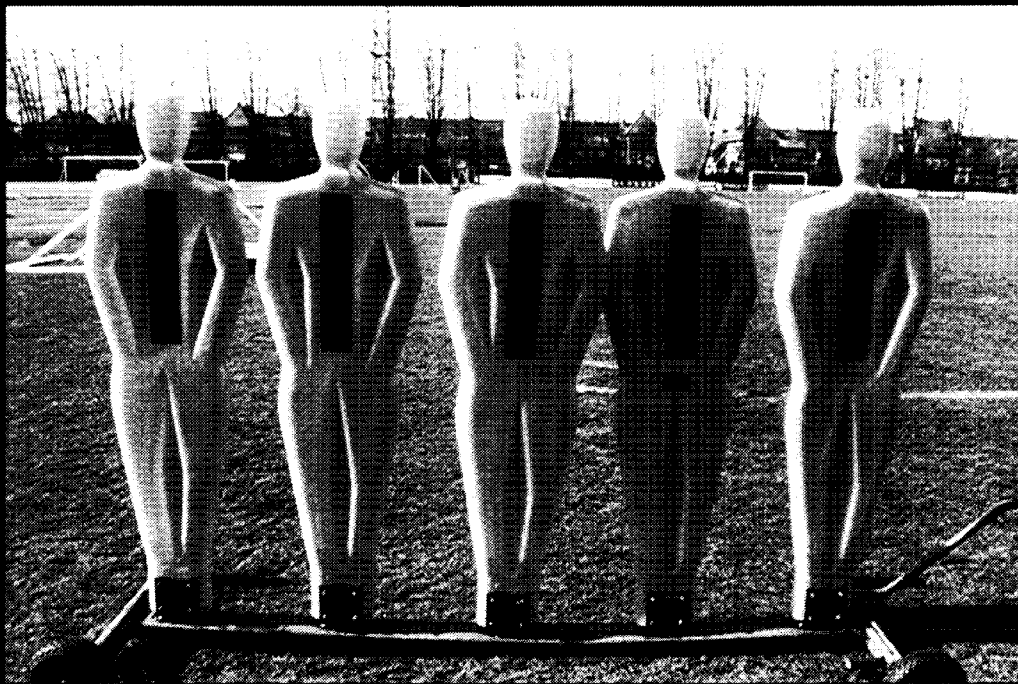


45

Merja Kauhanen

Job Security Provisions, Wage Setting  
and Unemployment Persistence



UNIVERSITY OF JYVÄSKYLÄ

JYVÄSKYLÄ 1998

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JYVÄSKYLÄ 1998



# Job Security Provisions, Wage Setting and Unemployment Persistence





JYVÄSKYLÄ STUDIES IN COMPUTER SCIENCE, ECONOMICS AND STATISTICS 45

Merja Kauhanen

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and Unemployment Persistence



UNIVERSITY OF JYVÄSKYLÄ

JYVÄSKYLÄ 1998

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## ABSTRACT

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Finnish Summary

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This study embraces two surveys and four empirical studies dealing with two closely related explanations of unemployment persistence, viz. the insider-outsider explanation and employment protection legislation. The empirical findings have special reference to Finland. The survey of the former explanation implies that employment effects following one-time shocks may be persistent owing to the close connection between employment status and insider membership. Strict hysteresis is eliminated where the firm has bargaining power or outsiders have some weight in the insiders' objective function. The survey also deals with insider-outsider considerations in empirical work. There is evidence of persistence effects, but little of strict hysteresis. With Finnish (mostly manufacturing) data three implications of the insider-outsider theory are examined: the role of insider and outsider factors in wage formation, the asymmetric nature of wages and employment adjustment to shocks in both directions and the relevance of the membership hysteresis hypothesis. The results suggest that both insider and outsider factors are important in industry-level wage formation. The greatest influence is exerted by the outside wage level. The asymmetric nature of wages and employment adjustment obtains support from a simple wage sum inspection. The regime-switching regression results for the number of employees do not imply asymmetric adjustment. Unit root tests, but not the Granger-causality tests suggest that the union may induce hysteresis in employment. The other main theme deals with the impact of job security on creating persistence effects. The survey indicates that on both theoretical and empirical grounds job security stabilizes variations in employment to fluctuations in demand. Conversely, the predictions concerning the impact of job security on the average level of employment and unemployment are far more mixed. In the evaluation of the impact of job security it is also important to take into account country's other institutional factors. Here, the impact of job security on the adjustment speeds of labour input is studied empirically. In line with predictions, in Finnish manufacturing working hours/employee are adjusted faster than number of workers to changes in output. The estimated adjustment speeds are not exceptionally slow compared to estimates elsewhere. The reparameterization results show that both unionization and unemployment rates are also important for the adjustment of labour input.

Keywords: insiders, outsiders, wage setting, persistence effects, job security, adjustment speed



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Jyväskylä, May 1998

Merja Kauhanen



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# 1 INTRODUCTION

## 1.1 Study Background

Unemployment and its persistence at a high level has emerged as one of the most serious economic and political problems faced by the majority of OECD countries in our times. In Europe the unemployment experience has been especially worrisome. The average European unemployment rate has been much higher in the 1980s and 1990s compared to the preceding decades. For example, the European average unemployment rate has been around 8.7 % during the 1980s and 10% throughout the 1990s, whereas the average level in the 1970s was only around 5 % (Figure 1.1). Typical of the dynamics of unemployment in European countries is that it has been asymmetric: the rise in unemployment has been much sharper than its decrease. An extreme example of this phenomenon is the rapid growth of unemployment in Finland in the 1990s: the unemployment rose manyfold in just 3 years, from 3% in 1990 to around 20% in 1993, but has shown only a slow decrease thereafter.

The stubbornly high rates of unemployment experienced by many OECD countries in the 1980s and 1990s have made unemployment and its persistence at a high level as one of the top priorities in economics research. The tendency of unemployment to persist in Europe has been illustrated by estimated autoregressive models for unemployment rates where the AR(1) coefficient has been interpreted as an indicator of persistence (see e.g. Alokoskoufis and Manning 1988, Barro 1988, Elmeskov 1993, Mitchell 1993). The closer to one the estimates have been, the higher the persistence. Coefficients equal to one have been interpreted as sign of hysteresis, i.e. the dependence of equilibrium unemployment on its past values. The estimated coefficients of AR(1) have been larger for European coun-

tries than for USA<sup>1</sup>.

The initial growth of unemployment in Europe has been quite animously traced back to the adverse supply shocks such as the first and the second oil shocks, the slowdown in productivity growth and tight monetary and fiscal policies pursued in many European countries (e.g. Bruno and Sachs 1985, Layard et al. 1991). The puzzling part of unemployment, which has gained increasing attention since the mid-eighties, in the context of the European unemployment

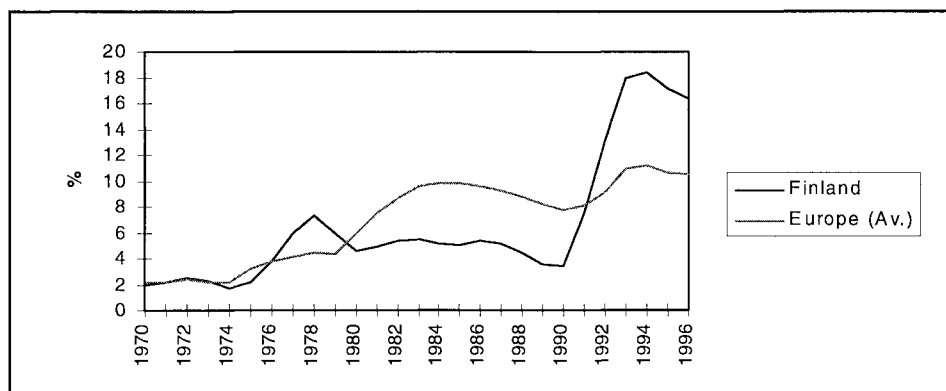


Figure 1.1 Unemployment rates in Finland and Europe, 1970-1996.

problem, has been to explain why unemployment rates have not fallen although economic conditions have improved. This has led to an increasing interest in finding mechanisms that can explain why the effects of adverse shocks persist in the labour market.

It has been common to locate the problem of unemployment persistence in the labour market and its imperfect functioning<sup>2</sup>. There are four main sources or mechanisms of unemployment persistence that have been emphasised in the literature in the 1980s and 1990s. The idea in these persistence theories is that the rise in equilibrium unemployment itself is a consequence of past shocks, rather than reflecting any change in the fundamental determinants of equilibrium unemployment (Alogoskoufis et al. 1995)<sup>3</sup>. These mechanisms cause unemployment to

<sup>1</sup>One problem with the interpretation of hysteresis/persistence effects from AR(1) coefficient is the following. Perron (1989) has shown that if there is structural break in the time series, i.e. if the level or the trend of a series has changed exogenously at any time during the sample period, the power of the unit root tests is dramatically reduced, i.e. they cannot reject the unit root hypothesis even if the series were be stationary in the two parts of the sample.

<sup>2</sup>Unemployment can also be caused by factors largely outside the labour market. Of the outside factors, the role of the fall in productivity growth (see e.g. Elmeskov 1993) and the role of real interest rates (e.g. Phelps 1994) have, among other things, been advanced to explaining unemployment.

<sup>3</sup>The other view is that the equilibrium itself has changed due to the change in structural factors, but it is hard to find evidence for this view.

return to its equilibrium level very slowly after the shock or they may eventually change the equilibrium itself. Two of these sources/mechanisms derive from the demand side of the labour market and two from the supply side.

First, on the demand-side, job security regulations such as hiring and firing costs have been argued to hinder employers' adjustment of their workforce to fluctuations in output. Because job security slows down the reduction in downturns, it has been assumed to raise the shadow price of labour and, thereby, to decrease the willingness of employers to hire new workers in upturns and have a depressing impact on employment (e.g. Lazear 1990). Second, the other demand-side theory, i.e. the capital shortage theory (e.g. Sneessens and Dreze 1986), argues that after a recession the reduced capital stock may be inadequate to employ the current labour force. The mechanism is such that the reductions in the capital stock associated with adverse shocks reduce the subsequent demand for labour and thus cause protracted employment (see Bean 1994).

On the supply-side or the wage-setting side of the labour market, the insider-outsider theory (e.g. Lindbeck and Snower 1988, Blanchard and Summers 1986) argues that the unemployment situation may not be recovered after a recession, because the wage-setting is dominated by employed insiders, who seek to raise their wages once their own employment is secured and do not put that much weight on the interests of unemployed outsiders. The other supply-side theory, the duration theory (e.g. Layard and Nickell 1986) pays attention to the behaviour and characteristics of unemployed outsiders, especially the long-term unemployed. According to the duration theory, the long-term unemployed exert only very little downward pressure on wages and they do not effectively compete for jobs. There are various reasons for this, e.g. the activity of the long-term unemployed to apply for jobs may decrease with the duration of unemployment (discouragement phenomenon) and their skills (human capital) may deteriorate during unemployment because they are not able to maintain and update their skills and they may be discriminated against by employers.

Basically these mechanisms of persistence can be traced back to the prevailing institutional factors. Although the persistence of unemployment has been great in Europe overall, there has been great differences between countries in unemployment experience, which cannot solely be explained by the fact that the extent of the shocks have differed between countries. Citing Layard et al. (1991): "the effect of any given shock depends on the country-specific parameters of the wage and price equations, which in turn depend on the institutional structure of the country". According to Gregg and Manning (1997) and OECD Jobs Study 1994, among economists the mainstream view is to identify the problem of the persistently high level of unemployment in OECD countries as being on the supply side of the economy and in the labour market in particular. Interference in the free workings of the labour market which keep real wage costs above market-clearing levels is seen as one of the main causes of unemployment.

The most important institutional factors which interfere the functioning of the labour market and are normally referred to in the discussion of unemployment are social security systems, minimum wages, employment protection legis-

lation and collective bargaining. They have been argued to affect unemployment in the following ways. First, social security systems, by providing a safety net for the unemployed, reduce the incentives to find or keep jobs and also increase total labour costs if financed by taxes on wages. Minimum wages price workers out of jobs. Employment protection legislation such as hiring and firing regulations increase labour costs and, thereby, decrease flexibility and increase unemployment. In turn, trade unions are thought to raise wages above market-clearing level, which destroys jobs, and to reduce productive efficiency through restrictive practices. Therefore the remedy recommended for high unemployment nowadays is that of increasing flexibility by removing rigidities in the labour market along US lines (e.g. OECD Jobs Study 1994, Alokoskoufis et al. 1995). The need for increased flexibility has further been motivated by increased globalization, which has made competition harder. In particular, globalisation together with the technological change have been evaluated to increase unemployment among the unskilled in OECD countries. And labour market regulation has hindered the required adjustment of wages. (Gregg and Manning 1997)

## 1.2 Study Outline

### 1.2.1 Description of the institutional features of the Finnish labour market

Below we briefly describe some of the central features of the Finnish labour market with regard to labour relations and legislation. We begin with labour relations. During the post-war period the rate of unionisation increased in Finland to the one of the highest in the industrialised countries. In the 1960s, the union density (organised labour force/ labour force) was on average 30 % and it has steadily grown to around 80% since the late 1960s when the political integration of the trade union movement and the establishment of an effective negotiated incomes policy took place. The high unemployment in the 1990s has further increased the unionisation. Besides the centralised bargaining system and high level of unemployment, the high unionization rates in Finland have been related to the fact that membership fees are tax deductible, fees are collected mainly by employers and the unions provide earnings-related unemployment insurance benefits. (Santamäki-Vuori and Parviainen 1996, Pehkonen and Tanninen 1997)

The unions are organized nationwide either by industry or professions. Individual unions, in turn, are members of central confederations. There are three central confederations in Finland: the Central Organization of the Finnish Trade Unions (SAK) representing blue-collar workers (1.1 million members), the Confederation of Technical Employees organization (STTK) (620 000 members) and the Confederation of Unions for Academic Professionals in Finland (AKAVA) (320 000 members). The share of the SAK members of all unionized members has decreased since the 1970s. This is partly due to the change in the occupational structure of the labour force and the growth of unionization among white-collar workers in the 1970s. The degree of unionization is higher in the public sector and

among white-collar workers than it is in the private sector and among blue-collar workers. There are also marked industry-specific differences in unionization rates: in the state sector 93 % of the employed workers were organized, as against 85 % in the municipal sector, 84% in agriculture and forestry and 80% in the manufacturing sector and, finally, 49 % in the private service sector. (Kauppinen and Köykkä 1991; Santamäki-Vuori and Parviainen 1996)

Employers too are well-organized. As far as the employer side is considered, there are four major central organisations and three smaller ones. Over 60 % of the private sector employees (almost 700 000 employees) work in firms that are members of the two largest employers' confederations: Confederation of Finnish Industry and Employers (TT) and the Employers' Confederation of Service Industries in Finland (PT). Public sector employers have four organisations which represent the state, municipalities, church and some other public employers. The biggest of these organisations are the Commission for Local Authority Employers (KT) and the State Employer Office (VTML). (Santamäki-Vuori and Parviainen 1996)

Since 1968 a centralized incomes policy has been a distinguishing feature of the Finnish labour market, but different kinds of stabilisation agreements have been made ever since the year 1940. It began with the reunification of the Social Democratic Party and trade union movement and the new government's stabilisation policy. The Finnish incomes policy agreements can be characterised as tripartite agreements as three negotiators have been involved: the employees' and the employers' organisations and the government. Besides wages, prices, taxes, social security and working-time adjustments have belonged to the negotiation agenda. In particular, tax decisions and the social welfare reform have been connected to the wage negotiations.

The procedure of the centralized wage formation is characterized by a three-step process. First, the central organisations negotiate. If they reach an agreement, the so called frame-agreement, it sets the general guidelines for wage developments. Second, at the union level individual unions negotiate collective agreements, which are legally binding and prescribe minimum terms to be included in all employment contracts. Third, at the local level, i.e. in individual firms, talks on implementing the agreements are held. Contract lengths have varied from one to two years. During the period 1968-1994 there was always a collective agreement in force in Finland. In the case of only five years during this time was the collective agreement bargained at industry level with no economy-wide agreement (1973, 1980, 1983, 1988 and 1994) (Tyrväinen 1995). The collective agreements also cover non-unionized workers and, therefore, non-confederation employers must follow the agreements. The collective agreements are generally binding if at least 50 % of the total employees in the sector fall within their scope.

The implementation of collective agreements in the private sector, in manufacturing industry in particular, has often implied that pay rises have differed from those centrally negotiated. This is called wage drift, i.e. the wage increments paid on top of the negotiated wage increase. During 1970-1995 wage drift averaged 30 % of the total wage increases (Vartiainen 1994).

The labour market legislation in Finland concerns three important areas: employment protection legislation, regulation of working time and minimum wage regulation. Much of this legislation has resulted from tri-partite co-operation and has been connected to incomes policy. In the area of job security, a large number of laws have been passed during the last twenty years. This legislation has improved employees' job security significantly. The General Agreement on Employment Security concluded by STK and SAK in 1966 for the first time restricted the employers' right to dismiss or lay-off without a specified, valid reason. This same agreement also deals with the order of lay-offs and specifies which groups get special protection. The Severance Payment Act of 1970 stipulates the compensation payable to persons who have been dismissed for economic or production reasons and who due to their age (40-65 years) may have difficulties in finding another job. The Employment Contracts Act of the same year regulates employment contracts for a fixed-term or for an indefinite period, and stipulates 75 days as a maximum for lay-offs and two weeks as prenotification for dismissals and temporary lay-offs. Under the Act fixed-term contracts are restricted to situations such as performing a task of fixed duration, for traineeship or if the permanent occupant of the post is temporarily absent. This law has been amended in 1979 and 1989. In 1978 the prenotification time was extended to one to four months depending on the service length of the employees and to three months in the case of temporary lay-offs. Prenotification was further extended to two to six months in 1989. The Dismissals Act of 1984 restricted the employer's right to dismiss workers in the context of ownership changes in the firms and imposed new limitations on the use of fixed-term employment contracts. This act also stipulates the procedure for investigating the grounds for individual dismissals and also imposes a conditional compensation scheme. (Lilja et al. 1990).

The Working Hours Act regulates regular working hours and overtime. The Act limits regular working hours to 8 hours per day and 40 per week. With regard to overtime, an employer may not allocate more than 200 hours of daily overtime per year to a single employee.

Minimum wages are set by collective agreements. The sectoral agreements imply that there are differences in minimum wage levels across sectors. In most collective agreements, minimum wages are graded by age so that employees under 18 can be paid lower wages.

### **1.2.2 The purpose of the study**

The present study emphasizes the importance of insider dominated wage setting and employment protection legislation in the functioning of the Finnish labour market. The issues of particular interest are how these mechanisms affect the employment performance of the Finnish labour market and whether they have a marked effect on the functioning of the Finnish labour market. Both these factors and their functioning are connected with the institutional factors characterizing the Finnish labour market. These two mechanisms are also in close connection with each other as is illustrated by the following figure. The employment protec-

tion legislation is one source of turnover costs, which gives insiders market power to bargain for higher wages. Hence, employment protection legislation affects employment performance in the economy directly by affecting employers hiring and firing decisions and indirectly via the wage setting mechanism<sup>4</sup>.

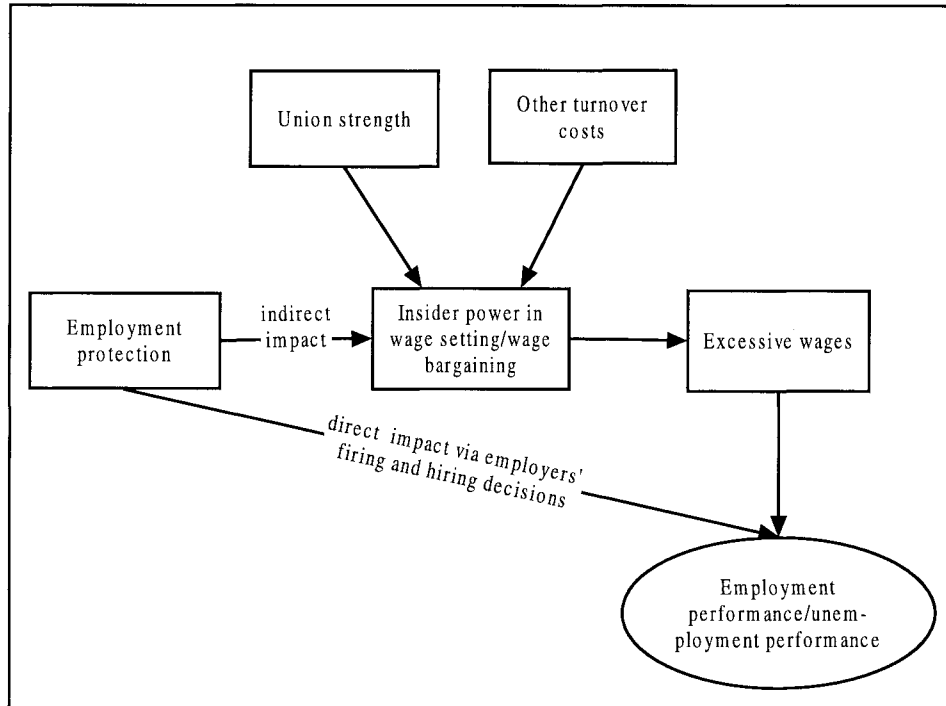


Figure 2.2 The relationship between employment protection legislation and insider power in wage setting.

An obvious motivation to study the sources of unemployment persistence in Finland is its current mass unemployment. The country has had the second highest unemployment rate of the OECD countries since 1993, and the unemployment has shown only a slow decrease. With the high unemployment rate the share of the long-term unemployed has also risen, constituting over 30 % of all the unemployed in 1997.

Employment protection legislation and insider dominated wage setting deserve to be paid closer attention. First, there is an obvious lack of empirical knowledge about the influences of these two mechanisms in the Finnish labour market. Earlier contributions in the field of insider-outsider theory are few. Eriksson (19-

<sup>4</sup> As regards the other mechanisms of unemployment persistence and empirical evidence from the Finnish labour market, we do not go into details here, but are content merely to give references to empirical work conducted with the Finnish data. Kettunen (1993) studies the role of unemployment benefits. Among others, Eriksson (1988), Aarnio (1989) and Lilja (1992) analyse the impact of the duration of unemployment for the persistence of unemployment. Pehkonen (1994) analyses long-term unemployment in Finland.



88) studied both insider and outsider hysteresis using annual data from the Finnish manufacturing and private sector. His results concerning insider hysteresis were mixed. As for outsider hysteresis his results implied that short-term, medium and long-term unemployed have differing impacts on real wages. Elomaa's (1988) study also investigated insider hysteresis (1988). The earlier contributions in the field of job security include Rahiala and Teräsvirta's (1988) study on labour hoarding. In addition, job security has been used as an explanatory variable in explaining long-term unemployment (Pehkonen 1994) and in explaining inflows and outflows from unemployment (Eriksson and Pehkonen 1995).

In the theoretical literature and empirical work these two mechanisms have been considered as prominent candidates which might partly explain unemployment persistence. But the earlier empirical evidence on the impact of these mechanisms is far from clear-cut and, therefore, further evidence from different countries is needed.

The main general questions which this study seeks to answer are as follows:

- (i) What are the main predictions of the insider-outsider theories in the light of the theoretical work done so far?
- (ii) What does the empirical evidence imply about the relevance of the insider-outsider explanation of unemployment persistence?
- (iii) What are the main implications of employment protection legislation on the performance of the labour market?

In the context of Finnish labour market:

- (iv) What is the role played by insider and outsider factors in wage determination in the Finnish labour market?
- (v) Do asymmetries exist in the adjustment of wages and employment as predicted by the insider-outsider theory?
- (vi) Can we detect membership hysteresis effects in the Finnish labour market?
- (vii) How does employment protection legislation affect the adjustment of employment to fluctuations in demand?
- (viii) How does employment protection legislation affect the adjustment of the number of working hours to fluctuations in demand?

As regards the effects of these two mechanisms on the functioning of the Finnish labour market, our approach is empirical in nature. As mentioned above, the reason is the obvious lack of empirical evidence on the impact of these two effects in the Finnish labour market. The empirical work utilises annual or quarterly time-series data except for Chapter 3 where panel data is employed. Hence, the empirical results are mostly based on time-series analysis in this study. With regard to the degree of spatial aggregation, we utilise both aggregate level data from the whole economy and from the manufacturing sector and more disaggregate level data from the different manufacturing industries. The availability of data has affected the level of aggregation of our data set.

### 1.2.3 The insider-outsider explanation of unemployment persistence

In Chapter 2 a survey of the insider-outsider explanation of unemployment per-

sistence is given. The insider-outsider explanation emphasises the wage setting behaviour as a mechanism through which even temporary shocks may have long-lasting effects in the labour market and cause unemployment persistence. The purpose of the survey is to analyse the main consequences of the insider wage setting for labour market performance, employment performance in particular, on the basis of both theoretical insider-outsider models and empirical evidence. In addition, as regards the theoretical work, the aim is to highlight the main features of these models (e.g. the source of insider power, the role of insider membership rules) and how they differ from each other with respect to these main features. On the basis of the empirical evidence, we also attempt to evaluate the relevance of the insider-outsider models in explaining unemployment persistence.

