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The Wage Bargaining Structure in Norway and Sweden and its Influence on Real Wage Developments

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Abstract

The paper investigates the determinants of wages in the tradables and service sectors in Norway and Sweden. Tradables wages are determined by their own productivity growth whereas service sector wages are influenced by wage growth in the tradables sector. The traditional strong sensitivity of the real wage to changes in the unemployment rate has been virtually eliminated since the recessionary period in the early 1990s in Sweden, and real wages have grown faster than macroeconomic factors alone would suggest. In contrast, real wages have become more sensitive to cyclical conditions in Norway and have grown less rapidly than macroeconomic factors indicate. These changes in the wage process have hindered the development of private sector employment in Sweden but have stimulated private sector employment in Norway.

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Summary

The general consensus is that wage bargaining at the industry level is considered the worst economic option because it creates negative externalities and does not internalize unemployment and fiscal externalities. When separate groups achieve independent wage increases, pay rises are likely to shift to consumers through an increase in the relative output price; whereas when wage bargaining takes place at the central level, consumption wages are raised uniformly across all sectors and there is no relative price change. Moreover, wage increases are moderated in centralized wage-bargaining frameworks because unions recognize that higher wages affect the likelihood that their own members become unemployed. In terms of the fiscal externality, bargaining units at the industry level can ride free on the understanding that an increase in unemployment benefits is financed by increased premiums paid by all workers; whereas centralized bargaining units are more likely to internalize this externality.

The paper investigates wage movements in Norway and Sweden and considers whether wage-setting behavior has changed between both countries since the late 1980s, when Sweden switched to industry level bargaining. Tradables wages are determined by their own productivity growth rates; whereas service sector wages are influenced by wage growth in the tradables sector. Moreover, the traditional strong sensitivity of the real wage to changes in the unemployment rate has been virtually eliminated since the recessionary period in the early 1990s in Sweden, and real wages have grown faster than macroeconomic factors alone would suggest. In contrast, real wages have become more sensitive to cyclical conditions in Norway and have grown less rapidly than macroeconomic factors indicate. These changes in the wage process have hindered the development of private sector employment in Sweden but have stimulated private sector employment in Norway.

I. INTRODUCTION

Over the past ten years, considerable debate has arisen regarding the relationship between labor market institutions and employment performance. This debate was kindled by a seminal paper by Calmfors and Driffil (1988) showing that there was a inverted U-shaped cross-country relationship between the degree of centralization in wage bargaining and the unemployment rate, with the transmission mechanism occurring through real wage developments. Since the publication of this paper a number of researchers have tried to pinpoint weaknesses in the original analysis, in particular by pointing out the difficulty in ranking countries according to the degree of centralization because of the existence of multilevel bargaining. However, various alternative rankings for the degree of centralization have not been able to disprove the empirical connection between the variables (see in particular the work of Freeman (1988), Rowthorn (1992) and Bleaney (1996)). The purpose of this paper is to document and analyze the behavior of wages within Norway and Sweden's wage bargaining frameworks which vary according to the degree of centralization. In Norway the wage bargaining framework is fairly centralized whereas wage setting in Sweden has become dominated by industry/sectoral level bargaining since the mid-1980s.

II. THEORETICAL CONSIDERATIONS

One of the main drawbacks of a wage bargaining framework at the industry level is that it creates negative externalities. For example, when separate groups achieve independent wage increases, there are significant possibilities to shift pay rises onto consumers through an increase in the relative output price. As a result, the increase in the real product wage and the resulting employment loss are moderated. However, consumers of the industry's products are worse off because they must pay higher prices for the products. In contrast, when wage bargaining takes place at the central level, consumption wages are raised uniformly across all sectors and therefore there is no relative price change. Moreover, wage increases are moderated because unions recognize that higher wages raise product prices which have to be paid by their own members.

Centralized bargaining units can also internalize unemployment and fiscal externalities. The unemployment externality results from workers who become unemployed making it more difficult for every unemployed person to find work. In a decentralized system, bargaining is by individual unions which are less likely to be concerned about the effects on other unemployed people of one of their own members becoming unemployed. In contrast, in a centralized system the unions bargain as a group and incorporate into their wage bargaining strategy the understanding that their actions affect the likelihood that their own members become unemployed. The fiscal externality relates to the fact that high wage bargains which result in unemployment impose a cost to the union members if the unemployment benefit system is partially financed by employee contributions. Bargaining units at the industry level can free ride on the understanding that an increase in unemployment benefits is financed by increased

premiums paid by all workers whereas centralized bargaining units are more likely to internalize this externality.[1]

One of the advantages of wage bargaining at the sectoral level over centralized bargaining is that, to a certain extent, it can incorporate different labor market conditions across sectors and therefore can reward work according to its market valuation. It must be recognized, however, that many wage agreements contain both local and centrally negotiated elements. In fact, some commentators have argued that the local bargain rarely reverses the centralized bargain, which acts essentially as a floor to which the local wage bargain is added. The evidence on this proposition for the Scandinavian countries is mixed. For Sweden, Flanagan (1990) fails to find any interdependence between both variables whereas Flanagan et al. (1983) find that negotiated wage increases at the centralized level have compensated for the difference between the allowable wage increase according to the Scandinavian model (the sum of labor productivity and world market prices) and wage drift.[2] Moreover, Holmlund and Skedinger (1990) find that, on average, wage drift has partially offset the negotiated wage increase. Wage drift in Norway over the past 30 years has typically averaged about half of the total wage increase in each year and Holden (1989) is unable to reject the hypothesis that there has been no wage drift offset of the centralized wage increase.

Figure 1, panel 1 presents the total wage increase and the proportion attributable to wage drift received by private workers in firms which are associated with the Norwegian employers' confederation. The peaks in wage growth are synchronous with a shift between main and intermediate negotiations. During the last cyclical upswing in the late 1980s, when local labor market conditions became important, annual increases in the total wage were dominated by wage drift. However, this situation was reversed in 1989 and 1990 when an upper limit was imposed on the centralized wage increase and local negotiations were prohibited. Since then, wage drift has been fairly stable at around 2 percent per year while the centrally-negotiated wage has risen more in line with cyclical developments. Figure 1, panel 2 presents the corresponding wages of workers in both the private and public sectors in Sweden. Historically, wage drift has varied much less than the aggregate wage change, ranging from 0.7 to 3.7 percent. Over the 1970–91 period, wage drift averaged 2½ percent but since then it has fallen to 1 percent in 1997, the lowest outcome in 30 years. Part of the explanation for the

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[1]One way of addressing this problem is to set premiums in such a way that those industries which press for high wage bargains are forced to pay for the resulting increase in benefits.

[2]This component of the Swedish model, the so-called EFO model was developed by three economists of the white-collar trade union, the employers' organization, and the blue collar trade union-Edgren, Faxen, and Odher. The main thrust of the model was to maintain the international competitiveness of Swedish industry through forcing wage increases to be determined by the sum of international price inflation and the rate of growth of labor productivity in the sector.

fall in wage drift in the recent period is lower inflation expectations because the aggregate real wage has risen over this period (Figure 2, panel 2).

