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REAL WAGE ADJUSTMENT AND EMPLOYMENT POLICIES
IN THE NORDIC COUNTRIES

by

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1. Introduction

In most OECD countries, substantial real wage adjustments were required in the late seventies and early eighties in order to make it possible to combine high employment, external balance, and growth. Yet most European economies failed to achieve this. The consequence has been high and persistent unemployment. Some of the Nordic countries, however, deviate from this general European trend. Especially Sweden, but also Norway and Finland, have managed to avoid large unemployment rises.

Many foreign observers attribute the different Nordic development to the combination of employment policies and a "corporatist" wage-setting system, which should have secured real wage moderation more or less painlessly (Bruno and Sachs, 1985; Bean et al., 1986; Newell and Symons, 1987; Jackman et al., 1989; and Jackman, 1990). This picture, however, stands in stark contrast to the internal policy debate within the Nordic countries, where the difficulty of keeping real wage increases in line with productivity growth and maintaining international cost competitiveness despite high employment is usually regarded as the overriding macroeconomic policy problem. We shall argue that the real wage restraint achieved is better explained by reversals of the traditional policies rather than by their continuation and by corporatist co-operation between government and labour market organisations.

The two inconsistent pictures of Nordic wage formation may be explained by differences in perspective: from a European point of view, the Nordic problems may appear smaller than in a more provincial context. But there is naturally also insufficient knowledge abroad of how the Nordic wage setting systems really function. Our aim here is to penetrate this, and to analyse in detail how wage setting has been affected by macro policies. One main topic concerns the role of hysteresis effects and to

what extent active employment policies have helped to avoid them. Another concerns the risk that these policies weaken the incentives for wage restraint. We find that hysteresis effects appear to be of small potential importance, and that active employment policies may entail greater risks for wage setting than is usually perceived. These may be important lessons for those who regard the Nordic model as a blueprint to follow.

The structure of the paper is as follows. Section 2 describes the recent macroeconomic development, and Section 3 reviews the macroeconomic policies that are likely to have affected wage setting. Sections 4 and 5 contain analytical discussions of the impact of the specific Nordic wage setting institutions and the macro policies pursued, respectively. Section 6 surveys earlier empirical knowledge on Nordic wage formation, and Section 7 presents new results. Section 8 sums up the main conclusions.

2. The macroeconomic development

Comparing the recent macroeconomic development in the Nordic economies and in Western Europe in general, two features stand out. The first concerns unemployment, which has been much lower in Sweden and Norway, but also in Finland, for the better part of the period. As Figure 1 makes clear, Denmark is the only Nordic country which has shared in the general European increase of unemployment.

Price inflation has presented the same variations in the Nordic countries as elsewhere. Figure 2 shows that they shared both in the rise of inflation in the seventies and in the subsequent reduction. There has, however, been a persistent tendency for inflation in the Nordic countries to exceed that in Western Europe in the eighties. Figure 3 shows a similar picture for wage inflation.

Figure 4 gives relative unit labour costs in common currency. All the countries exhibited peaking relative costs in the mid-seventies after

large wage increases in relation to foreign competitors (in local currencies), as depicted in Figure 5. Subsequently, relative unit labour costs were reduced in the late seventies or early eighties. The reduction was greatest in Sweden, but there were substantial reductions in Finland and Denmark as well. This was not so much related to smaller money wage costs increases than abroad (see Figure 5) as to exchange rate depreciations (see Section 3.1). From the mid-eighties there is again a uniform picture of renewed deterioration of the cost competitiveness. This has chiefly been related to faster money wage growth than abroad.

The improvements of the relative cost position in the late seventies and early eighties reflected an earlier and greater adjustment of real wage increases to lower productivity growth than in Western Europe. Table 1 sets out the development of product real wages (money wage costs, including payroll taxes, to employers, deflated by output prices) and labour productivity in the Nordic countries and in Western Europe.

The comparison provides information on gross profit shares: greater increases for the product wage than for productivity is synonymous with falling profit shares, and vice versa. As in Western Europe, product wages increased much faster than productivity in all the Nordic countries except Denmark in the mid-seventies. The largest discrepancies occurred in Finland and Norway, whereas the difference was of the same magnitude in Sweden as in Western Europe in general. In 1978-83, the growth of product real wages was considerably restrained and fell below productivity growth in all the countries. The largest discrepancy now occurred in Sweden, but the discrepancies in Norway and Finland were also larger than in Western Europe. In 1984-87, product real wages continued to grow more slowly than productivity in all the countries except Finland, although differences in

growth rates were now smaller. This was in contrast to Western Europe, where now a major adjustment of wages relative to productivity took place.

3. Policies affecting real labour costs

We shall begin by reviewing the principal policies that may have affected real labour costs and international cost competitiveness. They can be grouped in four categories: (i) exchange rate policies; (ii) demand-side policies in order to avoid unemployment; (iii) tax policies; and (iv) direct government interventions in wage bargaining.¹

3.1. Exchange rate policies

In as open economies as the Nordic ones, exchange rate developments will have a strong impact on both real labour costs and international cost competitiveness provided that wages do not adjust immediately. Exchange rate policies are therefore one obvious determinant to look for.

In the mid-seventies, there were effective appreciations of the Swedish, Danish, and Norwegian crowns (Figure 6), because these currencies formed part of the European "snake" during the period when the European currencies appreciated vis-a-vis the dollar. All the major Nordic countries have subsequently resorted to currency depreciations at times. In 1976-78, discretionary devaluations were made in Sweden, Finland and Norway. In Sweden and Finland in particular, this led to substantial depreciations of the effective exchange rates. In this context, Sweden and Norway also left the currency snake and opted for fixed exchange rates vis-a-vis trade-weighted baskets, as Finland had done before.

Denmark, however, remained in the snake and joined the EMS when it was formed in 1979. Effective depreciations in Denmark did not occur until in connection with the realignments within the EMS in 1979-82. However, from 1982 onwards, Denmark has followed a hard-currency line with no

further discretionary devaluations. Together with the appreciation of the EMS currencies vis-a-vis the dollar, this has caused an effective appreciation of the Danish crown in the last few years.

In contrast, there was a second round of currency depreciations in the other Nordic countries. Sweden devalued again in both 1981 and 1982, and Finland in 1982. In Norway, no important devaluation was undertaken until 1986. In sum, Sweden is the Nordic country that has relied most on exchange rate depreciation, and Denmark the country where least reliance has been put on this policy.

Comparisons between on the one hand Figure 6 and on the other hand Figure 4 and Table 1 suggest that exchange rate changes may have had powerful short-run effects on real labour costs and international competitiveness. The largest changes occurred in connection with the Swedish devaluations in 1981-82, but the changes in connection with the Finnish devaluations in 1976-77 and the Danish ones in 1979-81 were also substantial. The 1986 Norwegian depreciation is the only one that was not followed by a temporary improvement of the competitive position.

3.2. Demand-side policies

Another likely determinant of real labour costs is government demand-side policies in order to avoid unemployment. To this broad category we refer a number of measures such as fiscal policies in general, expansion of the public sector, subsidies to particular industries, and various government labour-market programmes. Monetary policy is of less interest in this context, since monetary autonomy has been limited.

All the Nordic countries entered the first oil-price shock in the mid-seventies with strong commitments to high employment. The initial responses in Norway, Sweden and Denmark were to "bridge" the international recession through expansionary fiscal policies. These "bridging policies"

were, to use the terminology of Andersen (1990), subsequently transformed into "sheltering strategies" aiming to combine internal and external balance by shifting both demand and supply to non-traded-goods sectors. The idea was to maintain macroeconomic balance without real labour cost adjustments. Not until the early eighties did fiscal policies shift to less employment stabilisation.

The most persistent attempts to accommodate employment through demand-side policies were Norway's. This is natural in view of the high oil revenues from the mid-seventies on, which virtually eliminated the government-budget and external-balance constraints (cf Figures 7 and 8). The policies included fiscal stimulus through expenditure and tax changes in general, as well as a rapid expansion of public-sector employment (Figure 9) and extensive subsidisation of declining sectors: in the peak year 1982, public support accounted for a tenth of gross value added in industry, excluding oil production (*OECD Economic Survey of Norway*, 1987-88). The liberal-conservative government which took office in 1981 shifted to contractionary fiscal policies, and began to cut subsidies in 1982-84, although there was a temporary reversal of policies in the election year 1985. The social democratic government, which took over in 1986, opted for a harsh fiscal contraction, mainly in response to the deterioration of the current account caused by falling oil prices.

In Sweden, demand-side policies were similar to those in Norway. Here, too, policies included heavy government support to industry, which in 1982-83 amounted to as much as 2.8 per cent of GDP (Lawrence and Bosworth, 1987). In the absence of oil incomes, the result was sustained public-sector and current-account deficits, which culminated in the early eighties. There was a policy shift in 1981/82 in connection with the devaluations, which were given a real back-up through more stringent fiscal

policies. On the whole, government budget balance considerations were given a greater emphasis relative to employment goals than before. As a result, the share of public-sector employment levelled off, the growth of government expenditure was reduced, selective subsidies and labour market programmes were cut, and the government budget position improved.

The Danish policies are more difficult to characterise. On the one hand, open unemployment was allowed to rise considerably, and the amount of selective subsidies was considerably smaller than in Norway and Sweden. On the other hand, there were attempts to switch demand from tradables to non-tradables through combinations of increased government expenditures (with low import propensities) and tax increases (Andersen, 1990). The entry of the liberal-conservative government in 1982 meant a drastic shift to non-accommodating policies with greater stress on budget-balance considerations. Fiscal policy was further tightened in 1985-86 in connection with the deterioration of the current-account position. These policies can be discerned in Figures 7 and 9, which show a drastic improvement in the government budget position and a reduction in the relative size of the public sector.

Finland's development has been the reverse of the other Nordic countries'. Traditionally, Keynesian policy objectives have played a small role in Finland (Åkerholm, 1982, and Pekkarinen et al., 1984). Consequently, policy makers abstained from trying to stabilise employment through demand policies in the seventies. Selective subsidies were almost non-existent. As a result, big government budget deficits never emerged. However, in the early eighties fiscal policies have begun to be used more for employment stabilisation (Eriksson et al., 1990). In Figure 9, this is reflected in a growing share of public employment.

Government labour market programmes in order to avoid open unemployment, such as relief work, labour market retraining, specific youth programmes, and subsidies to induce recruitment and prevent lay-offs, have been much discussed in recent years (see e.g. Layard, 1986; *OECD Employment Outlook*, 1987-89; Jackman et al., 1989; or Jackman, 1990). Table 2 provides data for the Nordic countries on the percentage of the labour force engaged in such programmes and on the accommodative stance, which we measure as the ratio between the number of workers in programmes and the sum of these workers and those in open unemployment. The accommodative stance can be seen as a proxy for the probability that a worker who is not regularly employed will be able to avoid open unemployment.

Labour market programmes have been quite unimportant in Denmark and Norway, but they have been expanded in the eighties. In Sweden and Finland, the programmes have been of much larger size, but the developments have differed substantially. Whereas there has been a steady downward trend in the percentage of the labour force in those programmes in Finland, there was a strong upward trend which peaked in the late seventies in Sweden. The accommodative-stance measure shows this pattern in an even more pronounced way.

Table 3 compares government expenditures on labour market programmes with expenditures on passive benefits (unemployment compensation and early retirement pensions for labour market reasons) in 1985-88 in the Nordic countries and Western Europe. The Table confirms the large relative importance of labour market programmes in Sweden, whereas Denmark and Norway conform more to the general European picture.²

3.3. Tax policies

It is widely agreed that taxes are likely to affect real labour costs in the short run, although it has been debated whether they also do so in

the long run, or whether they are then shifted back completely on to the after-tax consumption wages of workers (Sachs, 1987; Blanchard and Summers, 1987; Knoester and van der Windt, 1988; and Jackman et al., 1989).

Table 4 gives the changes of the after-tax consumption real wage (which we shall henceforth refer to as the consumption wage only), and of what we shall label the income tax factor ($1 - \text{the average income tax rate}$) and the payroll tax factor ($1 + \text{the payroll tax rate}$). The Table gives information on the pressure for product real wage increases: if - given the development of the capital stock and technical progress - the product wage is to change at the same rate as before, a larger rate of increase for the tax factors must be offset by a smaller increase of the consumption real wage.³

The Table yields a uniform picture of considerable tax increases in the sixties and early seventies. The very great tax increases in Finland and above all, in Sweden, at precisely the time of the first oil shock and the dampening of productivity growth in the mid-seventies is noteworthy.