What are the main consequences of the insider wage setting as regards the employment performance? First, the insider-outsider model holds that insiders by their wage-setting policy can prolong the effects of adverse shocks on employment and thereby cause unemployment persistence. Those who lost their jobs during a recession may find it difficult to get re-employed after the recession, because the insiders have the market power due to turnover costs and unionization to maintain or even increase real wages and, thereby, prevent the employment of outsiders. In these models, the severity of unemployment consequences depend on how much weight outside conditions are given in insider-dominated unions' preferences. If an insider union cares only about the previously employed (the assumption made only in the most rigid models), the result is unemployment hysteresis (e.g. Blanchard and Summers 1986). The more weight outsiders are given in insider unions' preferences, the smaller the persistence effects on unemployment<sup>5</sup>. Second, the insider-outsider models imply that predicted changes in variables affecting labour demand show mostly in wages while unpredicted changes show mostly in employment. Third, the insider wage setting behaviour also implies that there may exist asymmetric adjustment of wages and employment upwards and downwards in such a way that wages are more rigid downwards than upwards, and due to wage behaviour employment changes are greater downwards than upwards (e.g. Lindbeck and Snower 1988).

As far as the empirical evidence on the insider-outsider explanation is concerned, it is ambiguous and mixed. The empirical work can roughly be divided into three categories: (i) studies that test hysteresis effects, i.e. both the insider hysteresis and outsider hysteresis effects, (ii) studies on the relevance of insider

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<sup>5</sup> The assumption of no outsider influence on wages is too rigid. The more realistic insider-outsider models (e.g. Blanchard and Summers 1987, Nickell and Wadhvani 1990, Heylen 1991) allow outsiders to have influence on wages. There are various channels through which outsiders can affect wages. First, high unemployment makes it harder for the laid-off to find a new job in the labour market, which insiders can be expected to take into account in their wage demands. Second, high unemployment affects wages through another channel: when the gap between the insider wage and the reservation wage paid to outsiders becomes large enough, the firm may be tempted to replace insiders by outsiders in spite of the costs this involves. Third, new firms can hire outsiders and through price competition force insider groups in other firms to accept lower wages.

and outsider factors in wage determination and (iii) studies on the nature of the adjustment of wages and employment in upward and downward directions.

On the basis of the empirical work, there is not much evidence on insider hysteresis effects, implying that wages would depend negatively on the past level of employment. On the contrary, there is much more evidence on the outsider hysteresis effects resulting from the limited downward pressure of the long-term unemployed on wages. This can be interpreted in favour of the insider-outsider theory, where insiders take into account of the interests of insiders and short-term unemployed, but not those of the long-term unemployed. The studies on the relative importance of insider and outsider factors imply that both insider and outsider factors matter for wage-setting, and the unemployment variable appears significant almost without exception. The importance of external factors, unemployment in particular, can be interpreted against the most strictest insider-outsider models, which allow no role for outsider influences. With regard to the nature of the adjustment of wages, the empirical evidence implies that wages show more responsiveness in an upward than downward direction. The empirical evidence in favour of the asymmetric adjustment of employment, however, is scanty.

#### **1.2.4 Insider and outsider factors in wage determination**

In Chapter three we study the relevance of the insider and outsider factors in wage determination in the Finnish labour market. The importance of internal versus external forces in wage determination at the firm and sectoral level has been a popular target of many studies during recent years, including Nickell and Wadhvani (1990), Holmlund and Zetterberg (1991), Nickell and Kong (1992), Forslund (1994), Graafland and Lever (1996), Johansen (1996). Among other things, empirical evidence on the relevance of insider-outsider theory has been drawn from such studies. The purpose of our study is to contribute to two issues that have not received much attention in the Finnish labour market: (i) What is the role of industry-specific and outside factors in wage determination in different Finnish industries? and (ii) Do wages depend positively on the change in the employment level, i.e. are any insider hysteresis effects detectable in Finnish industries?

As regards the estimation method, we apply the general method of moment technique (GMM) by Arellano and Bond in the estimation of nominal wage equations that comprise both insider and outsider factors. Our data consists of the annual panel of 180 Finnish industries for the period 1985-1994. We also apply the method of Holtz-Eakin, Newey and Rosen (1988) to conduct causality tests on the importance of insider factors and hence get further evidence of the robustness of our results from GMM.

The main findings of the study are that both insider and outsider factors play role in industry level wage formation, but the greatest influence is exerted by the outside wage level with coefficients of around 0.6-0.7. The dominating impact of outside wages compares with the results for other European countries. The coefficients of insider weight of 0.04-0.06 imply only a small, positive influence of

insider factors and thereby support the view of the smaller relative importance of insider factors in countries with centralized wage setting. The small, positive hysteresis term proxied by the change in the employment level implies some evidence of industry-specific hysteresis. The causality tests conducted by the method of Holtz-Eakin, Newey and Rosen (1988) confirm the significance of insider factors in industry level wage formation in Finland.

### 1.2.5 Asymmetric adjustment of wages and employment

Chapter 4 deals with the asymmetric responses of wages and employment to shocks. One of the implications of the insider-outsider theory is that wages tend to be more rigid downwards than upwards and due to this employment also behaves asymmetrically. The downward rigidity of wages has received attention before the development of insider-outsider theories and micro-foundations for such behaviour have been offered by many authors (see Layard et al. 1991). The insider-outsider theory holds that wages are not completely rigid downwards, but there may exist asymmetries in the adjustment of wages upwards and downwards. Therefore “the view that wages are rigid is too simple but it remains possible that there are asymmetries” (Layard et al. 1991, 207). One way to interpret the asymmetry is that the insider wages react more to firm-specific/industry-specific conditions in good times than in bad times.

The purpose of the study is to test the asymmetric adjustment of wages and employment in response to shocks by utilising time-series data from the Finnish manufacturing sector during 1961-1994. The earlier evidence from other countries (e.g. Blanchflower 1988, Nickell and Wadhvani 1990, Holzer and Montgomery 1990) suggest asymmetric behaviour on the part of wages upwards and downwards, whereas the evidence on the asymmetric behaviour of employment is sparser and less. The study is worthwhile for two reasons. First, the nature of adjustment of wages and employment in response to shocks has received relatively little attention in empirical work on the Finnish labour market. Secondly, the high unemployment together with growing share of the long-term unemployment makes the issue one of top priority. Therefore it is important to get more empirical evidence as to the possible mechanisms in the Finnish labour market that may cause unemployment to persist.

The nature of employment adjustment, in particular its extensive margin (the number of employees) is studied with the testing procedure developed by Begg et al. (1989). The procedure is based on the estimation of a simple insider-outsider model with OLS. The central issue in the test is how insiders, when knowing the direction and magnitude of the shock, adjust employment and hours. Regime-switching regressions allowing different adjustment paths in response to expected changes in labour demand upwards and downwards are estimated. According to our results, the data does not imply asymmetric adjustment in the the number of employees.

### 1.2.6 Membership hysteresis

The purpose of the study presented in Chapter five is to provide evidence on the relevance of the membership hysteresis hypothesis utilising Finnish employment and union membership data for the period 1950-1993. This hypothesis implies that insiders/insider-dominated unions can induce hysteresis effects in employment and, due to the close relationship between employment and union status, they can induce hysteresis effects in the union membership as well. Employment hysteresis has earlier been studied with Finnish data by Eriksson (1988) and Elomaa (1988). Eriksson's results based on the estimation of Phillips-type wage equations and employment equations did not give clear evidence on the existence of insider hysteresis. Elomaa, who studied insider hysteresis by testing insider and random walk hypotheses along the lines of Nelson and Plosser (1982) with Finnish aggregate employment data rejected the random walk, but could not reject the unit root. Therefore, there is need for further evidence.

To study the employment and membership hysteresis we employ two different tests suggested by Burda (1990), viz. tests for unit root and Granger causality. If there exists membership hysteresis (i) autoregressive representations of employment and union membership should contain a unit root and (ii) both employment and union membership should Granger-cause real consumption wages. We conduct ADF and Phillips-Perron tests to detect a unit root. In the case of the Granger causality tests we employ the VAR technique. The advantage of these test methods is that they do not require explicit parameter estimations.

According to our results, unit root tests provide evidence of membership hysteresis. We cannot reject the unit root for manufacturing and total employment data, and for the total union membership data and for union membership data for four of our six sample unions. The results of the Granger causality tests, in turn, do not provide evidence of the existence of membership hysteresis in Finland. With regard to the results from the Granger causality tests, our results accord with those for other Nordic countries (see Burda 1990b).

### 1.2.7 Job security and the functioning of the labour market

In Chapter six ('Job security and labour market performance') the main aim is to analyse the question of how job security affects the functioning of the labour market on the basis of theoretical and empirical work. We deal with the following areas, where job security may affect the functioning of the labour market: the impact of job security on both the dynamics of employment and its average level, and related to this, the impact of job security on the level of unemployment. With regard to the effects of job security on employment dynamics, we also deal separately with the evidence provided by job turnover data. In addition, we tackle the indirect effects of job security on employment, the impact it has via the determination of wages. To survey the impact of job security legislation is of particular interest as there has been an increasing pressure towards the deregulation of job security since the 1980s in Europe. These pressures have become stronger in Fin-

land in the 1990s with the worsened unemployment problem. In addition, there is a need for a survey of the impacts of employment protection in order to clarify the picture, since the earlier theoretical and empirical studies suggest contrasting effects. This summary tries to contribute to this issue.

A clear implication of the theoretical and empirical analyses is that job security stabilizes the variation in employment and unemployment to demand fluctuations, i.e. although it decreases the number of hirings during upturns, it also decreases the number of dismissals during downturns. Conversely, the predictions of the impact of job security on the average level of both employment and unemployment are far more mixed, though the majority of both theoretical and empirical studies suggest that job security has a positive effect on the average level of employment and an adverse effect on the level of unemployment. Differences in unemployment rates between countries cannot be explained by the degree of strictness of job security legislation. What job security may have contributed to is the creation of long-term unemployment because it diminishes the exit rate from unemployment.

As regards the wage effect, job security may affect wages both directly and indirectly. Job security may directly increase wage pressure by incurring higher adjustment costs of labour, and thereby creating bargaining power for current employees to exploit in the wage setting. In the theoretical context it has been shown that other labour market institutions such as the minimum wage legislation may be necessary for job security to have this effect. The empirical evidence on the direct wage effect of job security is scarce and mixed. What comes to the indirect effect of job security on wages, i.e. the impact operating via long-term unemployment, there is some evidence that stricter job security raises long-term unemployment, and thus enhances hysteresis in wage setting.

### **1.2.8 Job security and the adjustment of labour**

The impact of job security provisions (legislation and regulations) on the adjustment of both aspects of labour input, i.e. the number of employees and hours per employee, is studied in Chapter Seven. The purpose of this study is to address the following questions in the context of the Finnish labour market: (i) How do job security provisions, which incur costs of adjustment, affect the speed of adjustment of the number of employees fluctuations in demand? (ii) Has the adjustment changed over time along with the changes in the job security legislation? and (iii) Does adjustment via hours per employee differ from adjustment via the number of workers? This study is motivated by the fact that this is an area where surprisingly little empirical work has been carried out in Finland. Rahiala and Teräsvirta (1988) studied the relation between a firm's adjustment costs and labour hoarding, i.e. the tendency to hold excessive labour. In addition, employment protection has been used as one explanatory variable in explaining long-term unemployment (Pehkonen 1994) and in explaining inflows and outflows from unemployment (Pehkonen and Eriksson 1995). However, none of these studies have considered the role played by job security legislation and labour adjustment costs

in the speed of adjustment of labour to fluctuations in demand.

In our study we utilise quarterly data from the Finnish manufacturing sector 1971(1)-1992(4) and from the three industries: the paper and pulp industry, the manufacture of metal products and the textile and clothing industry 1976(1)-1992(4). The quarterly data is employed in our estimations, because we believe it matches better the timing of the employers' decisions than the use of annual data. The questions posed above are analysed in the framework of a dynamic labour demand model. To establish the dynamics, an error-correction model is specified by the two-step Engle-Granger method. The error correction model is convenient for our purposes, as the coefficient of the error-correction term directly provides the speed of adjustment of employment to demand fluctuations. After the estimation of the error-correction models, we replace the adjustment speed coefficient in each error-correction model by a set of variables that might explain that adjustment speed.

A change in labour input induces adjustment costs which are different in the case of adjusting the number of employees and the number of hours worked by each employee. Whereas the alteration in the number of workers implies fixed costs such as search and screening costs, training expenditure and costs due to the job protection legislation (the prenotification of dismissal and right to severance pay), hours can usually be altered either without or with only slight adjustment costs. These different costs could reasonably be assumed to lead firms in the first instance to prefer adjusting their labour input by changing the hours of work per employee to hiring and firing workers. The Finnish working time legislation allows firms to adjust the number of working hours in three different ways: overtime work, lay-offs and a shortened working week.

Our results suggest that the adjustment of working hours is quicker than the adjustment of the number of workers. We found that the speed of adjustment of working hours per employee expressed as median lags was 1.7 lags at most, whereas the rate of adjustment of the number of employees was 3 median lags at most. That the adjustment of working hours per employee is faster is in line with the theoretical considerations and with earlier empirical evidence from other countries. As far as the adjustment of the number of employees is concerned, the adjustment was slowest in the textile and clothing industry. The obtained median lags describing the speed are around three quarters for the textile and clothing industry, two quarters for the manufacturing sector as a whole, 1.4 quarters for the manufacture of the metal products and 1.2 quarters for the paper and pulp industry. Correspondingly, the speed of adjustment of working hours was fastest in the textile and clothing industry (0 median lags) and slowest in the total manufacturing sector (1.7 median lags). The differences in the adjustment speeds of working hours between industries might partly be explained by the production technology used and the capital intensiveness of the production process. Compared with the reported median lags in empirical studies from other European countries, the adjustment speeds of hours worked and of the number of employees in Finland do not seem exceptionally slow.

In the manufacturing sector as a whole our reparameterization results sug-

gest that both unionization rate and unemployment rate affect the speed of adjustment of both number of employees and hours per employee. As expected, the unionization rate seemed to slow down the adjustment and, in turn, the unemployment rate seemed to speed it up. In addition, in the estimations trend obtained a negative significant coefficient in the ECM for the number of employees, which implies that the adjustment of number of employees has become more flexible over time. When the trend was left out of the set of adjustment cost variables, of the employment protection variables, PROT also obtained a negative, significant coefficient.

Of the three separate industries, in the paper and pulp industry both the unionization rate and the dummy DIS affected the adjustment speed of the number of workers, the unionization rate slowing down the adjustment of the number of workers and DIS speeding it up. In the other two industries, the adjustment cost variables did not obtain significant coefficients in the nonlinear system estimation. The replacement of the adjustment coefficient in the ECM by a set of variables explaining the adjustment succeeded in two cases out of the four: in the total manufacturing sector and in the textile and clothing industry. The trend gained significant value in the ECM for the total manufacturing sector, implying that the adjustment of hours has become more flexible. In the textile and clothing industry the unionization rate gained a negative value, implying that unions seek to encourage the adjustment of hours instead of the number of employees.

### 1.3 Possible extensions

As far as possible extensions and improvements are concerned, the following issues at least merit further research. In the area of job security provisions, the assumptions about the structure of the adjustment costs affect the path of adjustment. In our estimations of the adjustment speeds of labour input we have assumed symmetric, convex adjustment costs. In future research it would be interesting to see how the assumption of asymmetric convex costs, which allows the costs of hiring and firing to differ from one another and thereby appears more realistic, would affect the results. In addition, in our estimations of the error-correction models we have utilised the Engle-Granger two-step method. For comparison, the application of the Johansen-Juselius method in these estimations would be interesting. In the reparameterization of the adjustment speed coefficient, finding better proxies for the adjustment cost variables such as job security might be worthwhile. One further possible extension would be to conduct a country comparison between Finland and some other countries which differ from each other in the degree of job security. Another extension would be to conduct a comparison of the speeds of adjustment between different sectors, e.g. the manufacturing and the service sector. The study of the direct wage effects of job security would also be challenging. In the area of insider-outsider considerations, the use of micro-level/firm-level data, in studying the asymmetric adjustment of wages and employment would also be a clear improvement.



## 2 THE INSIDER-OUTSIDER EXPLANATION OF UNEMPLOYMENT PERSISTENCE

### **Abstract**

This study analyses the insider-outsider explanation of unemployment persistence on the basis of both theoretical and empirical work. The theory offers an explanation as to why unemployment returns to its pre-shock level very slowly or why temporary shocks may even change the equilibrium itself. The basic idea is that if wage bargaining is a prevalent feature of the labour market, the dynamic interactions between employment and the group of insiders may generate employment and unemployment persistence. The persistence effects can arise because changes in employment may change the membership of the insider group and thereby alter its objective function in the wage setting. Wages are primarily determined by insiders or unions primarily pursuing insiders' interests, and outsiders do not have much influence in this process. The market power of the insiders derives from the turnover costs of labour and from unionization. If the insider status is closely linked with employment, temporary downswings may have persistent effects on employment and unemployment. By allowing the firm to have some bargaining power or the outsiders to have some weight in the insiders' objective function, the strict hysteresis effect of a one-time shock is eliminated. There is evidence of persistence effects, but the evidence on strict hysteresis caused by insider membership dynamics is scarce. The empirical evidence provides more evidence of outsider hysteresis effects. In addition, the evidence suggests that both insider and outsider factors are important in wage determination and that wages show more responsiveness in upward than in downward direction.

### **2.1 Introduction**

Unemployment and its persistence at a high level has posed a major problem faced by many OECD countries during the past few decades. Particularly worrisome has been the development of unemployment in Europe. Average European unemployment has been much higher in 1980s and 1990s compared to the earlier decades (Figure 2.1). In the 1990s, the Scandinavian countries, which in the 1980s

succeeded keeping unemployment low, have also experienced an increase in unemployment to unprecedented levels. Typical of the dynamics of unemployment has been that it increases much faster than it falls.

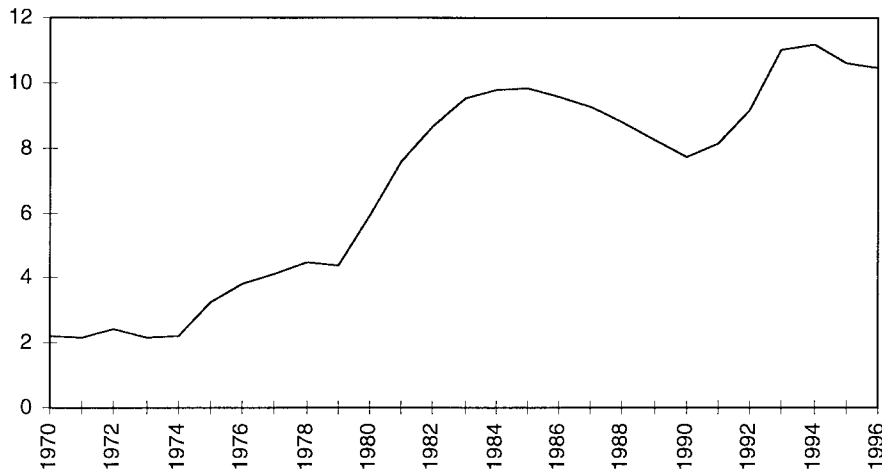


Figure 2.1 Unemployment rate (%) in Europe, 1970-1996.

According to Pissarides (1989), in the analysis of unemployment three items need to be explained. These are, (i) What kind of shocks can cause changes in unemployment? (ii) What is the mechanism that transfers the effects of shocks to employment? and (iii) What is the mechanism that causes the effects of shocks to persist in the economy? In the European context, the initial growth of unemployment has been quite animously traced back to adverse supply shocks such as the first and second oil shock, the slowdown in productivity growth and tight monetary and fiscal policies pursued in many European countries (e.g. Layard et al. 1991; Bean 1994). But the puzzling part, which has obtained increasing attention since the mid-1980s, has been to explain why unemployment rates have not fallen, although economic conditions have improved. Therefore, this has led to an increasing interest in finding the mechanisms that can explain why the effects of adverse shocks have persisted in the labour market.

The problem of unemployment persistence has commonly been located in the labour market and its imperfect functioning. One strand of thinking has been that the current high unemployment levels are a result of an increase in equilibrium unemployment, which has changed due to the change in the basic structural determinants of the natural unemployment rate (Holmlund 1991). But it has been hard to find evidence for this view (see Alokoskoufis et al. 1995). Alternative explanations of unemployment persistence have been offered by so called persisten-

ce or hysteresis theories, put forward in the literature in the 1980s and 1990s. The idea in these theories is that the rise in equilibrium unemployment itself is a consequence of past shocks rather than reflecting any change in the fundamental determinants of equilibrium unemployment (Alokoskoufis et al.1995). These mechanisms cause unemployment to return to its equilibrium level very slowly after shocks or they may eventually change the equilibrium itself, in which case they would cause hysteresis effects<sup>1</sup>.

The four mechanisms/sources emphasised in the literature are the insider-outsider mechanism (the insider-outsider theory), the human capital/prolonged unemployment mechanism (the duration theory), the physical capital mechanism (the capital shortage theory) and employment protection mechanism. Of these, on the demand-side, job security regulations such as hiring and firing costs have been argued to hinder employers' adjustment of their workforce to fluctuations in output. Because job security slows down the reduction in downturns, it has been assumed to raise the shadow price of labour and, thereby decrease the willingness of employers to hire new workers in upturns, hence having a depressing impact on employment (e.g. Lazear 1990). The other demand-side theory, i.e. the capital shortage theory (e.g. Sneessens and Dreze 1986), argues that after a recession the reduced capital stock may be inadequate to employ the current labour force.

On the supply-side/ the wage-setting side of the labour market, the insider-outsider theory (e.g. Lindbeck and Snower 1988; Blanchard and Summers 1986) argues that unemployment situation may not be recovered after a recession, because wage-setting is dominated by employed insiders who seek to raise their wages once their own employment is secure and do not put all that much weight on the interests of unemployed outsiders. The other supply-side theory, the duration theory (e.g. Layard and Nickell 1986) pays attention to the behaviour and characteristics of unemployed outsiders, especially the long-term unemployed. According to the duration theory, the long-term unemployed exert very little downward pressure on wages and they are not in effective competition for jobs. There are various reasons for this, e.g. the activity of the long-term unemployed to apply for jobs may decrease with the duration of unemployment (discouragement phenomenon) and their skills (human capital) may deteriorate during unemployment because they are not able to maintain and update their skills and they may be discriminated against by employers.

The purpose of this study is to take a closer look at one of these mechanisms, viz. the insider-outsider explanation of unemployment persistence. On the basis of theoretical and empirical work we aim to shed light on how, according to this mechanism, temporary shocks to employment may create persistence of unemployment. The insider-outsider theory is based on the idea that if wage bargaining is a prevalent feature of the labour market, the dynamic interactions between

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<sup>1</sup> According to Franz's definition (1987, 92) there is hysteresis in unemployment when the present level of unemployment is dependent on its last periods' values, the coefficients of which sum up to one.

employment and the size of the group of insiders may generate substantial employment and unemployment persistence (Blanchard and Summers 1986). The seminal contributions to the development of the insider-outsider theory are Blanchard and Summers' (1986,1987) hysteresis model and Lindbeck and Snower's (1985, 1986, 1988) insider-outsider model. Other important contributions to the insider-outsider literature include Solow (1987), Gottfries and Horn (1986), Caruth and Oswald (1987), Begg (1988) and Drazen and Gottfries (1990). A summary of these important insider-outsider models is given in Appendix 2.1. Here we concentrate on representing the main features of Blanchard and Summers' and Lindbeck and Snower's models and their implications about the persistence effects on employment caused by the insider-dominated wage-setting system. The dominant role is on the membership rules determining the membership of the insider group.

As far as the empirical evidence is concerned, we present evidence in favour of the insider-outsider theory on the basis of testable implications of the theory, dividing the empirical work into three broad categories: (i) studies on hysteresis and persistence effects, (ii) studies on the relative importance of the insider and outsider effects in wage determination and (iii) the nature of the persistence effects on wages and employment due to insiders' wage policies.

The rest of the paper is organized as follows. Sections 2.2 and 2.3 present two of the seminal contributions to the insider-outsider theory and section 2.4 analyses separately the most important aspects of the insider-outsider approach from the perspective of how they can attribute to the persistence of unemployment. Section 2.5 presents a review of different types of empirical work conducted on the insider-outsider approach and the empirical evidence on the validity of this explanation of unemployment persistence. Finally in section 2.6. some concluding comments and policy implications are presented. The estimates of three different indicators of the trend rate of structural unemployment indeed seem to track the evolution of actual unemployment quite closely.

## **2.2 Blanchard and Summers's model**

Blanchard and Summers's hysteresis model of unemployment persistence (1986, 1987) is, together with Lindbeck and Snower's (1985, 1986, 1988) insider-outsider model, the seminal contribution to the insider-outsider literature. In the following we briefly describe the main features of the model and sketch its implications for generating employment and unemployment persistence under different membership rules. In the model the rules regulating insider membership play an important role in the dynamic relationship between insiders and employment.

