. Connected with this, the rate of return on total assets in manufacturing has been rather high by Nordic standards

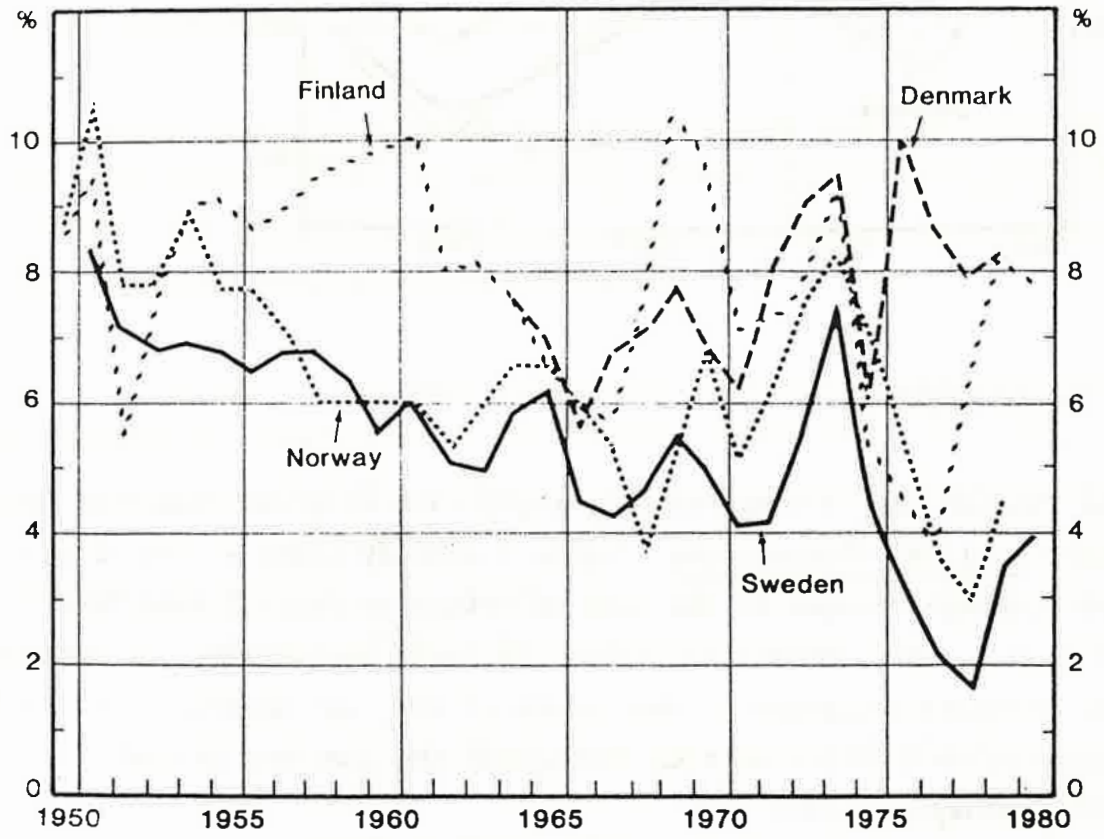
Figure 1. Manufacturing output growth in the Nordic countries and OECD, 1950-1982



Source: Economic Growth in the Nordic Perspective (1984).

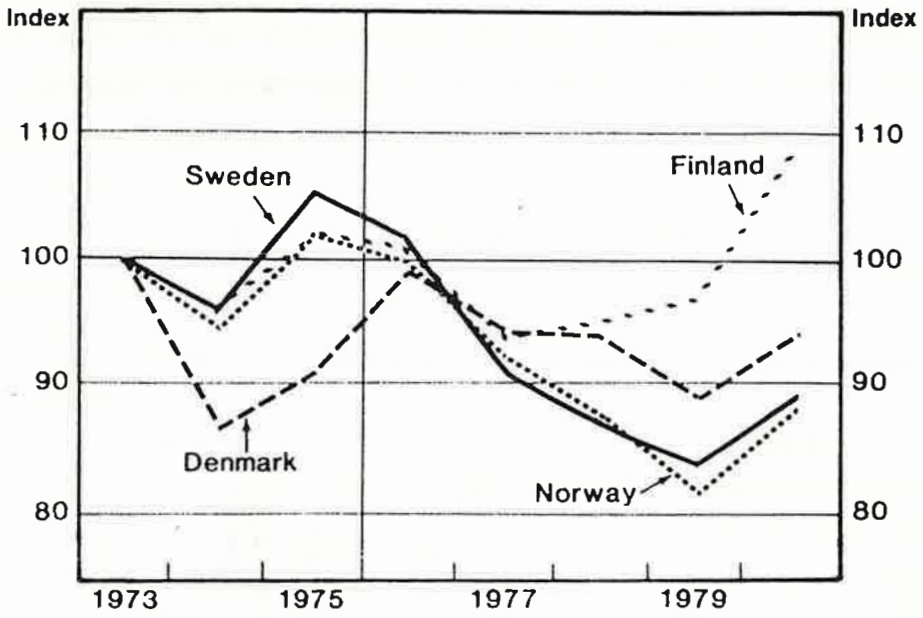
in Finland, and, moreover, it does not exhibit such a marked downward trend as e.g. in Sweden (Figure 2.) The rate of investment has been relatively high in Finland throughout the entire post-war period. In the 1970´s, investment in manufacturing did not decline in relation to the OECD-average as in other Nordic countries (Figure 3). In 1970-82 the average rate of investment in Finnish manufacturing (20.4 %) was among the highest in the OECD countries.