All the countries changed tax policies after the mid-seventies. In Sweden, the strongly rising tax trend was broken, although there still were some slight rises. In Norway and Finland there were actual tax cuts. In the last few years, however, all the countries, except Norway seem to have returned to a path of somewhat larger tax rises.

Table 4 suggests that tax changes have a strong effect on product wages, at least in the short run. In most instances, tax and consumption real wage changes move in the same rather than in opposite directions. This was particularly true in 1977-83, when both taxes and consumption wages tended to increase less than in the preceding periods or even fell, and in 1984-87, when both variables increased again, or increased more than in 1984-87, in all the countries. The continuation of both large tax and

wage increases in Denmark in 1970-73 and in Sweden 1974-76 also agree with this evidence. One of the few exceptions is the combination of large consumption real wage increases and income tax cuts in Norway in 1974-76.

3.4. Government interventions in wage bargaining

The very high degrees of unionisation (in 1985, union density was 82 per cent in Denmark, 80 in Finland, 63 in Norway, and 80 in Sweden, according to Neumann et al., 1989), centralised and mostly synchronised bargaining between large economy-wide labour market organisations, and the strong social democratic representation in governments has laid the ground for attempts at "corporatist" deals between governments and labour market organisations.

Finland has experienced the greatest extent of direct government interventions. Tripartite bargaining between the government, labour unions, and employer associations, resulting in so-called comprehensive incomes policy package solutions, have been the rule since 1968. Tax changes designed to guarantee wage earners a certain real after-tax wage development have often been a crucial ingredient. Social contracts, in which the government has aimed to exchange tax cuts for wage moderation, have also been frequent in Norway. The social democratic government resorted to such solutions in 1973 and in 1975-80, when growing oil incomes made tax cuts possible. However, no such attempts have been made after 1981.

In Norway, there have also been a few examples of legislative action (in addition to the cases of compulsory arbitration that can be decided by Parliament). In 1978-79 and 1988-89, the central wage agreements were complemented by mandatory wage freezes directed mainly at local bargaining.

In Denmark, there has been little formal tripartite bargaining, and most attempts have failed. But there have been many cases of direct

legislative interference. As in Norway, there is a strong mediation institution, and the mediators' proposals have often been enacted in law, especially in the seventies. In addition, restrictions on wage increases due to indexation were often imposed in these years. In 1982, wage indexation was formally suspended, and in 1986 it was abandoned. Government wage guidelines for 1985-87 were also enacted in law, but these incomes policies broke down in 1987.

The Swedish government has interfered the least. There have been no instances of legislation since the early fifties and only few attempts at multilateral bargaining. The social democratic government tried in 1974-76 to exchange income tax cuts designed to offset fiscal drag for lower wage increases at the same time as payroll taxes were increased. The social democratic governments after 1982 have made some more modest attempts to link tax and wage policies. On the whole, the Swedish attempts at tax-wage bargains have, however, been far less formalised than in Finland and Norway.

4. The role of centralised bargaining

The high levels of unionisation and centralised bargaining distinguish the Nordic labour markets from those in Western Europe. This Section discusses how these features are likely to influence wage setting and the effects of macro policies.

4.1 Considerations with respect to employment

One major issue in the literature on union behaviour is whether employment considerations affect wage setting or not. The first generation of models (such as McDonald and Solow, 1981; Oswald, 1982; Layard, 1982; and Calmfors, 1982) generally assumed this to be the case. This assumption has later come under debate, the argument being that democratic unions

ought to act in the interest of median members, who in practice may face no lay-off risk at all (Oswald, 1986). Hence the individual union ought simply to try to push the wage as high as possible without forcing the bankruptcy of the employer. Wage demands are then held back mainly by the employers' interest in profits, but not by union concerns to preserve the employment of marginal members. The outside employment situation will matter, not because it affects the alternative employment opportunities of laid-off members, but only if it affects the fall-back level of income for workers on strike or the "efficiency wage" that the employer desires (Jackman et al., 1989).

Employment considerations can be brought back by introducing uncertainty in median-voter models, in which case even the median union member will run a certain lay-off risk, especially so, since formal seniority rules are often abandoned in situations when the survival of the firm is at stake.⁴ The counterargument is that the perceived risk may be very small, since natural turnover, especially among manual workers, is usually so large that contracting firms can avoid lay-offs (Jackman et al., 1989).

However, employment considerations are usually regarded to play a larger role in the more centralised Nordic bargaining systems. For instance, Jackman et al. (1989) maintain that bargaining occurs "on behalf of all potential workers, and not just on the basis of the employed workers, most of whose jobs are safe." Casual empiricism also suggests that Nordic union leaders often see their role more as persuading union members to hold back demands rather than to make employers concede to them: in official union statements on wage policies, employment considerations certainly play a large role (see e.g. Rødseth, 1990).

The reasons for the concern for employment are not, however, self-evident. One could argue that centralisation should be of no consequence for union preferences, since centralised union confederations are built up from decentralised local unions (indeed, in a model with symmetric firms, the median member in a centralised union ought to be identical with the typical median voter in an individual union). One can, however, also find at least two strong arguments for more of employment concerns in centralised unions. The first is that they are not made up of symmetric local unions. On the contrary, they are built up of unions in firms and industries that at each point of time show very different levels of profitability depending upon the shocks they have been exposed to. The risk of closing down of whole firms that meet with adverse shocks may be substantial in bad times. The second argument is that the more members a union organises, the larger the probability that the wage decision affects the employment possibilities not only of the median worker but also of his relatives and friends, who may be unemployed or threatened by lay-offs, and for whom he may care.

4.2 Internalisation effects

The internalisation of the employment effects on others in the case of altruistic preferences could thus make for lower wages under centralisation than under decentralisation. Leaving this aside, internalisation of at least three other effects could work in the same direction.

4.2.1 Price effects. An increase of the consumption real wage in an individual monopolistically competitive firm raises the relative price of the goods produced. This relative-price increase mitigates the resulting fall of employment and profits (Calmfors and Driffill, 1988; Jackman et

al., 1989). The more centralised wage setting is, i.e. the larger the number of firms in which wages are raised simultaneously, the smaller is the relative-price increase and hence the larger the negative employment and profit effects. This makes for lower wages when centralisation increases, provided that the elasticities of composite product demand for the firms (or sectors) bargaining together do not fall as much so as to offset the price effects (which they are likely to do at low levels of centralisation but not at high, as argued in Calmfors and Driffill, 1988). The internalisation of price effects matters less, the more open the economy, since most firms in the tradables sector have their main competitors abroad: hence there is still scope for relative-price increases (vis-a-vis foreign competitors), even if complete centralisation means that all domestic wages rise equiproportionally.

4.2.2 Fiscal effects. A small bargaining area bears only a negligible share of the increased costs for unemployment benefits and the tax increases that are necessary to finance given government expenditures when workers are disemployed because of wage increases. Indeed, an individual union can extract a net transfer of income from the rest of the economy by pushing up wages, thus reducing the employment of its members. The larger the size of the bargaining unit, the more of these fiscal externalities are internalised. This also makes for lower wages under centralisation.

4.2.3 Outside employment. Finally, as has been argued by e.g. Jackman (1990), a large union is likely to recognise that higher wages reduces alternative employment opportunities for the individual worker. A small union does not take into account that an own wage increase, by reducing employment in the own bargaining area, drives down the chances of others to get work.

4.2.4 An evaluation. The above reasoning has led i.a. Jackman et al. (1989) and Jackman (1990) to the conclusion that centralised bargaining is likely to produce real-wage outcomes that give corner solutions with full employment. Centralised bargaining should thus more or less mimic a perfectly competitive labour market. This has been advanced as an explanation of why real wages have adjusted so as to preserve high employment in especially Sweden. We shall question this interpretation and argue that the importance of centralised bargaining in the Nordic countries has been exaggerated. The differences with respect to centralisation between the Nordic countries and Western Europe may in practice not be large enough to make a major difference.

Contrary to what is often maintained (Bruno and Sachs, 1985; Newell and Symons, 1987; Jackman et al., 1989; Jackman, 1990), the bargaining unit at the central level is not the whole economy even in the Nordic countries. Instead there are several large central bargaining areas. Table 5 shows that the largest central wage-earner organisation, which in all the countries is the union confederation of blue-collar workers, in no case comprises more than half of the labour force (and usually less). The largest employer organisation covers 20-25 per cent of the labour force. The various bargaining areas are far smaller still, since there is in practice virtually no coordination at all between the private-sector and public-sector unions within the central wage-earner organisations. In addition, both private and public employers bargain with different organisations for at least blue-collar and white-collar workers.

Moreover, bargaining has never occurred at the central level only. Central bargaining has always been accompanied also by bargaining at industry and firm levels. In some years, no central wage contracts have

been concluded at all. In Finland and Norway, this has occurred from time to time throughout the post-war period (Eriksson et al., 1990; Rödseth and Holden, 1990). In Sweden, industry bargaining has become more important from 1983 and on, i.e. precisely at the time when real wage moderation has been most pronounced (Calmfors and Forslund, 1990).

In particular, the large importance of wage drift, i.e. wage increases at the local level in excess of the central agreements, makes it unclear to what extent central wage bargainers control the final wage outcomes. Drift is usually seen as the outcome of either local bargaining (Holden, 1990; Holmlund, 1990) or individual employers' attempts to adjust to market conditions (to set efficiency wages in modern terminology).⁵

Around half of money wage increases for blue-collar workers is usually wage drift (Flanagan, 1990). The evidence in Calmfors (1990b) lends some weak support to the hypothesis that central bargainers may be able to offset variations in wage drift. This view has, however, been challenged by Schager (1988) and Flanagan (1990). The question remains unsettled, but it may very well be that central agreements is decisive in some firms and drift in others.

The upshot is that the Nordic economies are far from complete centralisation. This weakens the case for full-employment outcomes. It is straightforward to show that e.g. the internalisation of fiscal effects falls very quickly when centralisation decreases from high levels. Appendix A1 gives a simple example, according to which the wage rises by as much when the size of a union falls from 90 to 80 per cent of the labour force, as when it falls from 50 to approximately zero per cent. Our conclusion is that the differences in centralisation between the Nordic countries and Western Europe are likely to give quantitative rather than qualitative effects on wage setting. This view receives further support

from the differing experiences of the various Nordic countries despite similar institutional structures. The experiences of Denmark are very similar to those of the other EC countries, although bargaining is much more centralised in the former country. Norway has probably least centralisation of the Nordic countries, and has yet had the lowest unemployment for most of the post-war period. Finland has had substantially more unemployment than Sweden and Norway, although the incomes-policy package solutions are likely to have imposed more centralisation.

5. Employment policies and wage setting

Section 4 thus suggests that it may be more important to look at macro policies than wage-setting institutions in order to understand real wage and employment developments in the Nordic countries.

5.1 A model framework

We shall make an analytical interpretation of the policies pursued with the help of a Layard-Nickell-type digram for the labour market as in Figure 10a. The upward-sloping wage-setting schedule shows that the consumption real wage increases with employment. The downward-sloping curve is most easily interpreted as a labour-demand relation. Since labour demand depends upon the product real wage, this schedule will shift with changes in the wedge between the product and consumption real wages.⁶

A stylised interpretation of the general European development since the mid-seventies is as follows. First, factors such as slower productivity growth, the oil-price shocks, tax increases and more generous unemployment compensation are likely to have shifted the labour demand schedule downward in relation to the wage-setting schedule. As a consequence, the equilibrium moved from A to B with lower employment.

Second, the move to disinflationary monetary policies in most European countries around 1980 is likely to have caused actual employment to fall below equilibrium employment. The reason was that the unexpected deflation probably caused expectational errors on behalf of both unions and firms. By overestimating price increases, wage setters are likely to have chosen nominal wages resulting in higher real wages than desired; by overestimating nominal wage increases, firms may have perceived real labour costs as higher than they actually were, and hence cut down on employment. The likely outcome is a point like C.

Third, the equilibrium may have been affected by the process itself according to the hysteresis argument. According to the membership-hysteresis version (Blanchard and Summers, 1986), a temporary fall in employment will have permanent effects, because the number of insiders (effective membership) is reduced. Since the remaining insiders face a smaller lay-off risk at given labour demand, wages are pushed up. The Layard-Nickell (1986) version of the argument stresses instead how past unemployment increases long-term unemployment. A larger share of long-term unemployment tends to push up wages, because insiders face less outside competition for jobs: long-term unemployed are likely to search less intensively for work and the loss of human capital from enforced inactivity makes them less attractive to employers. As a result, the wage-setting schedule may have drifted further to the left, moving the equilibrium to a point like D.