### **2.2.1 Wages and employment in one period model**

In the model, wage bargaining is presented as a model reminiscent of the monopoly union model, where the group of insiders first unilaterally chooses the wage

and the firm then chooses employment given the wage and the realized value of the technological shock as a result of the profit maximization. It is assumed that firm is passive in wage setting and outsiders have no influence on wages. The labour demand function faced by the insiders is (in logarithmic form<sup>2</sup>):

$$(2.1) \quad n = -cw + e,$$

where  $n$  is employment,  $w$  is the real wage,  $c$  is the real wage elasticity of employment and  $e$  is the random technological shock, which is uniformly distributed in  $[Ee - \alpha, Ee + \alpha]$ , where  $\alpha$  represents the random element of the shock and the mean  $Ee$  is known to the insiders, when they set the wage.

Insiders maximize the expected utility of their representative member

$$(2.2) \quad U = p + bw,$$

which is linear in the retention probability  $p$  and the wage  $w$  ( $b$  is the marginal utility of the real wage). This kind of specification of the utility implies a stochastically inelastic labour supply so that an increase in expected productivity  $Ee$  is entirely absorbed into wages and the retention probability is left unchanged.

The retention probability (see for derivation Blanchard and Summers 1986) is given by

$$(2.3) \quad p = 1, \text{ if } n > n_0, \text{ i.e. } n_0 + cw \geq Ee - \alpha \\ = 1 - (1/4a)(n_0 + cw - Ee + \alpha)^2, \text{ if } n < n_0, \text{ i.e. } n_0 + cw \leq Ee - \alpha \\ (n_0 \text{ is the initial number of insiders})$$

When  $n < n_0$ , the probability is an increasing function of the expected productivity  $Ee$  and a decreasing function of the initial membership  $n_0$ , the wage and the degree of uncertainty  $\alpha$ .

The optimal wage in the model is obtained as a solution to the maximization of the insiders' objective function (when  $p$  in equation (2.2) is replaced with equation (2.3) and the utility function is derivated with respect to the wage)

$$(2.4) \quad w^* = (1/c)(-n_0 + Ee + \alpha(2(b/c) - 1))$$

When  $w$  is replaced with  $w^*$  in labour demand equation (2.1) and in equation (2.3), we get employment

$$(2.5) \quad n = n_0 - \alpha(2(b/c) - 1) + (e - Ee)$$

and the optimal probability

$$(2.6) \quad p^* = 1 - \alpha(b/c)^2$$

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<sup>2</sup>All variables in the model, unless otherwise not mentioned, are in logarithmic form.

It can be seen from (2.4) that the optimal wage depends negatively on the initial membership. As  $(e-Ee)=0$  by definition, the sign of  $\alpha(2(b/c)-1)$  determines whether employment exceeds the insider membership in equation (2.5). If  $\alpha(2(b/c)-1) < 0 \Leftrightarrow b/c < 1/2$ , then expected employment is greater than the initial membership. If, on the other hand,  $b/c > 1/2$ , employment is smaller than the membership. The lower the marginal utility of the wage,  $b$ , is, the more weight insiders put on the employment protection. The higher the wage elasticity of employment,  $c$ , the smaller the wage reduction has to be to increase expected employment.

### 2.2.2 Membership rules and their implications for employment dynamics

In the one-period model, insiders do not have to take into account the impact of their wage demand on the insider membership of the next period. In the dynamic model there is a relationship between current employment and next period insider membership. This relationship depends on the form of the membership rules indexed by  $m$ . The impact of insider wage setting on employment and future membership is inspected under three different membership rules: (i) membership is forever  $m=\infty$ , (ii) membership is equal to employment  $m=1$  and (iii) the intermediate case, where  $1 < m < \infty$ .

In the case of constant membership ( $m=\infty$ ), the insiders' objective function is the same as in the one-period model. The utility function of a representative member in period 0 is thus

$$(2.7) \quad U_0 = E_0 \sum r^i [p_i + bw_i], \quad r < 1 \quad (r \text{ is the discount factor})$$

It is assumed that shocks to labour demand are serially uncorrelated over time, i.e. uniformly distributed in  $[-\alpha, +\alpha]$  ( $Ee_i = 0$ ). Therefore the retention probability in period  $i$ , given wage  $w_i$ , is

$$(2.8) \quad p_i = 1, \text{ if } n_0 + cw_i \geq -\alpha \\ = 1 - (1/4\alpha)(n_0 + cw_i + \alpha)^2, \text{ if } n_0 + cw_i \leq -\alpha.$$

Because employment outcomes cannot change the insider membership and shocks to labour demand are white noise, the insiders' maximization problem is the same every period and thus the solutions for optimal wage  $w^*$  and employment are the same as in the one-period case:

$$(2.9) \quad w^* = (1/c)(-n_0 + \alpha(2(b/c) - 1))$$

$$(2.10) \quad n = n_0 - \alpha(2(b/c) - 1) + e_i$$

In response to white noise shocks, employment will also be white noise. Whether employment is smaller or greater than the initial membership, depends again on whether  $(b/c) < 1/2$  or  $(b/c) > 1/2$ .

In the case where membership is equal to employment ( $m=n_{i-1}$ ), the insiders' intertemporal maximization problem is not as clear-cut as in the previous case,

because insiders know that the wage decisions in the next period will be made by an insider group that may be different from that of the current period. The cost of dismissal is now greater. This is likely to moderate the insiders' wage demand for a given labour demand, so that they can remain insiders.

By assumption  $w'$  is the wage level around which the insiders' objective function is linearized. The solution to the maximization problem then yields

$$(2.11) \quad w^* = (1/c)(-n_{i-1} + \alpha(2(b/c)(1/(1+brw')) - 1))$$

$$(2.12) \quad n_i = n_{i-1} - \alpha(2(b/c)(1/(1+brw') - 1) + e.$$

The retention probability is a constant and given by

$$(2.13) \quad p^* = 1 - \alpha[(2(b/c)(1/(1+brw')))^2]$$

Under this membership rule employment follows a random walk with a drift. Uncorrelated shocks to employment change the current employment, and through it, the insider membership and expected employment in the next period. As a consequence of this kind of relationship between insider membership and employment, there exists unemployment hysteresis, i.e. the evolution of equilibrium unemployment follows the path of actual unemployment and temporary, unexpected shocks may have permanent effects on unemployment.

In the intermediate case of membership rules ( $1 < m < \infty$ ), the insiders do not lose their membership immediately after dismissal and newcomers do not become insiders straight away. Therefore there may be differing interests as regards wage demands. Newcomers and unemployed members are likely to be in favour of more moderate wage policies than the incumbent insiders. Thus, under this membership rule, insiders' wage demands are likely to be more cautious than in the case  $m=1$ , but less cautious than in the case  $m=\infty$ . Further, under this rule, a long sequence of shocks of the same sign has large effects on membership and on the mean level of employment, but not the short one.

The outcomes of the model for employment and unemployment dynamics depend to a great extent on the membership rules in the model. When the insider membership is closely linked with employment, there is substantial persistence in employment. When membership does not change or changes little with changes in employment, employment is likely to show much less persistence. The model also implies that the membership depends on the distribution of the shocks. If shocks have large variance, the membership must be close to one to avoid large differences between it and the employed.

In the model temporary shocks may have long-lasting effects on unemployment for two alternative reasons. First, when  $1 < m < \infty$ , the sequence of adverse shocks will lead to a change in insider membership and, thereby, change the level of employment permanently. Second, when shocks are large and lots of members are laid off, the current employees may take over and ignore the interests of the unemployed members in the wage setting, thus reducing  $m$  and increasing persistence.

### 2.2.3 The persistence effects of nominal and real shocks to labour demand

Persistence effects of shocks to labour demand generated by the insider wage setting can be formalized in the following macroeconomic model, where insiders now set nominal wages so that nominal shocks can also affect employment. In the goods market there are  $n$  monopolistically competitive firms, who all face a following demand function (all variables in logarithmic form) :

$$(2.14) \quad y_i = -s(p_i - p) + (m - p), \quad s > 1,$$

where  $y_i$  = the firm's output,  $p_i$  = nominal price charged by the firm,  $m$  = nominal money and  $p$  = the price level.

Thus the demand for the firm's output depends both on the relative price of the product and on aggregate real money balances, i.e., the consumers' stock of real money. Each firm operates under constant returns to labour, which implies that  $n_i = y_i$  (increase in the labour input increases output in the same proportion). In profit maximization under these assumptions each firm chooses  $p_i = w_i - e$ , where  $e$  is the random technological shock. Replacing  $p_i = w_i - e$  in equation (2.1) gives the labour demand for firm  $i$ :

$$(2.15) \quad n_i = -s(w_i - e - p) + (m - p),$$

By assumption the insider membership rule  $m=1$  is applied so that at time zero the insider membership equals the previous period's employment  $n_i(-1)$ . In the model insiders maximize their nominal wage subject to the firm's labour demand curve, i.e. they choose the nominal wage on the basis of their expectations of the price level ( $E_p$ ), nominal money ( $E_m$ ) and the value of the technological shock ( $E_e$ ).

In the profit maximization insiders, choose a wage so that the expected level of employment equals the membership plus a constant. Ignoring the constant this is

$$(2.16) \quad -s(w_i - E_e - E_p) + (E_m - E_p) = n_i(-1),$$

which implicitly defines the wage  $w_i$  as a function of the membership  $n_i(-1)$  and of the expectations of  $E_e$ ,  $E_m$  and  $E_p$ .

Since  $m=n(-1)$  applies to all insider groups ( $n_i(-1) = n(-1)$ ) and nominal prices in each firm equal the aggregate price level,  $w_i - E_e - E_p = 0$ . Thus from (2.3) we get

$$(2.17) \quad E_p = E_m - n(-1)$$

$$(2.18) \quad w_i = E_e + E_m - n(-1).$$

The expected price level depends positively on the expected nominal money and negatively on the insider membership. The nominal wage is a growing function of the expected technological shock and the expected nominal money and a decreasing function of the insider membership.



Replacing  $w_i$  and  $E_p$  by their values in (2.2) and aggregating (2.2) yields the labour demand function

$$(2.19) \quad n = n(-1) + (m - Em) + (e - Ee)$$

The demand function implies that only unexpected nominal and real shocks can affect employment. In response to the expected changes in productivity, insiders set real wages so that employment does not change. This comes from the assumption of inelastic labour supply. Also, in response to expected aggregate demand insiders set nominal wages so that they all retain their jobs.

Unexpected shocks can have long-lasting effects on employment and unemployment through membership changes. Under membership rule  $m=1$ , once employment is reduced, it permanently stays at a lower level due to insiders' wage setting, unless other unexpected shocks change the situation. When employment falls, the number of insiders is also reduced. In the next period the remaining insiders set wages so that the last period's employment is secured. Given the insider workforce, the equilibrium unemployment is the same as the actual unemployment in the last period. Under the membership rule  $1 < M < \infty$ , a short sequence of negative shocks in aggregate demand does not have permanent effects on equilibrium unemployment, but it takes a long sequence of negative shocks to cause persistent changes in equilibrium unemployment.

In the model there is no straightforward relation between employment and real wages. This is due to the assumptions of constant returns to scale and constant elasticity of demand, due to which nominal shocks do not affect real wages or the markup of prices over wages. Therefore it is possible to have high sustained unemployment in the model without high real wages<sup>3</sup> and, moreover, it is possible to lower unemployment through economic policies without altering real wages.

#### 2.2.4 Extensions of the model

Although the persistence effects are more likely to be present when there are explicit unions, they may arise in settings where insider-outsider considerations are important. Blanchard and Summers (1986) argue that even in nonunion contexts current incumbent workers and prospective workers cannot be regarded symmetrically. This is because the requirement of co-operation and the collective knowledge possessed by incumbent workers make their position different.

Making extensions to the model eliminates the result that one-time shocks have permanent effects on employment. First, if the insiders' objective function in-

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<sup>3</sup>According to Franz's definition (1987, 92) there is hysteresis in unemployment when the present level of unemployment is dependent of its last periods' values, the coefficients of which sum up to one.

<sup>4</sup>The role of high real wages has been emphasized in explaining the high persistent unemployment in many European countries (see e.g. Bruno and Sachs 1985).

cludes positive utility in the event of unemployment, it is less attractive for insiders to reduce the wage to increase the probability of employment when the number of insiders is large and the wage is low than it is when the number of insiders is small. Second, if the firm has some bargaining power or the outsiders have some weight in the insiders' objective function, the wage does not rise to fully offset reductions in the number of insiders. Under plausible assumptions, introducing considerations like these causes employment to return gradually to its initial level after a one-time demand shock. Without membership dynamics, however, employment returns immediately to its initial level. Thus making the number of insiders endogenous still has important implications for the dynamics of employment. (Romer 1996)

### **2.3 Lindbeck and Snower's insider-outsider model of unemployment persistence**

Lindbeck and Snower's model of unemployment persistence is based on their microeconomic explanation of involuntary unemployment, the so-called insider-outsider hypothesis of involuntary unemployment. Therefore we first briefly go through the main features of this hypothesis and explain how according to this hypothesis involuntary unemployment may exist.

#### **2.3.1 The insider-outsider hypothesis of involuntary unemployment**

Unemployment is involuntary if unemployed workers do not by underbidding, i.e. by offering to work at a lower wage, get jobs at which they are as competent as incumbent workers. Lindbeck and Snower's (e.g. 1985, 1988) explanation of the failure of underbidding is based on the firms' and insiders' rational utility maximization and the distinction of the work force into insiders (currently incumbent workers) who have market power in wage negotiations and unemployed outsiders and newcomers/entrants who do not have any influence on wages. According to the hypothesis, insiders have the market power to set wages above the market-clearing level, i.e. the Walrasian level, due to the turnover costs, which firm incurs when insiders are replaced with outsiders and which raise the outsiders' reservation wage above the level at which employers would be willing to employ them. These turnover costs are divided into three categories: (i) hiring, training and firing costs, (ii) costs which incur when insiders refuse to co-operate with newcomers and harass them, and (iii) costs caused by lower productivity and lower effort, because the turnover weakens the work morale. In the wage setting, the insiders are able to capture some or all of the turnover costs to their wages. The insider wage can exceed the entrant wage by the marginal firing costs at most and the outsider reservation wage by the sum of the marginal hiring and firing cost at most.

Because this hypothesis was developed to explain involuntary unemployment, the skill differences between insiders and outsiders must also be taken into

account. For this purpose the turnover costs are further divided into two classes: (i) production-related costs (hiring and training costs), which are necessary for production and (ii) rent-related turnover costs (firing costs), which do not affect production directly. The skill differences are evaluated on the basis of the production-related costs. The skill difference between the insider and the outsider is the difference of their marginal productivities plus the production-related costs spent on the insider. If the difference of the insider wage and the outsider reservation wage exceeds the skill difference, the outsider is involuntarily unemployed.

### 2.3.2 The model of unemployment persistence

The aim of Lindbeck and Snower's model of unemployment persistence (1988) is to show how the exercise of insider market power in wage setting affects the ability of the labour market to recover from a recession. The point they like to make is that in economies with large labour turnover costs and powerful insiders, negative, unexpected shocks to employment tend to persist relatively long and may create unemployment persistence.

The model consists of the wage-setting equation and the entry-exit function regulating insider membership. The focus is first on a single firm, whose wage-employment activity is later interpreted as a microcosm applicable for the entire labour market. In the model two types of insiders are distinguished: union members and employed nonmembers. By assumption the union members (or the union) only take care of their own interests and employed nonmembers are fired before union members. The wage is assumed to be the outcome of a Nash bargain between the firm and the union, and the employment decision is made by the firm alone. Thus the question is about the right-to-manage bargaining model. The wage is set before the realized value of the demand shock  $\theta$  is known (but with perfect information of the distribution of the shock). The employment decision is made by the firm with information about the wage and the realized value of the shock. In the model the firm maximizes its profits

$$(2.20) \quad \Pi = \theta f(L) - WL,$$

where  $\theta f(L)$  is the firm's production function,  $\theta$  is the random demand shock with a time invariant distribution,  $L$  is the number of employees and  $W$  is the wage. Solving the first-order condition of (2.7) with respect to employment yields the labour-demand curve

$$(2.21) \quad L = l(W/\theta), \quad l' < 0$$

By assumption, the union members are risk-neutral and each of them faces the same retention probability in the model. Therefore the union maximizes the expected utility of each of its members in the model. For simplicity, the utility of the member is  $U(W)$  when employed, and zero if he is fired. Thus the union's objective function is

$$(2.22) \quad U = \sigma U(W),$$

where  $\sigma$  is the incumbent insider's expected retention probability.

Letting  $L^t$  be the current number of union members and letting  $l(W/\theta) = L^t$ , the retention probability can be defined as

$$(2.23) \quad \sigma = \int [L/L^t] G(\theta) d\theta + \int G(\theta) d\theta,$$

where  $G(\theta)$  is the density of  $\theta$ . The retention probability is decreasing both by the increase of wage and by the growth of the union membership.

So far the turnover costs have not explicitly been taken into account. Let  $T$  be the firm's turnover cost, which is incurred when the firm fires an insider and hires an outsider, and  $R$  be the reservation wage. When the turnover cost  $T$  is taken into account, the firm's objective in the wage negotiations is  $B = \Pi(W) - \Pi(R + T)$ , where  $\Pi(R + T)$  represents the firm's threat point, i.e. the profit that accrues when insiders are replaced with outsiders. Combining this and the union's objective  $C = \sigma U(W)$ , yields the following Nash bargain:

$$(2.24) \quad \max \Omega = B^\beta C^{1-\beta} \text{ subject to } W \geq R, \Pi(W) \geq \Pi(R + T) \text{ and } \Pi(W) \geq 0$$

( $\beta$  measures the bargaining strength,  $0 < \beta < 1$ ).

The first constraint implies that union members prefer employment to unemployment and the second and third ones imply that the firm has no incentive to replace insiders by outsiders or close down the firm. The second constraint also implies that the upper limit for the wage is  $R + T$ :  $W \leq R + T$ . The first order condition of (2.11) for an interior solution is

$$(2.25) \quad C_w + (\beta/1-\beta)(C/B)B_w = 0,$$

from which it can be shown together with some restrictions on the density of the demand shock and the production function (see Lindbeck and Snower 1988, xx) that the bargained wage depends negatively on the size of the union membership and positively on  $R + T$ . In other words, a larger union membership decreases the retention probability and thus lowers the wage demands. The greater  $R + T$  is, the higher the firm's threat point, and the higher the wage. These implications apply in the model when the wage ranges between the reservation wage  $R$  and  $R + T$ .

In the model the current insider membership ( $L^t$ ) is determined by the rule

$$(2.26) \quad L^t = (1-r)L_{-1}^t + h[(1-r)(L_{-1} - L_{-1}^t)],$$

where  $r$  is the retirement rate and  $h[(1-r)(L_{-1} - L_{-1}^t)]$  is the entry-exit function, which describes how many of firm's employed nonmembers become union members and how many dismissed members exit from the union.

This entry-exit function has the following characteristics:

$$\begin{aligned} h &= 0, & \text{if } L^t &= L_{-1}^t, \\ h &= 1, & \text{if } L^t &< L_{-1}^t, \\ 0 &\leq h \leq 1, & \text{if } L^t &> L_{-1}^t. \end{aligned}$$

In other words, there is a free entry to membership of the union, if each of the last period's nonmembers, who are employed in the current period, obtain membership ( $h=1$  for all  $(L^1 - L^1_{-1})$ ). There is no entry, if employed nonmembers have no opportunity of joining the union ( $h=0$  for  $L^1 - L^1_{-1} \geq 0$ ).

### 2.3.3 The exercise of the insider/union power and the impact of temporary, unexpected labour demand shocks

The previous model of wage-employment activity is now interpreted to apply to the entire labour market. The following figures help to inspect how the use of insider market power or union power affects the labour market equilibrium and may create unemployment persistence effects in response to shocks. The labour demand function is given in figure 2.2a. The wage-setting equation and the entry-exit function presented in Lindbeck and Snower's model are pictured in figures 2.2b and 2.2d, respectively.

Lindbeck and Snower distinguish two effects through which the exercise of the insider(union) power in wage bargaining may cause temporary, unexpected shocks to labour demand have long-lasting effects in the labour market:

#### (I) *The symmetric persistence effect*

The union affects the wage so that temporary shocks to labour demand create persistent, symmetric changes in unemployment. A negative shock in labour demand increases future unemployment and a positive shock increases future employment. If the positive and negative shocks are of same size, the changes in unemployment are also of equal magnitude.

#### ii) *The asymmetric persistence effect*

Positive and negative shocks to labour demand have asymmetric impacts on unemployment: as a consequence of a negative shock the fall in employment is reater than the rise in employment as a consequence of a positive labour demand shock of equal magnitude. This is due to the fact that the wage increase from a positive shock is greater than the corresponding wage fall from a negative shock.

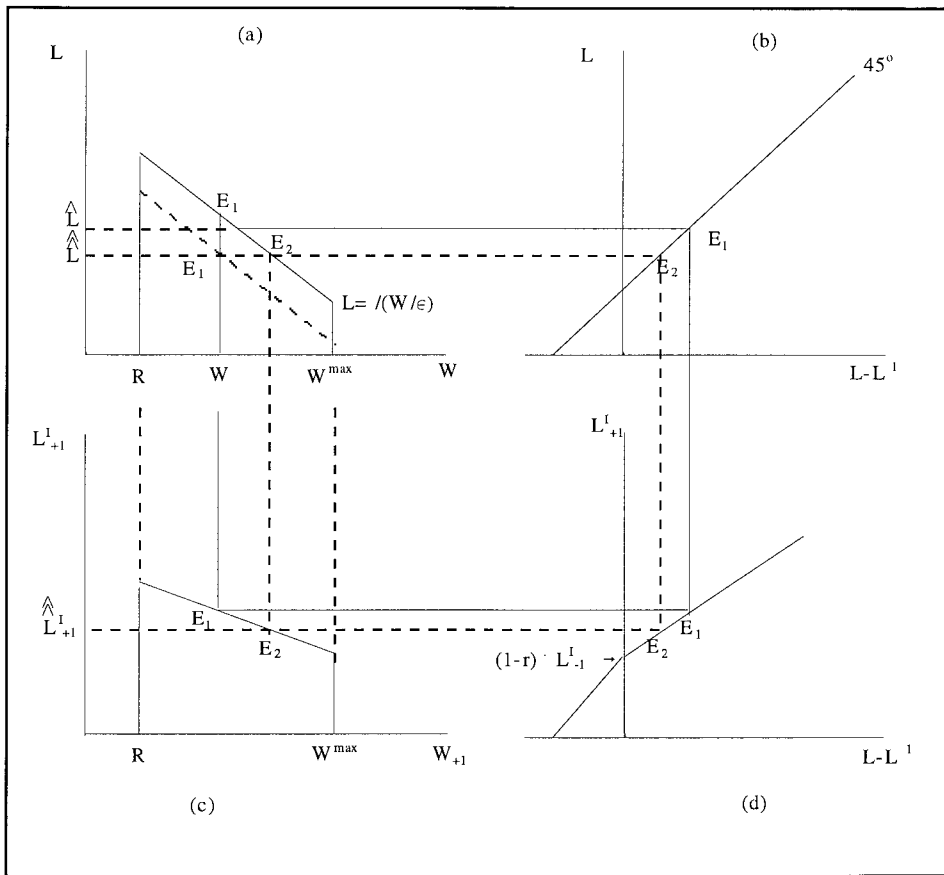


Figure 2.2 Labour market equilibrium and the unemployment persistence effects (Lindbeck and Snower 1988, 216).

Let us place the symmetric persistence effect under a closer scrutiny first. Assume that there is a negative, unexpected shock to labour demand after the wage is negotiated to level  $W$ . The labour demand curve shifts downward and thus implies a lower employment,  $L$ , for the current wage (point  $E_1'$  in figure 2.2a). Assuming  $h > 0$ , the current number of insiders is reduced. Since a fall in the membership raises the retention probability, the union negotiates a higher wage in the next round. This is shown by point  $E_2$  in figure 2.2a. At the higher wage level the firm will hire fewer new workers than it otherwise would have done. Therefore, for any  $\theta_{+1}$ , the current rate of employment will be lower.

The symmetric persistence effect is influenced by two factors. First, the entry conditions affect the magnitude of the effect, when  $h > 0$  and  $L > L^I$ . The easier it is to enter the union (insider group), the more the change in employment will affect the number of insiders, and thus the greater will be the symmetric persistence effect. Second, the union's bargaining power affects the persistence effect in the following way: an increase in union bargaining power will lead to a greater wage

response to a given change in  $L^I$  and thus strengthen the symmetric persistence effect. The larger the wage response to employment change, the flatter the  $W-L^I$  curve in figure 2.2c.