Figure 2. Real (before tax) rates of return on total assets in manufacturing, 1950-1980



Source: as in Figure 1.

Figure 3. Investment in manufacturing in relation to OECD total (=100), 1975-1980



Source: as in Figure 1.

But, in the Finnish case, a comparatively rapid rate of growth has been accompanied by sharp cyclical fluctuations. Figure 2 already hints at the volatility of the Finnish economy: changes in the rate of return on capital have been greater in Finland than in other Nordic countries. In fact, instability, as indicated e.g. by the standard deviation of the volume of GDP, was greater in Finland than in the industrialized OECD countries throughout the post-war period up to the end of the 1970´s (**Bingham** (1977)).

A relatively high, yet volatile, rate of inflation is a further aspect of the instability of the Finnish economy. In 1950-1980, the average annual rate of change in consumer prices was 7.2 %, in 1960-82, it was 8.3 % (OECD-average 6.4 %), reaching double-digit figures in 1973-77 and 1980-81.

Certain structural factors have moulded the growth and cyclical performance of the Finnish economy. After the war, Finland was still a largely agricultural country with a big growth potential in terms of labour reserves etc. The geographical and commodity composition of exports has been rather favourable for growth, as well as being a factor that has promoted the rapid structural transformation of the economy. At the same time, the traditional export sector, i.e.

the forest industries, has been very sensitive to cyclical fluctuations. Changes in both the volume and prices of exports in Finland have been among the greatest in the OECD countries.

The cyclical instability of the export sector has been transmitted through various channels to the domestic economy. For example, it can be argued that volatile foreign trade prices, combined with sluggish adjustment in domestic prices and wages, have repeatedly led to a situation where there is a choice between accommodating the domestic price and cost level to the world market through devaluation or pursuing contractionary economic policy in order to bring domestic price developments gradually back into line with the external world.

The economic policy debate in Finland has traditionally shown an inclination towards this interpretation. At the beginning of the 1970´s the mood changed, however. Some Finnish economists pointed out that the devaluations of 1957 and 1967 had been large by purchasing power standards.[1]

They regarded the policy of big devaluations as frustrated attempts to boost the investment, growth and employment of the economy. Since then, this view of exchange rate policy as an element of growth and employment policy has been dominant in Finland. It has also led to controversies, for those who first analyzed the Finnish exchange rate policy in these terms were highly critical of it. In particular, they put forward two propositions:

1) First, they claimed that the Finnish devaluations had increased the instability and inflation rate of the economy. To emphasize this, the concept of a devaluation cycle was introduced to describe a growth cycle typical of the Finnish economy. The cycle starts with a big devaluation, which first increases profits, and then gradually investment and employment in the open sector. Subsequently, however, wages and inflation begin to accelerate, leading to a deterioration in competitiveness, profits, investment and employment in the open sector. After a decade or so, the economy finds itself back in the same situation it started from: domestic inflation is out of line with that of competitors, profits are low, investment is slack and unemployment is high and increasing. It is in these circumstances that the cycle is started again by a new devaluation.

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1 The analyses of **Paunio** (1969) and, in particular, **Korpinen** and **Kykkänen** (1974) had the greatest impact.

Hence, it was argued that devaluations increase the instability of the economy and that the volatility of the Finnish economy was partly due to the exchange rate policy pursued.

2) The critique was sharpened by a further claim to the effect that the attempts to boost investment, growth and employment by successive devaluations had been in vain. Thus, it was maintained that devaluation policy had had only harmful consequences for the economy. Thus it seemed to constitute a good case for refraining from it, particularly as it had been given an analytical foundation.[1]

But, in opposition to this critical view of the devaluation cycle, there has existed in the Finnish debate another, let us say, "apologetic" view. This does not question hypothesis 1) above, i.e. its is ready to admit that the policy of big devaluations has increased the instability of the economy. It does, however, contest the validity of hypothesis 2) by maintaining that this policy has had some positive employment and growth effects, i.e. that it has been one factor behind the relatively good investment, growth and employment performance of the Finnish economy.

The apologetic view argues for a trade-off between instability, on the one hand, and growth and employment, on the other. Recalling the ongoing "finlandization" of the other Nordic countries, it is interesting to examine this issue more carefully than heretofore. In particular, it is worthwhile asking whether the supply-oriented framework used in the analytical discussion of the devaluation cycle supports the critical view, as it has been generally maintained in Finland and in other Nordic countries, or the apologetic one. It turns out that this framework is, in fact, more inclined towards the apologetic view, which makes the evaluation of devaluation policy more complicated than its critics have supposed.