5.2 The Nordic development

The macroeconomic development in Denmark resembles the typical Western European one most, whereas especially the Swedish and Norwegian experiences are very different.

A stylised account of the Swedish development would stress how the unemployment effects of the same type of shocks as in other European countries in the mid- and late seventies were counteracted by expansive fiscal policies (cf. Section 3.2), which shifted the labour-demand schedule to the right again. The reason for the shift is that a demand expansion raises the price of domestic goods relative to foreign goods, and hence the relative price between domestic output and consumption: by reducing the wedge between product and consumption real wages, this tends to lower the product real wage and hence to increase employment at a given consumption real wage.⁶ The Swedish economy may therefore have tended to a position like B' rather than B in the years around 1980 (Figure 10b).

The problem with maintaining employment through such fiscal expansion is that external imbalances are likely to arise. To illustrate this, we draw a vertical line indicating which employment, and hence also which output, that is consistent with current-account balance. The simple idea is as follows. The current account is the sum of government financial savings (tax income minus government expenditure) and private financial savings. Given the tax rate and government expenditure, government savings increase with output. Private savings increase with private-sector income (output minus taxes). Hence, given taxes and government expenditures, the current account improves if output and thus employment increases. Increases of government expenditure, as occurred in Sweden, thus shift the zero-current-account schedule more to the right than the labour-demand schedule, as depicted in the diagram.⁷

The Swedish devaluations are likely to have had at least two effects. First, they probably helped reducing real wages once the shift of the labour-demand relation was realised in the late seventies. Second, they meant that there was no deflationary monetary policy shock in the early

eighties in Sweden, as in most countries in Western Europe. This helped avoid a point like C in Figure 10a. Following the devaluations, a change to restrictive fiscal policies took place in the first half of the eighties. The labour-demand and zero-current-account schedules are thus likely to have moved to the left again (to LD' and CA, respectively). This can explain the large real wage adjustment and the improvement of the current account. However, it cannot explain why employment expanded at the same time as real wages were cut in the early eighties. One theoretically possible explanation is nominal wage inertia, in which case the employment increase would reflect an excess of actual over equilibrium unemployment. But with synchronised bargaining, this explanation appears less probable. Slower tax increases, which should shift the wage-setting curve back to the right may have contributed. However, it seems necessary to look also for other explanations.

The Swedish development of the last few years is more easily illustrated. The combination of strong foreign demand and a domestic consumption boom, arising from the deregulation of the credit market in a situation with weak tax incentives for saving, is likely to have shifted the labour-demand schedule to the right again, raising both employment and real wages.

The Norwegian development resembles the Swedish one. One major difference is, however, that the same external-balance constraint was not met in 1975-85 because of increasing oil income (this could be illustrated as a leftward shift of the zero-current-account schedule - given employment is associated with higher output). The smaller real wage adjustments in the first half of the eighties than in Sweden may be explained by less fiscal contraction (less of a leftward movement of the labour-demand relation). Large real wage adjustments do not seem to have occurred until

in 1989-90 in connection with a wage freeze and high unemployment resulting from a harsh fiscal contraction in 1987-88 (*OECD Economic Survey of Norway*, 1989).

As discussed in Section 3.2, the Finnish development in the mid-seventies differed from the Swedish and Norwegian to the extent that expansive fiscal policies were not pursued. Instead, substantial tax cuts and reduced unemployment compensation are candidates for explaining a rightward shift back of the wage-setting curve, thus limiting the rise of unemployment (see Figure 10c, where the economy may have ended up in C on the wage-setting curve WS'' instead of in B on WS'). The devaluations of 1976/77 may have speeded up this real wage adjustment. But we shall look for other explanations here, too.

5.3. The conflict between real wage moderation and employment

We have stressed the conflict between real wage moderation and demand-side policies designed to avoid unemployment. There are two reasons why this conflict may be mitigated. The first relates to the hysteresis argument, the second to the risk that accommodative employment policies may be counterproductive because they weaken the incentives for wage restraint.

5.3.1 The hysteresis argument. If temporary unemployment tends to raise wages in the longer run via hysteresis effects, demand-side policies preserving employment in the short run may help to restrain future wages and thus also promote future employment. On the face of it, this argument might seem applicable to the Nordic countries. On the one hand, Sweden and Norway, which both avoided large unemployment increases in the late seventies and early eighties, have also (with the exception of 1989-90 in Norway) been able to avoid high unemployment subsequently. On the other hand, the large unemployment increase in Denmark seems to have become more

or less permanent. The moderate rise of unemployment in Finland appears also to have been difficult to break out of.

Research on cross-section data for firms in Britain (Nickell and Wadhvani, 1988) suggests, however, that the importance of inside factors is not overwhelmingly large. For Finland, Norway and Sweden, Holmlund and Zetterberg (1989) have found only negligible evidence that sectoral conditions matter for wage setting and none whatsoever that wages should be inversely related to the size of the incumbent work force. This speaks against the membership-hysteresis hypothesis for the Nordic countries.

The development of aggregate unionisation may give some additional insights. Despite the differences with respect to unemployment, union density has increased similarly in Denmark and Finland as in Sweden (Figure 11). The odd man out is Norway with a stationary level. Indeed, there is little evidence of cyclical sensitivity over time within the countries according to Pedersen (1989). He explains the increase of union density in Denmark with the existence of a union-administered unemployment insurance system. The argument is that higher unemployment increases the expected benefit from union membership and hence unionisation. These observations need not necessarily be taken as evidence against membership hysteresis, since the unemployed might exert a small influence on union wage setting even to the extent that they are members. But they do not strengthen the case for this hypothesis either.

On the face of it, there seems to be more to the long-term-unemployment version of hysteresis. Although there has been an upward trend in the share of long-term unemployment in all the countries, the change since the mid-seventies is by far more pronounced in Denmark (Figure 12). As expected, there have been substantial rises in Finland. The strong rise in Norway comes more unexpectedly.

It remains an open question, however, to what extent the larger increase of long-term unemployment in Denmark is related to past unemployment rises rather than to the unemployment benefit system. Recent research (Burda 1989; Jackman et al. 1989; Jackman 1990) has stressed high replacement ratios and, especially, long duration of unemployment benefits as major explanations of the differing unemployment experiences of different countries. Jackman (1990) has pointed to the fact that Denmark does in this respect indeed represent an outlier in the Nordic context with higher benefit-wage ratios and longer benefit duration than in the other countries.

5.3.2. Accommodating employment policies. In the Nordic policy debate, it has often been stressed how systematic government policies to offset unemployment may be counterproductive. The argument is that the incentives for unions concerned with employment to restrain wages are weakened (Calmfors, 1982; Calmfors and Horn 1985, 1986; Hersoug 1985; Rødseth 1985).

This analysis has usually stressed the role of the public sector as an employer of last resort (see also Söderström and Viotti, 1978). However, with our interpretation in Section 4.2.4 that Nordic wage setting is in effect very far from complete centralisation, such accommodation effects of aggregate fiscal policies ought to have been diluted (even if centralisation was stronger in the sixties and seventies than in the eighties). The argument would then instead have to refer to the selective subsidies to preserve employment in individual firms or sectors or to labour market programmes. The subsidies are likely to have the double effect of reducing the sensitivity of both employment and profits to wage changes. To the extent that labour market programmes are near-substitutes for employment, a larger relative importance for them (cf Table 2) will

reduce the expected welfare loss for employees that lose regular employment: the probability of ending up in a labour market programme instead of in open unemployment increases. The consequence is a wage rise for much the same reason as when unemployment compensation is raised (see Appendix A.2).

Suppose that the welfare difference between labour market programmes and open unemployment is large, and that the difference between alternative employment in the case of lay-offs and labour market programmes is small. Then it cannot be ruled out that a fall in employment that is completely offset by an expansion of labour market programmes (so that open unemployment remains unchanged) will be associated with higher wages (see Appendix A.2). The reason is that the expected welfare in the case of a lay-off may increase: this happens if the expected welfare gain from a larger probability of ending up in a labour market programme when out of regular employment is larger than the expected welfare loss from a lower probability of alternative employment. We shall argue that the welfare difference between labour market programmes and open unemployment is indeed likely to be large. In the case of recruitment subsidies or subsidies to prevent lay-offs, labour market programmes are more or less perfect substitutes for regular work. Relief work may be perceived similarly, whereas labour market education does involve a welfare benefit, because it represents subsidised human capital accumulation. In any case, workers in these programmes avoid the social stigmatisation of open unemployment. Likewise, the welfare difference between alternative employment and labour market programmes may be small to the extent that the former is associated with high mobility costs.

We shall argue that the development of subsidies and labour market programmes is likely to have had a substantial influence on wage setting.

The major reductions of the relative importance of labour market programmes in Finland in 1975-79 and in Sweden in 1980-84 (see Table 3) may have been important reasons for downward shifts of the wage-setting schedules. Reductions of selective subsidies in Sweden and Norway in the eighties may have performed a similar role.

5.3.3. Accommodation versus hysteresis. Our analysis suggests two opposite conclusions. Demand-side employment policies appear more favourable if they help restrain future wages by eliminating hysteresis effects. They appear less favourable to the extent that they weaken incentives for wage restraint. To sort out the relative importance of these effects is the main theme in Sections 6 and 7.

Here we shall just note that the micro evidence that the celebrated Swedish labour market policies should increase future employment prospects and hence increase the competition for jobs is weak. Björklund (1990) surveys a number of studies that cannot reject the hypothesis that participation in labour market programmes does not improve the chances of reemployment compared to the alternative of being openly unemployed. Edin and Holmlund (1989) find that participants in relief work spend less time searching for jobs than do openly unemployed.

6. Earlier econometric studies

To substantiate our interpretation of the stylised facts in Section 5, econometric evidence is needed. We shall rely on both earlier studies and new work of our own.

The recent empirical material on Nordic wage formation consists partly of results from studies where similar wage equations have been estimated for many countries, partly of idiosyncratic country studies. An intermediate form is represented by the Nordic Wage Formation Project

(Calmfors, 1990b), in which individual country studies have been made within a common framework.

All these studies are consistent with the union/bargaining framework underlying our earlier discussion. Given some variable(s) to determine the long-run real wage trend -- usually labour productivity or the capital-labour ratio, but sometimes also unemployment compensation and working time as well as wedge variables (taxes and the relative price between output and consumption) -- the specifications typically involve a steady-state relation between the product real wage and unemployment.

Table 6 summarises the results in the main studies of relevance.

6.1 The wage-unemployment relationship

One consistent finding is the great sensitivity of real wages to open unemployment in Sweden. With only two exceptions, a one percentage point increase of open unemployment is found to give more than a 5 percent real-wage decrease in the long run. This suggests that a large part of the Swedish real-wage adjustment in 1978-83 can be explained simply by the response to the modest rise of open unemployment along a steeply sloped wage-setting schedule.

Another consistent finding is the much lower sensitivity of wages to unemployment in Denmark and Finland.⁸ In the case of Denmark, this is consistent with the long duration of unemployment benefits pointed to by e.g. Jackman (1990). Indeed, Jackman et al. (1989) have found benefit duration to be an important determinant of the sensitivity of wages to unemployment in cross-country regressions.

Results for Norway are more diverse: on the one hand, the multi-country studies find a sensitivity of a similar magnitude as in Sweden, on the other hand, two of the Norwegian studies find a much smaller impact (Rødseth and Holden, 1990, even fail to establish any effect at all).

These differences are surprising, but it may be that the results for Norway are particularly sensitive to whether certain idiosyncratic variables are included or not. For example, most Norwegian studies feature highly significant effects from the wage freeze in the late seventies (see Section 3.4) and reductions in working hours. These variables are conspicuously absent from the multi-country studies.

6.2 Hysteresis effects

The evidence on wage hysteresis is much less abundant. Alogoskoufis and Manning (1989) and Jackman et al. (1989) both included present as well as past unemployment in their regressions, the idea being that past unemployment is negatively correlated with current effective union membership and/or with the proportion of long-term unemployment. Hence a sign reversal for past unemployment (i.e. a positive regression coefficient instead of a negative one as for current unemployment) could be an indication of wage hysteresis.