III. Historical Perspective

Centralized wage bargaining in Norway goes back to 1935 when the two main labor organizations, LO, the union confederation and NAF, the employers' confederation, agreed on a constitution which confirmed centralized bargaining as the integral mechanism to achieve wage agreements. [3]Members of LO and NAF account for roughly 55 percent of all workers, but their influence in wage agreements account for more than their share of workers because workers in other unions use the LO-NAF agreement as a benchmark. Unions outside LO are mainly professional and are members of either the Federation of Norwegian Professional Associations (AF) or the Confederation of Vocational Unions (YS). Public sector employees in the central and local governments are the other major employee group and their wage agreements are also determined in conjunction with the other union confederations.

Since 1964 the length of contract period has been for two years, with strikes and lock-outs prohibited during the contract period. Intermediate bargaining adjusts for changes in the outlook for inflation but is only conducted at the LO-NAF level. Once the central negotiations have concluded, most firms have local negotiations which are added to the centrally determined wage rate.

Over the past 30 years the degree of involvement of the central government in the wage bargaining process has varied. During the 1960s the central government played a passive role except for the wage council agreements in 1964 and in 1966.[4] In the mid and late 1970s however, the central government played a more active role in wage negotiations to help moderate the rapid wage increases that had taken place earlier in the decade to compensate for rapid inflation (Figure 2, panel 1).[5] To help induce the unions to accept moderate wage agreements, the government offered generous price subsidies and lower taxes. During the 1980s the government once again attempted to use wage councils to achieve acceptable wage agreements in both the public and private sectors and safeguard Norwegian competitiveness. This approach met with limited success, as between 1983 and 1988 the cumulative real wage

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[3] LO is politically affiliated with the social democratic party, Labor, and is a major financial contributor to the party. In return, every Labor government contains ministers who come from the leadership of LO.

[4]Any major dispute between the LO and NAF legally has to be referred to wage councils. This has occurred nine times since the second world war.

[5]In early 1997, Statistics Norway made major revisions to its series to comply with the 1993 System of National Accounts. As a result, consistent series are only available as far back as 1978.

increase was 7 percent. To reinforce wage discipline, during April 1988-April 1990, the labor unions agreed to an upper limit on nominal wage growth at the central level and the prohibition of local bargains. In return, the government provided a variety of incentives, including a reduction in the retirement age and in the interest costs of housing loans. This development led to flat real wages in 1988 and 1989.

During the recession of the early 1990s, there was broad agreement among the unions, the employers and the government on the need for more cooperation in incomes policies. This led to the publication of a policy document in August 1992 that has set the tone for subsequent wage agreements. This policy, which is one element of a tripartite economic policy framework known as the Solidarity Alternative, targets lower wage growth in Norway than among its major trading partners.[6] Since the adoption of this approach nominal wage growth has been moderate but, because inflationary pressures have also been subdued, the recent pattern of real wage changes has not differed much from its profile during the mid-1980s.

Centralized wage bargaining in Sweden goes back to 1938 when the two main labor organizations, LO, the union confederation and SAF, the employers' confederation, concluded the Saltsjöbaden Agreement which regulated the relations between labor and management with regard to collective bargaining and industrial action. Two other unions were formed during the following decade, the Confederation of Professional Employees (TCO) in 1944 and the Confederation of Professional Associations (SACO) in 1947. During the heyday of Swedish labor market policies in the 1950s and 1960s both unions followed the lead taken by LO in requesting moderate wage increases. However, in 1973 a common bargaining unit encompassing private sector unions from both TCO and SACO was formed and, over the 1974–87 period, it concluded wage agreements with SAF independently of LO. Moreover, since the early 1980s some unions have split ranks even within LO. In 1983, the engineering industry broke away from the central agreement arguing that centralized wage contracts were not taking adequate account of conditions prevailing in specific industries; in the following year, central negotiations gave way to bargaining at the industry level. During the late-1980s a variety of bargaining systems were tried which led to the abandonment of centralized wage bargaining by SAF in 1990. Since then, negotiations have been carried out at the sectoral level between national employers' associations and trade unions. In contrast to the experience in the private sector, wage bargaining in the public sector has been fairly well coordinated between the public sector union and the three separate public-sector employer organizations for the central, regional, and local governments.

During the early 1970s, wage increases were moderate, growing in line with the sum of productivity increases and inflation (Figure 2, panel 2). However, in the mid 1970s, significant wage increases were triggered by imported price increases in connection with world-wide

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[6]The other components of the framework include maintaining the exchange rate of the krone stable against European currencies and using fiscal policy to moderate cyclical imbalances in the economy.

inflation and by increases in payroll taxes whose effects the government tried unsuccessfully to quell through the Haga agreements. As a result, the growth of product real wages far out paced the growth of labor productivity leading to a loss of competitiveness and export market shares. A number of discretionary exchange rate devaluations were undertaken to restore competitiveness (1976, 1977, 1981, 1982) and nominal wage increases returned to levels experienced prior to the mid-1970s. Following the 1982 devaluation, the government obtained a tacit understanding from LO that it would accept the pending real wage losses without claiming compensation. In 1984 and in 1985 the government reinforced this request by offering tax scale adjustments and tax-deductible union membership fees in return for modest wage increases.

During the recession of the early 1990s, the government advocated a voluntary incomes policy in conjunction with a sharp disinflation policy. This enabled a fairly high degree of wage coordination involving virtually all employer organizations and most of the unions.[7] However, the policy has not succeeded in moderating real wages because they have risen at a time when the aggregate unemployment rate has hovered around an extremely high level (by Swedish standards) of 12 percent.

The Scandinavian countries employ a large fraction of their workforces in the public sector. In Norway, roughly 27 percent of working time is carried out in the public sector with 22 percent of working time in Sweden (Table 1). As in many other countries, hours worked in service industries have increased rapidly over the past quarter century displacing workers in agriculture and in manufacturing industries. At present, the banking and business sector accounts for about 8½ percent of total hours worked in both Norway and Sweden and other services account for roughly 14 percent in Norway and 28 percent in Sweden. Part of the difference can be explained by government provision of some private services in Norway. The proportion of workers in retail and wholesale trade has remained fairly steady for many years at about 12 and 14 percent respectively whereas the downward trend in hours worked in manufacturing has stabilized since the early 1990s at 16 percent in both countries. The smallest categories are construction, communication, and agriculture, each representing between 5 and 7 percent of total hours worked.

A major focus of this paper is to consider the extent to which wage movements in the tradables and service sectors are determined by economic variables within those sectors rather than by economy-wide variables. Before addressing this issue empirically we consider some stylized facts about wage and productivity differentials across industrial sectors in both

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[7]The degree of government involvement during the early 1990s contrasts with its passive role in previous decades. Historically, the Swedish government has not followed Norway and Finland's example of reaching tripartite agreements between the unions, the employers and the government. Moreover, the recent tendency towards decentralized wage bargains has likely reduced the scope for such contracts in future.

countries.[8] Figure 3, panels 1 and 2 show the evolution of the real consumption wage across industries relative to the economy-wide average over the 1980s and early 1990s.[9] In Norway, relative wages have remained fairly constant over time within a fairly narrow range of 20 percent. For Sweden, the sizeable differential between wages in the service industries and in the tradables industries reflects the use of data on white collar workers for the service industries and blue collar workers in tradables. Replacing the wages of blue collar workers with the wages of white collar workers in manufacturing and construction indicates a fairly narrow wage spread of about 10 percent across industries (Figure 3, panel 3).[10] This is a noticeable feature of the Scandinavian labor market and contrasts with more decentralized labor markets such as in the United States where the wage differential between the highest and lowest paying 1-digit sector is about 40 percent (OECD Jobs Study). Turning to productivity developments, we notice a sizeable improvement in productivity in the communication sectors of both countries since the mid-1980s and a similar improvement in the Swedish manufacturing sector since the early 1990s (Figure 4). In contrast, productivity remains at or below the economy-wide average in retail trade and has declined significantly in relative terms in the banking and business sector.