The model that has generally been used in the analysis of the devaluation cycle was originally presented by Sixten **Korkman** (1978 and 1980). He based his analysis on an ingenious observation on the economic growth in Finland (c.f. Figure 4). It seems that there exists a growth cycle with a time-span of about ten years which corresponds closely to the timing of successive devaluations. Furthermore, Figure 4 indicates that this growth cycle is connected with cyclical oscillation of the functional distribution of income and unemployment. Devaluations (D) typically

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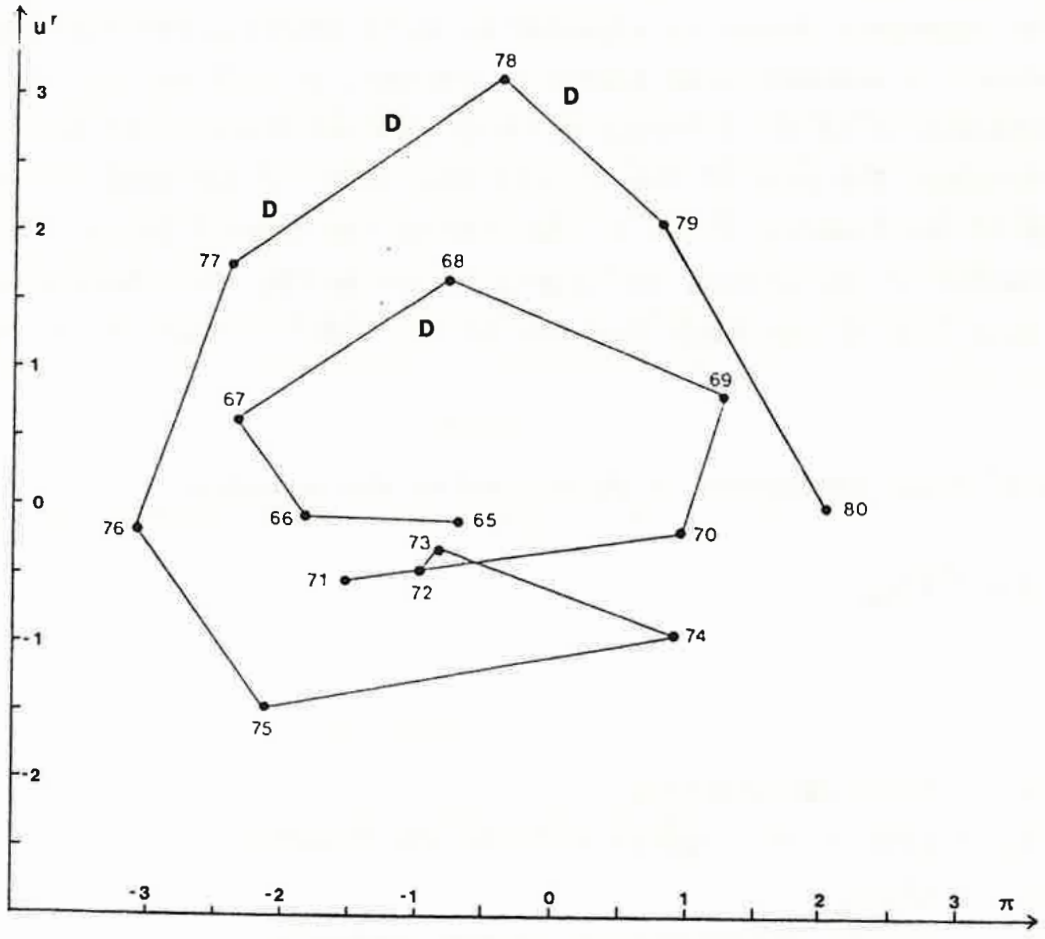
1 Cf. Section V below.

occur in a phase of relatively low - albeit an increasing - level of profits and a high and rising level of unemployment. Initially, devaluations appear to increase the profit share and decrease the level of unemployment. Subsequently, however, the profit share begins to decline while unemployment continues to fall, but soon it, too, begins to climb. Finally, a rising level of unemployment is combined with an increasing profit share, which calls for a new devaluation.

Figure 4. The Finnish devaluation cycle projected on employment and profits.



u^r = relative rate of unemployment (unemployment rate in Finland subtracted with the weighted average of the unemployment rates in USA, UK, Germany and Sweden)

Π = gross operating surplus as percentages of disposable national income (deviation from trend)

Source: Korkman (1981)

The cyclical movement of income distribution and unemployment in Figure 4 suggests a supply-oriented model which emphasizes the relationship between fhe functional distribution of income, investment, capacity and employment. We shall present the building blocks of such a model in the next section. This is followed by a discussion of how devaluations can be introduced in the model.

III The Model of the Economy

The model used is a slightly modified version of that developed by Sixten Korkman (see **Korkman** (1980) pp. 106-119). This model is adopted here because it has formed the analytical basis for the Finnish debate on the devaluation cycle. It is a two-sector growth model in which the T-sector produces tradeable goods and the N-sector produces non-tradeable goods. Firms in the T-sector are price takers in the world market and they are able to sell all the products they produce: demand for tradeables equals capacity output. By contrast, excess capacity prevails in the N-sector and output is demand-determined. Furthermore, it is assumed that aggregate demand is adjusted so as to maintain external balance; the current account is assumed to be always in balance. It will be seen that under these assumptions it is the T-sector which determines the dynamic behaviour of the whole economy. The size of the economy (the level of national income) depends on the size of the T-sector (i.e. on the size of the capital stock in the T-sector), and the dynamics of the economy is largely determined by the dynamics of the T-sector. Thus, one of the basic features of the model is that it is supply-oriented.