The evidence appears somewhat surprising. For Denmark, none of the two studies found support for hysteresis effects. This would seem to confirm our more casual analysis of union membership developments in Section 5.3.1. For Finland and Norway, however, both studies indicated important hysteresis effects. For Sweden, the two studies gave opposite results.

Another way of testing for membership hysteresis is to include past employment in the wage regressions. This has been tried by Hersoug et al. (1986) for Norway, by Andersen and Risager (1990) for Denmark, and by Holmlund (1989), and Calmfors and Forslund (1990) for Sweden. In no case were negative coefficients, which would be consistent with membership hysteresis, obtained.

There has been even less testing of the competition-for-jobs version of hysteresis for the Nordic countries. One exception is Eriksson et al. (1990), who found that the explanatory power in their wage equations for Finland rested with medium-term unemployment (3-6 months). No influence was found from long-term unemployment (more than 6 months). For Sweden, the point estimates of Holmlund (1990) indicate that long-term unemployment (more than 6 months) has a smaller effect on wages than short-term unemployment (less than 6 months), but he could reject neither the hypothesis of an equal effect nor the hypothesis of a zero effect.

In sum, there is some support, although rather weak, for wage hysteresis in the Nordic countries. The evidence is strongest for Finland. It appears consistent with the difficulties in this country of breaking out of the higher unemployment from the mid-seventies. But there is no evidence for Denmark, where unemployment has been most persistent. For Norway and Sweden, it seems to be more of an open question whether the hysteresis effects are of potential importance, and hence whether the demand-side policies of the late seventies and early eighties may have contributed to avoiding such effects.

6.3. Accommodative policies

There has been even less econometric testing of the effects of accommodating policies. However, for Sweden, the results of Calmfors and Forslund (1990) and Holmlund (1990) suggest that it indeed does make a great difference to wages whether a fall in employment results in open unemployment or is offset by an expansion of labour market programmes. The long-run effect on the real wage is around a 6 per cent increase, if one percentage point of the labour force moves from open unemployment to labour market programmes. The effects of an increase of labour market programmes at given open unemployment, however, differ between the two studies:

whereas Calmfors and Forslund found a strong wage-raising effect, Holmlund's results tend rather to give a small wage reduction. Similar results were also found for Sweden by Newell and Symons (1987). For Finland, Eriksson et al. (1990) found a zero depressing effect on wages from increases of labour market programmes at given open unemployment.

The little evidence there is thus supports our hypothesis in Section 5.3.2. that there may indeed be a serious goal conflict between real wage moderation and government employment programmes. This also lends support to the view that the reduction of the relative importance of labour market programmes in Finland in 1975-79 and in Sweden in 1980-84 may have contributed substantially to real wage moderation.

A few tests have also been made of accommodative policies in a broader sense. Andersen and Risager (1990) and Eriksson et al. (1990) investigated the impact of changes in the extent to which public-sector employment growth has offset employment changes in the private sector for Denmark and Finland, respectively. They failed to find any evidence of such effects. This contradicts the original hypothesis of Calmfors (1982) and Calmfors and Horn (1985, 1986), but is consistent with our interpretation here that not even the Nordic bargaining systems may be centralised enough for aggregate accommodation effects to be of importance.

A cruder test is to examine whether wage-setting behaviour has differed between periods with more or less accommodation. For Denmark, Andersen and Risager (1990) found ceteris paribus lower real wages in the 1983-85 period, which they associated with the shift to a non-accommodation policy strategy. In Calmfors and Forslund (1990), there is some evidence of a similar structural break in wage setting in 1983-86 for Sweden as well, which might be related to the reorientation of fiscal policies in connection with the 1982 devaluation. However, in both cases there exist

alternative explanations: the incomes policies directed at abolishing wage indexation in Denmark, and rigidities of money wage growth in connection with the Swedish devaluation.

6.4 Taxes

The question of whether changes in the wedge variables, particularly taxes, have only a short-run or also a long-run impact on real labour costs has been the subject of controversy (see Section 3.3). The empirical results in this respect seem often more to reflect differences in specification than to be the result of careful testing of various hypotheses. This applies to the Nordic countries as well.

For Sweden, the evidence that tax changes are shifted on to the product real wage at least in the short run is ample. Newell and Symons (1985, 1987) and Holmlund (1990) found a substantial short-run pass-through, but specified their models to give a zero long-run effect. Bean et al. (1986), Holmlund (1989), and Calmfors and Forslund (1990), however, all found a long-run pass-through of about 40-60 percent. Even if no stand is taken on the long-run effects, these studies support the hypothesis of Section 3.3 that the large Swedish tax increases in the mid-seventies did contribute to the real wage gap that emerged then.

The results for the other countries are more varying. For Denmark, most of the evidence seems to be against forward shifting of taxes, although Andersen and Risager (1990) came up with the opposite result of a complete pass-through in the long-run. For Finland, Jackman et al. (1989), Newell and Symons (1985) and Eriksson et al. (1990) found little support for long-run effects of tax changes on the product wage, whereas the two first studies found a pass-through in the short-run of about 50 per cent. For Norway, the implications of the multi-country studies are very diverse. The studies of Hoel and Nymoene (1988), Nymoene (1989), and Rødseth and

Holden (1990) all failed to find support for effects of income taxes on the product wage either in the short or in the long run.

The absence of support for long-run effects on product wages of income tax cuts in Finland and Norway is noteworthy, since they are the two countries that have most frequently tried to buy wage restraint this way. These policies may therefore have been futile in the long run, and may not even have had a big short-run impact.

6.5 Inflation

The evidence on whether the real wage can be inflated down in the short run or not is scarce. Bean et al. (1986) did not in general find support for including the change of inflation as an explanatory variable. Jackman et al. (1989), however, found substantial effects for Norway and Sweden in particular. Alogoskoufis and Manning (1988) included the difference between actual and expected inflation as an explanatory variable for all the Nordic countries, although the variable was significant only for Denmark and Sweden (with the greatest quantitative importance for the latter country).

The estimations in the Nordic Wage Formation Project (Calmfors, 1990b) support some and contradict some of the results from the multi-country studies. For Sweden there is some -- but rather weak -- support for a depressing effect on the real wage of increased inflation. But for Denmark and Finland, the hypothesis is rejected. For Norway, the wage equations in Rödseth and Holden (1990) were specified so that an increase in inflation reduces real wages in the same year almost by one to one. Moreover, changes in inflation associated with exchange rate changes were found to have more long-lasting effects on real wages than changes in inflation arising for other reasons.

The likelihood that real labour costs have been lowered through inflation thus appears considerable for Norway and Sweden but small for Denmark and Finland.

7. A new econometric study

There is obviously a need for complementing earlier econometric research with more systematic testing of the impact of especially labour market policies and hysteresis effects. We also felt it necessary to base the analysis on a more careful analysis of the temporal properties of the various time series, and to embed the analysis of long-run effects in a more general dynamic structure than in most earlier studies.

The methodology adopted was first to develop a general model for each country, where the specification was chosen on the basis of a preliminary time series analysis and previous empirical work. A general-to-specific procedure was used to derive parsimonious wage equations in a second stage. In a third stage, we examined whether our "baseline" regressions could be improved by taking account also of labour market programmes and duration of unemployment. By adopting this procedure, we took care not to stack the cards in favour of the effects we are interested in. Hence, to the extent that we cannot reject the hypotheses that labour market programmes and unemployment duration matter, the evidence should thus be regarded as quite strong.

Our methodology differs from that of the multi-country studies, which usually rely only on variables which turn out "significant" in all country equations. As pointed out by Grubb (1986), inference from models that are too finely tuned to each country's data can be fragile because of "data mining". On the other hand, not allowing for country differences, succinctly captured by idiosyncratic variables, may indeed bias the coefficient estimates for the common variables. There is, of course, no

right and wrong; the two methods should be seen as complementary rather than mutually exclusive.

7.1 The general framework

The country-specific wage equations are special cases of the following model:

$$(1) \quad DW_t = \alpha_0 + \alpha_1(L)DP_t + \alpha_2(L)DP_{c,t} + \alpha_3(L)Dy_t + \alpha_4(L)Dz_t \\ + \alpha_5(L)F(U_t) + \alpha_6w_{p,t-1} + \alpha_7x_t + \xi_{1t}, \quad 0 < -\alpha_6 < 1,$$

where W = the money wage, P = the value-added price index, P_c = the consumer price index, y = labour productivity, U = the rate of open unemployment, and w_p = the product real wage. All variables except U are in log form. L denotes the lag operator, D the difference operator $D=1-L$. $F(.)$ indicates that we investigate the relative merits of different functional forms of the unemployment rate. z is a vector with other variables, such as working time and import prices, as well as payroll and income tax factors. x contains other variables in levels than unemployment and the lagged product wage, most notably productivity - which turns out to be the most important variable for the long-run development of the real wage - but also variables such as the replacement ratio, wedge terms, and variables relating to labour market policies and unemployment duration.

If Dz and x contain only real variables, (1) is homogeneous in both price levels and price changes when $\alpha_1(L) + \alpha_2(L) = 1$. The data accept this restriction for all the countries.

We can understand equation (1) as a real-wage equation derived from a union/bargaining framework embedded in a dynamic structure. The union/bargaining framework has then been used to choose the variables in levels. The steady-state effects of various variables on the product real

wage can be derived by differentiation of the level variables, holding all rates of change constant. As always, the dynamic specification should be seen as a reasonable empirical generalisation but lacking a well-founded theoretical basis.

Our formulation nests both recent models of real-wage formation and the traditional Phillips-curve and Scandinavian wage-formation models. A natural-rate Phillips-curve equation is obtained if $\alpha_3 = \alpha_4 = \alpha_6 = \alpha_7 = 0$, in which case equation (1) reduces to

$$(2) \quad DW_t = \alpha_0 + \alpha_1(L)DP_t + \alpha_2(L)DP_{C,t} + \alpha_5(L)F(U_t), \quad \alpha_1(L) + \alpha_2(L) = 1,$$

If we set $\alpha_0 = \alpha_2 = \alpha_4 = \alpha_5 = \alpha_6 = \alpha_7 = 0$ and $\alpha_3 = 1$ instead, we get the wage equation of the original Scandinavian model of wage formation (Aukrust, 1977), according to which wages follow a corridor given by the sum of price and productivity increases in the traded-goods sector (manufacturing), so as to preserve a constant wage share:

$$(3) \quad DW_t = DP_t + Dy_t.$$

A somewhat more general version of the Scandinavian model is obtained if unemployment is allowed to influence wage increases, i.e. if $\alpha_5 \neq 0$, as in Calmfors (1977). This formulation introduces the possibility that unemployment adjustments can keep wages in the corridor, but in view of recent theoretical development it is more reasonable to assume the wage level to follow a non-explosive path for any given level of unemployment. This is captured most succinctly by an error-correction formulation, according to which the steady-state wage share becomes a function of the other variables in levels in equation (1), which gives

$$(4) \quad DW_t = DP_t + Dy_t + \alpha_5(L)F(U_t) + \alpha_6(w_p - y)_{t-1} + \alpha_7x_t + \xi_t, \quad 0 < -\alpha_6 < 1.$$

Phrased in modern terminology, the error-correction version of the Scandinavian model predicts that the two non-stationary variables real wage and productivity are co-integrated with parameter equal to one, i.e. that the wage share is stationary.⁹ This restriction has an intuitive appeal. The wage equations estimated in the European Unemployment Programme (Drèze and Bean, 1989) take a similar form, although the connection with the Scandinavian model is not stressed.

The reader is referred to Appendix B for the details of the estimations. Table B1 gives the full "baseline" estimations and Table B2, the implied long-run equations. Here we shall focus on five points: (i) the long-run properties of the wage equations; (ii) the short-term determinants of wages; (iii) the wage-unemployment relationship; (iv) the impact of labour market programmes; and (v) hysteresis effects.

7.2. Long-run properties of the wage equations

The lagged real wage level comes out with a significant coefficient in all the equations in Table B1. This adds to the accumulating evidence against traditional Phillips-curve formulations.

For Denmark, Finland, and Sweden, lagged productivity enters the dynamic wage equations with minus the coefficient of the lagged product real wage. This implies a unitary coefficient in the corresponding long-run equations (Table B2), i.e. that each percentage point increase in labour productivity is associated with an equiproportional real-wage increase over time. For Finland, this result is consistent with the fact that univariate time series tests unanimously show stationarity of the wage share in value added. For Sweden, the evidence from non-stationary tests

is less conclusive. However, since unemployment is the only other variable in levels in the wage equation, stationarity of the wage share is the only interpretation that is consistent with all the evidence (unless we believe in non-stationarity of unemployment and co-integration between the two variables).