To gain a more aggregative view of the contrasting real wage and productivity developments in the sectors that are most exposed to international competition (manufacturing, construction, and communication) versus the less exposed service sectors (banking, insurance, and retail trade), the panels in Figure 5 aggregate both categories using weights based on total hours worked for the various sectors.[11] The results appear to confirm that real wages in both sector groups have moved closely together even though the productivity profiles differ considerably. In particular, the real consumption wage in tradables has moved in line with the corresponding wage in services even though since the late-1980s, its relative productivity level has risen sharply in both Norway and Sweden (Figure 5, panel 1). This is shown more starkly in Figure 5, panel 2 which shows the historical profile of the wage shares in tradables and in

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[8]In this paper the agricultural and public sectors are excluded from the analysis and the focus is on the different evolution of wages and employment in the manufacturing, construction, communication, banking, insurance, and retail industries.

[9]The aggregate analysis is confined to this period because consistent time-series data on the banking sector is only available from 1980.

[10]White collar wage data for the communication sector is not available.

[11]The communication sector has only become competitive since the late 1980s and therefore referring to it as an exposed sector over the whole period is debatable. However, the lack of degrees of freedom preclude splitting the samples into two sub-periods. Moreover, although the construction sector is not generally regarded as an exposed sector, it is often included with the manufacturing sector when considering wage developments.

services. The wage share in tradables has trended down since 1980 except for 1996 in Sweden when real wages rose sharply. In services, the wage share has remained fairly constant over time in Sweden and has risen only slightly in Norway.

Real wages in the service sector appear to mimic developments in the sectors that are more exposed to international competition. The exposed sectors have preserved competitiveness through wage restraint which has allowed wages to grow much more slowly than productivity. This phenomenon has helped to hold wage growth in the less exposed sectors in line with productivity developments. Part of the explanation for the strong performance of productivity in the exposed sectors is the labor shedding that has taken place since the peak of the previous cycle in 1986 in Norway and 1990 in Sweden. Between 1986 and 1992 employment in manufacturing and communication in Norway fell by 15 percent whereas employment in the service sectors remained fairly flat (Figure 5, panel 3). In Sweden, employment in the tradables sector fell by roughly 19 percent between 1990 and 1993 whereas employment in the service sectors fell by 3½ percent. Since 1992–93 employment has recovered in the exposed and service sectors of both countries but with diverging rates of growth. In Sweden, over the 1993–96 period, employment in the exposed and service sectors has recorded average annual growth rates of 1.3 and 1½ percent respectively whereas the corresponding employment growth rates for Norway over this period are ½ percentage point higher at 1.8 and 2.1 percent.

One of the surprising features of Figure 5 is that the wage share profiles are comparable for Norway and Sweden even though their cyclical positions have differed substantially in recent years. In particular, the stronger aggregate employment growth in Norway has facilitated a reduction in the unemployment rate to below 5 percent in 1996. In contrast, the more muted aggregate employment growth in Sweden has failed to lower the unemployment rate below 12 percent. The changing sensitivity of real wages to changes in the unemployment rate in both countries is discussed in more detail below.

IV. Real Wage Developments across Norwegian and Swedish Sectors

A number of authors have estimated wage relationships using Scandinavian data (see, in particular, Holden (1989), Johansen (1995), and Evjen and Nymoen (1997) for Norway and Bean, Layard, and Nickell (1986), Calmfors and Forslund (1990), Calmfors and Nymoen (1990), and Pencavel and Holmlund (1989) for Sweden). Two major findings are consistent among the various analyses of the Norwegian manufacturing sector: (1) payroll taxes have no long-run effect on the gross wage because the tax burden is shifted to the workers, and (2) labor market pressures based on a variety of specifications influence wage outcomes. Holden (1989) argues that labor market pressures are best captured by the vacancy rate whereas Johansen argues that a non-linear representation of the unemployment rate is necessary to capture wage movements prior to the 1990s. In contrast, Evjen and Nymoen demonstrate that Johansen's non-linear specification fails to hold up during the 1990s because of parameter instability and prefer the log-linear specification. For Sweden, most analyses find that the real wage is very sensitive to changes in the unemployment rate but that the relationship between

payroll taxes and the real wage is more equivocal because some studies find a pass-through effect of between 0.4–0.6 whereas other studies find no effect. The effects on the real wage of increases in labor market programs also differs across the Scandinavian countries. In Calmfors and Forslund (1990), the ratio of labor market program participants to the total unemployed pool has a positive effect on the Swedish real wage, controlling for movements in the total unemployment rate. In contrast, Raaum and Wulfsberg (1995) find that active labor market programs reduce wage pressure in Norway.

To test whether real wages in the sheltered sectors are more heavily dependent on developments in the exposed sectors than in their own sector and whether the recent behavior of the real wage in Norway and Sweden is atypical, this paper estimates a wage-setting schedule which is defined as follows:

$$w_i = \eta(pty_i, u, \tau, accr)$$

where w is the real wage, defined as the hourly wage deflated by the CPI index, pty is real GDP divided by total hours worked, u is the unemployment rate, τ is the payroll tax rate, and accr is the accommodation rate ie. the ratio of participants in active labor market programs to the total pool of unemployed.[12] The wage and productivity variables are expressed in log-levels whereas all other variables are in levels; the industry specific variables are indexed by *i*. For Norway dummy variables for the 1988–92 and 1993–96 periods were also included to control for the low wage increases agreed between the unions and the government in 1988–89 and to assess whether the Solidarity Alternative adopted in 1992 has influenced real wage growth subsequently. For Sweden a dummy variable for the post–91 period proxies for the high real wages offered over this period.[13] The unemployment rate was also interacted with the dummy variables.

A. Estimates for Norway

Recent revisions to the national accounts in Norway limit the analysis to annual data over the 1978–96 period. In order to conserve degrees of freedom, estimates were obtained by pooling the data across sectors, with a distinction made between exposed sectors and less exposed sectors. Weighted Symmetric t test statistics indicate that the wage, productivity and unemployment variables have trended upwards over time although in some cases the first

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[12]This variable was not available for Norway.

[13]The importance of blue collar work in tradables and white collar work in services determined the choice of blue collar wages for the tradables sector and white collar wages for the non-tradables sector.

differences of the variables appear to be stationary (Table 2).[14] The relationships were analyzed in first differences to maintain consistency with previous research in this area.