There are two conditions on which the exercise of insider power may generate asymmetric persistence effects. First, there must be less than free entry to the insider membership, i.e.  $h < 1$ . When  $h < 1$ , the left-hand side of the entry-exit function is steeper ( $45^\circ$ ) than the right-hand side. This means that all the dismissed insiders lose their influence on wage determination, but not all the hired entrants are able to join the union and thus obtain an influence on wages. Therefore a negative labour demand shock leads to a greater change in the current insider membership than a positive shock. And further, it leads to a rise in future wages and unemployment greater than the fall in wages and unemployment from a positive shock of similar magnitude. This implies that random labour demand shocks with a stationary mean may cause a ratchet effect on wages and employment, characterized by an upward trend in wages and unemployment and a downward trend in the number of insiders.

The ratchet effect is limited by three factors. First, the wage ratchet is bounded from above: the wage cannot be raised above the  $W^{\max}$  without the firm replacing insiders with outsiders<sup>s</sup>. Second, with this upper limit for wages, unemployment will rise only if the random labour demand shocks have a stationary mean. Third, a fall in the union membership is likely to be accompanied by a fall in bargaining strength as well, which is likely to lower wages and unemployment.

### **2.3.4 The exercise of insider power and the impact of foreseen, permanent labour demand shocks**

Also predictable, permanent shocks to labour demand may result in persistence effects on the labour market due to insiders' wage bargaining. Expected shocks may cause persistent changes in wages and employment when the insiders' wage responses to positive and negative shocks differ from each other. Insiders may have incentive for asymmetric wage responses if (i) all insiders are not equal and the seniority rule (first in, last out) is applied in firing, and insiders have some influence on the labour turnover costs; and (ii) insiders face different unemployment risks in upswings and downswings, and (iii) the insider-dominated union has kinked indifference curves in which the indifference curves are downward sloping when all the insiders are not employed and flat after the point where all the insiders are employed (see Carruth and Oswald 1987a for details).

### **2.3.5 The role of outsiders in wage bargaining**

There are extensions to the basic insider-outsider model by which outsiders may also have an impact on wages. First, the existence of the secondary sector of the labour market, where wages are determined competitively and the importance of turnover costs is smaller. Second, membership rules affect outsiders' possibilities to influence wages: the longer it takes for an insider to lose his impact on wages

after dismissal, the more weight outside factors have in wage decisions. Finally, If the wage is a result of a Nash bargain between the union and the firm, the outside factors influence wage decisions through both the firm's and union's objectives in the negotiations.

## 2.4 The evaluation of insider-outsider models

Before turning to the empirical evidence provided about the insider and outsider effects in wage formation, we discuss some of the most important aspects of the insider-outsider models, possible extensions and the criticism which the insider-outsider models have been subjected to.

### 2.4.1 Sources of insiders' market power

In the insider-outsider models, insiders possess market power to bargain for a higher level wage than the market clearing one. Three sources of insider power have been brought out in different insider-outsider models: (i) turnover costs of labour, (ii) unions and (iii) firm-specific skills. How credible are these three as sources of insiders' market power? Let us consider turnover costs first. Of these, firing costs make a credible source of the market power. The size of these costs in most countries is regulated by statutory job security legislation or by collective agreements. Statutory legislation has been regarded as increasing the shadow price of labour and, thereby, decreasing employers' willingness to hire during up-turns. This, in turn, has been seen to increase inequality between incumbent insiders and increasingly long-term unemployed outsiders. On the other hand, Vetter and Andersen's (1994) analysis of the ability of insiders to extract rents show that the higher the rents from exogenous turnover costs are, the greater the incentives for outsiders to become insiders by underbidding. This restricts the possibilities of insiders to extract rents and also sets a lower limit to the number of insiders who can prevent outsiders' getting jobs by underbidding.

Although insiders can have market power even if they are not organized as unions (e.g. Lindbeck and Snower 1988; Blanchard and Summers 1986), unions can be regarded as playing an important role as intensifiers of the insiders' market power. Organized as a union, insiders can intensify their power and obtain a larger share of the rent that it is to be divided:

*"The unions can more easily boost labour turnover costs by both intensifying non-cooperation and harassment activities and by pursuing political lobbying for job security legislation that raises the firing costs of labour and they may also lobby for laws that make wages below those agreed upon in collective bargaining illegal for even unorganized workers" (Lindbeck 1991, 212).*

The role of firm-specific skills as a source of insiders' market power emphasised in some insider-outsider models (e.g. Begg 1988) is not that credible. Rather it would seem more likely that workers possess an industry-specific human capital



instead of human capital related to one specific industry.

#### **2.4.2 The degree of the centralization in wage bargaining**

Most insider-outsider models do not take into account the impact of the degree of centralization in wage negotiations for the insiders' wage policies<sup>4</sup>. However, the level of centralization of the bargaining notably makes a difference to the performance of employment. It has been established in many studies (see e.g. Newell and Symons 1987; Calmfors and Driffill 1988; Calmfors and Nymoen 1990; Layard et al. 1991; Heylen 1993) that there is a connection between low unemployment and centralized wage bargaining. The rationale behind this result is that under centralised bargaining the negative externalities of a wage increase in one part of the economy on others will be internalised, i.e. the bargainers internalise all the employment effects of the wage bargain and thus have incentives for real wage restraint. The marginal costs from a real wage increase are higher, because under centralised bargaining the bargainers' outside opportunities are more limited than under decentralised bargaining: the only alternative to employment is living on benefit.

Thus the persistence effects of temporary shocks on employment due to insiders' wage policies may also depend on the degree of centralization in the bargaining. Under centralised bargaining, the effects are smaller because unemployed employees are not disenfranchised to the same extent as under decentralised wage setting and insiders have more incentives for wage moderation (Layard et al. 1991). According to Layard et al., the empirical evidence from Scandinavian countries with powerful unions but no detectable insider effects suggests that the distinction might rather be between decentralised union bargaining and the rest than between union and non-union firms. The connection is, however, not necessarily that clear. Moene et al. (1991) suggest that the centralised bargaining can lead to lower unemployment, if the unions come to an agreement about how to spread the wage increase between themselves. But if there is no co-operation and an internal agreement, centralised bargaining can become a form of multi-level bargaining that is not centralised at all.

#### **2.4.3 Membership considerations**

The outcomes of the insider-outsider models for the dynamics of employment and unemployment depend greatly on the insider membership rules, i.e. whose interests are advocated in the wage bargaining, as was shown above. The consequences of temporary shocks to employment and unemployment are more drastic in the models where only the incumbent employees are considered members of the insider group and the unemployed are outsiders. If the insider membership is extended to the short-term unemployed as well (e.g. Graafland 1992; Lever

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<sup>4</sup> A notable exception is Heylen (1993).

1991), wage policies are likely to be different. The extension of insider membership to the short-term unemployed also brings the insider-outsider theory closer to the duration theory, where the short-term unemployed are closely connected to the employed and have an impact on the wage bargaining unlike the long-term unemployed who have been disenfranchised and have lost their influence on the wage setting.

Another possible extension of the insider-outsider models would be to bring seniority considerations into the insider-outsider models as is done by e.g. Drazen and Gottfries (1990). Most insider-outsider models assume a hiring hall union, where all union members are identical and jobs/lay-offs are allocated by random draw. But the assumption of seniority in lay-offs and hirings seems to fit better the facts in the real world. For example, in many European countries seniority considerations are applied in firings and the existing job security legislation makes it more costly to fire senior workers.

The implications of introducing seniority considerations into the insider-outsider model are that the insider group, whose interests are actually advocated in the wage bargaining, might be smaller than the group of employed workers. By seniority considerations it can be explained why all insiders are not equally inside and why senior insiders can demand higher wages without risking their own jobs. They also explain why the union would let the firm set employment unilaterally (Oswald 1993). Otherwise, it is hard to understand why insiders would leave the employment decision to the firm, as the opportunity cost of doing so is high<sup>5</sup>.

#### 2.4.4 Criticism

The strong version of the insider-outsider model has also been criticised for several other reasons. First, in Blanchard and Summers' (1986) model, wage-setting behaviour depends only on changes in employment, but not on the level of it (Hunter 1988; Booth 1995b). This implies that economies with totally different levels of employment should experience similar wage demands, which seems rather odd. The second problem is related to the turnover of the labour force. Critics have pointed to the fact that why employment has not fallen due to the high turnover of labour force, if unions only care about the interests of the surviving insiders in wage bargaining. Third, the strong version has been criticized for not reflecting the fact that in the long run the level of employment is affected by the size of the labour force (Layard and Bean 1989). Fourth, in the Blanchard and Summers' model there is no upper limit to the insider wage after which it would be profitable for the firms to fire insiders and replace them with outsiders. This constitutes a logical problem in the model, because the wages should be increas-

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<sup>5</sup>“Even if the union fixes the nominal wage, one wonders why it does not find ways of constraining hiring by the firm or of organizing the union by laws such that, for example, the current members maintain control of the union even if they lose their jobs” (Blanchard and Fischer 1989, 495).

ing and employment should be decreasing continuously (Hall 1986). Fifth, the strong version does not take into account the bargaining power of firms enabling them to bypass the unions and go straight to the unemployed outsiders at some cost (Blanchard 1988).

In addition, e.g. Blanchard and Summers' insider-outsider model has been criticized for the fact the model ignores the impact which the conditions in other markets besides labour markets have on the persistence of unemployment (Adams 1988). According to Adams (1988, 393-394), the structure of financial markets is important as it affects conditions on which finance for setting up new firms can be obtained. And similarly, the conditions in the goods market are important because they may affect the entry of the new firms and employers' incentives to negotiate directly with unemployed outsiders. Yet another notable problem of the insider-outsider model is that they take the initial number of insiders as historically given. But in a dynamic world, firms will know that today's new entrants become tomorrow's insiders. As the size of the incumbent insider group grows, the power of insiders to engage in rent-seeking activity falls. This possibility should affect the firms' optimal strategy in hiring outsiders (Chatterji 1991).

There have also been doubts that the use of insider power could be the main explanation for the divergence of the short-run NAIRU from the long-run NAIRU for such a long time (Layard and Bean 1989). According to Layard and Bean, these doubts have been based on two empirical notions. The first is that there is evidence of a strong outside influence on wages. The second is that there has been a huge movement in the unemployment-vacancy (U/V) curve, which is inconsistent with the implications of the insider-outsider models. If the insider-outsider approach were correct, a large rise in unemployment would lead to a collapse in the vacancy rate, but would not show in the location of the u/v curve. The empirical evidence in favour of and against insider-outsider models is dealt with in more detail in 2.5.

## 2.5 Insider-outsider considerations in empirical work

There are several testable implications deriving from the theoretical insider-outsider models. First, Blanchard and Summers' (1986), Lindbeck and Snower's (1988) and Gottfries and Horn's (1986) models imply that there is an inverse relationship between wages and the size of the insider group, which is proxied by the lagged employment terms in the wage equations. The smaller the group, the higher the wage demands and vice versa. Actually, the relationship may also be positive, if the following effect is dominant: the smaller the insider workforce, the smaller the bargaining power. Second, the strong versions of the insider-outsider models suggest that temporary adverse shocks may, due to the insiders' wage policies thereafter, cause long-lasting resp. hysteresis effects in employment and unemployment. Third, the insider-outsider models also suggest that, if the impact of the previous level of employment on the wage determination is allowed for,

the level of unemployment does not influence wages or has only a very minor influence. On the whole, the firm-specific or industry-specific factors play a more important role than outside factors according to the insider-outsider models. Fourth, in the model proposed by Lindbeck and Snower (1988) temporary shocks to labour demand may cause asymmetric persistence effects on wages and employment, if there is asymmetry in gaining and losing insider membership.

In addition, the small impact of the long-term unemployed on wage determination can also be interpreted to provide evidence in favour of the insider-outsider or the duration theory (Lever 1991, Graafland 1992). The result provides evidence of the insider-outsider theory if the union cares more about incumbent employees and the short-term unemployed than about the long-term unemployed. But if it is caused by the reduced search intensity of the long-term unemployed is evidence of the duration theory (Lever 1991). Besides the reduced search intensity, the reasons suggested for smaller wage pressure exerted by the long-term unemployed are the deterioration of human capital, the discouraged worker effect and the employers' ranking of the long-term unemployed as undesirable workers. The insider-outsider theory also stresses that if the duration effects worsen the employment opportunities of the long-term unemployed, they will also lose their influence on wage setting.

The empirical work done on the relevance of insider-outsider explanations can be broadly divided into three categories: (i) studies on hysteresis and persistence effects, (ii) studies on the relative importance of the insider and outsider effects in the wage determination, and (iii) the nature of persistence effects on wages and employment due to insiders' wage policies, although some studies could be located in more than one category. We use this division in the presentation of the empirical results and evidence.

### 2.5.1 Hysteresis effects

One strand of the empirical work on the relevance of the insider-outsider models, which has been very popular, is related to the persistence or hysteresis effects on employment and unemployment due to insiders' wage policies. If there exists hysteresis or persistence effects, the development of (un)employment should be path-dependent, i.e. dependent to a great extent on past levels of (un)employment. Therefore one way to study hysteresis/persistence effects has been to conduct unit root tests on employment (e.g. Burda 1990b; Elomaa 1988; Wikström 1992) and unemployment (e.g. Blanchard and Summers 1986). The interpretation is that there is hysteresis in (un)employment if the coefficients of the lagged (un)employment variables sum up to one. In addition, the unit root tests have also been extended to the membership data as well (Burda 1990). However, these kinds of studies based on time-series analyses of the employment or unemployment data do not explicitly identify the reasons underlying the persistence in the model. Besides, the unit root tests based on Dickey-Fuller tests pose the problem that they may not be valid when the time series under study is affected by a structural break (Perron 1991).

Another procedure for testing for hysteresis effects has been to estimate wage equations of Phillips type, where the growth of real wages depends on the change of (un)employment (e.g. Blanchard and Summers 1986; Eriksson 1988; Graafland 1988; Alogoskoufis and Manning 1988). The hysteresis effect in these type of equations has been detected by comparing the ratio of the coefficients on either current and lagged (un)employment or (un)employment lagged once or twice. If this ratio equals one, the real wage growth will depend on the change of (un)employment rather than its level. Blanchard and Summers' estimation results from such wage equations imply that hysteresis effects can be detected in employment and unemployment in the UK, Germany and France, but not in the USA. Blanchard and Summers's results are confirmed by Graafland (1989). He finds evidence for strong hysteresis effects in wage formation in Europe<sup>6</sup> (coefficients near 1), whereas the hysteresis effect for the USA amounts to 0.55. On the contrary, Alogoskoufis and Manning (1988) do not find membership/insider considerations to be a prominent source of persistence of unemployment in Europe or the USA, but find evidence for the significant role of real wage aspirations as a source of persistence. As for country-specific studies on hysteresis effects, Eriksson's (1988) results for insider hysteresis effects with Finnish data, for example, are mixed.

In addition to the hysteresis effects generated by membership changes, the hysteresis effects on employment and unemployment created by the behaviour of outsiders have been taken under scrutiny (outsider hysteresis). The outsider hysteresis effects have been studied by estimating wage equations of Phillips type, where the duration-specific unemployment variables, that is, short-term and long-term unemployment, have been included as explanatory variables (e.g. Layard and Nickell 1985, 1986; Coe 1988; Eriksson 1988; Neudorfer et al. 1990). With British data during 1953-1985, Layard and Nickell (1985) test the proposition that only the short-term unemployed have some impact on wages, whereas the long-term unemployed do not. For this purpose, they estimate wage equations using both the total unemployment rate and the short-term unemployment rate as a proportion of unemployment as explanatory variables. Their result simply that the greatest pressure on the wage reduction is exerted by the short-term unemployed (i.e. unemployed for under a year). The results received from the majority of other empirical studies on outsider hysteresis (Coe 1988; Eriksson 1988; Neudorfer et al. 1990) also confirm that the long-term unemployed exert less influence on wage demands than the short-term unemployed<sup>7</sup>. This result can be interpreted in favour of either insider-outsider models or duration models (see above).

Another test for outsider hysteresis has been to study the speed at which

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<sup>6</sup> Graafland (1988) treats Europe as a joint economy consisting of six countries of the EC: Belgium, France, Germany, Italy, the Netherlands and the UK.

<sup>7</sup> But also see Blanchflower and Oswald (1990, 1994), Blackaby et al. (1991) and Blackaby and Hunt (1992), where somewhat divergent results are presented.

the natural rate adjusts to the actual rate of unemployment (Coe 1988). In this test the natural rate has been defined as a lagged moving average of the actual unemployment rate and the degree of hysteresis has been related to the speed of adjustment of the natural rate to the actual rate of unemployment. On the basis of this test procedure, Coe (1988) finds strongest evidence of hysteresis for the UK, Germany, Australia, Finland and Spain, but only little evidence of hysteresis in the USA, Japan and Italy. In addition, hysteresis effects caused by the ineffectiveness of the long-term unemployed have also been studied by estimating unemployment-vacancy (U-V) equations, where a distinction between the short-term and long-term unemployed is made (Graafland 1991). The utilization of the U-V equation is based on the following type of reasoning. If the long-term unemployed do not actively look for a job or if they are disregarded by employers, the number of matchings will not depend on the long-term unemployment. Hence, a shift from short-term to long-term unemployment will reduce the number of matchings and raise the steady state level of the vacancy rate (Graafland 1991). Graafland's results from the U-V equations for the Netherlands provide evidence of outsider hysteresis.

To sum up, there seems to be more evidence of outsider hysteresis effects than of the hysteresis effects caused by the insider or membership dynamics. The pure hysteresis models, which assume that outside conditions like the overall unemployment rate play no role in wage setting, have mostly been rejected by the empirical evidence. The empirical studies on hysteresis effects are summarized in Table 2.2 below.

**Table 2.2 Studies of hysteresis effects**

Study	Data	The "type" of hysteresis tested	Testing method	Results
Blanchard and Summers 1986	time-series data from manufacturing sector for UK, Germany, France and the USA, 1953-1984	insider hysteresis; hysteresis caused by membership effects	Phillips type wage equation + employment equation	results suggest hysteresis in UK, Germany and France, but not in the USA
Layard and Nickell 1985	aggregate level, time-series data, UK, 1953-1983	outsider hysteresis: the duration effect of unemployment on wage pressure	wage equation, where short-term unemployment and total unemployment rate as separate variables	the greater share of the long-term unemployed implies a lower pressure on wages
Coe 1988	aggregate level time-series data from OECD countries; sample periods vary: all between 1964-1985	outsider hysteresis	1) wage equations, where short-term and long-term unemployment separate variables 2) proxy for natural rate of unemployment specified	little evidence of hysteresis in USA, Japan and Italy; strongest evidence for UK, Germany, Australia, Finland and Spain

Eriksson 1988	annual data from Finnish 1) manufac- turing sector, 1960-1985 2) private sector 1968-1985	1)insider hysteresis; 2)outsider hysteresis	1) Phillips type wage equation, employment and unemployment equations 2) wage equations, where short-term, medium-term and long-term unemp- loyment as separate variables	1)results concer- ning hysteresis mixed 2) evidence that duration-specific unemployment rates have differ- ing influence on real wages
Graafland 1988	annual aggregate data;EC-6 (Bel- gium, France, Germany, Ita- ly,the Nether- lands, the UK) and USA, 1970- 1985	insider hysteresis	Phillips type wage equation	Europe's wage formation shows strong hysteresis effects, whereas the US wage for- mation does not
Burda 1990	aggregate level time-series data from 8 European countries, USA; West-German union member- ship data, 1952- 1988, 1952-1985	membership hysteresis	Dickey-Fuller unit root test; Granger causality test	the German data provides support for the member- ship hysteresis
Neudorfer, Pichelmann and Wagner 1990	aggregate level, Austrian time- series data, 1966-1986	outsider hyste- resis	wage equations, where different unemploy- ment variables in- cluded	evidence of the long-term unem- ployed's lower pressure on wa- ges; does not necessarily imply hysteresis
Graafland 1991	aggregate level, Dutch time- series data, 1966-1987	outsider hysteresis	U-V equation, wage equation	U-V analysis: evi- dence of a weaker effect of the long- term unemployed on wages; estima- tion results of wa- ge equation do not give any such evidence

### 2.5.2 Insider and outsider effects in wage formation

Besides hysteresis effects, the relative importance of insider and outsider effects on wage formation has been a popular target in the empirical evaluation of the insider-outsider models (summary given in Table 2.3 below). The insider-outsider theory implies that if insiders have market power in wage determination, insider effects, i.e. the firm-or sector-specific conditions, should play a more important

role in the wage formation than outsider effects, that is, the conditions in the labour market as a whole.

*"Under these conditions, rules of fairness and equity for sharing productivity growth among the employed workforce are developed and the existence of idle workforce outside the firm may not exert a great deal of direct influence on wage growth." (Gregory 1986, S64).*

*"One implication of the insider-outsider model is that wages will be primarily, although not exclusively, determined by conditions specific to individual firms or industries rather than by conditions in the labour market as a whole." (Snower 1988, 3-7).*

For this purpose wage equations pertaining to insider and outsider factors have been estimated. In the estimated wage equations insider factors have been proxied by, among others things, technical progress, productivity, liquidity variables, expected output price, union strength and the previous level of employment. In turn, outsider factors have been presented by variables such as the average total wage rate, the regional level of unemployment, the aggregate level of unemployment, unemployment benefits and the replacement ratio. In addition, in these wage equations the inverse relationship between wages and lagged employment has been studied, but the evidence has not been very promising. Most of the empirical work on the relevance of insider factors versus outsider factors has utilized firm- or industry-level data. The firm-level data has been based on employers' interviews (e.g. Blanchflower et al. 1990; Nickell and Wadhvani 1990; Forslund 1994), published accounts of firms (Nickell and Wadhvani 1990) or on questionnaires administered to individual workers (Blanchflower 1988).

Most empirical studies on this subject have been done with the British micro- and industry-level data (e.g. Blanchflower 1988; Blanchflower et al. 1990; Nickell and Wadhvani 1990; Nickell et al. 1994). The main findings from these studies are that both insider and outsider factors play a role in the wage determination. The estimates for the magnitude of the insider weight from the British studies vary from 0.08 to 0.52. Blanchflower et al. (1990) estimate wage equations (weekly earnings as dependent variable) for unskilled, semi-skilled and skilled manual workers. According to their results from the individual wage equations, insider pressure in wage determination ranges from 20 per cent in the unionised sector and 30-40 per cent in the non-unionised one, whereas the wage band due to external pressure is around 15 per cent. Blanchflower (1988) reports very similar results from individual wage equations as well.

Nickell and Wadhvani (1990) study the relevance of the insider and outsider factors by estimating firm-specific wage equations<sup>8</sup>. Their results imply a significant long-run insider weight. Using different instrument sets, exogeneity assumptions and alternative samples they obtain values for the insider weight ranging between 0.08 and 0.15. They also find evidence of strong outsider effects as proxied by the level of unemployment and the share of long-term unemploy-

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<sup>8</sup>See also Scaramozzino's study (1991) on insider and outsider factors utilising the same data set.



ment. Nickell and Kong's (1992) results from the industry level wage equations (14 industries) provide evidence in favour of the significant role of industry-specific factors. Their estimates for the insider weight in different industries vary from 0.04 to 0.52, the larger estimates being for industries with strong unions. For 10 out of 14 industries there is evidence of a negative outside pressure.

The majority of the empirical evidence for the Nordic countries of the importance of insider and outsider factors in wage determination implies a smaller role on the part of insider factors, hence confirming the view as to the smaller relative importance of insider factors in countries with centralised wage setting. Holmlund and Zetterberg (1991) found for Sweden, Finland and Norway, using a panel of manufacturing industries, that industry wages are predominantly not modified by sectoral conditions. Their estimates for insider weight for Sweden are 0.03-0.12, 0.00-0.01 for Finland and 0.03-0.04 for Norway. Forslund's (1994) study utilising a Swedish panel of 434 firms during 1980-1989 supports the results for Sweden, implying that local performance has a minor influence on local wage determination. A notable exception is Johansen (1996), who shows for 114 Norwegian industries (1966-1987) that industry wages are significantly affected by industry performance similarly to countries with decentralised wage setting. His estimates for the insider weight are of the magnitude 0.20. As for other European countries, estimates of the weight of internal factors such as 0.04-0.12 for Germany (Holmlund and Zetterberg 1991) and 0.07-0.26 for the Netherlands (Graafland and Lever 1996) have been obtained. The greatest estimates for insider weight have been received for the USA (0.30-0.48) by Holmlund and Zetterberg (1991) with industry level data and for Japan (0.28-0.35) by Brunello and Wadhvani (1989). According to the majority of these studies, the role of outside factors, the average wage level in particular, is very important in wage determination. Also, the level of unemployment clearly affects wages, having in most a depressing effect.

In addition to studies taking into account both internal and external factors in wage determination, there are studies that concentrate on insider factors. Utilising annual, industry-level data for fourteen industrialised countries, Coe (1990) tests the hypothesis that only industry-specific variables are important in wage determination. For this purpose he estimates industry-specific wage equations, which nest a natural rate model and two versions of an insider-outsider model (an insider-outsider/hysteresis model and a real-wage bargaining model). Of the estimated wage equations for 196 industries, 70 per cent are correctly signed and the wage equations give evidence of the domination of insider factors in wage determination.