Unlike in Finland and Sweden, the wage share in Denmark appears to be a slowly-moving or long-memory process. Hence a co-integration relationship for Danish real wages must necessarily include other non-stationary variables than productivity as well. This explains the inclusion of the relative price between consumption and output as well as union density in the Danish wage equation (see also Section 7.6.2).

For Norway, lagged productivity was the only non-stationary level variable that entered the wage equation, but with a significantly smaller coefficient than the real wage, which indicates a less than unitary elasticity in the long run (Table B2). The implication is that the product real wage is indeed co-integrated with productivity but with parameter less than one.

7.3. Short-term effects

7.3.1. Taxes. Our results imply that taxes do not have any long term effect on real labour costs. However, the short-run (first-year) effects can be read off from Table 7. The results conform quite well to earlier studies (especially from the Nordic Wage Formation Project in Calmfors, 1990b). In the short run, pay-roll taxes appear to be completely shifted on to the product wage in Denmark and Norway, whereas the pass-through for Sweden is about 2/3. Only for Finland do data reject an effect. In contrast, there is no evidence of strong short-run effects of income-tax changes on the product wage. For Finland and Norway we could

find no short-run impact at all, and for Denmark and Sweden only a modest pass-through (about $1/3$).

The differences in short-run impact between payroll and income taxes are intuitively plausible in systems with long-term contracts. The simple reason is that a payroll tax change has an automatic effect on the product wage if the wage paid to workers remains unchanged, whereas an income tax change has an effect only if there is an immediate wage response. In sum, our results on taxes strengthen our earlier conclusions in Sections 3.3 and 6.4 about the effects of payroll taxes on the short-run development of real labour costs and on the futility of trying to buy wage restraint through income tax cuts (especially in Finland and Norway, which have tried this the most).

7.3.2. Working time. According to Table 7, working time reductions seem to have a wage-raising effect in the short run, presumably because workers try to compensate themselves for the tendency to reduced wage income (Calmfors, 1985; Holmlund, 1989; Nymoen, 1989b). This is particularly true for Norway and Sweden, but we also find a small effect for Denmark. Finland is the only country for which we could trace no effect.

7.2.3. The relative price between output and consumption. An increase in the relative price between output and consumption appears to reduce the product real wage in all the countries in the short term. This effect is important, since it is the channel through which policies that increase aggregate product demand raise employment, as we presupposed in our discussion of macroeconomic policies in Section 5.2.

7.2.4. Inflation. An increase in the rate of inflation appears to reduce real labour costs temporarily in all the countries except Finland. The effect was found to be greatest for Norway, which is consistent with

the findings of Rödseth and Holden (1990). A devaluation is likely to have a great effect since most of the inflation effect in the Norwegian equation is related to import prices. The inflation effects were considerably smaller for Denmark and Sweden. It is also harder to judge the effects of exchange rate policies there, since they will depend upon how fast the prices of domestic goods react. However, it does not appear likely that the Swedish and Danish devaluations around 1980 were a major determinant of the real wage cuts of the time.

7.3.5. Productivity. There is very little evidence of short-run effects of productivity changes on wages. For Sweden and Norway, we find no short-run impact at all, and for Denmark and Finland the elasticity is of an order of magnitude of 0.2-0.3. Indeed, the long-run effect of productivity that we have found derives from the error-correction mechanism and only builds up slowly over time. This result is very important since it suggests that the long lag with which real wages respond to a fall in productivity growth may be an important determinant both of the wage gaps that emerged in the mid-seventies and of the subsequent real-wage adjustment.

7.4. The wage-unemployment relationship

Our results with respect to the wage-unemployment relationship also agree rather well with earlier studies (Table 8). Again, Sweden shows the greatest responsiveness by far. With 2 percent unemployment initially, a one percentage point increase in unemployment reduces the product wage by 1.3 percent in the first year and by 14 percent in the long run. The long-run effect is higher than in earlier studies. The Danish responsiveness (5 percent in the long run at the same initial unemployment) is greater than is usually found, whereas the results for both Norway and Finland (long-run responses of 3.7 and 0.65 percent respectively) indicate smaller effects

than in most earlier studies. For Denmark, Norway and Sweden, we found support for a convex rather than a linear wage-employment relationship. For these countries, the regression error was considerably lower when unemployment was entered in log form than when it was entered linearly, whereas the opposite applied to Finland.

One reason for Finland's unusually low response could be that it is the only country where we include unemployment benefits as an explanatory variable. Since the impact of unemployment on wages is likely to depend on the unemployment benefit system, one could argue that the inclusion of this variable may bias the wage responsiveness to unemployment downwards in Finland compared to the other countries. To test for this, we tried including the replacement ratio in the other equations as well, but drew a blank: the estimated unemployment coefficients in particular were robust to the inclusion or exclusion of benefits.

7.5. Labour market programmes

To examine the impact of labour market programmes we added the current and lagged value of the share of the labour force in such programmes to the earlier equations and then performed a "left-out-variable" test (Table B.3). The F-tests turned out insignificant at the 5 percent level in all the cases, although there was a tendency to a positive effect. The only exception was Norway, where the sum of the two labour-market policy variables is close to being significantly negative.

As a second test, we restricted the distributed lag for labour market programmes. This procedure did support the view that wages may increase if a fall in employment is offset completely by an expansion of labour market programmes. For Finland, the data accepted that open unemployment and labour market programmes have the same long-run effect, but with opposite signs. The strongest effect of labour market policies was found for

Denmark. For Sweden we were unable to establish a separate long-run effect, although a significantly positive short-run effect was found. The odd man out was Norway, for which the labour-market-policy variable appeared a better indicator of downward labour market pressures on the wage than open unemployment (which was knocked out of the equation).

Finally, we re-estimated our equations with total unemployment (open unemployment plus labour market programmes) and the accommodative stance of programmes (labour market programmes in percent of "total unemployment") as the explanatory labour market variables (Table 10). In many ways this is a more appealing parameterisation of accommodation effects. Theoretically, the coefficient of the accommodative-stance variable is now unambiguously signed. Econometrically, the fact that we add open unemployment and programmes means that we "net out" the short-run interdependencies between these two variables. Hence multicollinearity should be less of a problem with this parameterisation.

The accommodative-stance variable turned out significant and with the expected positive sign for both Sweden and Finland. It was positive but less precisely determined for Denmark. The only exception was Norway, where the variable did not reach significance.

Together, our results support the view that labour market programmes are not a perfect substitute for open unemployment from the point of view of wage setting. Norway was the only case in which this did not come through clearly, but this country's limited experience of unemployment of any kind probably means that there is little information in the Norwegian data. We conclude that there is indeed overall support for our hypothesis that it makes a substantial difference to real wage adjustment whether a fall in employment results in open unemployment or is offset by labour market programmes, and that this may have been of considerable importance

in both Sweden and Finland. In the case of Sweden, the reduction of the relative weight of labour market programmes between 1975-79 and 1980-84 by 12 percentage points (Table 2) should give a long-run real-wage reduction of as much as 5 percent according to Table 10.

7.6. Hysteresis effects

7.6.1. Lagged unemployment. One first test was made already in the baseline equations by introducing current and lagged unemployment as explanatory variables. Table 8 shows that we did not find the sign reversals that would follow from hysteresis effects (see Section 6.2) except for Finland. These results correspond rather well with the earlier studies.

If we believe that lagged unemployment captures the proportion of long-term unemployment rather than membership development, one possible explanation for the absence of sign reversal is that the dynamics of unemployment may differ from what is usually postulated. Nickell (1987, 1988) has argued that a rise in unemployment initially increases the proportion of short-term unemployed. As unemployment settles at a higher level, however, the long-term proportion will eventually increase. If indeed the long-term unemployed are bad inflation fighters, this implies that a one-shot increase of unemployment has an initial wage-depressing effect, which is counteracted over time. To study this hypothesis, we ran a regression for Sweden on how the short-term proportion is related to unemployment, which gave

$$(5) \quad D(U_s/U)_t = 0.37 - 0.046 DU_t - 0.044U_{t-1} - 0.329(U_s/U)_{t-1},$$

(3.78) (-4.20) (-4.32) (-3.48)

where U_s = short-term open unemployment and U = total open unemployment, both in percent of the labour force.¹⁰

The clear-cut result is that the short-term proportion is reduced as unemployment increases. Hence, given that the short-term unemployed actually exert a stronger downward pressure on wages than the long-term unemployed, we should indeed expect the immediate effect of unemployment on wages to be smaller than the long-run effect.

A similar regression for Finland shows virtually a zero effect from DU_t on the short-term proportion. It thus seems that the dynamics of the short-term proportion is very different to Sweden. We do not have a ready explanation for this except the observation that lay-offs appear relatively less important as a cause of unemployment in Sweden than in most other countries, presumably because the Swedish system of unemployment insurance does not permit temporary lay-offs (Björklund, 1990).

7.6.2. Union density. As a direct test of membership hysteresis, we introduced union density as an explanatory variable. It worked best for Denmark, where it was included as a long-run determinant of the product wage in the baseline equation in Table B.1. We experimented with various functional forms and found a variant with both union density and the inverse of union density to work best. The two terms worked in opposite directions, the first tending to increase wages, the second to reduce them. A speculative interpretation would be that the two terms capture different effects: the first might capture that increased union coverage increases the costs that unions can inflict on employers in a conflict (i.e. it reduces the fall-back level of profits in a Nash bargaining solution), the second a median-worker effect. The latter effect dominates at a level of unionisation above 70 percent, which was the level reached in Denmark in 1976. This was the only support for potential hysteresis effects that we could find for Denmark. However, even if we accept this potential effect,

it has obviously not been translated into an actual hysteresis effect since union density in Denmark has increased rather than decreased in the period of high unemployment since the mid-seventies (see Section 5.3.1).

We tested for union density effects also in the wage equations for the other countries. There was some support for a wage-depressing effect of an increase in union density for both Sweden and Finland: for Sweden we found a long-run, for Finland only a short-run effect (see Calmfors and Nymoén (1990) for details).

7.6.3. The proportion of long-term unemployment. We also tested the hypothesis that increases in the long-term proportion puts downward pressure on wages directly by adding the proportion of long-term unemployment to our wage regressions from Table B.1 in the same way as we did with the relative weight of labour market programmes. Table 11 shows that Finland is the only country where a positive impact of the long-term proportion attains any reasonable (although low) degree of significance. Sweden has the strongest negative effect. These results thus agree with the ones for lagged unemployment, although they put our interpretation of these results for Sweden in Section 7.6.1 in doubt since it relied on a positive effect on wages of a higher proportion of long-term unemployment. However, the negative sign for long-term unemployment in the Swedish wage equation is consistent with the result from panel studies that the probability of re-employment seems to increase with unemployment duration (Björklund, 1989). This positive duration dependence does not appear to be explained by targetting of labour market programmes on the long-term unemployed (Edin, 1989). It seems more likely to be explained by a falling reservation wage of the unemployed over time (Björklund, 1989).

In all, we conclude that the evidence for wage hysteresis effects in the Nordic countries is weak except for Finland. For Sweden and Denmark the only evidence was from union density variables, but they only indicate the possibility of potential, not actual hysteresis effects, since there appears to be no support for a link between unemployment and union membership (Section 5.3.1). Hence it does not seem possible to attribute the differences in unemployment development between Denmark on the one hand and Sweden and Norway on the other to demand-side policies preventing wage hysteresis to develop in the latter countries.

7.7. Structural shifts

Finally, we examined the evidence on whether structural shifts in wage setting in the 1978-87 period could explain the real wage adjustments. Such structural shifts would be caused by less accommodative policy regimes that we have not been able to catch otherwise (cf. Section 3.2), by "corporatist" co-operation (or the government interferences with wage indexation in Denmark) as a response to the productivity slow-down or by changes in real-wage behaviour in connection with the devaluations.