Tests were also conducted to discover cointegrating relationships and a cointegrating vector was obtained between the real wage, the aggregate productivity estimate for tradables and the unemployment rate.[15] However, upon further inspection it was found that adding the unemployment rate did not improve on the accuracy of the estimate (ie. the Chi-squared test statistic was insignificant). In the less exposed sectors it was postulated that the real wage was related to the real wage in the exposed sector and to productivity developments in the less exposed sectors. However, no cointegrating relationship could be found between these variables.

A dynamic error-correction equation was set up for real wage changes in the exposed sectors with explanatory variables composed of lags in the dependent variable, contemporaneous and lagged changes in the payroll tax rate, lagged changes in productivity and in the unemployment rate and the error correction term. Two lags were chosen to conserve degrees of freedom. Table 3 presents the estimates and indicates that the most significant explanatory variable is the first lag of the change in productivity. However, the coefficient estimate is considerably below unity suggesting that real wage changes in the exposed sectors have only partially compensated for productivity improvements. The other significant variables include the lagged change in the dependent variable and the dummy for the 1988–92 period.

To conserve degrees of freedom, the second lag of the unemployment rate was excluded from further analysis and the dummies for the 1988–92 and 1993–96 periods were incorporated into one dummy for the whole period. Moreover, an additional variable was introduced into the specification to determine whether the sensitivity of the real wage to movements in the unemployment rate had changed since the adoption of the Solidarity Alternative in 1992. The coefficient estimates from this specification are shown in the second column and indicate that the payroll tax variable is now significant. Simulating the effects of a permanent 1 percent increase in the payroll tax rate indicates that the real gross wage increases by 1 percent within two years and stabilizes at this value. Therefore, at least for the exposed sector, this result contrasts with the general finding that payroll taxes have no long-run effect on the gross wage. Finally, the sensitivity of the real wage to movements in the unemployment rate has increased greatly over the 1993–96 period demonstrating that the Solidarity Alternative has made wages more responsive to cyclical movements.

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[14]The inconclusive stationarity tests partly reflect the limited degrees of freedom.

[15]The construction sector was left out of the analysis because it appears to have experienced no real wage increase since the late 1970s. This finding is consistent with Stolen (1995) who finds a very poor explanatory fit for wage developments in the construction sector.

Bowitz and Cappelen (1997) document that the wage freeze in the late 1980s had long-lasting effects on real wages. Moreover, while Evjen and Nymoen (1997) argue that there has not been any noticeable change in wage behavior since the implementation of the Solidarity Alternative in 1993, they concede that important changes may have taken place in the labor market since the imposition of the wage freeze in 1988. In this analysis the dummy variable for the post-1988 period is significant, indicating that real wages have been 1 percentage point lower in the post-1988 period, holding all other explanatory factors constant.

In both equation specifications the error correction term is insignificant so that during this limited estimation period, real wages in Norway have not adjusted to any long-run disparity between the real wage and productivity. It is possible that over a longer time horizon the importance of the cointegrating relationship would be more evident. Excluding the error correction term has little effect on the other coefficients.

A comparable relationship to that proposed for the exposed sectors was estimated for the less exposed sectors, with the addition of the real wage in the exposed sectors as a further explanatory variable for wage changes in the less exposed sectors. In this case the productivity variables were insignificant and the real wage in the exposed sectors was highly significant although the hypothesis that the coefficient was unity was rejected. Changes in payroll tax rates were also significant with the initial full pass-though effect on the real wage of a 1 percent increase in the payroll tax rate completely reversing itself within two years, consistent with the results of other researchers. The other significant variable was the second lag of the change in the unemployment rate. Excluding the first lag of the unemployment rate and interacting the second lag with a dummy variable for the 1993–96 period revealed a significant increase in the responsiveness of the real wage to movements in the unemployment rate over the recent period. It appears therefore that the sensitivity of the real wage in services to cyclical conditions has also increased following the adoption of the Solidarity Alternative. In this specification the productivity variables became significant so that the hypothesis that wages in the service sector are insensitive to productivity movements remains open.

B. Estimates for Sweden

For Sweden estimates were also obtained by pooling the data across sectors, distinguishing between exposed and less exposed sectors. The time period analyzed for the exposed sector was 1970–96 whereas the corresponding period for the less exposed sectors was shortened to 1980–96 owing to lack of data. Weighted Symmetric t test statistics and Phillips z-tau statistics indicate that all of the variables have trended upwards over time although in some cases the first differences of the variables appear to be stationary (Table 2).[16] The relationships were also analyzed in log first differences to maintain consistency with previous research in this area.

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[16]The inconclusive stationarity tests partly reflect the limited degrees of freedom.

No cointegrating vector was obtained between real wages in the exposed sectors and the levels of productivity and unemployment nor between the real wage in the less exposed sector, productivity and the real wage in the exposed sector. Therefore, no long-run relationship was postulated and real wage changes in the exposed sectors were regressed on lags of the dependent variable, lagged changes in productivity and in the payroll tax rate, and lagged changes in the unemployment rate with and without interactions with a dummy variable for the post-1991 period. Two lags were chosen to conserve degrees of freedom. In the initial analysis the payroll tax and accommodation variables were always insignificant and were dropped from the specification presented in Table 4. The table shows that the most significant explanatory variables are the first lag of the dependent variable and the change in productivity, the second lag of the change in the unemployment rate and its interaction term, and the dummy for the post 1991 period. The coefficient on the unemployment rate is large, consistent with pervious work, but is totally offset in the post 1991 period, suggesting that real wages have not responded to the cyclical position in recent years. This observation is reinforced by the coefficient estimate on the post 1991 dummy suggesting that, holding all other factors constant, real wages have grown by 3–4 percent annually over this period.

A comparable relationship to that proposed for the exposed sectors was estimated for the less exposed sectors, with the addition of the real wage in the exposed sectors as in the specification for Norway. In this case the second lag of the productivity variable is significantly positive and its coefficient estimate is larger than the corresponding estimate for wages in the exposed sector. It appears therefore that in Sweden, real wages in the service sectors adjust just as much to productivity movements in their own sectors as do real wages in the exposed sectors. Turning to the unemployment rate, the coefficient estimates demonstrate a similar pattern to the analysis of wages in the exposed sectors in that the negative coefficient on the second lag is partially offset in the post 1991 period. Eliminating the first lag of the unemployment rate from the analysis confirms this finding, indicating that real wages have been relatively insensitive to movements in the unemployment rate since 1991. An interesting feature of the coefficient estimates for the unemployment rate is that they are considerably smaller than the corresponding estimates in the equation for wage changes in the exposed sectors. This is consistent with the general observation that service industries are less sensitive than goods industries to cyclical conditions. Finally, the real wage in the exposed sector is strongly related to the real wage in the less exposed sector although the relationship is significantly less than one-one.

V. Conclusion

This paper has analyzed real wage behavior across sectors of the Norwegian and Swedish economies and finds that it is broadly consistent with the stylized facts of wage determination in the Scandinavian economies in general. In particular, wages in the exposed sectors are dependent on economic conditions within those sectors, whereas wages in the less exposed sectors are determined by the wage increases granted in the exposed sectors. However, all of the specifications indicate that wages in the less exposed sectors in Sweden are also dependent on local economic conditions in contrast to some of the specifications for Norway. This

finding may be related to the more decentralized nature of wage setting in Sweden. On the other hand, the traditionally strong sensitivity of real wages to changes in the unemployment rate in Sweden has virtually been eliminated during the 1990s and wages have grown significantly faster than macroeconomic factors would indicate. These changes in the wage process have contributed to the relatively weak development of private sector employment in recent years. In contrast, real wages have become more responsive to the cycle in Norway but have also grown less rapidly than suggested by macroeconomic factors, thereby stimulating private sector employment.