In short, empirical evidence on the impact of insider factors and outsider factors in wage determination, based on firm-level and industry-level data, suggests that both factors are important in wage determination. The majority of studies also suggest that the greatest single influence on wages is exerted by the outside wage level. As far as the relation between the importance of insider factors and union power are concerned, the results are mixed.

**Table 2.3 Empirical studies on insider and outsider factors in wage determination**

Study	Data	Purpose	Testing method	Results
Blanchflower, Oswald and Garrett 1987	data by workplace industrial relations survey on 2019 firms, UK, 1984	to study the importance of insider and outsider factors in wage determination + their relative importance	wage equations for unskilled, semi-skilled and skilled manual workers estimated	estimation results suggestive of the importance of both insider and outsider factors in wage determination
Blanchflower 1988	data on 3373 employees gathered by questionnaires, UK, 1983-1986	to study the insider factors versus outsider factors	individual wage equations estimated	outside labour market conditions have a depressing influence on the wage determination
Holmlund and Zetterberg 1989	industry level data from Sweden, Norway, Finland, West Germany and the USA, 1965-1985	do industry-specific wages respond more to industry-specific shocks or are they mainly determined by general economic conditions	industry-specific wage equations estimated	industry wages in USA reacted most sensitively to sectoral trend productivity growth and relative price changes of these five countries and the Nordic countries least
Nickell and Wadhvani 1990	219 UK manufacturing firms, 1972-1982	to study the importance of inside factors and outside labour market conditions in wage-setting	firm-level wage equation estimated	evidence of both insider and outsider influence (aggregate unemployment and the share of the long-term unemployed)
Coe 1990	annual time-series data from 15 industries (manufacturing and service sector); data from 14 OECD countries, 1965-1985	to study the hypothesis that only industry-specific variables important in wage determination	industry-specific wage equations estimated	evidence of the importance of insider factors

Study	Data	Purpose	Testing method	Results
Nickell and Kong 1992	annual British data on 14 two-digit industrial sectors, 1961-1985	to study the importance of insider and outsider factors; the connection between union power and the importance of insider factors	unrestricted and tightly specified wage equations estimated, joint significance of insider variables tested with F-tests, cross-industry variation between union power and insider factors analyzed	insider factors important: insider coefficients larger for industries with strong unions; in ten industries data show evidence of outside pressure
Forslund 1994	data on 434 Swedish firms collected via questionnaires, 1984-1988	to study the strength of insider effects in wage setting	firm-level wage equation estimated	evidence of small, positive effect of insider factors on wages; the outside factors play more important role
Johansen 1996	annual panel on 117 industries; Norway, 1966-1987	to study the importance of insider and outsider factors in wage determination	industry-level wage equations estimated	evidence of both insider and outsider influence on wage determination
Graafland and Lever 1996	annual data for 16 sectors; Netherlands 1963-1990	to study the importance of insider and outsider factors in wage determination	industry-level wage equations estimated	evidence of both insider and outsider influence on wage determination

### 2.5.3 Asymmetric adjustment of wages and employment

The insider-outsider theory also implies that temporary shocks to labour demand may cause asymmetric persistence effects on wages and employment due to insiders' wage policies under certain conditions, such as asymmetric entry and exit functions to the insider membership, seniority rules and insiders' kinked indifference curves. The point is that insiders are more willing to adjust wages to positive shocks than to negative ones. This also leads to the asymmetric adjustment of employment so that the changes of employment are greater to negative shocks than to positive ones.

The asymmetric adjustment of wages has received more empirical attention than that of employment. Studies utilising micro-level data on this subject are e.g. Bell and Freeman (1985), Blanchflower (1989), Nickell and Wadhvani (1990), Brunello and Wadhvani (1989) and Holzer and Montgomery (1992) and Johansen (1996) (see Table 2.4 below). Of these Blanchflower (1989), Nickell and Wadhvani (1990), Brunello and Wadhvani (1989) and Johansen (1996) specifically study the asymmetry of wages in an upward and downward direction caused by insiders'

wage behaviour. These studies have, almost without exception, established that wages adjust asymmetrically to changes in demand in both upward and downward directions. Instead, the asymmetric adjustment of employment has not been empirically established to the same extent. When interpreting these results, it is noteworthy that they are at least to some extent affected by the chosen test strategy and estimation method.

Blanchflower (1989), utilising UK data on individual workers, tests whether there exists a wage ratchet such that wages display more flexibility upwards than downwards direction. According to his results, in firms where employment was expected to rise, wages enhanced, whereas wages did not notably fall in those firms where employment was expected to decrease. Further, wages were more responsive to overall unemployment in the economy in non-unionised firms. The asymmetric behaviour of wages, i.e. smaller responsiveness to negative demand shocks, is also confirmed by Nickell and Wadhvani (1990) with British firm-level data. They studied such asymmetry where wages respond more to firm-specific factors, when demand is expected to go up than when it is expected to fall. To test asymmetry they interacted a dummy variable, taking the value one when demand was below trend and zero otherwise, with the insider variable in the wage equation.

Utilising data on large Japanese and British firms, Brunello and Wadhvani (1989) studied a similar type of asymmetry to that of Nickell and Wadhvani in the adjustment of wages by using four different types of dummy variables. Brunello and Wadhvani's results for the asymmetric behaviour of wages are mixed and seem to depend on the dummy variables used to a great extent. With Japanese firm-level data, they found that in two cases wages seemed to be more responsive to insider effects when times were good and in two cases when times were bad. In the British firms wages were more responsive to insider effects in bad times in three of the four cases. Johansen's (1996) results for Norway on the asymmetric adjustment of wage with industry level data were in line with those of Nickell and Wadhvani's (1990).

Bell and Freeman (1985) and Holzer and Montgomery (1990) studied the adjustment of wages with the US data. With industry level data, Bell and Freeman found that wages were more responsive to increases in sectoral productivity than to decreases. There were also differences between industries in the adjustment: a ten per cent change in productivity changed wages by two point eight per cent in most productive industries, whereas the corresponding wage change was two point three per cent for poor productivity industries. Utilising data of 3400 US firms, Holzer and Montgomery (1990) tested how wages and employment adjusted in response to positive and negative changes in demand. They also found wages to respond asymmetrically to sales growth: a rise in wages was significant when sales rose, but when sales declined, wages did not fall. They were unable to distinguish adjustment between large and small firms or between the manufacturing and non-manufacturing sectors. The only differences they detected were between unionised and non-unionised firms in that in non-unionised firms wages were rigid only downwards, whereas in the unionised firms

wages were rigid in both directions. As far as the adjustment of employment is concerned, Holzer and Montgomery did not detect asymmetric adjustment of employment, when they used the whole sample of firms. However, their corresponding results for subsamples showed a different adjustment of employment in small and large firms: small firms seemed to adjust their employment more in response to positive demand shifts, whereas larger firms adjusted the number of workers more in response to negative demand shifts.

**Table 2.5 Micro-level studies on asymmetric behaviour of wages and employment**

Study	Data	Purpose	Testing method	Results
Bell and Freeman 1985	US data on 53 industries; 1970-1982, 1970-1980	to study the asymmetry of wages	wage productivity equations re-estimated; the sample firms divided into two groups (productivity growth above and under the average growth)	wages are more flexible in upward direction than in downward one; i.e. there exists asymmetry in the behaviour of wages
Blanchflower 1988	3373 employees, UK; 1983-1986	to study the asymmetry of wages; the existence of wage ratchet	the estimation of individual wage equation	evidence of the asymmetric behaviour of wages, evidence of a wage ratchet
Nickell and Wadhvani 1990	219 manufacturing firms, UK; 1972-1982	to study the asymmetry of wages	a dummy variable $D_T$ used (= 1, when expected sales changes below trend; = 0 otherwise); this interacted with the insider variables of the wage equation	evidence of asymmetric adjustment of wages (more rigidity downwards than upwards)
Brunello and Wadhvani 1990	157 Japanese manufacturing firms; 1977-1987	to study the asymmetry of wages	four different types of dummies used in studying asymmetry	Japanese firms: in two cases wages more responsive to insider effects in good times, in the other two cases the opposite true; British firms: wages more responsive to insider effects in bad times in three of the four cases

Study	Data	Purpose	Testing method	Results
Holzer and Montgomery 1990	3400 US firms on 28 local labour markets; 1980-1982	to study the asymmetry of wages and employment	reduced-form wage and employment equations estimated	wages adjust asymmetrically in response sales growth (more responsiveness upwards); data are not suggestive of asymmetric adjustment of employment, when the whole sample of firms used

Apart from micro-level studies on the asymmetric adjustment of wages and employment implied by the insider-outsider theory, there are also studies based on more aggregate-level, time-series data (e.g. Begg et al. 1989; Andersen and Hylleberg 1993; Persson 1994) summarised in Table 6. The disadvantage of using more aggregate-level data in these kind of studies is that there is a possibility that some information may be lost in the aggregation. Moreover, just as in the case of panel data studies, the results obtained from the tests for asymmetry depend on the chosen test strategy to a great extent.

Begg et al. (1989) study, within the framework of a simple insider-outsider model, how insiders, once the direction and magnitude of the shock is known, adjust wages and employment. In particular, their focus is on the nature of adjustment of the number of employees to expected changes in demand. Utilising aggregate-level time-series data from the UK, Japan and West-Germany during 1953-1985(6), they find strong evidence of asymmetric persistence of employment for Japan and the UK, but only weak evidence of such effects for West-Germany. Andersen and Hylleberg (1993) test asymmetry in the adjustment of wages and employment in response to anticipated and unanticipated shocks with data from the Danish manufacturing sector (1974-1991). According to the insider-outsider approach, anticipated changes in variables determining labour demand should be absorbed by wages, whereas unanticipated changes should be reflected in employment. The evidence from the estimation of a bivariate error-correction model of wage and employment formation gives evidence of this kind of asymmetric adjustment, where unanticipated shocks have more influence on employment than on wages. Further, both anticipated and unanticipated changes affect wages. Jansson's results (1994) from the employment of the same test strategy for the Swedish private sector were in line with Andersen and Hylleberg's results. He found that only anticipated shocks exerted an influence on wages, whereas both anticipated and unanticipated shocks had an influence on wages.

**Table 2.6 Time-series studies of asymmetric adjustment**

Study	Data	Purpose of the study	Testing method	Results
Begg et al. 1989	aggregate level time-series data; the UK, Japan and West-Germany; 1953- 1985(6 )	adjustment of employment into expected labour demand changes up wards and downwards	OLS regressions based on a simple insider-out-sider model	the British and Japanese data give stronger evidence of asymmetric persistence, whereas only weak evidence yielded by the German data
Andersen and Hylleberg 1993	quarterly data from manufacturing sector; Denmark; 1974.1-1991.4	adjustment of employment and wages into anticipated and unanticipated shocks	estimation of a bivariate wage-employment error-correction model (Johansen and Engle-Granger two step procedures)	only unanticipated shocks relevant for employment, whereas both anticipated and unanticipated shocks have influence on wages
Jansson 1994	quarterly data from private sector; Sweden 1965.1-1991.4	adjustment of employment and wages into anticipated and unanticipated shocks	estimation of a bivariate wage employment error-correction model (Johansen and Engle-Granger two step procedures)	only unanticipated shocks relevant for employment, whereas both anticipated and unanticipated shocks have influence on wages

Going slightly beyond the insider-outsider theme, as a third category, we present here empirical studies on asymmetry that concentrate on testing the asymmetric behaviour of employment and unemployment over the business cycle. These studies share three common features: they lack theoretical underpinnings, utilise time-series data and base their analysis of asymmetry on statistical tests.

Neftci (1984) studies whether the behaviour of an economic time series is asymmetric by means of a statistical test, i.e. a final Markov process. He utilises quarterly data on the US unemployment rate in testing the hypothesis of asymmetric behaviour. The empirical work is based on defining finite state Markov processes that represent increases and decreases in the time series, defining transition probabilities for the realization of different states and getting maximum likelihood estimates for the transition probabilities. If a time series behaves symmetrically, a transition probability denoting a decrease in the time series (if the values of the two previous sequences have also been negative) equals a transition probability denoting an increase in the value of time series (if the values of the two previous sequences have also been positive). Neftci's results give evidence in favour of the asymmetric behaviour of US unemployment series over the business cycle.

The starting point of Luukkonen and Teräsvirta's (1988) study is that a smooth transition autoregressive model (STAR) (which is a generalization of the self-exciting threshold autoregressive models (SETAR)) can generate cyclically asymmetric realizations. This enables them to inspect the possible asymmetry by testing the linearity of a process (symmetry) against non-linearity (asymmetry), which they specify using a STAR model. The linearity of a time-series against non-linearity is tested by tests of Lagrange multiplier type employing quarterly data from unemployment series, unemployment series from 13 OECD countries and output series. Their evidence implies that the results of asymmetry are sensitive both to the choice of series to represent the cycle and to the data transformations.

Pfann (1992) studies asymmetric behaviour of seven quarterly US employment series during 1954-1990<sup>9</sup>. In the work both asymmetry of magnitude (difference between the magnitude of peaks and troughs) and asymmetry of duration (a time difference of (un)employment rising from a trough to a peak and falling from a peak to a trough) of employment series are investigated. For this purpose Pfann employs a testing procedure developed by DeLong and Summers (1986) and a nonlinear AR model (see Ozaki 1982, 1984), which endogenously generates asymmetries of magnitude and duration. In the first procedure asymmetries are measured by computing a frequency distribution coefficient of skewness for smoothed series and smoothed series in first differences<sup>10</sup>. To ascertain whether asymmetries arise from the propagation mechanism or from random shocks, Pfann computes Monte Carlo and Bootstrapping simulations.

The estimation results on US employment series data from the first test are suggestive of asymmetry of magnitude being mainly due to unexpectedly large innovations, i.e. random shocks, in the economic system. In turn, asymmetry of duration is mainly due to the nonlinear propagation mechanism of the data and not caused by anomalous random shocks. As for the different employment series, the estimation results give evidence of the existence of both types of asymmetries in the US aggregate employment and US white male employment series. The estimation results from a non-linear AR model suggest that the nonlinear model fits all the employment series of the study except US nonfarm workers, i.e. it seems an appropriate model for time series that show negative skewnesses.

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<sup>9</sup>These are aggregate employment, white male and female employment, non-white male and female employment, professional employment and non-farm labourers.

<sup>10</sup> A negative skewness of a series implies a distribution with over half of its observations above the mean, and a negative skewness in first differences implies that it takes longer for a series to rise from a trough to a peak than to fall from a peak to a trough.



**Table 2.7 Time-series studies on asymmetric behaviour over business cycle**

Study	Data	Type of asymmetry studied	Testing method	Results
Neftci 1984	quarterly time-series data on US unemployment rate; 1948-1981	asymmetric behaviour of unemployment series over the business cycle	the method of final Markov processes	evidence suggestive of asymmetric behaviour of unemployment series
Luukkonen and Teräsvirta 1988	1) same unemployment series that Neftci used; 1948-1981 2) unemployment series from 13 OECD countries and output series; 1960-1986	asymmetric behaviour of time series over the business cycle	a linearity of a process tested against non-linearity, i.e. asymmetry specified with a STAR model	evidence shows that results are sensitive both to the choice of series and data transformations
Pfann 1992	quarterly time-series data on seven US employment series; 1954-1990	the asymmetry of magnitude and asymmetry of duration	1) the frequency distribution coefficients of skewness computed 2) a nonlinear AR model estimated 3) employment series estimated with linear model	data suggestive of asymmetric behaviour of employment series

## 2.6 Conclusions

The insider-outsider theory was developed to explain the persistence of high unemployment rates in many European countries in the 1980s and 1990s. In Europe the recovery of employment rates after negative shocks to its pre-shock levels has been very slow. The appeal of the insider-outsider models, together with other persistence theories, is that they offer an explanation why unemployment returns to its pre-shock level very slowly or why temporary shocks may even change the equilibrium itself.

The insider-outsider theory is based on the idea that if wage bargaining is a prevalent feature of the labour market, the dynamic interactions between employment and the group of insiders may generate substantial employment and unemployment persistence. The persistence effects can arise because changes in employment may change the membership of the insider group and thereby alter its objective function in the wage setting.

According to the insider-outsider theory, incumbent insiders and unemployed outsiders are in a different position in wage setting: wages are primarily

determined by insiders or unions primarily pursuing insiders' interests, and the outsiders do not have much influence over this process. The power asymmetry or the market power of the insiders derives from the turnover costs of labour such as hiring, training and firing costs and costs from harassment by insiders. Unionization and the turnover costs give insiders the market power to set/bargain their wages above the market clearing level. The persistence effects due to temporary shocks can arise because changes in employment may change the membership of the insider group and thereby alter its objective function in the wage setting. Thus membership dynamics plays a very important role in the generation of persistence effects. If the insider status is closely linked with employment, temporary downswings may have persistent effects on employment and unemployment, when there is an inverse relationship between the size of the insider group and the wage demands. Allowing the firm to have some bargaining power or the outsiders to have some weight in the insiders' objective function, the strict hysteresis effect of a one-time shock is eliminated, when the wage does not rise to fully offset reductions in the number of insiders. In addition, if it is easier to lose than to gain an insider membership, shocks of the same size but opposite direction may have asymmetric effects on employment and wages.

What kind of conclusions can be drawn about the relevance of the insider-outsider theory on the basis of the empirical evidence? First of all, there is evidence of persistence effects, but evidence on the strict hysteresis caused by insider membership dynamics is scarce. Besides, the evidence also implies that insider-outsider considerations are more important in some European countries than in the USA or Japan.

Second, the preponderance of the empirical work has found the unemployment rate to be significant in wage determination, a finding which is against the strictest versions of insider-outsider models. However, this result does not falsify the insider-outsider theory; it is quite likely that unemployment enters the wage equation because it affects the alternative options available to the bargaining parties (Lever 1995).

Third, there is evidence that the long-term unemployed exert less influence on wages than the short-term unemployed. This result can be interpreted in favour of both the insider-outsider theory or the duration theory. It supports the insider-outsider theory if the insider membership is extended to the short-term unemployed as well and the union cares more about the interests of the incumbent insiders and the short-term unemployed than about the interests of the long-term unemployed.

Fourth, the insider-outsider theory implies that the firm-specific or industry-specific factors should be more important in wage determination than outside factors. However, the empirical evidence from firm and industry-level data does not support this view. According to the empirical evidence on the impact of insider and outsider factors in wage determination, both factors are important. The majority of studies also suggest that the greatest single influence on wages is exerted by the outside wage level. The smallest impact of the insider factors on wages has been found in Scandinavian countries and the biggest in the USA. As

far as the relation between the importance of insider factors and union power are concerned, the results are mixed.

Fifth, there is little empirical work on the asymmetric nature of the adjustment of wages and employment. The existing evidence gives support to the view that wages show more responsiveness in an upward than downward direction. However, the empirical evidence in favour of the asymmetric adjustment of employment is less clear and more empirical evidence is needed.

Can any coherent policy recommendations be made on the basis of theory and existing evidence? Both theory and empirical evidence imply that the disenfranchising of the long-term unemployed ought to be prevented and outsiders' influence in wage negotiations ought to be increased. It has been proposed to achieve this by so called enfranchising policies, which include profit-sharing schemes of labour remuneration, various forms of labour market training (apprenticeship systems, government run- or subsidized vocational training programmes and job-sharing programs) and reducing barriers to the entry of new firms. As a means of decreasing insiders' market power in wage negotiations, loosening job security legislation and imposing legal restrictions on strikes and picketing have been suggested. In addition, policies to increase productivity or reduce the costs of all workers have been suggested. These so called employment-promoting policies include government investment in the industrial infrastructure, reduction in payroll taxes and measures to open the economy to foreign competition. (Lindbeck and Snower 1988, 1990, 1992; Blanchard and Summers 1986; Layard et al. 1991).

To sum up, the insider-outsider approach offers one possible explanation for the persistence of unemployment. Although this explanation has, at least to some extent, established its position in the economic literature, there is need for further research into those areas, where critics have pointed out theoretical caveats. In addition, more empirical evidence is still needed.

**Table 2.1a Comparison between insider-outsider models**

Insider-outsider study	Source of insiders' market power	Wage bargaining framework	Time horizon	Partial/general equilibrium
Lindbeck and Snower 1988, 1992	Labour turnover costs Firm-specific human capital	Right-to-manage bargaining	one period	partial equilibrium
Blanchard and Summers 1986, 1987	Labour turnover costs Firm-specific human capital	Monopoly union bargaining	two periods	partial+ general equilibrium
Solow 1985	Firm-specific human capital	Monopoly union bargaining	two periods	partial equilibrium
Gottfries and Horn 1986	Labour turnover costs	Monopoly union + Right-to-manage bargaining	two periods	partial equilibrium
Carruth and Oswald 1987	-----	Efficient bargaining	two periods	partial equilibrium
Begg 1988	Firm-specific human capital	Monopoly union bargaining	two periods	partial equilibrium
Drazen and Gottfries 1990	-----	Monopoly union bargaining	infinite horizon	partial equilibrium

### 2.1b Comparison between insider-outsider models

Insider-outsider study	Nature of shocks causing persistence effects	Membership rules specified	Upper limit for the insider wage	Utility function
Lindbeck and Snower 1988, 1992	unexpected and expected temporary demand side shocks	the entry-exit function specified	yes; entrant wage + marginal turnover costs	expected utility of a representative member maximized
Blanchard and Summers 1986, 1987	unexpected, temporary nominal and real shocks	employment dynamics looked at under three different membership rules	no	utility function of "ad hoc" type maximized: $U = p + bw$
Solow 1985	unexpected, demand side shocks	(the outsiders hired in the first period become insiders in the second period; insider status connected with employment)	yes; insiders fired if their wage exceeds their marginal productivity	expected utility from being employed in both periods maximized
Gottfries and Horn 1986	unexpected, temporary nominal shocks	no	----	expected utility of a representative member maximized
Carruth and Oswald 1987	unexpected, demand side shocks	no	----	a utilitarian utility function; total sum of members' utility levels maximized
Begg 1988	unexpected, demand side shocks	(insider status gained after working in the firm for one period)	no	insiders maximize their wages (utility) subject to constraint that all insiders are employed
Drazen and Gottfries 1990	demand side shocks	(seniority status gained after working one period; it is connected with employment)	yes; insiders fired if their wage exceeds their marginal productivity	a utilitarian utility function: a weighted sum of the discounted utilities of members maximized; different weights for senior and junior workers

### **3 THE ROLE OF INSIDER AND OUTSIDER EFFECTS IN WAGE DETERMINATION: THE CASE OF FINLAND 1985-1994**

#### **Abstract**

Using an annual panel of 180 Finnish industries for the period 1985-1994, this chapter studies the relative importance of insider and outsider factors in industry level wage formation. For this purpose wage equations are estimated by employing the GMM estimation technique. The main findings are that both insider and outsider factors play a role in industry level wage formation. The biggest influence is exerted by the outside wage level. The insider weight obtains coefficients of around 0.04-0.06, which thus supports the view as to the smaller relative importance of insider factors in countries with centralized wage setting. In addition, the small, positive, significant insider hysteresis term implies some evidence of industry-specific hysteresis. The significance of insider factors is further confirmed by causality tests conducted by the VAR method developed by Holtz-Eakin, Newey and Rosen.

#### **3.1 Introduction**

Evaluating the importance of internal versus external forces in wage determination at the firm and sectoral level has been an objective of many studies during recent years, see e.g. Nickell and Kong (1992), Holmlund and Zetterberg (1991), Nickell and Wadhvani (1990), Forslund (1994), Graafland and Lever (1996), Johansen (1996). One reason for the rise of interest in this topic is connected with the advancement of insider-outsider models, e.g. Lindbeck and Snower (1988), Blanchard and Summers (1986). According to the insider-outsider theory, if insiders have market power, the wage rate will be determined more by internal (firm/industry-specific) factors than by external factors (the conditions in the labour market as a whole). In empirical studies internal factors have been proxied by such factors as productivity, product prices, financial variables, union strength and the previous level of employment. In turn, external factors are

represented by the average total wage level, total unemployment rate, regional unemployment rate, unemployment benefits and the replacement ratio.

The purpose of this paper is to study the role of industry-specific effects versus outside effects in wage formation in Finnish industries. This has not been studied earlier in the Finnish labour market, with the exception of Holmlund and Zetterberg (1991). Using the panel of 28 Finnish manufacturing industries they did not find internal forces to have practically any influence on sectoral wage formation. The present study is related to this earlier study and updates the sample period to the 1990s. Here, the importance of industry-specific performance in shaping wages in Finnish industry is studied using an annual panel data from 180 manufacturing and mining industries during 1985-1994.

Finland and the Nordic countries in general are characterized by highly centralized wage bargaining. Traditionally, centralized wage bargaining has been considered to leave relatively little scope for sectoral demand or productivity shocks to influence wage formation. Table 3.1 below gives a summary of the estimates of the importance of insider weights in three Nordic countries and in some other countries suggested by earlier studies. Holmlund and Zetterberg (1991) found for Sweden, Finland and Norway that industry wages are predominantly not modified by sectoral conditions. Forslund's (1994) study utilising a Swedish panel of 434 firms during 1980-1989 supports this view, implying that local performance has a minor influence on local wage setting. Contrary to Holmlund and Zetterberg's results, Johansen (1996) shows for 114 Norwegian industries (1966-1987) that industry wages are significantly affected by industry performance in a similar fashion as in countries with decentralised wage setting.