In the model[1] total employment is determined by the equation

$$N = f(P)K_T, \tag{1}$$

where

N = total employment,
K_T = size of the capital stock in the T-sector
$P = EP_T/P_N$,
P_T = foreign currency price of the tradeables
P_N = domestic currency price of the non-tradeables
E = domestic currency price of the foreign currency.

P_T is determined in the world market and is therefore an exogenous variable. P_N and K_T are fixed in the short run: they are state variables. It can be seen that the level of employment depends on the size of the capital stock in the T-sector and on relative prices. The function $f(P)$, which is assumed to be continuously

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1 In this paper only an abridged form of the model is presented. For a more detailed description, see **Korkman** (1980) pp. 106-114.

differentiable, describes the effects of relative prices. A devaluation raises the price ratio P and affects e.g. the sectoral allocation of domestic demand. The sign of $f'(P)$ is uncertain, but it is assumed that $f'(P)>0$. Hence, the short-run effect of a devaluation on employment is assumed to be positive. (For more details, see **Korkman** (1980) p. 113.) This assumption is, of course, of crucial importance.

The rate of accumulation in the T-sector is given by

$$(2) \qquad \dot{K}_T/K_T = g(P),$$

where g is assumed to be continuously differentiable. Furthermore, $g'(P)$ is assumed to be positive: a devaluation increases the rate of accumulation in the T-sector. This is assumed to be due to the following reasons (see **Korkman** (1980) p. 114): 1) devaluation lowers the price of inputs in terms of output, 2) the saving ratio is increased, because the share of profits is increased, 3) the T-sector's share of total investment is increased and this has a positive effect on the rate of accumulation in the T-sector.

Unit labour costs determine the price level in the N-sector:

$$(3) \qquad P_N = \alpha W,$$

where W denotes the nominal wage level.

Labour force is assumed to grow at a constant rate:

$$(4) \qquad L = L(0)e^{rt}.$$

The equations (1) - (4) are the same as in the model used by Korkman. However, we replace the following wage equation utilized by Korkman,

$$(5^*) \qquad \dot{W}/W = \dot{P}_T/P_T + h(U),$$

where $\dot{P}_P/P_T$ denotes the exogenously given rate of foreign inflation and U stands for the rate of unemployment, by the equation

$$(5) \qquad \dot{W}/W = h_1(U) + h_2(W/EP_T - (W/EP_T)^*).$$

We assume that, besides labour market tightness, nominal wages are also affected by the real wage target $(W/EP_T)^*$. (The real wage is defined only in terms of the good produced in the T-sector. It can be shown that the results we obtain would be the same if a commodity basket consisting of both of the goods produced were to be used.) Furthermore, we assume that h_1 and h_2 are continuously differentiable and that $h_1'<0$ and $h_2'<0$. It will be seen that the dynamic properties of the model depend largely on (5). Besides stability, the real wage target also affects the long-run equilibrium level of unemployment.

The most important feature of the model (1) - (5) is its supply orientation, which is due to the role played by the T-sector in the model: profitability in the T-sector determines the rate of accumulation in the sector and hence the growth of the economy as well. Profitability is affected by the struggle between workers and capitalists and by the exchange rate policy conducted by the authorities.

The analysis which follows is based on a consideration of the interplay between exchange rate policy, income distribution, growth and inflation within the framework provided by the model (1) - (5).

We do not, however, utilize the level form of the model, which can be non-linear. Instead, a variational form of the model (i.e. a log-linear form of the model) is employed. It can be shown that for given values of the exogenous variables P_{T_o}, E_o, $(W/EP_T)^*$ and the path $L_o(=)e^{rt}$ there exists a unique long-run equilibrium path, along which $P_N = P_{N_o}$, $W = W_o$, $U = U_o$, $N = N_o(t)$ and $K = K_o(t)$. Furthermore, $\dot{N}_o(t)/N_o(t) = \dot{K}_o(t)/K_o(t) = r$. It is worth noticing that the workers' real wage target is not necessarily attained in this equilibrium. When deriving the variational form, the steady state path is chosen as a reference path against which alternate time paths of the economy resulting from changes in the exchange rate are compared. The model is linearized in the neighbourhood of this path when the variational form is derived. (For variational analysis, see **Aoki** (1981) pp. 15-20). It is a well-known fact that a linearization can drastically change the properties of a non-linear dynamic model. A linearized modification of (1) - (5) is, however, suitable enough for our purposes.

Transforming (1) - (5) into a variational form gives:[1]

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1 We have used the notation $x = (X - X_o)/X_o$, where X is a variable expressed in levels and X_o is its value on the reference path.