Table 1. Average Employment Shares across Industries 1994–96

(In percent of total hours worked)

Industry	Norway	Sweden
Primary	9.3	3.4
Manufacturing	15.5	16.2
Construction	5.5	4.7
Communication	6.8	5.5
Trade	13.8	11.7
Banking	8.4	8.1
Other services	13.6	28.4
Government	26.9	22.0

Table 2. Unit Root Tests 1/

Variable	Sweden		Norway	
	Phillips-Perron Z (τ) Test	Weighted-Symetric τ Test	Phillips-Perron Z (τ) Test	Weighted-Symetric τ Test
wt	-5.5	-1.6	-5.8	-1.4
Δwt	-7.1	-1.8	-10.2	-2.7
ws	-6.3	-1.1	-6.6	-0.9
Δws	-7.3	-2.0	-6.2	-1.9
ptyt	-5.6	-1.9	-12.7	-3.0 *
Δptyt	-9.1	-3.8 *	-14.5	-1.7
ptys	-8.4	-2.3	-3.4	-2.0
Δptys	-26.1 *	-4.9 *	-10.7	-3.1 *
ptaxt	-1.8	-1.3	-4.9	-1.3
Δptaxt	-13.7	-2.9	-22.0 *	-2.9 *
accr	-4.8	-2.7	...	...
Δaccr	-15.1	-3.0 *	...	...
u	-1.3	-2.0	-3.0	0.6
Δu	-4.5	-2.6	-3.6	-2.2

1/ See text for data definitions. An asterisk denotes a variable or test statistic that is significant at the 10 percent level.

Table 3. Estimated Equations for Real Wage Growth in Norway

	Traded goods wage growth			Services wage growth	
Δpty (-1)	0.26 *	0.33 *	0.28 *	-0.05	0.13 *
Δpty (-2)	0.06	0.12 *	0.08*	-0.07	0.08 *
Δw (-1)	-0.41 *	-0.46 *	-0.40	0.12	-0.35 *
Δw (-2)	-0.10	-0.13	-0.12	0.12	-0.12 *
$\Delta\tau$	0.49	0.52 *	0.58*	1.08 *	0.72 *
$\Delta\tau$(-1)	0.24	0.46	0.35	-0.59	0.02
$\Delta\tau$(-2)	0.39	0.74 *	0.57	-0.80 *	-0.84 *
Δu (-1)	-0.79	-0.59	-0.36	0.35	
Δu (-1) *d 9396		-3.16 *	-2.38 *		
Δu (-2)	0.41			-0.79 *	0.15
Δu (-2) *d 9396					-4.40 *
Δw_{tg}				0.64 *	0.45 *
d 8892	-0.01 *	-0.01 *	-0.01 *		
d 9396	-0.01	-0.01 *	-0.01 *		
(w-pty)(-1)	-0.005	0.01			
d man	0.02 *	0.03 *			
d com	0.005	0.01 *			
d ret				0.01 *	0.02 *
d bank				0.003	0.01 *
d buss				0.008 *	0.02 *
d perss				0.002	0.008

An asterisk denotes significance at the 10 percent level.

Table 4. Estimated Equations for Real Wage Growth in Sweden

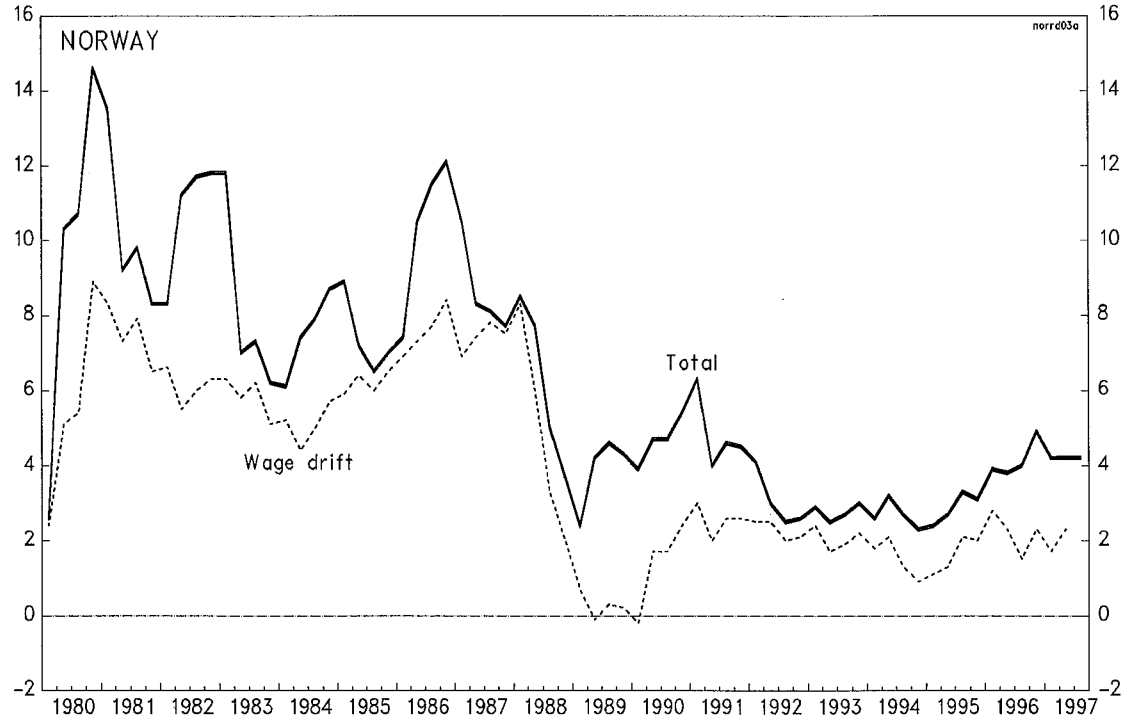
	Traded goods wage growth		Services wage growth	
Δpty (-1)	0.09*	0.09*	0.002	0.07
Δpty (-2)	0.03	0.04	0.19*	0.11*
Δw (-1)	0.23*	0.27*	0.10*	-0.11*
Δw (-2)	-0.16	-0.14	-0.17*	-0.2*
Δu (-1)	-1.22		0.62*	
Δu (-1) *d 9296	0.31		0.04	
Δu (-2)	-3.28*	-3.81*	-1.27*	-2.19*
Δu (-2) *d 9296	2.52*	2.87*	0.45*	1.06*
Δw_{tg}			0.71*	0.45*
d 9296	0.04*	0.03*	0.001	0.02*
d man	-0.001	-0.003		
d con	-0.003	-0.004		
d com	-0.003	-0.004		
d ret			0.002	0.002
d bank			0.01*	0.01*
d ins			0.003	0.002

An asterisk denotes significance at the 10 percent level.