We have looked into this in some detail. For each country, we investigated how well our equations fit the development in 1978-87 when we use parameters estimated up to 1977 instead of over the whole sample. But instead of parameter volatility as a result of institutional innovations, we found considerable parameter stability, although there was a small tendency to overprediction, particularly for Denmark. Generally speaking, however, the results do not suggest that uncaptured structural changes in the wage-setting process are important. Nevertheless there is some evidence of more uncertainty in the adjustment period than in the period up to 1977. For all country equations, the estimated regression standard error increases somewhat, but is not significant.¹¹

We also examined a possible impact from the attempts at corporatist tax-wage bargaining (from 1968 in Finland, in the second half of the seventies in Norway, in the mid-seventies and a few years in the early eighties in Sweden). Step dummies did not reveal any significant contributions from these attempts, though. The bottom line is therefore that we have only one example of a significant incomes-policy measure: the wage and price freeze in Norway in 1978 and 1979 had an immediate impact, and it continued to influence wage setting behaviour in 1980 and 1981.

8. Conclusions

A major theme has been the relationship between demand-side employment policies and real wage moderation in the Nordic countries. Except for Finland, we have not been able to find support for hysteresis effects working via wage formation, and so wage hysteresis does not appear a likely explanation for the high and persistent unemployment in Denmark. Nor does it seem possible to claim that demand-side employment policies have prevented potential wage hysteresis to materialise in Sweden and Norway.

We do find that expansion of government labour market programmes in order to offset tendencies to open unemployment appear to raise real wages. Especially for Sweden, this effect is very strong. These results should serve as a warning for those who regard labour market policies of the Swedish type as a blueprint to follow, since it is not clear which will be the net effect on open unemployment.

A typical feature of Nordic wage formation appears to be the long lag with which real wage changes adjust to productivity changes. This seems to be the main "explanation" for the real-wage gaps that emerged in the mid-seventies and the subsequent real-wage adjustments. These have probably been helped in the short run by devaluations causing inflation and by

slower increases of payroll taxes. In Sweden, and to some extent in Finland, less accommodative labour market policies are likely to have contributed substantially to the downward pressure on real wages from unemployment rises.

The upshot is that reversals of earlier policies rather than their continuation have played a greater role for real wage adjustments in the Nordic countries than is usually recognised by foreign observers. There certainly have not been any "corporatist" miracles: we can find no evidence of changes in wage-setting behaviour in connection with the attempts at corporatist tax-wage bargains in Finland, Norway, and Sweden. Indeed, we do not find much support at all, even in the short run, for the view that income tax cuts influence real labour costs.

1. The main sources have been Elvander (1988), Andersen (1990), Andersen and Risager (1990), Calmfors and Forslund (1990), Eriksson et al. (1990), Rødseth and Holden (1990), *OECD Economic Surveys of the various countries* and *Ekonomiska utsikter i Norden 1988-89 and 1989-90*.
2. Table 3 implies a smaller role for active labour market measures in Finland than Table 2. The data on workers in public work underlying Table 2 may overstate government employment programmes, since we have not been able to exclude workers on the payrolls of private sub-contractors.
3. If we let $w_p = W(1+\tau)/P$ and $w_c = W(1-t)/P_c$, where w_p = the product real wage, W = the money wage, τ = the payroll tax rate, P = the price of output, w_c = the consumption real wage, t = the income tax rate and P_c = the consumer price index, it holds identically that $w_p = \theta w_c$, where $\theta = (1+\tau)/(1-t)p_r$ is the wedge (ratio) between the product and the consumption real wage, and $p_r = P/P_c$ the relative price of domestic output. Since in general $p_r = p_r(w_c(1+\tau)/(1-t), \dots)$, a given rate of change of $w_c(1+\tau)/(1-t)$ should give a given rate of change of w_p , provided that the rates of change of the other arguments in the p_r function remain unchanged.
4. Blanchard and Summers (1986) are usually credited with the development of these models. The first were, however, Grossman (1983), and Blair and Crawford (1984). Horn (1983), Horn and Gottfries (1986), as well as Lindbeck and Snower (1986) also made early models of this type.
5. See e.g. Schager (1988) or Hoel (1989).
6. Cf. footnote 2.
7. Neglecting interest payments, we have that $B = (tY-G) + S((1-t)Y)$, where in addition to earlier symbols B = the current account position, Y = output, G = government expenditure and $S(\cdot)$ = private savings. A

traditional "Keynesian" output-demand equality (which must hold also under non-Keynesian conditions) gives $Y = C_d(Y(1-t) - S((1-t)Y) + G + X$, where C_d = domestic absorption of domestic goods, X = exports and $Y(1-t) - S((1-t)Y)$ = total domestic absorption measured in domestic goods. It is straightforward to show that $dB/dG = (1-t)(S' + C'_d(1-S') - 1)/(1 - C'_d(1-t)(1-S')) < 0$. A slightly - but not much - more sophisticated analysis would recognise that $S = S((1-t)Y + rA)$, where r = the rate of interest and A = private-sector holdings of interest-bearing assets. With this formulation, the zero current-account schedule would slowly move over time in response to the change in the stock of private wealth.

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8. Note, however, that since the lagged product wage is not significantly different from unity for any of the Nordic countries in Alogoskoufis and Manning (1988), it is not clear that their equations can be interpreted as relations between the level of the real wage and unemployment rather than as Phillips curves. This explains the implausible results for Denmark and Finland.
 9. Strictly speaking, this interpretation presupposes that all the terms in x_t are stationary. If this is not the case, the (implicit) co-integration equation is more complicated and the wage-share is non-stationary.
 10. Since Du_t is endogenous, estimation is made by instrumental variables. The instruments are lagged productivity change, lagged value-added price, current payroll-tax factor, lagged and current import price change, lagged real money balances, and current and lagged share of labour force in labour market programmes.
 11. Three years stand out: 1979 for Denmark and Finland, 1981 for Sweden, and 1987 for Denmark and Norway. Our guess is that the 1987 anomaly in the two latter countries may be associated with the reduction of working

hours at the time. In 1979, the second oil price shock may have caused increased uncertainty overall. It is also the year when Denmark entered the EMS. For Sweden, 1981 is the year when fiscal policies started to move towards less accommodation.

Appendix A: The theoretical structure

A.1. The impact of centralisation

Assume an economy of imperfectly competitive firms that also compete with foreign firms. Each firm has a demand function $y_i = p_i^{-\eta} \bar{y}$, where y_i = demand for the output of the firm, p_i = the relative price between the output of the firm and the consumption basket, $\bar{y}$ = real total expenditure per firm, and $-\eta$ = the product demand elasticity. Labour is the only input. Hence the profit-maximising relative price of the firm is $p_i = (1 - 1/\eta)^{-1} w_i$, where w_i = the consumption real wage in the firm. This gives labour demand of firm i as

$$(A1) \quad n_i = (1 - 1/\eta)^\eta w_i^{-\eta} \bar{y}.$$

A union may represent one or several firms. Employment for the members of an aggregate union can still be represented by (A1) (with subscript i and $\bar{y}$ suitably reinterpreted), since firms are assumed never to co-operate in product markets. Each union maximises its members' total revenues. They can be expressed as the sum of the wage bill and a net income transfer from the rest of the economy. With no mobility of labour between firms, the alternative income of a laid-off worker is unemployment compensation b . This is paid for partly or wholly out of a per capita tax t on employed workers, which also finances a lump-sum transfer g to all workers. Hence the net transfer to union i is $(m_i - n_i)b + m_i g - n_i t$, where m_i = the number of union i members. Total revenue is therefore

$$(A2) \quad \Omega_i = n_i w_i + (m_i - n_i)b + m_i g - n_i t.$$

In the aggregate, t is determined so that workers pay a fraction c of the total costs for unemployment compensation and transfers, i.e.

$$(A3) \quad c((m - n)b + mg) = nt,$$

where m = the total number of workers (union members) in the economy. The rest of the costs is paid by "capitalists".

The union chooses the real consumption wage w_i that maximises (A2) subject to (A1) and (A2). The outcome is the real consumption wage

$$(A4) \quad w_i = \eta[b+t-\alpha(cb+t)]/(\eta-1),$$

where $\alpha = n_i/n$ measures the relative size of the wage-setting unit. The terms within brackets are the *change in the net transfer* to the union that arises from one unit's change in employment of own union members. The real consumption wage is set as a mark-up over this net transfer change. As α grows, the change of the net transfer becomes smaller. Provided that the elasticity of labour demand remains constant, this means that a bigger wage-setting unit chooses a lower real wage. This is the internalisation of fiscal externalities discussed in the text.

If we set $c = 1$, i.e. assume that only workers pay taxes, (A4) simplifies to

$$(A5) \quad w_i = \eta(1-\alpha)(b+t)/(\eta-1).$$

Differentiation of (A5) with respect to α , holding b and t constant, gives

$$(A6) \quad (dw_i/d\alpha) \cdot (1/w_i) = \frac{1}{1-\alpha}.$$

A given reduction of centralisation causes a greater percentage increase of wages the more centralised wage setting is initially. A reduction of α from 0.9 to 0.8 and a reduction from 0.5 to approximately 0 both cause the wage to double.

Our model illustration has rested on specific assumptions, but similar results are obtained under more general assumptions on the share of

the tax burden borne by workers, on union utility functions, on bargaining behaviour, and on the internalisation of other effects as well (Calmfors and Driffill, 1988; Calmfors, 1990b).

A.2 The effect of labour market programmes

Assume for this purpose an even simpler economy which consists of m identical, perfectly competitive firms that produce a homogenous output. Wages are set by identical unions in each firm; together they organise all labour in the economy. The unions maximise the expected unweighted sum of members' welfare. Members may end up in four different states: (i) employment in the firm of own union with welfare $v^e = v^e(h^i, w_c^i)$, where h^i = working time and w_c^i = the consumption wage in firm i ; (ii) alternative employment in other firms with welfare $v^a = v^a(h^a, w_c^a)$, where h^a = working time and w_c^a = the consumption wage elsewhere; (iii) involvement in a labour market programme with welfare $v^r = v^r(\Omega)$, where Ω is the real benefit received; and (iv) open unemployment with welfare $v^u = v^u(b)$, where b = real unemployment compensation.

In a first round, a worker may or may not get a job in the firm of his own union. The expected utility in the latter case is $\bar{v}$. Total employment in the firm is N^i . A given fraction of jobs s is filled by entrants from other unions. Hence $(1-s)N^i$ jobs are reserved for union i members. Total membership in union i is M^i , and so $M^i - (1-s)N^i$ union i members do not get a job in firm i .

In a second step, the union i workers not employed in firm i may or may not become employed in another firm. The expected utility from not getting such alternative employment is v^n . The conditional probability of getting it is $\pi = \pi(n)$, where $n = N/M$ is the aggregate employment rate, N = the total employment in the economy, and M = the total labour force in the economy.

If a worker does not receive any regular job, he may in a third step become involved in a labour market programme or become openly unemployed. The conditional probabilities of ending up in a labour market programme or in open unemployment are $\gamma = r/(r+u)$ and $1-\gamma = 1-(r/(r+u))$, respectively, where r = the share of the labour force in labour market programmes and u = the rate of open unemployment.

The sum of expected utilities of the members of union i is

$$(A7) \quad v^i = (1-s)N^i v^e + [M^i - N^i(1-s)]\bar{v} = (1-s)N^i v^e + [M^i - N^i(1-s)] [\pi v^a + (1-\pi)v^n] = (1-s)N^i v^e + [M^i - N^i(1-s)] [\pi v^a + (1-\pi)(\gamma v^r + (1-\gamma)v^u)],$$

where $\bar{v} = \pi v^a + (1-\pi)v^n$, and $v^n = \gamma v^r + (1-\gamma)v^u$.

The individual union chooses a consumption wage w_c^i that maximises (A7) subject to the demand function for workers

$$(A8) \quad N^i = L^i(w_p^i, A^i, K^i)/h^i,$$

where w_p^i = the product wage, $L^i = h^i N^i$ = the total labour services demanded, A^i = an index of technical progress, and K^i = the capital stock in firm i . The result is a first-order condition

$$(A9) \quad \frac{\partial v^i}{\partial w_c^i} = \phi = \frac{\partial v^e}{\partial w_c^i} w_c^i - \beta(v^e - \bar{v}) = 0,$$

where $-\beta = (\partial N^i / \partial w_p^i) \cdot (w_p^i / N^i)$.

Imposing the symmetry conditions $w_p = w_p^i = w_p^a$, $w_c = w_c^i = w_c^a$, $K/m = K^i$, $A = A^i$, $N/m = N^i = N^a$, $M/m = M^i = M^a$ for all i , and using that $w_p = \theta w_c$, where θ is the wedge between the product and consumption wages, we can derive the effect of a change in γ , given n and thus also "total unemployment" $u_T = u+r$, by partial differentiation of (A9). This gives

$$\frac{dw_p}{d\gamma} = - \frac{\phi_\gamma}{\phi_w},$$

where

$$(A9) \quad \phi_\gamma = \beta \frac{d\bar{v}}{d\gamma} = \beta(1-\pi) \frac{dv^n}{d\gamma} = \beta(1-\pi)(v^r - v^u) > 0.$$

If $\phi_w = \frac{\partial \phi}{\partial w_p} < 0$ is imposed as a "dynamic stability condition", it follows that $dw_p/d\gamma > 0$ if $v^r > v^u$.