(6) $n = ap + k_T$,

where $a = f'(P_o)P_o/f(P_o)$;

(7) $\dot{k}_T = bp$,

where $b = P_o g'(P_o)/g(P_o)$;

(8) $p_N = w$,

(9) $\dot{w}/w = -c_1 u - c_2(w - e)$,

where $c_1 = -h'(U_o)U_o$ ja $c_2 = -h_2'(W_o/E_oP_T - (W/EP_T)^*)(W_o/E_oP_T)$.[1] Because $p = e-w$ and $u = -dn$, where $d = (1 - U_o)/U_o$, the behaviour of the system can be described as follows:

(10) $$\begin{pmatrix} \dot{k}_T \\ \dot{w} \end{pmatrix} = \begin{pmatrix} 0 & -b \\ c_1 d & -(ac_1 d + c_2) \end{pmatrix} \begin{pmatrix} k_T \\ w \end{pmatrix} + \begin{pmatrix} b \\ ac_1 d + c_2 \end{pmatrix} e,$$

where all parameters are assumed to be positive. It is easily seen that, under the assumption made above, the system is asymptotically stable. Convergence can, however, be either monotonic or spiral.

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1 We are not interested in analysing the effects of foreign price shocks, and therefore p_T is set equal to zero.

IV The Devaluation Cycle

Both the critical and the apologetic views in the Finnish debate have maintained that devaluations cause instability in the economy. We believe this effect of devaluations becomes most clearly visible in a stable economy (monotonically convergent in terms of our model) while successive devaluations introduce recurrent shocks in it. In what follows we shall argue that even in this case it is possible to generate cyclical oscillatinous analogous to the devaluation cycle of Figure 4 above. The cycles are initiatated and maintained by successive devaluations in an otherwise stable economy. We do not present the model as a true model of the economy, but we do maintain that it grasps the essence of the thinking behind the Finnish debate on exchange rate policy.

First, we have to introduce the exchange rate policy rule into the model set out in the last section. Our starting point is the assumption that the economic policy makers do not accept the combination of the unemployment rate and profit share implied by the long-run equilibrium of model (1) - (5) above. They opt, instead, for a lower level of unemployment and/or a higher share of profits to generate more investment and to accelerate growth. Because the only way to increase the level of employment in the model is to increase investments through the profit share, these two goals amount to the same thing. The position of the capitalists is strengthened by the fact that they control the employment opportunities in the economy through their investment.

We shall sketch the reaction function of the exchange rate policy as follows. In order to boost economic growth it has an aspiration level for the shares of investment and profits which are higher than in the steady state equilibrium. In a small open economy, which is a price taker in the world market, the exchange rate is an effective means of changing the distribution of income. The policy makers, however, cannot adjust the exchange rate freely, since the workers' bargaining power depends on the employment situation (eq. (5)). We shall assume that the influence the workers can exercise on the policy makers also depends on their bargaining position in the labour market: the greater the rate of unemployment, the more weight is given to the aspirations of the policy makers' growth and/or the capitalists' to profits. There is a critical threshold level of unemployment at which the workers can no longer resist devaluation. This leads to discrete devaluations, which always occur at a certain level of employment where unemployment is rising and the profit share has just started to increase. Devaluation increases the profit share immediately to the aspiration level of the policy

makers. This is higher than the steady state level. By equation (1), the level of employment rises immediately and it continues to rise gradually with the increase in capacity. To begin with this is higher than the steady state growth rate. Consequently, unemployment decreases. Together with the decline in real wages this speeds up wage inflation. The profit share declines, and with it the rate of growth of capacity. In due course, unemployment begins to rise again. This brings the system to the threshold level of unemployment where a new devaluation occurs.

We shall next show by simulation experiments how the model of section 3 generates a devaluation cycle as a result of the exchange rate policy reactions described above. We assume that the parameters of model (6) - (9) are such that the system converges monotonically if it is not disturbed by exchange rate changes. Devaluations always occur when a certain level of employment $\bar{n}$ is reached (since $u = -dn$, this corresponds to a certain level of unemployment). At this level, real wages are decreasing. Through devaluation, real wages are decreased (the profit share increased) to the desired level $\bar{w}$. Assuming certain values for the parameters of the model, it generates oscillations in employment and real wages which are depicted in Figures 5 and 6. They show the proportional deviations of the values of these variables from their steady state values at each point of time, which is measured on the horizontal axis.

Initially, employment (Figure 5) and profits (Figure 6) are both above their steady state levels. Employment increases faster than labour supply and employment rises. But, owing to the low level of unemployment and real wages, real wages begin to increase (the profit share begins to fall). Thus the level of employment begins to fall, which, in turn, starts to depress real wages. Nevertheless, they are still above the steady state level. In this phase, the system reaches the threshold level of employment $\bar{n}$, and devaluation lowers real wages to the level $\bar{w}$ which is below the steady state level. The rise in the share of profits immediately increases employment (parameter a in eq. (6) is positive). The rate of investment also increases, so that employment continues to rise. However, this leads to a development which ultimately calls for a new devaluation. In this way, successive devaluations give rise to a regularly recurring pattern of cyclical development and keep the economy out of the steady state.