FIGURE 1

WAGE DEVELOPMENTS

(percent change from a year ago)



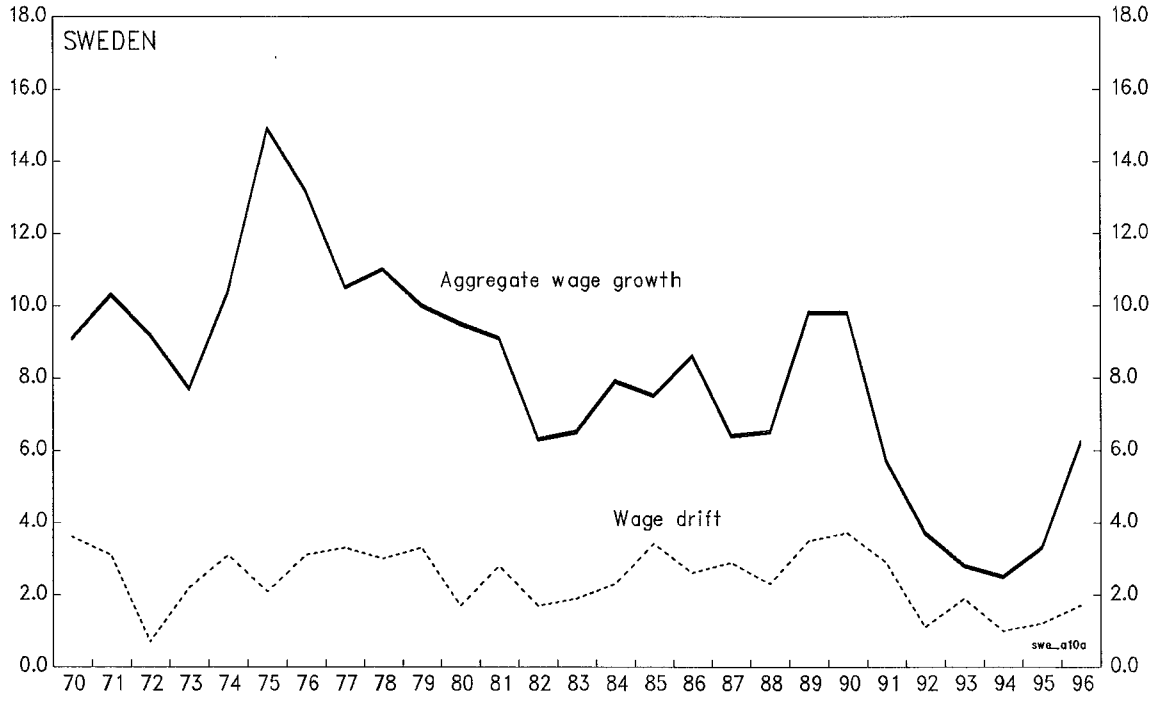
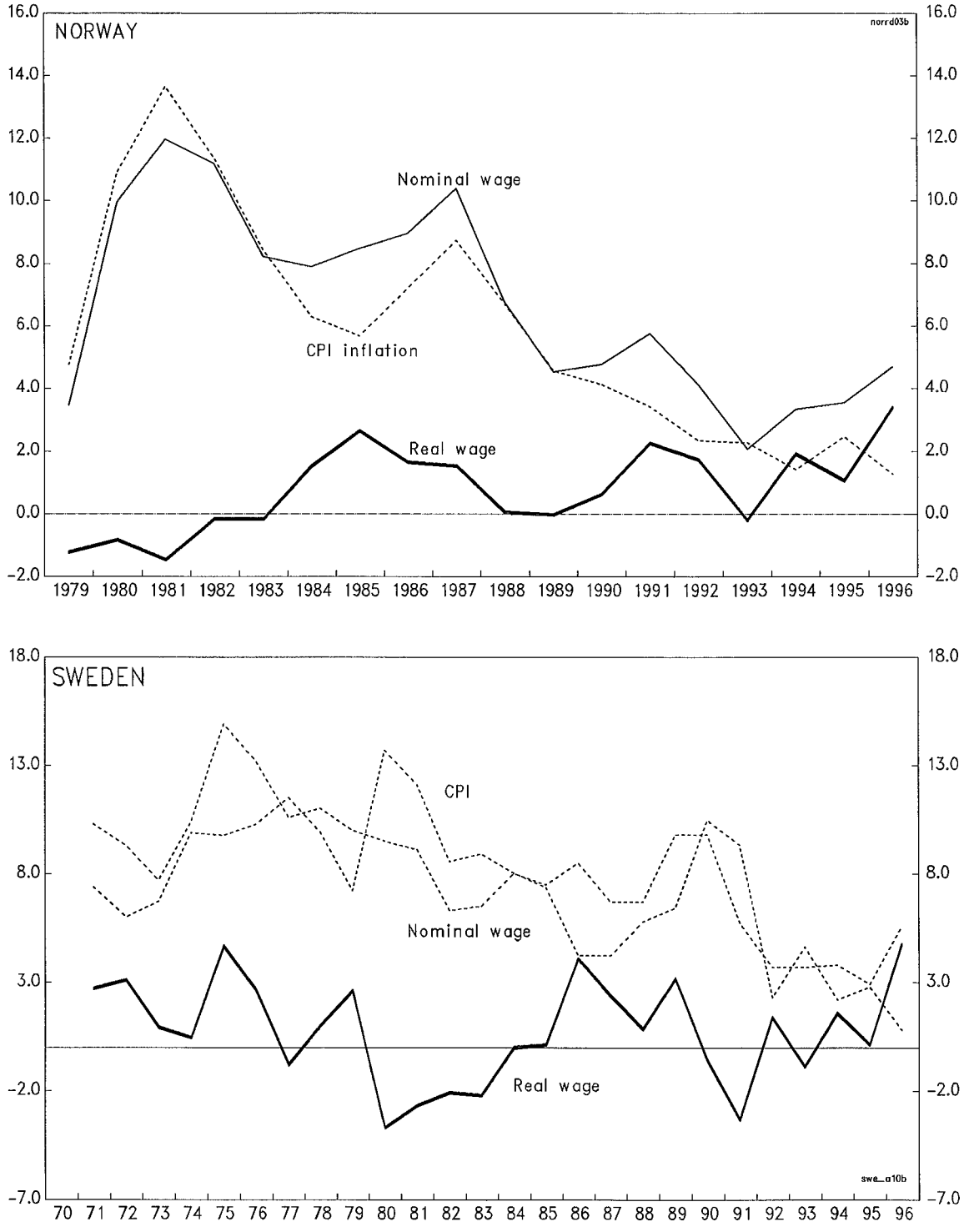