TABLE 3.1 Estimates for the weight of insider/internal factors in wage setting

Study	Data	Estimate of the weight of internal factors
A Studies for Nordic countries		
Holmlund and Zetterberg (1989)	Sweden, Finland, Norway; annual panel of 28/27 manufacturing industries, 1965-1985	0.03-0.12 (Sweden) 0.00-0.01 (Finland) 0.03-0.04(Norway)
Forslund (1994)	Sweden, annual panel of 343 manufacturing firms, 1980-1989	0.07
Johansen (1996)	Norway, annual panel for 117 industries, 1966-1987	0.2
B: Studies for other countries		
Nickell and Wadhvani (1990)	UK, annual panel of 219 manufacturing firms, 1974-1982	0.11, 0.08-0.17

Study	Data	Estimate of the weight of internal factors
Holmlund and Zetterberg (1989)	Germany, US, annual panel of 25/27 manufacturing industries, 1965-1985	0.04-0.12 (Germany) 0.30-0.48 (USA)
Brunello and Wadhvani (1989)	Japan, annual panel of 157 manufacturing firms, 1977-1987	0.33, 0.28-0.35
Nickell and Kong (1992)	UK, annual data for 14 industrial sectors, 1961-1985	0.04-0.52
Nickell, Vainiomäki and Wadhvani (1994)	UK, annual panel of 814 manufacturing firms, 1972-1986	0.11-0.12
Graafland and Lever (1996)	annual data for 16 sectors; Netherlands, 1963-1990	(i) total private sector:0.14 (ii) industry sector: 0.07 (iii) service sector

Why might industry-specific and firm-specific factors play a role in wage formation despite the high degree of centralization in Finland? Throughout the period 1964-1994 Finnish wages have been mostly set by a centralised level agreement. On only six occasions during this time has a collective agreement been concluded at industry level with no economy-wide agreement (Tyrväinen 1995). During our sample period 1985-1994, a collective agreement was concluded at industry level only in the years 1988 and 1994 (see Table 3.4; Pehkonen and Santamäki-Vuori 1997, 257). However, centralized wage formation in Finland is characterized by a three-step process. First, the central organizations negotiate and reach an agreement which sets the general guidelines for wage developments. This is followed by wage negotiations at both the industry and local levels. At each level workers' representatives (a relevant union body) negotiate with employers. The preponderance of wage drift, which is typical of countries with centralized bargaining, results from local bargaining and local settlements. Wage drift has varied between 0.5 % and 6.5 % of the earnings during the period 1965-1994, showing the greatest share in the 1970s. (Tyrväinen 1995)

The second objective of this study is to address the question of whose interests the union advances in the wage negotiations. This question is approached by applying insider hysteresis. According to the insider-outsider theory (e.g. Lindbeck and Snower 1988), unions chiefly act in the interests of their incumbent workers. If an adverse shock occurs and reduces the number of incumbent insiders, the remaining insiders will, after the recession, face a smaller risk of unemployment at the going wage rate and thus can push up wages. This may create hysteresis in the economy, as the effects of negative shocks are prolonged.

To anticipate our results, we find that both insider and outsider factors play a role in wage determination in Finnish industries. The biggest single impact is exerted by the outside wage level. The insider weight obtains values of around 0.04-0.06, which thus supports the view favouring the smaller relative impor-



tance of insider factors in countries with centralized wage bargaining.

The rest of the chapter is organized as follows. Section 3.2 presents the theoretical background of the study and gives the empirical specification of the wage equation. In section 3.3 the empirical methods are discussed and the results of the empirical estimations are presented. Finally, section 3.4 concludes.

### 3.2 The theoretical background

To study the role played by insider effects in wage formation in a panel of Finnish industries we apply the theoretical framework of the bargaining model very much similar to those presented e.g. in Nickell and Wadhvani (1990) and Johansen (1996). Taking into consideration the high rate of unionization in Finland, the bargaining framework is well suited to our analysis.

In the model, wages are determined by bargaining between the union and the firm. The bargaining takes place before the realisation of the random output price. Given both wages and the realised output price, the firm will choose that level of employment which maximizes its profits. By assumption the union is utilitarian and will thus maximize the utility of its representative incumbent member in the wage bargaining. The representative member's utility consists of his/her wage income when employed and his/her alternative income when laid off. The alternative income is assumed to depend positively on the replacement ratio, negatively on the unemployment rate and positively on the average wage level elsewhere. Lay-offs are assumed to be made by random draw. Therefore the union is interested in both the wage and the representative member's probability of being laid off.

The result of the wage bargaining depends on the relative bargaining power of the union and the firm. The bargaining result can conveniently be presented as the solution to the asymmetric Nash bargain. If the bargaining process breaks down, the fallback profit of the firm is zero (no fixed costs assumed) and the worker's utility during a strike will depend on his/her alternative income. Given these assumptions the following log-linear specification of the nominal wage equation can be derived:

$$(3.1) \quad w_{it} = \lambda_0 + \lambda_1 [va_{it}^e + \beta_{it} + \Delta n_{it}^e] + (1-\lambda)wa_{it} + \lambda_2 u_t + \lambda_3 r_t$$

where  $w_{it}$ = wage costs per hour,  $va_{it}$ = the value added per hour,  $\beta$ = the measure of union power,  $n_{it}$ = the members employed in the firm or sector,  $wa_{it}$ =the outside wage,  $r_t$ = the replacement ratio,  $u_t$ = unemployment rate.

The wage equation specifies nominal wages as a combination of both insider and outsider factors. The insider factors include the value added per hour, which describes the industry-specific performance, the strength of the union and the insider hysteresis term. Expected employment proxies the insider hysteresis term: a higher expected employment relative to the number of insiders diminishes the probability of an insider being laid off and hence generates upward pressure on wages. Thus the expected change in employment should be positive

in sign. The outside factors are characterized the average total wage, the replacement ratio (unemployment benefit/ wage)<sup>1</sup> and the total unemployment rate.

To get a satisfactory empirical specification of the wage equation (3.1), we need to make a number of changes. First, following the example of Nickell and Wadhvani (1990), we incorporate the lagged dependent variable in the right-hand side regressors to allow for inertia due, for example, to long-term contracts. Second, industry-specific fixed effects,  $f_i$ , are included to control for wage differences due to time-invariant unobserved variables. The union's bargaining power will be treated as such a variable, since the unionization rate remained rather stable during our sample period. Third, we include a variable characterizing changes in normal working hours,  $\Delta hn$ <sup>2</sup>. Finally, the outside wage is proxied by the average wage in all the other industries. Taking these considerations into account, the empirical specification of the wage equation becomes

$$(3.2) \quad w_{it} = \lambda_0 + \lambda_1 [va_{it}^e + \Delta n_{it}^e] + (1-\lambda_1)wa_{it} + \lambda_2 u_t + \lambda_3 r_t + \lambda_4 \Delta hn_t + f_i + w_{it-1}$$

### 3.3 Data and estimation results

We use a panel of annual time series data for 180 industries from 1985 to 1994. The source is Statistics Finland. The industries in the data set include mining and manufacturing, and together represent around 32 % of private sector employment. We have industries of different sizes in our sample, the number of firms in an industry varying from four to over six hundred firms. The average number of firms per industry is 51. Altogether the data set includes 1648 observations and is unbalanced in the sense that the number of time-series observations per industry varies from 10 to 4. We have carried out the estimations both with the balanced part of the data set (1230 observations) as well as with the whole unbalanced data set.

The detailed description of the variables can be found in the Data Appendix. However, we also describe some of the basic properties of the data here. The wage variable is the nominal hourly wage, which is obtained by dividing the wage sum of an industry by the number of working hours in an industry. The employment variable denotes the number of employees in that industry. The value added per hour of an industry, represents productivity. The outside wage is formed by dividing the average wage per hour in all the manufacturing and mining industries in the data set except the industry  $i$ .

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<sup>1</sup> Instead of the replacement ratio the strike benefit or the real unemployment benefit might also have been used.

<sup>2</sup> During the sample period annual average working hours in Finland fell by 100 hours. The reduction was mainly carried out by the extensions to annual holiday entitlements.

The annual growth of nominal hourly wages in the manufacturing and mining industries during this period averaged around seven per cent, the average growth being at lowest 1.8 per cent in 1993. The dispersion of hourly wages between the industries in the manufacturing and mining sector has shown an upward trend since 1986<sup>3</sup>. The inter-industry dispersion in the wage variable, however, remained on average smaller than the time-series wage dispersion within a single industry. The variance of hourly wages was 36.49 in 1985, whereas the corresponding figures were 84.01 in 1990 and 120.31 in 1994. The paper industry acted as a wage leader, i.e. the highest hourly wages were paid in the paper industry. The lowest hourly wages were, in turn, paid in the textile industry. The employment variable displayed a clear downward trend, the decline being around five per cent per annum on average. During the deepest years of the recession, 1991 and 1992, the decline peaked at eight to nine per cent. The average annual growth rate of the value added per hour was around ten per cent during the sample period, but declined to under three per cent in 1990. The dispersion of the value added per hour first increased from 1985 to 1987, thereafter declining until 1990, after which it increased again.

The estimation of the dynamic fixed-effects model by the usual OLS methods yields inconsistent estimates, since the disturbance terms are serially correlated. This causes the lagged dependent variable to be correlated with these disturbances. To tackle these problems, we use the generalised method of moment technique (GMM) by Arellano and Bond (1988, 1991). This method is an efficient extension of the first difference instrumental variables method, where the equation is first differenced to remove the correlation and thereafter estimated by instrumental variables consisting of the dependent variable lagged by two or more periods. The improvement proposed by Arellano and Bond (1991) provides a way of acquiring additional instruments by using all the orthogonality conditions that exist between the lagged values of the endogenous variables and the disturbances. The GMM estimator is implemented in the DPD program written in GAUSS and is a consistent estimator in the absence of serial correlation in the residuals. DPD also allows the estimation of unbalanced data sets where the number of time-series observations per industry varies.

Table 3.3 presents selected estimation results for wage equation (3.2), which has first been differenced in order to remove the fixed effect. In the estimations we also used the discrete lags of the explanatory variables. In addition to wage per hour, employment change and factor income per hour will be treated as endogenous in the model, as the firm determines both employment and prices.  $w_{it-2}$ ,  $n_{it-2}$  and  $va_{it-2}$  and further lags of these endogenous variables can be used as valid instruments only if the first-differenced residuals are serially uncorrelated, i.e. there is no serial correlation of order two. Besides the endogenous variables,

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<sup>3</sup> The observed increase in the wage inequality between industries in manufacturing and mining is in line with observations of the substantial increase in the overall earnings inequality in the latter half of the 1980s in Finland (see e.g. Eriksson (1994), Eriksson and Jäntti (1996)).

we included productivity, the first and second lag of import prices and the first lag of manufacturing prices in the instrument set<sup>4</sup>.

The second-order serial correlation is tested by the one-degree-of-freedom test,  $m_2$  (see Arellano and Bond (1991)). The reported  $m_2$  test statistics in Table 3.3 are all below critical values. The instrumental validity is also confirmed by the Sargan test, which yielded values below the critical values. The Wald test statistic is a test for the joint significance of the chosen coefficients. Table 3.3 reports four Wald tests. The first of these, Wald test 1, tests for the joint significance of all the reported coefficients. The test rejects the null hypothesis of no significance. Wald test 2 tests for the coefficient of  $\Delta va$ , and Wald test 3 tests for the coefficient of  $\Delta^2 n$ . According to the test statistics, the coefficients of both  $\Delta va$  and  $\Delta^2 n$  are significant and should therefore not be excluded from the wage equation. Wald test 4 tests for the joint significance of the time dummies in equations (3) and (4).

TABLE 3.3  
GMM Estimates of Wage Equations 1985-1994  
Dependent variable:  $\Delta w$

	(1)	(2)	(3)	(4)
const.	0.001(7.41)	0.025(9.8)	0.067(33.7)	0.067(20.8)
$\Delta w_{-1}$	0.189(18.5)	-	0.204(18.8)	0.09(4.18)
$\Delta va$	0.049(22.1)	0.052(9.5)	0.046(11.2)	0.06(9.32)
$\Delta^2 n$	0.010(22.1)	0.009(7.5)	0.011(22.2)	0.007(5.99)
$\Delta wa$	0.589 (28.7)	0.586(13.7)	-	-
$\Delta u_{-1}$	-0.026(-12.5)	-0.03(-10.4)	-	-
$\Delta^2 hn$	0.042 (2.13)	-	-	-
$\Delta r$	-0.044(-2.12)	0.12 (4.9)	-	-
Time				
dummies	No	No	Yes	Yes
N	123	180	123	180
Wald test 1	10826.69	4681.4	791.98	217.25
Wald test 2	152.85	90.17	124.99	86.89
Wald test 3	489.59	57.16	493.08	35.97
Wald test 4			9728.93	1873.56
Sargan test				
for instru-				
ment validity,				
$\chi^2(102)$	100	111.9	101.66	114.5
Test for second-				
order serial				
correlation,				
$m_2$	-0.175	-0.561	-0.189	-0.118

Notes:

(i) Absolute asymptotic t-values are reported in parentheses.

(ii) The reported estimates are two-step estimates robust for heteroskedasticity.

<sup>4</sup> We also tried other sets of instruments, but the results did not change much.

(iii) Wald test 1 tests the joint significance of the reported coefficients, asymptotically distributed as  $\chi^2(k)$  under the null.

(iii) The Sargan test is asymptotically distributed as  $\chi^2(k)$  under the null.

(iv) In equations (3.3) and (3.4) the aggregate variables are replaced with time dummies.

The estimation results for the wage equations with balanced data and unbalanced data (equations (1) and (2)) appear quite similar with the exception that the lagged dependent variable did not turn significant in equation (2). In addition, we tested for the robustness of the results by replacing the aggregate variables of the wage equation by time dummies in equations (3) and (4)<sup>5</sup>. Of the explanatory variables, the biggest influence on industry level wages per hour was exerted by the outside wage level<sup>6</sup>. The short-run elasticities in all versions are around 0.6. The dominating effect of outside wages accords with the results from other European studies. Johansen (1996) for Norway and Graafland and Lever (1996) for the Netherlands report elasticities as high as above 0.8. Forslund (1996) also reports the high impact of outside wages for Sweden. One explanation for the marked importance of outside wages in Finland can be traced back to wage-wage links: in Finnish manufacturing wages in the high-pay branches and low-pay branches have followed a common path in the long run (see Tyrväinen 1996).

The other external factors, replacement ratio, changes in normal working hours and unemployment rate, obtain significant but small coefficients in the wage equation (1). Against our expectations, the replacement ratio has a negative impact on wages in equation (1). Graafland and Lever (1996) also find the replacement ratio to have an inverse impact on wages in Dutch industrial sectors. In wage equation (2) the replacement ratio is correctly signed and shows a positive impact on the wage rate. The implications of the impact of the unemployment rate on the basis of wage equations (1) and (2) are similar. In both equations coefficients on the unemployment variable of around -0.026 - -0.03 imply that the change in the lagged unemployment rate has a small, downward pressure on wages. In this respect our results accord with earlier Finnish results from time-series analyses (e.g. Pehkonen 1990; Tyrväinen 1995) and show that wages are not insensitive to the unemployment situation<sup>7</sup>. The change in normal

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<sup>5</sup> We also tried explicitly to take into account the years (1988, 1994), when the wage agreement was concluded at the industry level in Finland by including dummies for these years. The role of internal factors could be expected to be bigger in these years. However, due to computational reasons related to DPD, we did not succeed in obtaining results from this procedure.

<sup>6</sup> The outside wage level is proxied in the estimations by the average wage level in the whole industry sector. We prefer to use the average wage level in the industry sector to the use of the average total wage level, since the industry sector has traditionally acted as a wage leader in Finland.

<sup>7</sup> According to Lever (1995, 263) the significance of the unemployment rate does not necessarily

working hours has a positive but rather small influence on wages in equation (1), whereas in equation (2) this variable did not become significant and was therefore omitted.

Turning to the importance of internal factors, value added per hour,  $va_{it}$ , attains the relative weight of 0.05 in equation (1) in Table 3.3 and of 0.04 in equation (2). In equations (3) and (4), where the aggregate variables have been replaced with time dummies, the relative insider weight obtains the values 0.04 and 0.06. Thus our estimates show internal factors to have a small but significant positive impact in industry level wage formation. Compared to the estimates reported by Holmlund and Zetterberg (1989), our estimates are four to six times as high as their estimates 0.00-0.01 for Finland. But their estimation period is 1965-1985, whereas our estimation period runs from the year 1985. Our estimates are also in agreement with those suggested for Sweden and Norway by Holmlund and Zetterberg (1991) and for Sweden by Forslund (1994), thus confirming earlier results that the relative importance of internal factors in wage setting is smaller in countries with centralized wage setting. However, they are clearly smaller than the estimated insider weight of 0.2 for Norwegian industries by Johansen (1996).

The insider hysteresis term/insider effect term as proxied by the change in the employment level obtains a positive, significant coefficient in our estimations. Hence, there is some evidence of industry-specific hysteresis arising from the  $\Delta n$  term. However, the coefficients of magnitude 0.01 imply only a small impact. Nickell and Wadhvani (1990) for UK data and Brunello and Wadhvani (1989) for Japanese data also report employment change to have a positive impact, but their results are not robust if the alternative sample is used. For other Nordic countries, the earlier studies have not provided evidence of the existence of insider hysteresis.

We further investigated the importance of insider factors in wage setting by conducting causality tests. The robustness of the results of the Wald tests are confirmed by causality tests carried out using the test strategy (VAR method) developed by Holtz-Eakin, Newey and Rosen (1988) (for details see Holtz-Eakin et al. 1988). These causality tests, reported in Table 3.4, imply that employment and value added per hour cause wages and have a significant impact on wages. Holtz-Eakin, Newey and Rosen point out that to get unbiased results from causality tests, they must be based on an appropriate dynamic panel data model with the right lag length<sup>8</sup>. Therefore, before conducting causality tests, the parameter

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falsify the insider-outsider considerations, but can be interpreted as weakening the union's power to realize the insiders' purposes.

<sup>8</sup> The point of departure is a dynamic panel data model which has the lags of all the variables and individual effects on its right-hand side:

(1)  $W_{it} = \alpha_0 + \sum \alpha_i W_{it-1} + \sum \delta_i Va_{it-1} + \sum \rho_i N_{it-1} + \psi f_i + u_{it}$  ( $i=1, \dots, N$ ) ( $t=(m+1), \dots, T$ ),  
 where  $f_i$  = the individual fixed effect,  $\alpha$ s and  $\delta$ s are parameters,  $m$  = the lag length.  
 By assumption,  $u_{it}$  satisfies the orthogonality conditions  
 (2)  $E[y_{it} u_{it}] = E[x_{it} u_{it}] = E[f_i u_{it}] = 0$ ,  $s < t$ .

constancy and appropriate/minimum lag length are tested for in order to find the appropriate model. Hence, the test strategy for the causality tests is carried out by the following steps:

- (i) choose the lag length to start with;
- (ii) estimate the unrestricted model, where the parameters are allowed to be time-variant;
- (iii) estimate the model assuming stationary individual effects;
- (iv) test if all the parameters are stationary, i.e. if they are time invariant;
- (v) using the model selected in steps (i)-(iv) test if the lag length can be shortened;
- (vi) using the model selected in steps (i)-(vi) perform causality tests.

We choose to start with lag length 2, so that we can estimate the model for the last six years of the period ( $t= 1989, \dots, 1994$ ). The most general model yields a Q value of 43.60 with 45 degrees of freedom. As the  $\chi^2$  value is 46.03, the most general model can be accepted. The test statistics for parameter stationarity and lag length are evaluated at the 10 % significance level to avoid type II error, whereas the causality tests are evaluated at the 5 % significance level. Next we impose the restriction of the stationary fixed effect and obtain a  $Q_R$  value of 61.53 with 63 degrees of freedom. The test statistic we now use is  $L=Q_R - Q$ , the residual sum of the restricted model minus the residual sum of squares of the unrestricted model, and it follows the  $\chi^2$  distribution with degrees of freedom equal to the degrees of freedom of  $Q_R$  minus the degrees of freedom of  $Q$ . Hence the value of  $L$  is 17.92 with 18 degrees of freedom. We accept the hypothesis of the individual fixed effect as the critical value is 24.76.

Thereafter we test for the hypothesis that all the parameters are stationary. Likewise, on the basis of the calculated  $L$  test statistic, we accept the hypothesis that all the parameters are stationary, i.e. time- invariant. The following step is to test whether the lag length can be shortened. The  $Q$  value obtained from restricting  $m=1$  is 352.52. Hence, we get a test statistic of 263.62, which is clearly higher than the critical value 6.25 for 3 degrees of freedom and the restriction is rejected. Finally we carry out the causality tests, i.e. whether employment or value added per hour can be excluded from the model. The values of the test statistics are beyond their critical values, which suggests that we cannot exclude either employment or value added per hour from the wage equation.

To conclude, we find that the past values of employment and value added per hour help to predict future wages, i.e. these insider variables have significance for wage determination. In addition, we find that the parameters of the wage equation are time-invariant and that lags of two years are sufficient to

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To eliminate the individual effect, equation (1) can be transformed by multiplying it with  $r=\psi_t/\psi_{t-1}$  and subtracting the result from the equation for period  $t$ :

$$(3) W_{it} = a_{0t} + \sum c_{it} W_{it-1} + \sum d_{it} V_{it-1} + \sum e_{it} N_{it} \quad (i=1, \dots, N) \quad (t=(m+2), \dots, T).$$

In the special case of  $r=1$ , this transformation corresponds to taking the first difference of equation (1). The consistent estimation of equation (3) requires the use of the instrumental variable technique.

describe this dynamic relationship.

TABLE 3.4  
Causality tests  
The wage equation (T=10, N=123, starting at m=2)

	Q	Df <sub>Q</sub>	L	Df <sub>L</sub>	$\chi^2$
(i) m=2, time varying parameters	43.6	45			46.03
(ii) stationary individual effect	61.53	63	17.92	18	24.76
(iii) all parameters stationary, i.e. time invariant	88.89	94	27.35	30	40.25
(iv) m=1, given iii	352.52	96	263.62	3	6.25
(v) exclude value added per hour, given iii	158.33	95	69.44	2	5.99
(vi) exclude employment, given iii	115.28	95	26.39	2	2

### 3.5 Concluding remarks

The aim of this paper was to study the relative importance of internal versus external factors in wage determination in Finnish industries. We also wanted to study whether there exists an inverse relationship between wages and lagged employment. We approached these questions by estimating wage equations for 180 industries from the Finnish mining and industry sectors with GMM for the period 1985-1994.

Our main results can be summarised as follows. First, we find that both insider and outsider factors play a role in wage determination at the industry level. Second, of the explanatory variables, the greatest influence on industry level wages is exerted by the outside wage level, which has coefficients of around 0.6. The dominating impact of outside wages compares with the results obtained for other European countries. Third, the relative weight of the insider factors is estimated at 0.04-0.06. Hence, the insider variables have small, but positive impact on industry level wages. The estimates for the internal factors are four to six times bigger than those received by Holmlund and Zetterberg (1991) for Finland, but they accord with the earlier results for Sweden, Norway (with the exception of Johansen's (1996) results) and the Netherlands. Fourth, the small, positive, significant insider hysteresis term proxied by the change in the employment level implies some evidence of industry specific hysteresis. Nickell and Wadhvani (1991) for UK data and Brunello and Wadhvani (1989) for Japanese data also



report a positive impact for employment change, but their results are not robust if the alternative sample is used. Finally, causality tests conducted by the method developed by Holtz-Eakin, Newey and Rosen (1988) confirm the significance of insider factors in industry level wage formation.

## Data Appendix

Source: Central Statistics Finland (unless otherwise mentioned)

Variables:

$W_i$  : Wage costs per manhour in industry  $i$

$N_i$ : The number of employees in industry  $i$

$Va_i$  : Value added per working hour in industry  $i$

$Wa_i$ : The outside wage, i.e. average hourly wage cost in all other industries except the industry  $i$

$U$ : Aggregate unemployment rate (Source:Statistical yearbook)

$H_n$  : Normal working hours per week in manufacturing (Source:TT)

$R$ : Replacement ratio

$Pp$ : Producer price index, manufacturing sector, 1990=100 (Source: Statistical yearbook)

$Pi$ : Import price index, 1990=100 (Source: Statistical yearbook)

$Prod$ : Productivity, 1985=100 (Source: BOF4)

### APPENDIX 3.1

TABLE 2. Descriptive Statistics<sup>9</sup> (Number of observations 1230)

YEAR	MEAN	MEAN	MEAN
	Wage per hour (W) (mk)	Number of employ- ees (N)	Value added per hour (mk)
1985	37.49	3136.82	180.59
1986	40.25	2938.13	216.61
1987	43.05	2900.46	251.92
1988	47.10	2746.70	272.65
1989	51.52	2711.65	300.21
1990	57.72	2593.44	308.42
1991	61.06	2390.98	325.33
1992	64.34	2157.87	360.48

<sup>9</sup> Descriptive statistics based on the balanced part of the data set.