Figure 5. Employment in the devaluation cycle

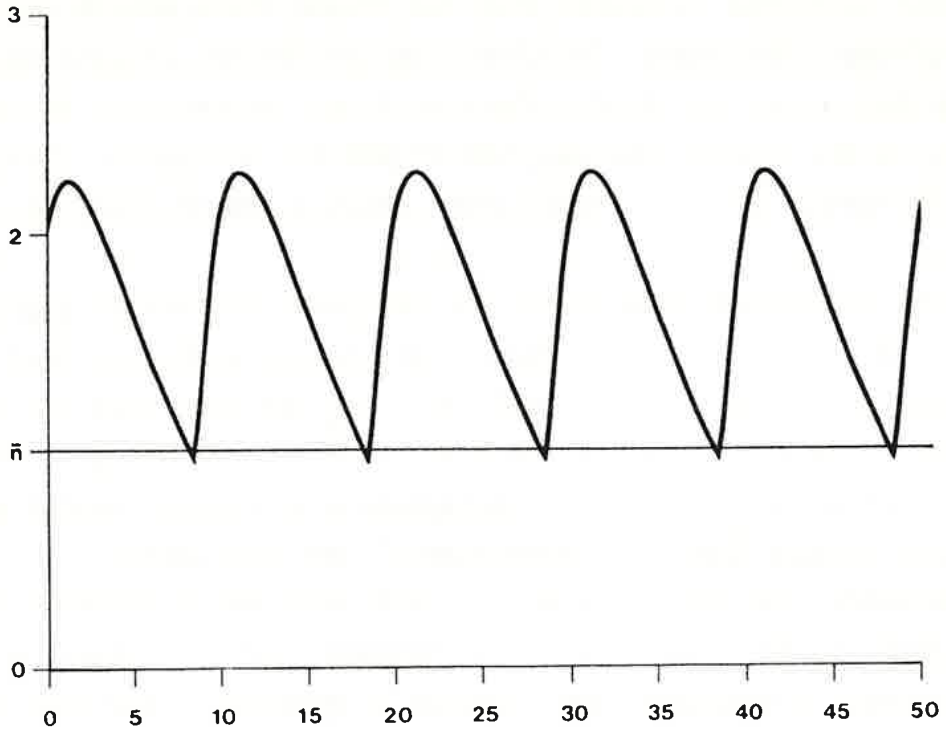
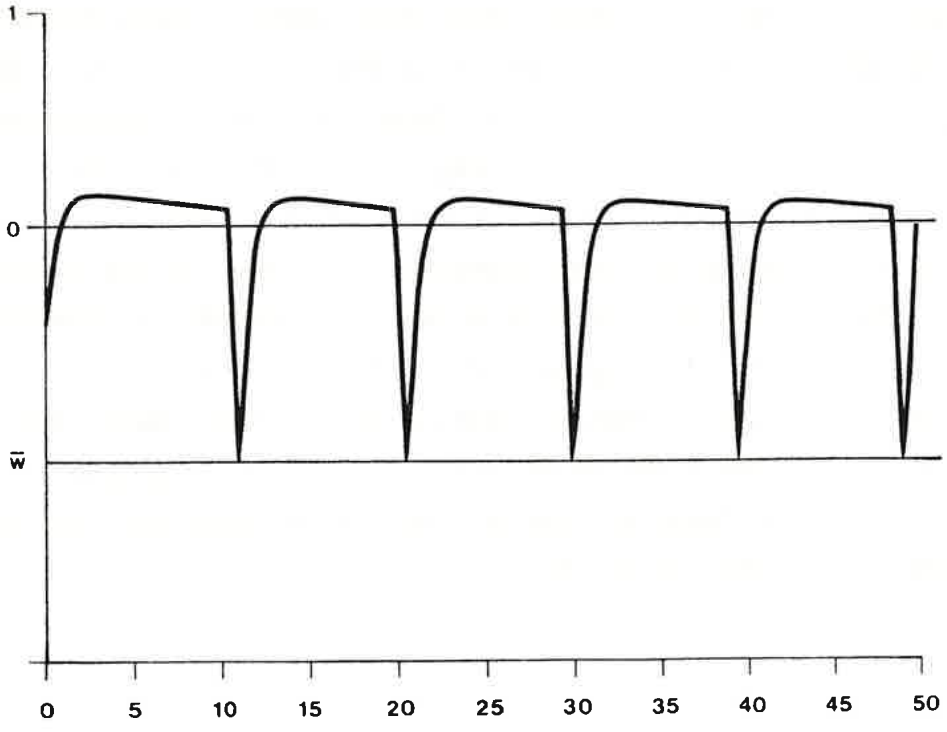


Figure 6. Real wages in the devaluation cycle



What are the results of this kind of devaluation policy? The properties of the steady state long-run equilibrium are unaffected except for the full nominal effects of devaluations on the price level. But this does not imply that devaluations, which keep the economy out of the steady state, have no effects on the long-run average values of the real variables.

This can be seen from Figure 5. Devaluations keep employment continuously above the steady state level. Thus, they do have real effects: the long-run average level of employment is higher than in the steady state. A one-time devaluation has no effect on the long run employment in the model which is asymptotically stable but the devaluation policy sketched above, consisting of successive devaluations, keeps the level of employment above its steady state value all the time. Recalling the Finnish policy debate in Section 2 above, we conclude that our model leads to an "apologetic" answer concerning the real effects of the devalvation policy.