We can also derive the effect of a change in the share of the work force in labour market programmes r , given open unemployment u by implicit differentiation of (A9). This gives

$$\frac{dw_p}{dr} = - \frac{\phi_r}{\phi_w},$$

where

$$(A10) \quad \phi_r = \beta \frac{d\bar{v}}{dr} = \beta \left[(1-\pi) \frac{dv^n}{dr} + \frac{d\pi}{dr} (v^a - v^n) \right] = \beta \left[(1-\pi) \frac{u}{(r+u)^2} (v^r - v^u) - \frac{\pi_1}{(1+u+r)^2} (v^a - v^n) \right] \begin{matrix} > \\ < \end{matrix} 0,$$

and $\pi_1 = \partial \pi / \partial n$. There are thus two opposing effects. On the one hand, the probability increases that a worker not receiving regular employment will end up in a labour market programme, which tends to increase the wage (the

first term within brackets). On the other hand, regular employment opportunities are reduced if labour market programmes increase at constant open unemployment. This tends to reduce the wage (the second term). The net effect on the wage is positive if

$$(A11) \quad \frac{v^a - v^u}{v^r - v^u} < \frac{u(1-\pi)(1+r+u)^2}{\pi_1(r+u)^2} + \gamma.$$

The condition is more likely to hold the greater is $v^r - v^u$, i.e. the difference between the utility from an employment programme and the utility from open unemployment, and the smaller is $v^a - v^u$, i.e. the difference between the utility from alternative employment and the utility from open unemployment. A high γ also increases the probability of a wage rise. The reason is that, given v^a , v^r , and v^u , the smaller the expected utility loss $v^a - v^n$ from not receiving regular employment, the greater the probability that a laid-off worker ends up in a labour market programme rather than as openly unemployed.

Appendix B: Nordic wage equations

The first-order condition (A9) defines an aggregate wage equation, which we can choose to write

$$(B1) \quad w_p = f(\theta, h, k, k', n, \gamma, A, K),$$

where $k = b/w_c$ and $k' = \Omega/w_c$ are replacement ratios. We assume that the compensation in labour market programmes Ω is a linear combination of the going wage and unemployment compensation b . Average labour productivity y is used as a proxy for A and K . Since $n = 1 - u_T = 1 - u - r$, (B1) then gives either

$$(B2) \quad w_p = g(\theta, h, k, u_T, \gamma, y)$$

or

$$(B3) \quad w_p = l(\theta, h, k, u, r, y) .$$

Equations (B2) and (B3) are used as the basis for the steady-state relations in our estimations. When we study hysteresis effects, we think in terms of either a median-voter framework, which will add a proxy for the number of insiders (union density or past unemployment), or in terms of the competition for jobs. In the latter case the probability for a laid-off worker is assumed to be a function $\pi = \pi(n, u_L/u)$, where u_L = long-term unemployment in percent of the labour force.

TABLE B.1. Baseline equations

<u>Denmark</u>	<u>Finland</u>
$DW_t - DP_t =$	$DW_t - DP_{c,t} - D(1+\tau)_t =$
3.182 (2.86)	- 0.357 (-8.68)
$\left\{ \begin{array}{l} + 0.245 \begin{bmatrix} (DP_c - DP)_t \\ Dy_t \\ -(Dh + D(1-\tau)_t) \end{bmatrix} \\ (3.43) \end{array} \right\}$	$\left\{ \begin{array}{l} + 0.168(DP_c - DP)_{t-1} \\ (3.61) \\ - 0.183D_2y_t \\ (3.30) \end{array} \right\}$
$\left\{ \begin{array}{l} + 0.342(DP_{c,t-1} - DP_t) \\ (3.56) \end{array} \right\}$	
$\left\{ \begin{array}{l} -0.033Du_t \\ (-3.17) \\ - 0.059u_{t-1} \\ (-3.16) \end{array} \right\}$	$\left\{ \begin{array}{l} - 0.006DU_t \\ (-2.49) \\ - 0.002U_{t-1} \\ (-2.05) \end{array} \right\}$
$\left\{ \begin{array}{l} - 0.551(w_p - y)_{t-1} \\ (-4.95) \\ + 0.156p_{r,t-1} \\ (3.16) \\ - 0.046UD_{t-1} \\ (-4.31) \\ - 216.3(1/UD_{t-1}) \\ (-3.93) \end{array} \right\}$	$\left\{ \begin{array}{l} - 0.311(w_p - y)_{t-1} \\ (-8.20) \\ + 0.010k \\ (9.97) \end{array} \right\}$
$\hat{\sigma} = 1.10\%$	$\hat{\sigma} = 0.70\%$
FAR (1,16) = 0.01	FAR (1,16) = 0.36
FAR (2,15) = 2.15	FAR (2,15) = 0.35

Norway	Sweden
$DW_t + Dh_t - DP_{m,t} =$	$DW_t - P_{c,t} =$
0.327 (10.79)	-0.859 (-6.30)
$\left\{ \begin{array}{l} + 0.245(DP_{t-1} - DP_{m,t}) \\ (6.21) \\ - 0.545DDP_{m,t} \\ (-16.30) \\ - 0.047POL \\ (-8.71) \end{array} \right.$	$\left\{ \begin{array}{l} + 0.339(Dp - D(1+\tau) - DP_c)_t \\ (5.04) \\ + 0.211(Dp_{t-1} - Dp_{c,t}) \\ (3.43) \\ - 0.773(Dh + .5D_2(1-t))_t \\ (-8.73) \end{array} \right.$
$\left\{ \begin{array}{l} -0.024u_{t-1} \\ (-2.84) \end{array} \right.$	$\left\{ \begin{array}{l} -0.026Du_t \\ (-2.61) \\ - 0.058u_{t-1} \\ (-7.33) \end{array} \right.$
$\left\{ \begin{array}{l} -0.316w_{p,t-1} \\ (-9.58) \\ + 0.258y_{t-1} \\ (8.20) \end{array} \right.$	$\left\{ \begin{array}{l} - 0.209(w_p^{-y})_{t-1} \\ (-6.86) \end{array} \right.$
$\hat{\sigma} = 0.76\%$ FAR (1,18) = 1.26 FAR (2,17) = 2.65	$\hat{\sigma} = 0.83\%$ FAR (1,18) = 0.03 FAR (2,17) = 0.49

W = ln money wage, P_c = ln consumer price index, P = ln value-added price index, y = ln productivity index, h = ln normal working time, $(1+\tau) = \ln(1 + \text{payroll tax rate})$, $1-t = \ln(1 - \text{average income tax rate})$, U = open unemployment in percent of labour force, $u = \ln U$, $w_p = \ln$ product real wage, $p_r = \ln P_c/P$, k = replacement ratio, UD = union density, POL = income policy dummy for Norway (1 in 1979, 1980, 1981), P_m = ln import price index.

The reported estimates are by OLS. The statistical exogeneity assumptions were tested and found to be valid. T-values in parenthesis. These may be underrated for Denmark because of a tendency to negative second-order autocorrelation. $\hat{\sigma}$ is the percentage standard error of the regression.

$F_{AR}(j, T-k-j)$ = F-form of LM-test of residual autocorrelation of order j (see Kiviet, 1986). T is the number of observations, k is the number of estimated coefficients in the regression.

TABLE B.2. Steady-state wage equations derived from Table B.1.

Denmark

$$w_p = \text{constant}^a + y - 0.101u + 0.284p_r - 0.081F(UD)^b$$

(-3.76) (3.85) (-9.35)

Finland

$$w_p = \text{constant} + y - 0.022(U/\bar{U}) + 0.308k$$

(-1.89) (7.29)

Norway

$$w_p = \text{constant} + 0.825y - 0.075u$$

(36.14) (-3.03)

Sweden

$$w_p = \text{constant} + y - 0.280u$$

(-4.43)

Approximate t-values in brackets (Bårdsen, 1989).

^a Since the dynamics contain differences of relative price terms, the steady state is taken to imply constant relative prices.

^b $F(UD) = UD + 4702.2(1/UD)$ is estimated from the equation in Table B.1. The dynamic model was subsequently re-estimated to provide the basis for the reported long-run equation.

TABLE B.3. Testing for the effects of labour market programmes

F-tests for adding $\sum_{j=0}^1 \beta_j r_{t-j}$, where r = the share of labour force in labour market programmes, to Table B.1 equations:

	<u>Denmark</u>	<u>Finland</u>	<u>Norway</u>	<u>Sweden</u>
F:	F(2,15)=1,09	F(2,17)=0.32	F(2,17)=2.16	F(2,17)=1.01
5% critical values:	3.68	3.59	3.59	3.59

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TABLE 1. Labour productivity and product real wage developments in manufacturing (average percentage changes per year)

	<u>1967-72</u>	<u>1973-77</u>	<u>1978-83</u>	<u>1984-87</u>
<u>Denmark</u>				
Product real wage growth	6.7	5.9	2.3	-0.1
Productivity growth	<u>6.9</u>	<u>5.8</u>	<u>3.1</u>	<u>-0.5</u>
Discrepancy	-0.2	0.1	-0.8	-0.4
<u>Finland</u>				
Product real wage growth	6.4	5.0	3.8	5.0
Productivity growth	<u>4.8</u>	<u>-0.4</u>	<u>4.8</u>	<u>5.0</u>
Discrepancy	1.6	5.4	-1.0	0.0
<u>Norway</u>				
Product real wage growth	7.8	5.7	1.1	2.9
Productivity growth	<u>8.4</u>	<u>2.5</u>	<u>2.7</u>	<u>3.6</u>
Discrepancy	-0.6	3.2	-1.6	-0.7
<u>Sweden</u>				
Product real wage growth	6.7	5.4	0.6	2.2
Productivity growth	<u>6.4</u>	<u>3.2</u>	<u>3.9</u>	<u>3.1</u>
Discrepancy	0.3	2.2	-3.3	-0.9
<u>Western Europe</u>				
Product real wage growth	6.9	6.9	3.4	0.2
Productivity growth	<u>6.8</u>	<u>4.7</u>	<u>4.1</u>	<u>3.5</u>
Discrepancy	0.1	2.2	-0.7	-3.3

Sources: Money wage costs: Wages and Total Labour Costs for Workers. International Survey. The Swedish Employers' Federation. Various issues. The implicit value-added price deflator in manufacturing: OECD National Accounts 1960-87. Productivity: OECD Economics and Statistics Department.

TABLE 2. Labour market programmes

	<u>1960-64</u>	<u>1965-69</u>	<u>1970-74</u>	<u>1975-79</u>	<u>1980-84</u>	<u>1985-89</u>
<u>Denmark</u>						
Share of labour force in percent	0	0.1	0.1	0.4	1.5	1.5
Accommodative stance	1.5	5.0	6.8	5.3	14.1	15.1
<u>Finland</u>						
Share of labour force in percent	4.0	4.4	3.7	3.6	3.3	2.9
Accommodative stance	74.7	65.8	61.8	42.8	39.7	36.8
<u>Norway</u>						
Share of labour force in percent	0.3	0.4	0.4	0.3	0.7	0.7
Accommodative stance	20.8	30.1	34.5	24.9	23.1	23.4
<u>Sweden</u>						
Share of labour force in percent	0.5	1.0	1.6	2.2	2.0	1.8
Accommodative stance	22.0	35.5	42.5	53.2	41.4	41.9

The accommodative stance of labour market programmes is defined as the ratio (in per cent) between the work force in such programmes and the sum of the work force in such programmes and in open unemployment.

Source: The data bank of the Nordic Wage Formation Project (Calmfors, 1990b).

TABLE 3. Average public expenditure on labour market programmes 1985-88
(per cent of GDP)

	<u>Denmark</u>	<u>Finland</u>	<u>Norway</u>	<u>Sweden</u>	<u>Western Europe</u>
Labour market training	0.5	0.3	0.1	0.5	0.2
Special youth measures	0.2	0	0	0.2	0.2
Direct job creation	0	0.4	0.1	0.3	0.2
Total labour market programmes	0.7	0.7	0.2	1.0	0.5
Unemployment compensation	2.8	0.9	0.4	0.7	1.6
Early retirement pensions	1.2	0.6	-	0.1	0.3
Total income maintenance	4.1	1.5	0.4	0.8	1.9
Total measures	4.8	2.2	0.6	1.8	2.5
Active measures/income maintenance (per cent)	15.6	32.8	29.7	54.6	22.2

Source: OECD Employment Outlook, July 1989, Table A 1.