YEAR	MEAN	MEAN	MEAN
1993	65.52	2032.01	400.75
1994	68.07	2043.55	419.23

Note: The means of hourly wage, number of employees and value added per hour in a single industry.

TABLE 3. Variances of log hourly wages, employment and value added per hour, 1985-1995

	1985	1987	1989	1991	1994
Wage per hour	0.0263	0.0235	0.0262	0.0274	0.0268
Employment	1.487	1.330	1.186	1.146	1.233
Value added per hour	0.355	0.418	0.402	0.391	0.391

Note: The variances of hourly wage, number of employees and value added per hour in a single industry

## **4 ASYMMETRIC ADJUSTMENT OF EMPLOYMENT AND WAGES IN THE FINNISH MANUFACTURING SECTOR (1961-1994)**

### **Abstract**

The aim of this chapter was to investigate, in the light of the insider-outsider explanation, the nature of the adjustment in response to shocks of wages and employment as suggested in the insider-outsider explanation in the Finnish manufacturing sector during 1961-1994. The particular interest was in the asymmetric nature of this adjustment. As a preliminary analysis a simple data analysis was carried out in which the division of the changes of the wage sum into the changes of the number of employees, hour intensity and hourly wages was under scrutiny. The results of this analysis lend support to the asymmetric adjustment path of wages in both upward and downward directions. The greater downward adjustment of the number of employees and the hour intensity implied by the data is also in line with the insider-outsider approach. Thereafter, a test of asymmetry a la Begg et al. (1989) based on a simple insider-outsider model was applied to study the adjustment of number of employees in response to upward and downward shocks. The results of the regime-switching regressions did not imply the asymmetric adjustment of the number of employees.

### **4.1 Introduction**

Typical of the unemployment in many western European countries has been the high share of the long-term unemployed (those out of work more than for a year) of total unemployment. This has led to an increasing interest in understanding the mechanisms underlying unemployment. In the economic literature the high level of persistent unemployment in Europe has been explained by both demand and supply side mechanisms (see Bean 1993). One of the explanations that has been received relatively much attention both in theoretical and empirical work in recent years is the supply-side explanation offered by the insider-outsider approach. The insider-outsider approach emphasizes that the insiders' use of insider power in the wage setting process prohibits unemployed outsiders from being

unemployed and may help to prolong the effects of temporary shocks on employment.

Empirical work done on the relevance of the insider-outsider explanations during the late 1980's and in the beginning of this decade mainly has dealt with three aspects of the insider-outsider theories. First, unemployment hysteresis, i.e. the path dependence of unemployment, implied by some insider-outsider models (e.g. Blanchard and Summers 1986, 1987; Coe 1988; Neudorfer et al. 1990) has been empirically tested. Second, the importance of internal and external factors in wage determination has been an object of several studies (e.g. Blanchflower and Garrett 1987; Blanchflower 1988; Holmlund and Zetterberg 1989; Nickell and Wadhvani 1990; Coe 1990). Third, and perhaps to a somewhat lesser extent, the nature of the persistence effects on wages and employment caused by insiders' wage policies has been studied empirically (e.g. Blanchflower 1988; Brunello and Wadhvani 1989; Nickell and Wadhvani 1990; Begg et al. 1989).

This chapter aims to test the insider-outsider explanation of the nature of the adjustment of wages and employment in response to shocks using Finnish time-series data. In particular we are interested in the asymmetric nature of this adjustment. The bulk of the evidence of mostly micro-level studies (e.g. Blanchflower 1988; Nickell and Wadhvani 1990; Holzer and Montgomery 1990) indicates the asymmetric adjustment of wages, whereas the evidence on the asymmetric adjustment of employment is much scantier and less clear. As a preliminary test we carry out a wage sum inspection and then a test of asymmetry *à la* Begg et al. (1989) based on a simple insider-outsider model. There are two reasons for using Finnish data. The first one is that the nature of the adjustment of wages and employment in response to shocks has received relatively little attention in the empirical work on the Finnish labour market. The second reason is the high level of unemployment coupled with the growing share of the long-term unemployed faced by Finland since the early years of this decade. It is, therefore, important to get more empirical evidence of the possible mechanisms in the Finnish labour market that may cause unemployment persistence. In our empirical work we utilize annual time-series data from the Finnish manufacturing sector during 1960-1990 and 1961-1994 (in the wage sum inspection).

This chapter is structured as follows. In section 4.2, theoretical rationales for adjustment of wages and employment as presented in the insider-outsider approach (mainly along the lines of Lindbeck and Snower's insider-outsider models e.g. 1986, 1988a, 1988b, 1992) are put forward. The description of the data used and the results of the wage sum inspection are reported in section 4.3. Section 4.4 gives a description of the Begg et al. testing procedure and the estimation results, and section 4.5 the conclusions.

## **4.2 Adjustment of wages and employment in the insider-outsider approach**

The wage-setting mechanism plays a major role in the explanation of the persistence effects of shocks in the insider-outsider models. In the insider-outsider approach, wage determination can be regarded as rent sharing, where the rent shared

is the surplus above the production costs that the employer and the workers can extract from consumers (Blanchflower et al. 1990). The greater the power of insiders, the employed workers, is in the wage negotiations, the greater will be the share of the rent to be divided. The market power insiders exploit in wage negotiations derive from either labour turnover costs or firm-specific human capital. In most insider-outsider models, the wage setting is described within a union wage bargaining framework, most commonly either in right-to-manage bargaining, or a monopoly union framework, which implies that the employment decision is made by the employer's side after the wage is known. It is also assumed that insiders, if their own employment is secured, are interested in pushing their wages as high as possible irrespective of the employment prospects of unemployed outsiders

Due to insider wage setting, shocks may cause persistence effects on wages and employment, i.e. effects that do not disappear immediately after the shock is over. For example, those who became unemployed during a recession may find it difficult to get jobs after the recession on account of the decrease in the demand for labour caused by the insiders demanding higher wages for themselves. These persistence effects may not necessarily be symmetric in both upward and downward directions. As to the nature of shocks that cause persistence effects, and asymmetric persistence effects in particular, insider-outsider models make varying assumptions<sup>1</sup>. In Blanchard and Summers (1986) the shocks, both on the demand and supply side, are assumed to be unexpected to have any persistence effects, because, the insiders knowing about the shock could adjust their wage demands accordingly. In contrast, in Lindbeck and Snower (e.g. 1988b) both unexpected and expected shocks can cause persistence effects, the latter in cases, where seniority rules are applied in firings and insiders can influence labour turnover costs.

Membership rules, viz. the rules regulating entry and exit from insider membership, play an important role in the nature of the adjustment of employment (employment dynamics) and wages in response to shocks. Blanchard and Summers deal with employment dynamics under various membership rules. They consider that wage demands vary under different membership rules, the wage demands being most modest under the membership rule where insider membership is lost upon unemployment. In Lindbeck and Snower (e.g. 1988b) the asymmetry in gaining and losing insider status may have such an effect that shocks of the same size but in the opposite direction have asymmetric persistence effects on employment and wages. The asymmetry is such that a fall in employment due to a negative shock is greater than a rise in employment as a consequence of a positive labour demand shock. The opposite applies to the adjustment of wages: the rise due to a positive shock is greater than the fall as a consequence

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<sup>1</sup> In this paper, for brevity, we only refer to Blanchard and Summers' and Lindbeck and Snower's insider-outsider models as these models have been considered the two main contributions in the field of insider-outsider theory. For the others see e.g. Kauhanen (1994).

of a negative shock of the same magnitude. When the shock is unanticipated, it is reflected in employment but not in wages. In contrast, when the shock is anticipated, it is reflected in employment and wages, and for wages more in the case of a positive than a negative shock.

To sum up, as rationales for asymmetric persistence effects on wages and employment, asymmetry in the membership rules and asymmetry in the wage responses to labour demand shocks (when the seniority system is applied in firings or insiders can influence turnover costs) have been brought out in the insider-outsider models. One additional rationale, under anticipated labour demand shocks, concerns the kinked indifference curves of labour unions (see more closely Carruth and Oswald 1987a and 1987b).

### 4.3 Wage sum analysis

As a preliminary analysis of the nature of the adjustment of wages and employment we inspect wage sum changes. Asymmetry in this adjustment is surveyed by looking at how the wage sum reacts in response to upswings and downswings and how this response is divided into changes in the various components of the wage sum<sup>2</sup>. The aim of this simple data inspection is to find out whether the data lend any support to the asymmetric adjustment of wages and employment in response to shocks as suggested by the insider-outsider approach. That is, if wages are more flexible upwards and the employment tends to decrease more than increase in response to a shock of the same size but in the opposite direction. An important issue in the analysis is how the shock facing the economy is defined. By using an artificial criterion, we assume that there is a negative shock in the economy, if the growth in the wage sum remains under 2%<sup>3</sup>. In turn, a positive shock is assumed when the change in the wage sum is above the average growth of the wage sum. The change in the wage sum can be regarded as a quite good indicator of the shocks faced by the economy, albeit not all of them.

Next, the idea of studying asymmetry by inspection of the wage sum is described. Let the wage sum be defined in the following way

$$(4.1) \quad \text{WAGE SUM} = WL; L = NH_a,$$

where W is the wage per time unit, L= labour input, N= employment and H<sub>a</sub>= hours worked per employee.

By first taking logs and then differencing the above formulation the change in the wage sum is:

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<sup>2</sup>This procedure was suggested to me by Jaakko Kiander. All the shortcomings and faults are of course my own responsibility.

<sup>3</sup> The criterion of zero growth of the wage sum, i.e. a negative change in the wage sum in response to a negative shock, turned out to be too strict a criterion.

$$(4.2) \quad d(\text{LOGWL}) = d(\text{LOGW}) + d(\text{LOGN}) + d(\text{LOGH}_a),$$

where d=difference.

In our inspection we look at the changes in the product wage sum, i.e. the nominal wage sum deflated by the producer price index:

$$(4.3) \quad \text{WL} = (\text{W}/\text{P}_p) * \text{L},$$

where  $\text{P}_p$  is the consumer price index.

Taking logs and then differencing this yields:

$$(4.4) \quad d(\text{LOGWL}) = d(\text{LOGW}/\text{P}_p) + d(\text{LOGN}) + d(\text{LOGH}_a)$$

In the wage sum change analysis, annual data from the Finnish manufacturing sector during 1960-1994 is employed. The main source of the data is the Bank of Finland (BOF4). Some descriptive statistics concerning the data are presented in Table 4.1. In Figures 4.1-4.4 the development of the wage sum, number of employees, working hours per employee and hourly wages are displayed.

TABLE 4.1 Descriptive statistics of wages, employment, hourly wages in the manufacturing sector, 1961-1994

	<b>Wage sum (WS/ Pp)</b>	<b>Employment (1000)</b>	<b>Hours per employee</b>	<b>Hourly wages (Wh/Pp)</b>
Mean	309.76	496.5	1783.4	0.36
Min	142.6	396.2	1389.8	0.14
Max	449.8	572.3	2063.9	0.63
Std.Devn.	91.99	55	172.3	0.14

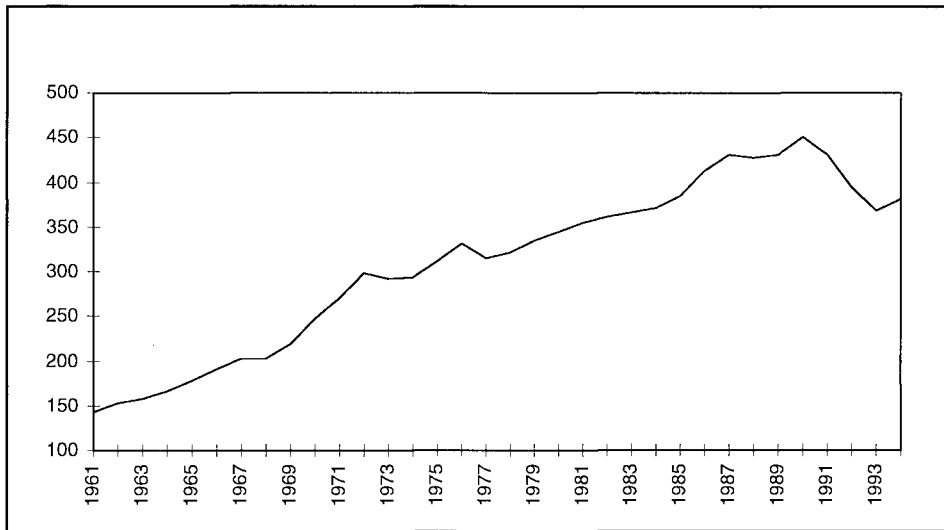


Figure 4.1 Wage sum (WS/Pp) in the total manufacturing sector, 1961-1994, mill. Fmk.

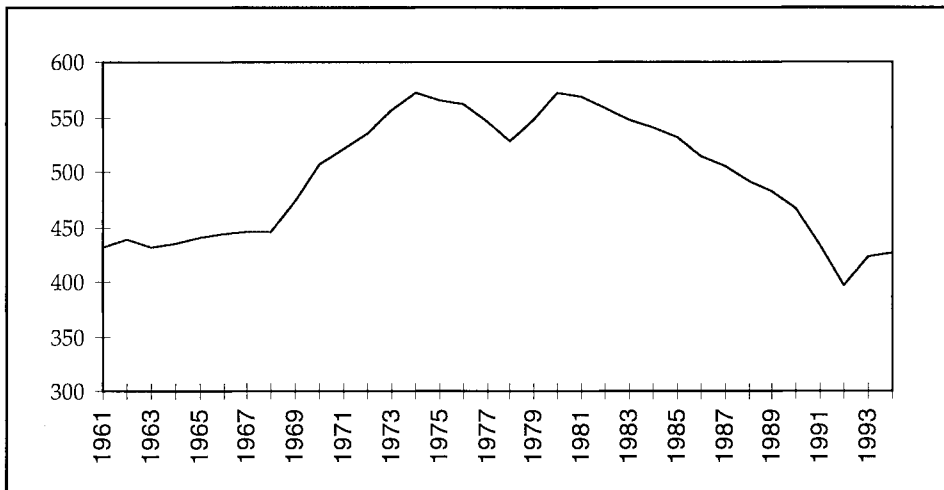


Figure 4.2 Number of employees in the manufacturing sector, 1961-1994 (1000 persons).

Figure 4.1 shows that the wage sum has steadily grown since the 1960's. The average growth rate has been around 3 % during our sample period. On the contrary, Figure 4.3 displays a clear, negative trend in working hours per employee since the early sixties. In the employment series (plotted in Figure 4.2) a growing trend is discernible from 1960 to around the year 1980, after which the trend becomes negative. The decline in working hours per employee in the manufacturing sector reflects the general shortening of working hours in Finland due to employment legislation and contracts. The negative trend in employment in



manufacturing during the 1980s reflects changes in the sectoral distribution of employment caused e.g. by technical progress<sup>4</sup>.

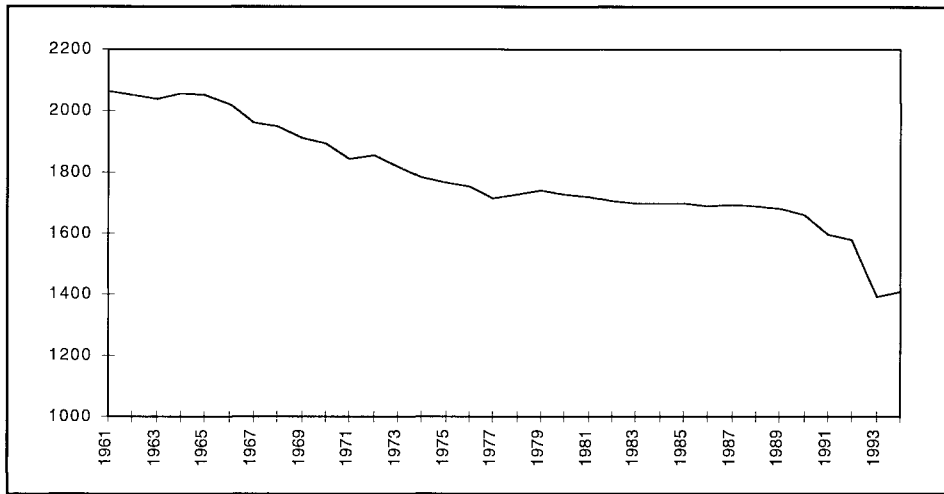


Figure 4.3 Working hours per employee per year in the manufacturing sector, 1961-1994.

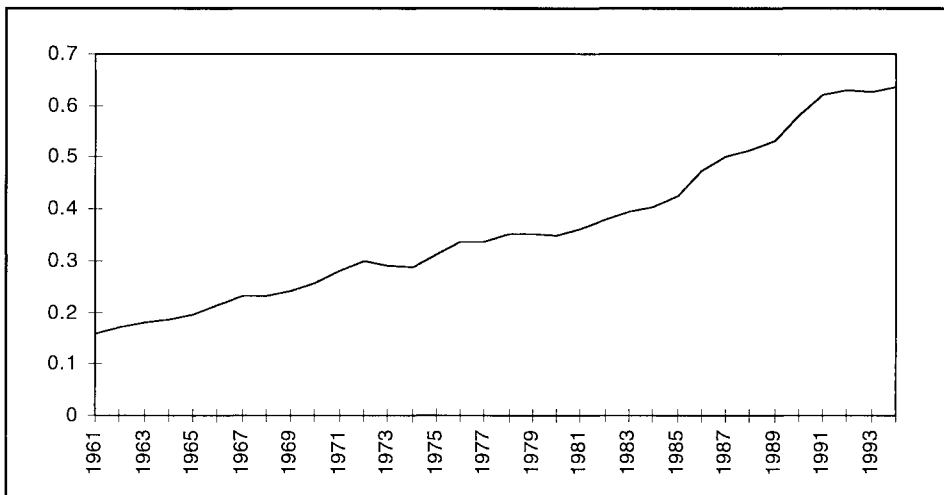


Figure 4.4. Hourly wages (Wh/Pp) in the manufacturing sector, 1961-1994.

Because we are interested in the local fluctuations in these time-series and not the trend, that is the long-term changes in the mean, we must first detrend them. There are several ways of carrying out the procedure of detrending, such as differencing the series or estimating a structural univariate model (see Harvey 1992).

<sup>4</sup> During the 1980s the changes in the sectoral distribution of employment have been characterized by the growth of service sector and the decline in the agriculture and manufacturing sectors.

In the latter procedure the series is decomposed into components such as trend, seasonal, cycle and irregular components, and finally the original series is detrended by subtracting the smoothed estimates of the trends from them. Due to the linear nature of the trends implied by the plotted figures, except for the number of employees, the detrending is here carried out by taking the first difference of the series<sup>5</sup>.

The division of the annual change in the wage sum into the changes in the hourly wage, number of employees and working hours per employee is depicted in Table 4.2. The criterion for the downswing of wage sum growth below 2 % picks up 1968, 1973-4, 1977, 1980-82, 1991-93 as downswing years. Of these years wage sum growth was negative in 1973, 1977, 1988 and 1991-93. The results of the table are suggestive of the asymmetric adjustment of wages along the lines of the insider-outsider approach: the hourly wages show greater adjustment in upswing years than in downswing ones. Wage sum changes of same size in upward and downward directions have not resulted in changes in the hourly wage of the same size in both directions. But it can be clearly noticed that the growth of hourly wages showed almost zero growth during the deepest years of recession of the 1970s and the early 1990s (when there had already been firings and new job losses were in prospect). Moreover, the data seem to imply that a major part of the small positive changes in the wage sum component transfer into the growth of hourly wages and only when the upswing is large enough is there an increase in the number of employees. For wage adjustment our results are in line with Ruutu's (1994) results utilising micro-level data from Finnish industrial firms during 1989-1992<sup>6</sup>.

As far as the adjustment of the two components of total working hours, i.e. number of employees (the extensive margin) and working hours per employee (the intensive margin<sup>7</sup>) is concerned, our detrended aggregate manufacturing data show greater variation in the number of employed workers in both directions than in the hour intensity. Further, it can be noticed that the changes in the number of the employed and in the hour intensity downwards are greater than changes upwards in response to wage sum changes of same magnitude but opposite sign. This kind of adjustment lends support to the explanation of insiders' capturing most of the positive effects of boom periods in their wages and thus leaving less space for the growth of employment. Hence, the data give evidence of asymmetric adjustment in employment as well.

However, the implications from the above wage sum inspection should be

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<sup>5</sup> The employment series was detrended by fitting a univariate structural model by STAMP.

<sup>6</sup> Ruutu (1994) studies the adjustment/changes of wages in Finland utilising individual-level data from five industries (metal, paper, textile, clothing and mechanical forest industries) during 1989-1992. He finds that wages also adjusted downwards during recession, but with a lag. In addition, there were differences in wage flexibility between new and old workers.

<sup>7</sup> The insider-outsider theory does not actually deal with the adjustment of the intensive margin of the labour input.

treated very cautiously and interpreted as indicative only. A caveat in studying the nature of the asymmetric adjustment of series from which trends have been removed is that the detrending may force the detrended series to behave more or less asymmetrically. On the other hand, the changes in real wages over time may also be influenced by such factors as changes in the structure of employment and the fact that during recessions those employees with the lowest productivity are first to lose their jobs. This may induce an upward movement in wages.

## **4.4 Model and results**

### **4.4.1 Test of asymmetry based on insider-outsider model**

Apart from the wage sum analysis we examine the adjustment path of employment in response to shocks by means of a testing procedure *à la* Begg et al. (1989). First, the use of similar test strategy allows us to compare our results with those received by Begg et al. (1989) in their country comparison with UK, German and Japanese data. Second, Begg et al. utilised aggregate level time-series data in their analysis, which we do also. The use of time-series data in the test makes it possible for us to study the adjustment of employment with Finnish manufacturing sector data over a time period of considerable length (1961-1994). Undoubtedly, in other respects, the use of micro-level data might have been more rewarding.

Below, we briefly present the main ideas behind the test strategy of Begg et al., which is based on a simple insider-outsider model. The model assumes that the insiders decide about the wage unilaterally, and thereafter the employment decision is made by the firm. The main issue of the test is how insiders, when knowing the direction and magnitude of the shock, adjust wages and employment. Is an anticipated shock captured in wages, thereby keeping the employment of insiders simultaneously unchanged? The following figures (4.4a and 4.4b) help to describe the idea of the test.

TABLE 4.2 The annual changes in the wage sum, LOG(WL), and its division into components (%), 1961-1994.

YEAR	D(LOGWL) (%)	D(LOGN*) (%)	D(LOGHa) (%)	D(LOGW/- P <sub>p</sub> ) (%)
1962	10.6	0.57	-0.65	10.69
1963	2.53	-1.65	-0.64	4.83
1964	5.28	0.20	0.86	4.21
1965	6.60	1.06	-0.21	5.75
1966	6.74	0.49	-1.44	7.68
1967	5.06	-1.07	-2.99	9.13
1968	-1.78	-2.10	-0.73	1.04
1969	3.91	1.96	-1.87	3.81
1970	9.75	2.25	-0.82	8.32
1971	5.60	-1.93	-2.91	10.4
1972	6.48	-1.44	0.72	7.20
1973	-3.38	0.88	-1.99	-2.27
1974	-0.43	1.47	-1.91	0.006
1975	6.22	-0.61	-0.86	7.69
1976	9.36	0.62	-0.83	9.57
1977	-1.93	-1.44	-2.27	1.78
1978	2.04	-2.32	0.82	3.54
1979	3.60	2.22	0.63	0.75
1980	0.74	2.74	-0.54	-1.46
1981	1.49	-1.26	-0.57	3.34
1982	1.75	-1.60	-0.65	4.01
1983	2.35	-0.27	-0.54	3.17
1984	3.76	0.96	0.002	2.79
1985	5.69	0.66	-0.12	5.15
1986	9.65	-1.22	-0.39	11.3
1987	5.86	-0.04	0.15	5.75
1988	2.96	-0.13	-0.09	3.18
1989	5.76	1.97	-0.51	4.31
1990	9.49	1.20	-1.42	9.70
1991	-1.27	-3.32	-3.76	5.81
1992	-4.63	-4.88	-1.08	1.33
1993	-3.76	7.61	-12.8	1.47
1994	5.63	2.08	1.34	2.20

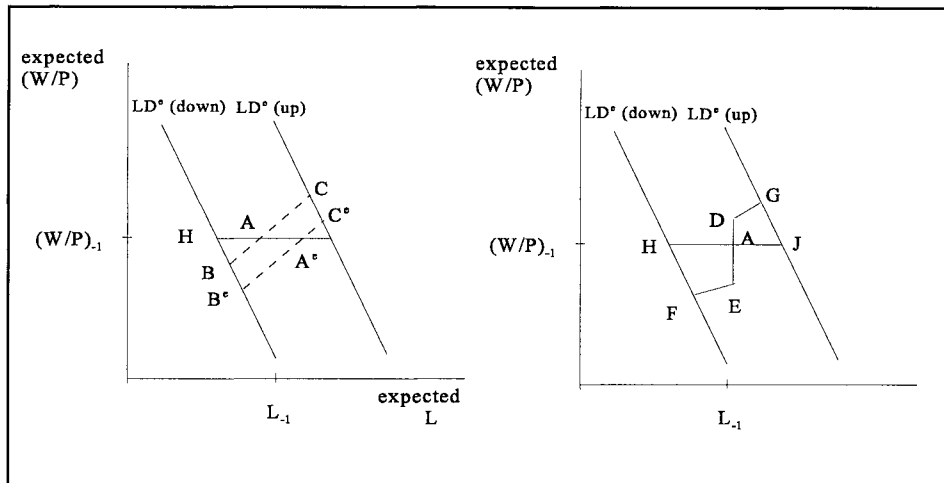


Figure 4.4a Symmetric Persistence (on the left) and 4.4b Asymmetric Persistence (on the right) (Begg et al. 1989, 564)

Point A in the figures is the initial point denoting employment and wages the previous year. The expected labour demand curve can go either up or down -  $LD^*(up)$  and  $LD^*(down)$  show these two possibilities when insiders have to make their wage decisions. Begg et al. distinguish upswings and downswings by the following sample selection criterion: an upswing is a situation where last year's insiders remain in their jobs and expect to get at least as great a real wage as they earned the previous year. Hence, there is an upswing if the expected labour demand curve lies above A and a downswing if it lies below A. The magnitude of the upswing or downswing is depicted by the horizontal distance AK or AJ, which shows how much employment can change if real wages remain unchanged in Figures 4.4a and 4.4b. Begg et al. call this horizontal distance either as DIFF or UPDIFF in case of upswing.