Our model also shows that devaluations increase the average level of employment at the cost of stability. It is the exchange rate policy which maintains cycles in our asymptotically stable model. The deflationary periods pave the way for the discrete interventions of the exchange rate policy, as increasing unemployment ultimately breaks the workers´ resistance to it. Furthermore, our model has the property that each time the economy reaches the point of devaluation, the former devaluation is fully reflected in the price level. Consequentely, devaluations increase the inflation rate of the economy. But, given a regular devaluation policy of the above kind, the average rate of the inflation during each cycle is constant.

The model envisages a trade-off between the unemployment rate on the one hand and instability and inflation on the other. This trade-off can be utilized by exchange rate policy.

We may also note that the devaluation cycle leaves the rate of growth of output unaffected, i.e. equal to the rate of growth of labour force (the natural growth rate of the economy). One could, of course, assume a more ambitious growth-oriented exchange rate policy so that it intervenes each time the growth rate of the economy reaches a given floor. Indeed, this kind of policy rule is sometimes touched upon in the Finnish debate. Such a policy would work for a certain time, but sooner or later the reserve army of the unemployed would be exhausted. Phases of slow growth are needed to keep it constant on average.

Recalling a distinction familiar from growth theory, devaluation policy does not change the rate of growth of output but its level. However, this is no good reason for despising its effects. A higher level of employment entails that at each point of time the economy has more capital than on the steady state growth path. The average amount of investment is also higher.

Finally, it should be mentioned that the devaluation cycle results in the same average level of real wages as in the steady state. Intuitively, this is not perhaps quite obvious.[1] But it can be understood by reference to the fact that, as Figure 6 shows, real wages oscillate around their steady state value. As the average rates of growth and investment correspond to the steady state values, so, too, does the profit share from which investments are made.

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1) It follows from the fact that the solution to eq. (10) is periodic with respect to $k_T(t)$ when the exchange rate policy rule discussed above is used. Consequently there is time period T such that $k_T(t) = k_T(t+T)$. Thus

$$\int_t^{t+T} \dot{k}_T(s)ds = 0$$

By eq. (7) it follows that

$$\int_t^{t+T} (w(s) - e(s))ds = 0$$

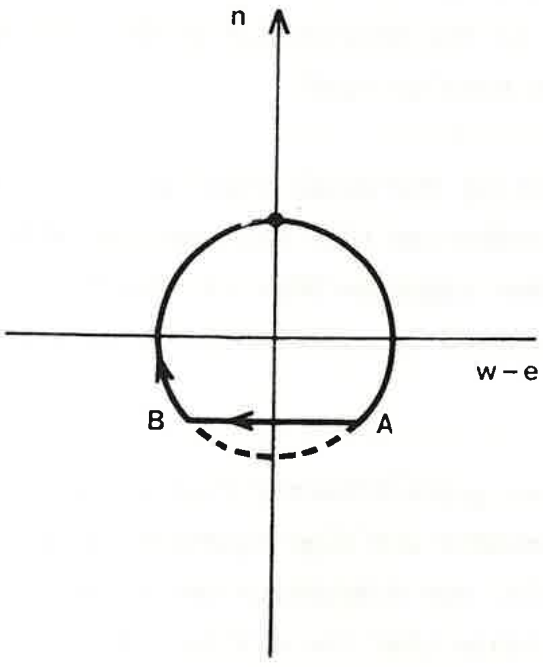
This shows that the average real wage in the cyclical case equals the steady state real wage.

V Concluding Remarks

Our model of the devaluation cycle differs from **Korkman** (1978 and 1980), who first analyzed the phenomenon with the same kind of model as ours. The model of the economy in Section III is due to Korkman, but he adopted a cyclical version of it. In the linearized model this truncates to the case where a = 0 in equation (6) and $c_2 = 0$ in equation (9). This forms a linear analogy of the Lotka-Volterra system, which **Goodwin** (1967) analyzed as a growth cycle.

Korkman´s model of the devaluation cycle is illustared in figure 7. It depicts the Goodwin-type growth cycle of the economy. The exchange rate policy rule is the same as in Section IV above except for one difference. Devaluations are assumed to take place at point A of the cycle, where the level of employment (n) is below its steady state value and the profit share has just started to increase. The devaluation is assumed to keep the economy on the same trajectory, merely moving it in a short cut from point A to point B. The level of employment starts to increase and in due course this leads to deterioration in the profit share, stagnation and a new devaluation again at point A.

Figure 7. Devaluation and the Goodwin growth cycle



Korkman interprteted his model to show that devaluations produce instability and inflation. As far as inflation is concerned, this effects in undeniable. But in this cyclical economy it is more problematic as far as the instability of the real variables is concerned. From Figure 7 it can be seen that devaluations actually decrease the amplitude of the oscillations of the level of employment. On the other hand the frequency of the cycles is increased. Thus, it seems to be appropriate to say that assuming a cyclical economy to begin with blurs the stability issue. Our own model of an asymptotically stable economy shows more clearly how devaluations can produce instability.