FIGURE 2

WAGE GROWTH AND INFLATION

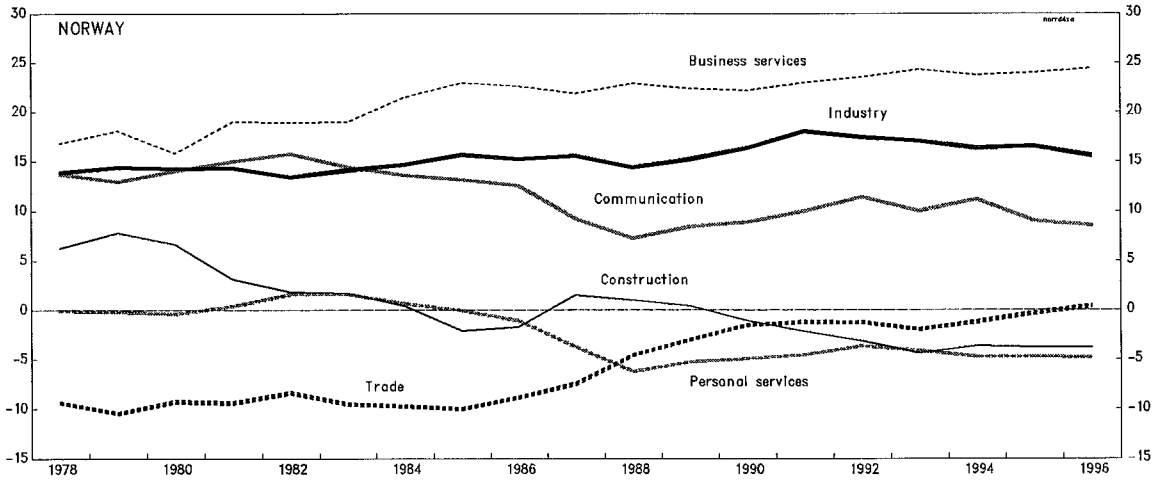
(In Percent)

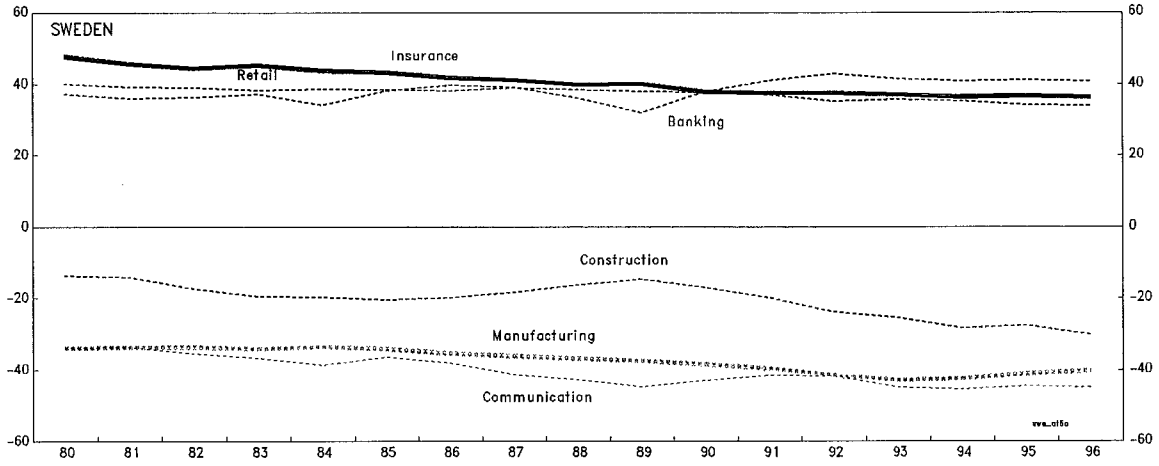


Sources: Employers' Confederation; and Statistics Norway.

FIGURE 3

WAGES ACROSS INDUSTRIES (RELATIVE TO AVERAGE)





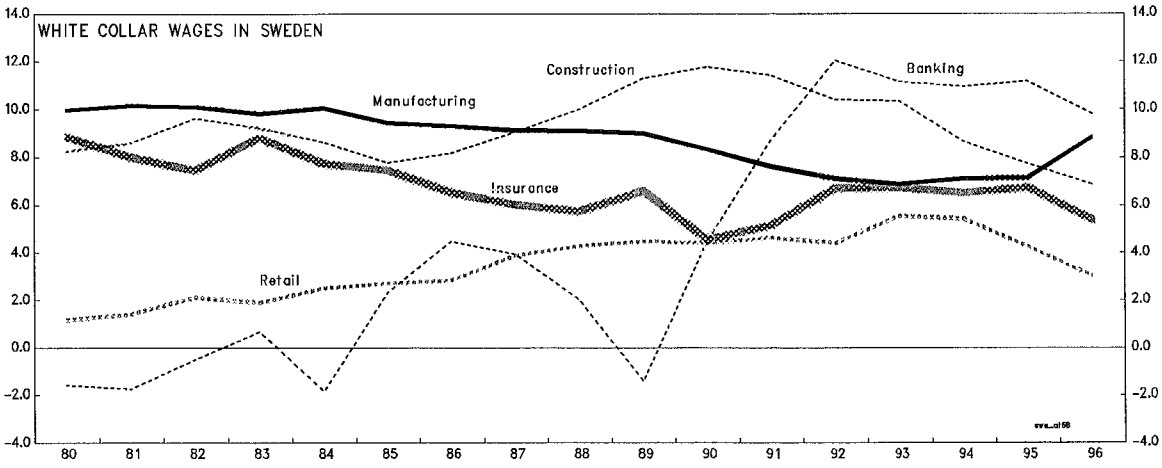


FIGURE 4

PRODUCTIVITY ACROSS INDUSTRIES (RELATIVE TO AVERAGE)