TABLE 4. Changes of taxes and after-tax consumption real wages

	1965 -69	1970 -73	1974 -76	1977 -83	1984 -87
<u>Denmark</u>					
Income tax factor	1.0	2.5	0.0	0.6	1.8
Payroll tax factor	-0.6	0.9	0.2	0.5	0.2
Sum of tax factors	0.4	3.4	0.2	1.1	2.0
Consumption real wage	4.4	6.1	4.7	-1.0	1.0
<u>Finland</u>					
Income tax factor	1.5	1.3	2.4	-0.9	1.5
Payroll tax factor	0.4	0.7	0.6	0.0	0.3
Sum of tax factors	1.9	2.0	3.0	-0.9	1.8
Consumption real wage	3.6	6.6	2.6	0.5	2.7
<u>Norway</u>					
Income tax factor	1.2	1.0	-1.3	-0.6	0.0
Payroll tax factor	0.3	1.4	-0.1	0.1	0.0
Sum of tax factors	1.5	2.4	-1.4	-0.5	0.0
Consumption real wage	3.2	1.4	7.8	-0.3	3.2
<u>Sweden</u>					
Income tax factor	1.3	1.7	1.0	-0.2	0.8
Payroll tax factor	0.8	1.4	3.9	1.0	0.2
Sum of tax factors	2.1	3.1	4.9	0.8	1.0
Consumption real wage	3.1	1.7	2.8	-1.9	1.1

Source: The data bank of the Nordic Wage Formation Project (Calmfors, 1990b).

TABLE 5. Labour market organisations in percent of labour force 1985

	<u>Unions</u>		<u>Employers</u>	
<u>Denmark</u>	LO ¹	50.1	DA ⁴	17.2
	FTF ²	11.8	Central government	8.1
	AC ³	3.6	Local government and municipalities	21.5
<u>Finland</u>	FFC ¹	39.0	AFC ¹	24.3
	TOC ²	14.4	AAC ¹	11.1
	FTFC ²	4.7	Central government	8.4
	Akava ³	7.8	Local government and municipalities	16.3
<u>Norway</u>	LO ¹	36.2	NAF	20.0
	AF ²	4.8	Central government	6.8
	YS ²	5.8	Local government and municipalities	17.9
<u>Sweden</u>	LO ¹	40.6	SAF ⁴	27.1
	TCO ²	24.8	Central government	13.1
	SACO-SR ³	4.9	Local government	9.5
			Municipalities	13.1

¹Union Confederation of blue-collar workers.

²Union Confederation of white-collar workers.

³Union Confederation of employees with university training.

⁴Federation of private employers.

Source: Bratt (1985).

J-L-N-W: Jackman et al. (1989)
 N-S 85: Newell and Symons (1985)
 N-S 87: - " - (1987)
 B-L-N: Bean et al. (1986)
 A-M: Alogoskoufis and Manning (1988)
 A-R: Andersen and Risager (1990)
 E: Eriksson et al. (1990)
 R-H: Rödseth and Holden (1990)
 H-N: Hoel and Nymoen (1988)
 N: Nymoen (1989a)
 C-F: Calmfors and Forslund (1990)
 H 89: Holmlund (1989)
 H 90: Holmlund (1990)

In A-M, A-R, E, and A-R the estimated equations are for consumer real wages. They have been re-arranged for presentation in this table. All entries are elasticities, except for unemployment which gives the impact of a one percentage point increase.

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- ^a LR indicates the long-run and SR the first-year effect.
 - ^b In A-M the increase of inflation is in comparison with expected inflation.
 - ^c The entry without parentheses refers to the payroll tax factor, the entry within parentheses to the income tax factor.
 - ^d Refers only to payroll and income tax factors.
 - ^e Estimates in log forms have been transformed by dividing with the average unemployment rate.
 - ^f Sum of lagged coefficients.
 - ^g Cumulated effects for first year.
 - ^h This effect follows from the specification and has not been tested.

TABLE 6: Effects on the product real wage in various studies

	Lagged product wage (SR) ^a	Current unemployment (SR)	Lagged unemployment (SR)	Unemployment (LR) ^a	Wedge (SR)	Wedge (LR)	Increase of inflation (SR) ^b
<u>DENMARK</u>							
J-L-N-W	0.67	-0.57	0	-1.73	0	0	-0.02
B-L-N	0.81	-0.49	-	-2.58	-0.22	-1.58	0
A-M	1.00	-0.87	0	-∞	1 ^h	1 ^h	-
A-R	0.45	0	-0.20	-0.44	1(0) ^d	1(0) ^d	0
<u>FINLAND</u>							
J-L-N-W	0.91	-0.55	0.38	-1.83	0.57	0	-0.14
N-S '85	0.75	-0.46	0.23	-0.92	0.65	0	-
B-L-N	0.30	-2.10	-	-3.0	0.17	0.24	0
A-M	0.99	-4.4	2.38	-202.4	1 ^h	1 ^h	-
E	-	-	-	-0.87 ^e	-	0.12 ^d	0.04
<u>NORWAY</u>							
J-L-N-W	0.81	-4.7	2.74	-10.59	0	0	-0.70
N-S '85	0.86	0	0	0	0.97	-	-
B-L-N	0.45	-5.93	-	-10.78	-0.13	-0.24	0
A-M	0.83	-7.46	4.17	-19.35	1 ^h	1 ^h	-
R-H	0.85	0	0	0	0.58(0) ^c	1(0) ^c	-0.93
H-N	0.70 ^f	-1.03 ^g	-1.14 ^g	-2.86	0.87(0.13) ^c	1(0) ^c	0.28
N	0.88 ^f	-2.01 ^g	-2.74 ^h	-11.11	0.56(0) ^c	0.79	-0.41
<u>SWEDEN</u>							
J-L-N-W	0.81	-2.31	0	-12.16	0	0	-0.68
N-S '85	0.34	0	-1.36	-2.1	0	0	-
N-S '87	0.39	-	-3.28	-5.20	0.54	-	-
B-L-N	0.03	-7.77	-	-8.01	0.48	0.49	0
A-M	0.85	-4.62	3.56	-7.1	1 ^h	1 ^h	-
C-F	0.39	-3.63 ^e	-	-5.9 ^e	0.30	0.49	-0.23
H '89	-	-	-	-1.82 ^e	-	0.55	-
H '90	0.53 ^f	0	-3.84 ^g	-6.05	0.23	0	0

Table 7. Impact effects on the product real wage (elasticities)

	Employment tax factor	Income tax factor	Working time	Increase in inflation	Relative price between output and consumption	Productivity
Denmark	1	-0.25 (-3.43)	-0.25 (-3.43)	-0.35 (-3.56)	-0.59 (-6.34)	0.25 (3.42)
Finland	0	0	0	0	-1.17 (-24.88)	0.18 (3.30)
Norway	1	0	-1	-0.80 (-15.1)	-1.71 ^a (-18.9)	0
Sweden	0.66 (9.84)	-0.39 (-8.73)	-0.77 (-8.73)	-0.21 (-3.43)	-0.45 (-4.91)	0

^a Scaled by import share of GDP.

All effects are first-year effects except for the relative price, which gives the sum of first-year and second-year effects. T-values in brackets. Since the equations are derived with a general-to-specific procedure, the "ones" and the "zeros" can be associated with non-significant t-tests for the implicit nulls.

Table 8: Elasticities of the product real wage with respect to open unemployment

	1st-year effect	1st + 2nd-year effect	Long-run effect ^b
Denmark	-0.033 (-3.17)	-0.059 (-3.16)	-0.101 (-3.76)
Finland	-0.021 ^a (-2.49)	-0.007 ^a (-2.04)	-0.022 ^a (-1.89)
Norway	0	-0.024 (-2.84)	-0.075 (-3.03)
Sweden	-0.026 (-2.61)	-0.058 (-6.86)	-0.280 (-4.43)

Based on Table B.1.

^a Scaled with the average unemployment rate over the period.

^b Asymptotic t-values in brackets (Bårdsen, 1989).

Table 9: Elasticities of the product real wage with respect to open unemployment and labour market programmes

	Unemployment			Programmes		
	1st-year effect	1st + 2nd-year effect	Long-run effect	1st-year effect	1st + 2nd-year effect	Long-run effect ^b
Denmark	-0.025 (-2.80)	-0.041 (-2.75)	-0.085 (-2.61)	-	0.016 (3.43)	0.032 (3.14)
Finland	-0.020 ^a (-2.44)	-0.006 ^a (-2.11)	-0.018 ^a (-2.00)	0.006 ^a (2.11)	0.006 ^a (2.11)	0.020 ^a (2.14)
Norway	-	-	-	-0.017 (-3.80)	-0.017 (-3.80)	-0.053 (-4.04)
Sweden	-0.032 (-2.97)	-0.058 (-7.34)	-0.285 (-6.49)	0.010 (1.32)	-	-

^a Scaled with average unemployment over the period.

^b Asymptotic t-values in brackets (Bårdsen, 1989).

Table 10: Long-run effects of total unemployment and labour market policy accommodation

	Total unemployment (in logarithms)			Accommodative stance ^a		
	1st-year effect	1st + 2nd- year effect	Long-run effect ^c	1st-year effect	1st + 2nd- year effect	Long-run effect ^c
Denmark	-0.028 (-7.92)	-0.056	-0.104 (-6.46)	0.0014 (1.17)	0.0014 (1.17)	0.0027 (1.13)
Finland	-0.0 ^{27b} (-2.21)	-	-	-	0.00026 (3.36)	0.0008 (2.20)
Norway	-0.013 (-2.76)	-0.026	-0.083 (-2.68)	-	-	-
Sweden	-0.025 (-2.44)	-0.056 (-6.87)	-0.319 (-3.89)	0.0008 (2.53)	0.0008 (2.53)	0.0042 (2.49)

Based on Table 3.4. The elasticities for the other variables are similar to Table B.1.

^a Labour market programmes in percent of total unemployment.

^b Scaled with average unemployment.

^c Asymptotic t-values in brackets.

Table 11: The long-term unemployment proportion in wage equations 1962-87

	Change in (the logarithm of) open unemployment	Open unemployment (in logarithms)	Long-term unemploy- ment in percent of open unemployment
Denmark	-0.032 (-3.01)	-0.058 ^a (-3.03)	-0.046 (-0.77)
Finland	-	-0.033 ^b (-2.31)	0.041 (1.06)
Norway	-	-0.024 ^a (-2.78)	0.014 ^a (0.31)
Sweden	-0.027 (-2.88)	-0.033 ^a (-2.11)	-0.125 ^a (-1.98)

The other variables are as in Table B.1. Their estimated coefficients are virtually unaffected. For the earliest years of the estimation period, the data for the long-term proportion have been constructed to allow full sample estimation. This caveat is probably only important for Norway, though.

^a Lagged variable.

^b Scaled with average unemployment over the period.

Figure 1a: Unemployment (per cent of labour force)
in Sweden, Denmark and Western Europe

Figure 1b: Unemployment (per cent of labour force)
in Finland, Norway and Western Europe

Figure 2a: Consumer price increases (per cent) in Denmark, Sweden and Western Europe

Figure 2b: Consumer price increases (per cent) in
Finland, Norway and Western Europe

Figure 3a: Wage inflation in Sweden, Denmark and Western Europe (blue-collar workers in manufacturing)

Figure 3b: Wage inflation in Norway, Finland and Western Europe (blue-collar workers in manufacturing)

Figure 4: Relative unit labour costs in common currency
(1970=100) for the Nordic countries

Figure 5: Relative wage costs in local currencies
(1970=100) for the Nordic countries

Figure 6: Effective exchange rates (1970=100)
for the Nordic countries

Figure 7: Government net lending as per cent of GDP

Figure 8: Current balances as per cent of GDP

Figure 9: Government employment as per cent of total employment

Figure 10a: European unemployment

Figure 10b: The Swedish development

Figure 10c: The Finnish development

Figure 11: Union density (unionised workers
in per cent of labour force)

Figure 12: The share of long-term unemployment (more than six months) in total unemployment