Korkman´s second main conclusion is still more problematic. Relying on the well-known properties of the Goodwin growth cycle that the long-run average values of the level of employment and income distribution are independent of their initial values and equal to their steady state values, Korkman concluded that devaluations do not affect long-run employment. As can be seen from Figure 7 this proposition does not hold: successive devaluations at point A do increase the average employment level above its steady state value.

It is worth paying attention to Korkman´s conclusions because they have formed the analytical basis in the Finnish debate for the critical view of devaluation policy which has also influenced the debate in other Nordic countries. Korkman´s interpretation does not hold in his own model, as we have shown. More generally, relying on the supply-oriented model of the economy in Section III it is, it seems, impossible to validate the critical view of the devaluation cycle: the cycles and the employment effects of devaluations go hand in hand.

Our model leaves open the issue of evaluating the devaluation policy in terms of the instability-employment trade-off. Remembering that devaluations also increase the inflation rate of the economy, the case might be debated. However, the case for the critical view is considerably weakened by allowing for positive employment effects.

The apologetic nature of the model follows quite directly from its structure and basic assumptions. Particularly the employment and wage equations play an important role. As these are simple and questionable, our discussion has by no means resolved the issue. We are not ready to claim that the critical view should be rejected in favour of the apologetic one. Instead, we would like to think of the exercise as useful in pointing out the limitations of the supply-oriented model

we have used. In conclusion we briefly point out those shortcomings of the model and areas of future work we regard as most important:

1) A full-blown model should also allow for the effects of devaluations through channels other than capacity. Thus e.g. demand factors do not play any role in our model. Apart from the limitations on their room of manoeuvre, devaluatios are all-mighty in the model. Any level of employment could be reached and maintained by a certain kind of exchange rate policy. Furthermore, as capacity determines employment and investment is determined by profits, the only way to change employment is to change the real wage. However, it is well known that devaluations may have contractionary effects in the short run.

We have also abstracted from the current account by assuming it to be always in balance. The J-curve tells us that the effects of d devaluation on the trade balance may be perverse in the short run. But allowing for the trade balance effects in the model would complicate it, making e.g. the introduction of the monetary mechanism necessary and leading to difficulties with stocks and flows.

2) While we have made devaluations an effective means of employment policy, we have not placed many restrictions on their execution. Here one may refer to the issue of inflation expectations. In a way, our model corresponds to the Phillips curve of 1960´s vintage by omitting this issue altogether. In the next stage of the work, it is necessary to find out how various assumptions on expectations formation affect the results of devaluation policy. However, it is not quite obvious how this should be done analytically, since devaluations occur at discrete intervals. This is not to deny the factual importance of the issue. Could it be reflected e.g. in the fact that in Finland devaluations seem to have occurred at shorter intervals at the end of the 1970´s than in the previous 10-year cycle towards the end of 1960´s? Has the expectations mechanism made the adjustment of real wages more rapid perhaps?

3) Finally, provided our model were accepted as an accurate description of the devaluation cycle, it raises the question whether our economic and social institutions are really incapable of providing the required volumes of saving and investment but through policy shocks, instability and inflation. This question would bring us to the exciting issues of profit sharing, workers' investment funds etc. But these issues must be tackled with different tools than used in this paper.

References

Aoki, Masanao (1981), Dynamic Analysis of Open Economies. New York.

Bingham, Gavin (1977), Suomen talouden stabiliteetti ja rakennemuutos (Growth and Structural Change in Finland), Yearbook of the Finnish Society for Economic Research 1977, 185-192.

Calmfors, Lars (1984), Stabilization Policy and Wage Formation in Economies with Strong Trade Unions. Emerson (ed.), Europes´s Stagflation. Oxford. 89-121.

Eichengreen, Barry and Sachs, Jeffrey (1984), Exchange Rates and Economic Recovery in the 1930´s. NBER Working Paper 1498. Cambridge, MA.

Economic Growth in a Nordic Perspective (1984). ETLA. Helsinki.

Goodwin, R.M. (1967), A Growth Cycle. Feinstein (ed.), Socialism, Capitalism and Economic Growth. London/New York.

Korkman Sixten (1978), The Devaluation Cycle. Oxford Economic Papers 30:3, 357-366.

Korkman, Sixten (1980), Exchange Rate Policy, Employment and External Balance. Bank of Finland Series B:33. Helsinki.

Korkman, Sixten (1981), Växelkurspolitiken i Finland. Ekonomisk Debatt. 1981:2. 91-99.

Korpinen, Pekka and Kykkänen, Seppo (1974), Suomen Pankin valuuttakurssipolitiikka 1945-1973 (The Exchange Rate Policy of the Bank of Finland in 1945-1974). The Labour Institute for Economic Research Katsaus 2 No 3. 22-37.

Lybeck, Johan A. (1985), Devalveringar. Research Report No 1. The Nordic Economic Research Council. Stockholm.

Maddison, Angus (1982), Phases of Capitalist Development. Oxford.

OECD (1984), Historical Statistics 1960-1982. Paris.

Paunio, Jouko (1969), Comments on the Papers by Göran Ohlin and Andre Marchal. In Samuelson (ed.), International Economic Adjustment. IEA Volume. London.