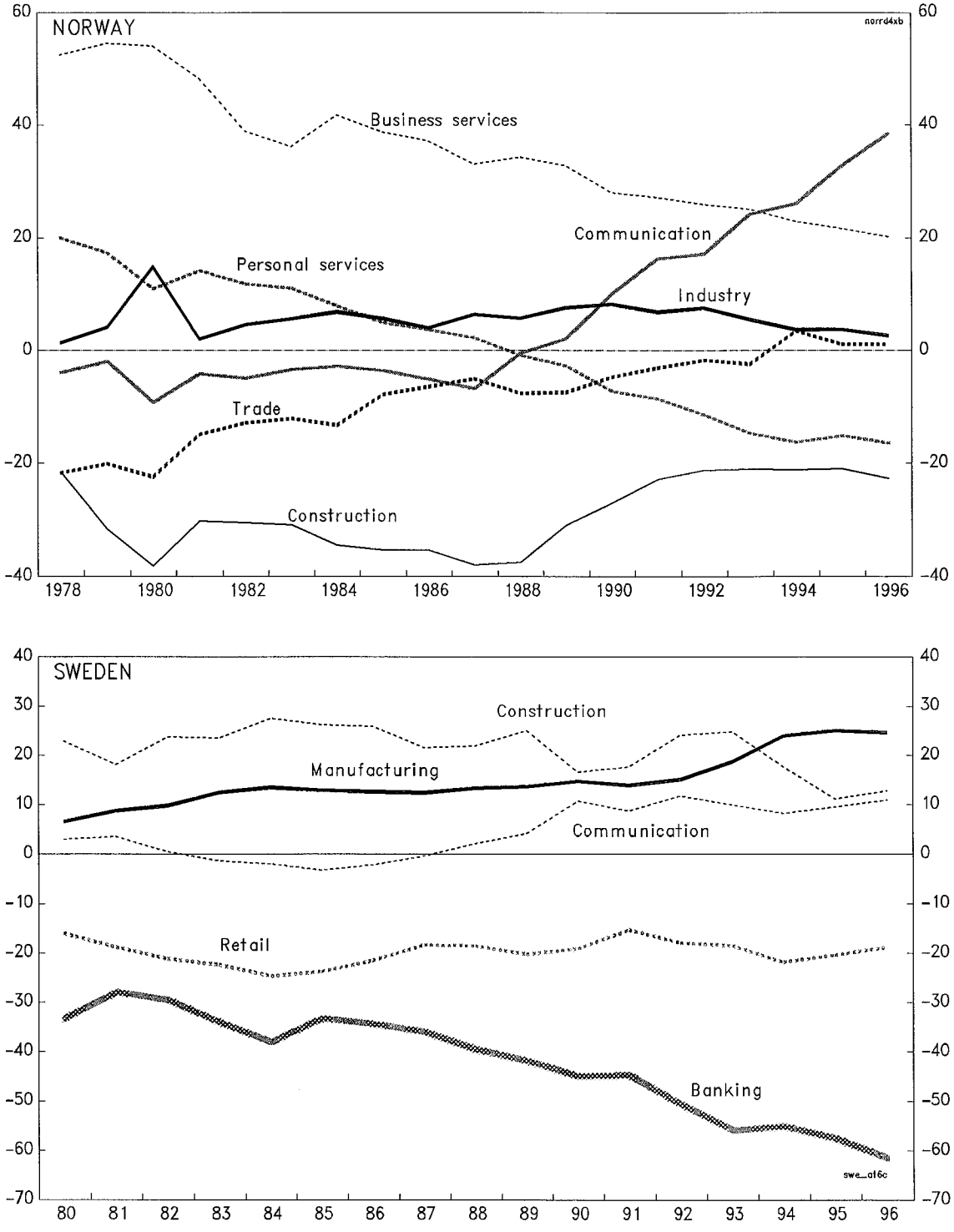
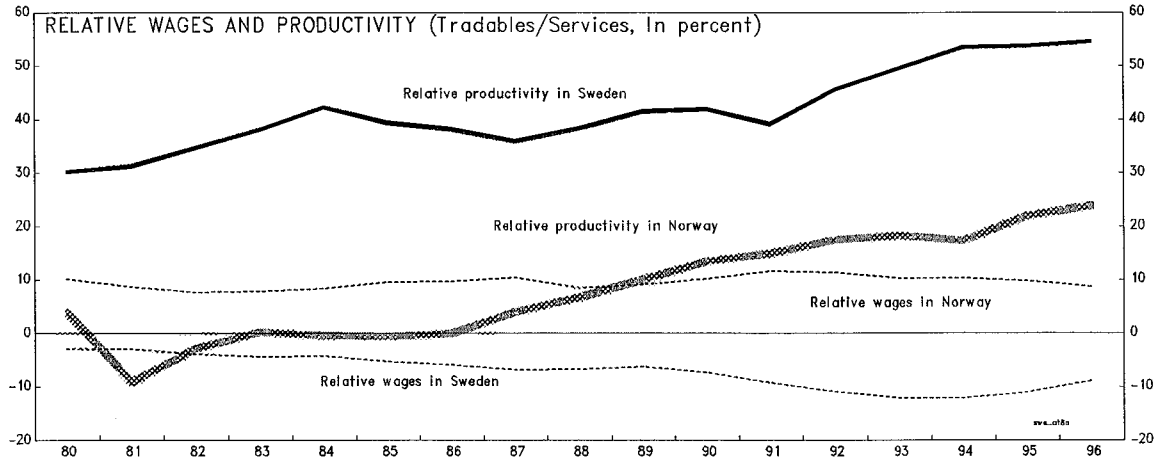
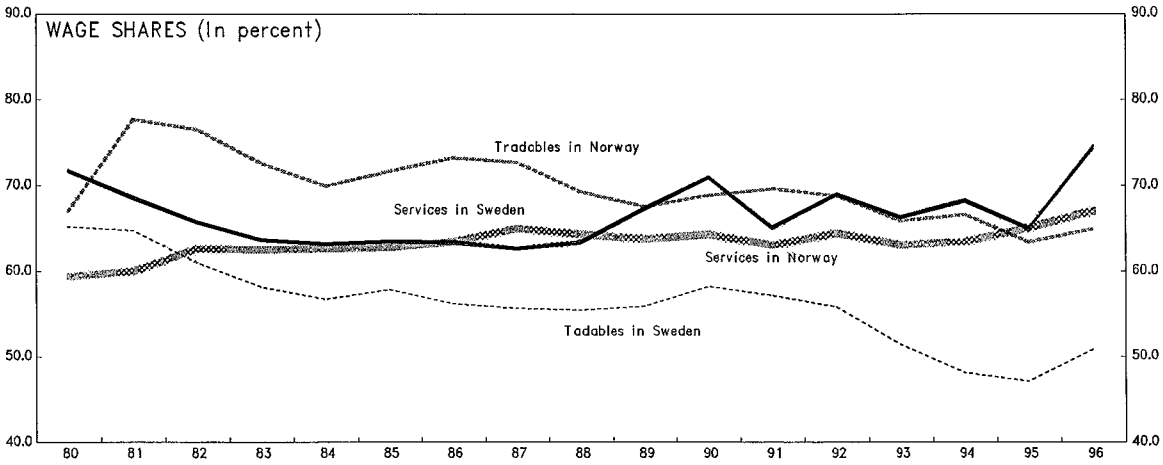
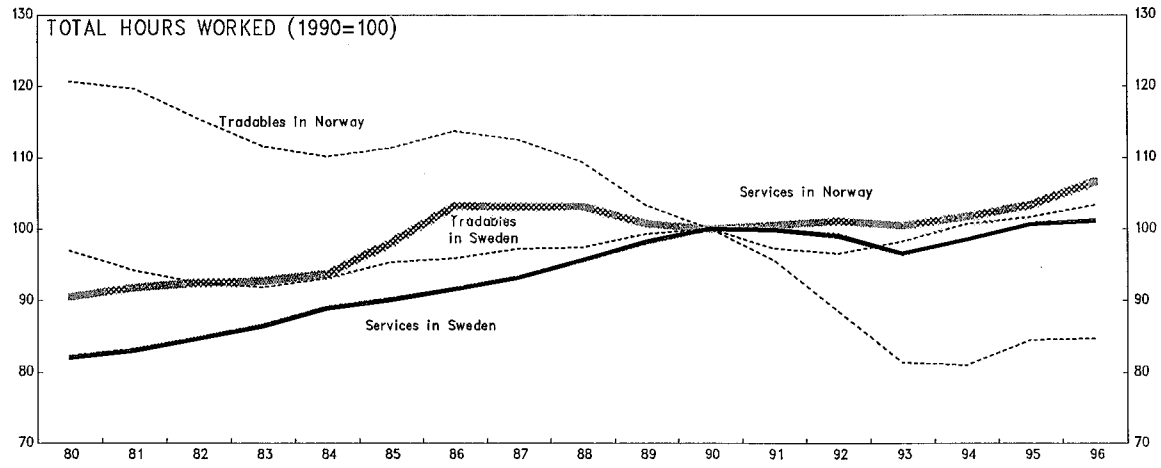


FIGURE 5

COMPARISON OF TRADABLES AND SERVICES







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