Figures 4.4a and 4.4b show different alternatives for how insiders may react, i.e. adjust wages and employment, when they have knowledge of the magnitude and the direction of DIFF. If by assumption the labour supply is perfectly elastic and there is no insider power, the employment would be at points J or K unaffected by horizontal movements in the position of A inherited from the past, i.e. present employment would not depend on past employment. The symmetric adjustment case of wages and employment in response to labour demand shifts is described by the line CAB in Figure 4.4a.

The third possibility is that the adjustment of wages and employment is asymmetric, as is described by GEADF in Figure 4.4b. In case of an upswing, when it is sufficiently small, the adjustment occurs along AD because the insiders capture the effects of the upswing entirely in their own wages. In larger upswings new employees are also hired and the adjustment occurs along line DF, which is flatter than AD. The steeper DF is, the less insiders want new workers to be hired. As regards the downswing case there may first be small wage reductions - along

AE - but larger downswings may also lead to a reduction in the workforce along line EG. The better the insiders are protected from dismissals, e.g. due to labour turnover costs and seniority systems, the flatter EG is expected to be. Begg et al. suggest that the asymmetry may take two forms here: either it refers to the difference in the slope between DF and EG or to a difference in the size of AD and EA.

To be able to test for possible asymmetry in the adjustment of employment, following Begg et al., we want to obtain DIFF, the measure for the upswing or downswing, as the difference between the expected employment at the previous year's real wage level and the previous year's employment. For this purpose a log-linear labour demand function for the number of employees as the dependent variable is first estimated. At the second stage DIFF is calculated on the basis of the estimated labour demand equation. Finally, we test a regime-switching model which allows for asymmetric adjustment rules for upswings and downswings.

#### 4.4.2 Results

The first phase in the testing procedure was to estimate the labour demand equation. The structural form of the labour demand equation used in the estimation was derived from a right-to-manage bargaining model - a model utilised in many recent analyses of the Finnish labour market (e.g. Pehkonen 1990; Eriksson et al. 1990; Tyrväinen 1992). Two different approaches were used to treat the endogenous real wage variable in the labour demand equation. First, the real wage was replaced by its fitted value from the estimated real product wage equation. Second, the wage variable was instrumented in the labour demand equation. The results of the estimations utilising the annual data from the Finnish manufacturing sector during 1961-1994 are reported in Appendix 4.1. Annual data were employed because some of the variables were available only in annual form. Second, variation in the contract length and the timing of the negotiations would have made dynamic specifications rather complicated, had quarterly data been used (see Eriksson et al. 1990, 212).

Having estimated the labour demand equations the next step was to define DIFF. This was done by using equation (4.5) below, where DIFF is defined as expected employment at the previous year's real wage subtracted by the previous year's employment:

$$(4.5) \quad \begin{aligned} \text{DIFF} &= \text{LOG}(N) - \text{LOG}(N)_{-1} \\ &= \text{FHAT} - \alpha \text{LOG}(\hat{W}_q)_{-1} - \text{LOG}(N)_{-1}, \end{aligned}$$

where  $N$  = the number of employees,  $\text{FHAT} (= \text{LOG}(N) + \alpha \text{LOG}(\hat{W}_q))$  is the fitted value of the other terms in the estimated labour demand equation except for the real wage term and  $\text{LOG}(\hat{W}_q)$  is the fitted value for the real wage.

The calculation of DIFF was followed by the definition of the sample selection criterion:

$$(4.6) \quad \text{UPDUMMY} = 1, \text{ if } \text{DIFF} > 0$$

= 0 otherwise.

In other words, the UPDUMMY variable is assigned the value one, when the expected labour demand is increasing. The last step was to estimate a regime-switching model which allows for the asymmetric adjustment rules for upswings and downswings, i.e. the dependent variable is determined by a regime-specific constant and by a regime-specific function of DIFF:

$$(4.7) \quad \text{LOG}(N) - \text{LOG}(N)_{-1} = \alpha_0 + \alpha_1 \text{UPDUMMY} + \alpha_2 \text{DIFF} + \alpha_3 \text{UPDIFF},$$

where the equation to be estimated in a downswing consists of a constant and DIFF (relevant parameters  $\alpha_0$  and  $\alpha_2$ ), whereas in the upswing the equation also includes the terms UPDUMMY and UPDIFF (parameters  $(\alpha_0 + \alpha_1)$  and  $(\alpha_2 + \alpha_3)$ ). UPDIFF is the interaction term, which is defined as DIFF multiplied by UPDUMMY.

Consequently, the actual test of asymmetry (the test of adjustment of the number of employees) was carried out by estimating a regime-switching regression for  $\text{LOG}N - \text{LOG}N_{-1}$  as the regressant and the UPDUMMY, DIFF and UPDIFF variables as regressors.

In testing for asymmetry we were interested in finding out whether there was intercept in the adjustment rule at point A (see figures 4.4a and 4.4b) or if the slopes of the adjustment rule differed from one another on both sides of point A, i.e. in upswings and downswings. The results of estimating the regime-switching equation are reported in Table 4.3.

TABLE 4.3 Dependent variable:  $\text{LOG}N - \text{LOG}N_{-1}$ . The sample is 1963 to 1994. The estimation method is OLS.

Variable	Regression 1	Regression 2
Constant	-0.012 (-2.1)	-0.014 (-1.6)
DIFF	0.90 (5.1)	0.85 (4.0)
UPDUMMY	0.005 (0.6)	-0.037 (-0.14)
UPDIFF	0.0002 (0.001)	0.002 (0.22)
R <sup>2</sup>	0.84	0.74
SEE	0.015	0.018
DW	1.49	1.63

SEE= the equation standard error, DW= Durbin Watson. The figures in parentheses give the t-values.

Our results do not imply evidence of the asymmetric adjustment of the number of employees. The interaction term, UPDUMMY, did not turn out significant in the regressions and thus we cannot conclude that there would be a discontinuity in the adjustment path of the number of employees. Another testable implication of asymmetry in our test strategy had to do with the slopes of the adjustment

path in upswings and downswings. According to the insider-outsider theory, the upswing slope coefficient ought to be smaller than the downswing slope coefficient, thus showing that insiders pursue higher real wages for themselves in good times and do not care about the employment prospects of unemployed outsiders. According to our results, the coefficient for the upswing slope (UPDIFF) is smaller than the corresponding coefficient for the downswing slope (DIFF). But as only DIFF became significant, we cannot draw any firm conclusions from this. In consequence, the evidence on the asymmetric adjustment of the number of employees indicated by the difference between the slope coefficients is not clear.

How can we interpret the coefficients of the regime-specific variables (if they were all significant)? Let us take regression 4.2 as an example. The UPDUMMY term with the coefficient -0.037 implies that, when labour demand is expected to rise, increases less than 3.7 % are totally shifted onto real wages and not onto total working hours. The DIFF variable with the coefficient 0.85 implies that a 1 % decline in labour demand leads to an expected 0.85 % decline in the number of employees.

Using a similar kind of test procedure for asymmetry Begg et al. (1989) found evidence of the asymmetric persistence for aggregate-level UK and Japanese data during 1953-1985(6), whereas there was only weak evidence with the West-German data. The indications of asymmetric persistence were shown by the significant intercept shifts (i.e. discontinuity points), whereas the slope coefficients did not imply this, because they did not differ from one another significantly. For comparison, the regime-switching regressions estimated in this study and in Begg et al. are summarised in the following table. The comparison is only indicative, as the regime-switching regressions in Begg et al. are based on the aggregate-level data and ours on data on the manufacturing sector as a whole. In addition, the estimated labour demand equation in this study was based on the right-to-manage model and thus differed from the specification used by Begg et al.. The countries compared also differ in their degree of centralization of wage bargaining. According to Calmfors and Driffill's (1988) ranking Finland is the most corporatist country of these countries, followed by Germany, the UK and, finally, Japan, which is ranked as the least corporatist of these four countries. The fact that despite powerful unions there is little detectable evidence of insider effects in the Scandinavian countries has been explained by the high degree of centralization of wage bargaining (see e.g. Layard et al. 1990)<sup>8</sup>.

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<sup>8</sup>The importance of labour market institutions on economic performance has been dealt with by e.g. Bruno and Sachs (1985), Newell and Symons (1987), Freeman (1988), Calmfors and Nymoen (1990), Moene et al. (1991), Layard and Nickell (1992). In most of these articles the connection between low employment and centralized wage bargaining has been brought out. However, the connection is not that clear. Moene et al. (1991, 80) consider that the centralized bargaining can lower unemployment, if the unions agree on how to spread the wage increase between themselves. If there is no co-operation and internal agreement, centralized bargaining can, in their opinion, become a form of multi-level bargaining that is not centralized at all.



Table 4.4 Comparison table of the regime-switching regressions

	Finland (this study)	UK (Begg et al.1989)	West-Germany (Begg et al. 1989)	Japan (Begg et al. 1989)
Constant	-0.014 (-1.6)	0.002 (0.72)	0.01 (3.5)	0.19 (8.3)
DIFF	0.85 (4.0)	1.239 (6.32)	1.31(6.5)	1.04(4.5)
UPDUMMY	-0.037 (-0.14)	-0.011(3.11)	-0.01 (1.4)	0.01 (3.5)
UPDIFF	0.002 (0.22)	-0.129 (0.50)	-0.40 (1.5)	0.28 (0.8)
SEE	0.018	0.0057	0.0064	0.0054
DW	1.63	1.80	1.62	2.27

SEE= the equation standard error, DW= Durbin Watson. The figures in parentheses give the t-values.

Finally, when interpreting these results we should bear in mind the following limitations. First, the results of the regime-switching regressions depend very much on the estimated real wage and labour demand functions. Second, due to the aggregate nature of the data used, there is also the possibility of losing some information (of a co-existing downswing in one industry in the manufacturing sector and an upswing in another. For the future we shall try to avoid this problem by collecting more disaggregated data (e.g. from different manufacturing industries or micro-level data). Moreover, the testing was based on a simple insider-outsider model, which ignores, among other things, the effect of retirements and seniority considerations. Consequently, bearing in mind the limitations of our empirical work, one ought to be cautious when interpreting these results.

#### 4.5 Conclusions

The aim of this chapter was to study the insider-outsider explanation of the nature of the adjustment of wages and employment in response to shocks utilizing Finnish manufacturing sector data. Our particular interest was in the asymmetric nature of this adjustment. For this purpose, as a preliminary, simple analysis, we carried out a wage sum inspection where we looked at the changes in the wage sum and its division into the changes of the number of employees, hourly wages and hour intensity. According to this analysis, our data seem to indicate the asymmetric adjustment of wages as assumed in the insider-outsider approach. Small positive changes in the wage sum were transferred mainly into the growth of hourly wages, and only when the wage sum growth (the upswing) was large enough was there also an increase in the number of employees. During the recession years hourly wages have also decreased, but the resulting downward adjustment in response to a negative shock is smaller than the upward adjustment in response to a positive shock of the same size. As regards the adjustment of the two components of total working hours, number of employees and work-



cluded the lagged real product wage variable. The reason for this was a methodological one. The real product wage equation was estimated by applying the so called general to specific modelling approach (see Henry 1989), where the starting point was a specification, where all potential explanatory variables as well as the dependent variable with lags are included. The trend growth of real wages has generally been explained either by the capital/labour ratio (e.g. Eriksson et al. 1990) or by output/labour ratio (e.g. Calmfors and Nymoer 1990). The capital/labour ratio was utilised here. The inclusion of normal working hours in the wage equation is based both on the trade union's objectives and the demand for labour (see Pehkonen 1991). The unionization ratio (the number of trade union members divided by employment) was used here as a proxy for the bargaining strength of the trade union and the real unemployment benefit was proxied by a daily average benefit. Moreover, it is noteworthy, that in the real product wage equation the tax variables and the  $P_c/P_p$  variable have not been tried to substitute by a combined wedge<sup>9</sup> variable describing a wedge between real product wages and the real after-tax consumption wage. This is due to the fact that the data rejects the wedge restriction, which presupposes that the factors of the wedge variable have equal coefficients in absolute value.

TABLE 1. Real product wage equation, dependent variable real product wage (LWp), estimation period 1961-1994; estimation method OLS.

Variable	Regression
Constant	0.16 (4.0)
LWp <sub>1</sub>	0.53 (7.0)
$\Delta LO$	0.51 (3.8)
LPc/Pp	0.71 (6.2)
LU <sub>1</sub>	-0.08 (-4.1)
LUNION <sub>1</sub>	0.41 (6.2)
$\Delta LK/N$	0.66 (4.0)
Diagnostics:	
R <sup>2</sup>	0.99
SEE	0.021
DW	1.51
AR 1-2 F(2,24)	2.58
ARCH 1 F(1,24)	0.30
Normality $\chi^2(2)$	2.67
Xi <sup>2</sup> F(12,13)	1.04
Reset F(1,25)	1.27

All the variables are in logarithmic form (L= LOG), SEE= the equation standard error, DW= Durbin Watson, AR 1-2 test for serial correlation, ARCH is the Lagrange Multiplier test for autocorrelated squared residuals, Normality refers to the Jarque and Bera statistic. The figures in parentheses give the t-values.

<sup>9</sup> A standard measure for the combined wedge is the following:  $wedge = (P_c/p)[(1+s)/(1-t)]$ , where s= the payroll tax rate, t= income tax rate (Eriksson et al. 1990)

The explanatory variables in the estimated regression are of expected sign and have significant t-values. Furthermore, according to the test diagnostics, the estimated regression is well-behaved.

The estimation results for the labour demand equation of the structural form given in (1) are reported in Table 2 below. Regression 1 is the labour demand equation, where the real wage variable has been replaced by its fitted value and regression 2 is the labour demand equation, where the real wage variable has been instrumented. The variables in regressions 1 and 2 are of expected sign corresponding to the a priori expectations and have significant t-values. In addition, according to the test diagnostics, both the models seem to fit the data well. The long-run wage elasticities calculated from regressions 1 and 2 are -0.50 and -0.56 respectively. When compared with the corresponding elasticities reported in other studies, the elasticities calculated from the regressions also seem reasonable: e.g. Pehkonen (1990) reports figures, where the long-run wage elasticity varies between -0.19 and -0.49 and Viren (1985) reports figures between -0.38 and -0.77.<sup>10</sup> The significant, negative trend in the regressions reflects the impact of technical progress on employment.

TABLE 2. The labour demand equation. Dependent variable: (log of) number of employees, LN, in the Finnish manufacturing sector. Sample period from 1964-1994.

Variables	Regression 1	Regression 2
Constant	-6.87 (-6.4)	-8.73 (-5.8)
LN <sub>1</sub>	0.40 (4.8)	0.25 (2.2)
LW <sub>r</sub>	-0.30 (-5.1)	-0.42 (-5.3)
LO	0.50 (8.5)	0.51 (8.5)
LK	-	0.62 (4.2)
LK <sub>1</sub>	0.42 (4.2)	-
Trend	-0.02 (-5.4)	-0.02 (-5.6)
Diagnostics:		
R <sup>2</sup>	0.98	0.99
SEE	0.016	0.016
DW	1.99	1.66
AR 1-2 F(2,23)/F(2,24)	0.42	-
ARCH 1 F(1,23)/F(1,24)	1.80	0.46
Normality $\chi^2(2)$	3.31	0.028
Xi <sup>2</sup> F(10,14)/F(10,15)	2.59	0.69
Reset F(1,25)	0.53	-

All the variables are in logarithmic form (L= LOG), SEE= the equation standard error, DW= Durbin Watson, AR 1-2 test for serial correlation, ARCH is the Lagrange Multiplier test for

<sup>10</sup> As far as the other elasticities are concerned, the long-run elasticity with respect to output with fixed capital stock is 0.83 (regression 1) and 0.68 (regression 2). With an endogenous capital stock the output elasticities ought to be smaller. These calculated output elasticities are approximately in line with elasticities reported in e.g. Santamäki (1986) and Pehkonen (1990).

autocorrelated squared residuals, Normality refers to the Jarque and Bera statistic. The figures in parentheses give the t-values. Estimation method in regression 1 OLS and in regression 2 IVE.

## DATA APPENDIX

DATA SOURCE: The data set of the Bank of Finland (BOF4) unless otherwise mentioned.

### List of Variables

**N:** Employment, manufacturing, 1000 persons.

**H:** Performed working hours, manufacturing, millions of hours.

**H<sub>N</sub>** :(Average) normal working hours, manufacturing. Sources: Incomes policy settlements in Finland, 1950-1987. The Prime Minister's Office. Estimates for years 1988-1994 by the writer.

**W:** Wages and salaries, manufacturing, FIM million.

**s:** Employer's social security contribution rate, manufacturing.

**τ:** Personal marginal income tax rate, estimate.

**P<sub>c</sub>**: Private consumption prices, 1985=100.

**P<sub>m</sub>**: Import prices of raw materials, 1985=100.

**P<sub>p</sub>**: Producer prices in manufacturing, 1985=100.

**Q:** Production at factor cost, manufacturing, millions of FIM.

**B:** Real unemployment compensation. An average daily benefit.

**U:** Aggregate unemployment rate.

**UNION:** Unionization rate; union members/employment. Source: Industrial relations - time series 1907-1988, Ministry of Labour and Statistical Yearbook of Finland.

## 5 MEMBERSHIP HYSTERESIS IN FINLAND: Some evidence from employment and union membership data

### Abstract

This chapter studies the relevance of the membership (insider) hysteresis hypothesis with Finnish employment and union membership data (1950-1993). In the examination of membership hysteresis and its effects, two test strategies along the lines of Burda (1990) are used, viz. unit root tests and Granger causality tests by means of the VAR technique. An advantage of our test strategy is that it does not require an explicit parameter estimation. On the basis of ADF and Phillips-Perron tests we cannot reject the unit root hypothesis in most of employment and union membership data. In turn, the evidence from Granger causality tests is against membership hysteresis.

### 5.1 Introduction

Since the late 1980s, one prominent explanation for unemployment persistence has based on insider-outsider considerations (e.g. a series of papers by Lindbeck and Snower 1986, 1988, 1992; Blanchard and Summers 1986, 1987; and, for a survey of various explanations, see Bean 1994). In essence, the insider-outsider approach concentrates on the wage determination mechanism in explaining unemployment persistence. Insiders (incumbent workers), due to their labour market power or to firm-specific capital have the market power to demand such high wages in wage negotiations as to worsen the employment possibilities of outsiders (unemployed workers).

Assumptions about insider or union membership rules, i.e. about gaining and losing the insider status are crucial to employment dynamics in the insider-outsider models. Typically these models assume that the membership of an insider group is gained with employment and lost with unemployment<sup>1</sup>. In other

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<sup>1</sup> The membership rule giving insider status only to those who are currently employed is rather strict. In most European countries the unemployed do not lose their membership with unemployment. Blanchard and Summers (1986) also deal with membership rules which do not link

words, the current insider membership is assumed to be equal to the level of employment in the previous period. In wage negotiations, insiders (or unions looking after insiders' interests) aim to raise wages as high as possible while ensuring their own jobs, with no concern for the employment prospects of unemployed employees. Therefore, even temporary shocks may have effects on employment that do not disappear after the shocks are over. For example, those who during a recession lose their jobs and, simultaneously, their insider status, may find it difficult to get re-employed, since the remaining pool of insiders pursues wages which maintain a lower level of employment permanently or for a considerable time. This is how insiders induce hysteresis in the behaviour of unemployment or employment<sup>2</sup>. If insiders can induce hysteresis in the behaviour of employment and insider membership depends on employment status, unions can also induce membership hysteresis. By definition hysteresis exists when the long-run value of a variable depends on the path taken towards it<sup>3</sup>.

This chapter aims, utilising Finnish data, to contribute to the evidence on relevance of membership hysteresis as implied by the insider-outsider theory. In the examination of membership hysteresis and its effects we use two test strategies, viz. unit root tests and Granger causality tests, by means of the VAR technique. In particular, we employ two testable implications of membership hysteresis from Burda's (1990a, 1990b) democratic model of union wage-setting<sup>4</sup>. These testable implications are: (i) autoregressive representations of employment and union membership should contain a unit root if unions are in fact able to induce hysteresis in the behaviour of employment and (ii) employment should Granger-cause real consumption wages, i.e. the development of employment should be of

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membership strictly to employment status but some outsiders who have recently lost their jobs continue to identify as insiders (see more closely Blanchard and Summers 1986).

<sup>2</sup> Besides the insider-outsider mechanism, another commonly cited source of hysteresis is given by the human capital theory (e.g. Phelps 1972; Layard et al. 1991). According to this theory unemployment erodes human capital, which, in turn, reduces the re-employment possibilities of the long-term unemployed. The third source is given by physical capital theory (e.g. Modigliani 1987). Based on the insider-outsider theory, an equally interesting target in lieu of membership hysteresis would be to study the so-called outsider hysteresis, i.e. to study what influence outsiders have or do not have on wage setting (e.g. Coe 1988).

<sup>3</sup> In this strict sense, hysteresis in unemployment implies that there is no unique equilibrium unemployment rate of unemployment in the long run, but the equilibrium level depends on the past levels of actual unemployment. This also implies that temporary shocks have permanent effects on unemployment. However, the use of the term hysteresis in economic models explaining unemployment persistence has generally been looser. It has been used synonymously with persistence to refer to a situation where current unemployment is highly dependent on the past unemployment and where temporary shocks have persistent, but not necessarily permanent effects on unemployment. Blanchard and Summers (1990, 281) use hysteresis "... more loosely to refer to a case where the degree of dependence on the past is very high, where the sum of coefficients is close but not necessarily equal to one".

<sup>4</sup> Burda tested for the existence of membership hysteresis by employing data from the following nine countries: the UK, France, Germany, Italy, Denmark, Sweden, Norway, Australia and the United States. According to his results most of these countries did not show evidence of the membership hysteresis on the basis of Granger causality tests.

help in predicting future consumption wages.

Previous empirical work on the importance of the insider hysteresis hypothesis has basically followed two main lines. First, a test strategy tackling the question whether (un)employment follows a random walk, i.e. whether current (un)employment depends on the past values of (un)employment with coefficients summing to one. Second, testing the Phillips-type of wage equations to detect whether wage growth is related to the level or the change in (un)employment (e.g. Blanchard and Summers 1986; Coe 1988). An advantage of using Burda's model is that the testable implications of membership hysteresis do not need an explicit parameter estimation like e.g. those from Blanchard and Summers' model. Moreover, Burda's model, which assumes endogeneous membership and seniority in employment, fits better the facts in the real world than the insider-outsider models which assume a hiring hall union where all members of the union are identical and jobs/lay-offs are allocated among the members randomly<sup>5</sup>. Implicitly, the idea of seniority is very important in the insider-outsider models. It explains why all employees are not equally inside and why senior insiders can demand higher wages without risking their own jobs in unions. Citing Grossman (1983, 277): "... the outcome of union voting is greatly influenced by senior workers who are fairly certain that they will not be laid off when normal shifts in the industry's demand for labour occur. These inframarginal workers are believed to vote for higher wage settlements than they would if their own jobs were not so secure."

In the 1990s the persistence of unemployment at a high level has become a severe problem in Finland. One cannot argue the mechanisms behind this persistence are all that clear cut. We feel that membership hysteresis with Finnish data merits further research, as the empirical evidence on the subject is still scarce. Elomaa (1988), who examined insider hysteresis by testing unit root and random walk hypotheses along the lines of Nelson and Plosser (1982) with Finnish aggregate employment data during 1957-1987, rejected the random walk, but could not reject the unit root. On the basis of Phillips-type wage equations and employment equations, a study by Eriksson (1988) on insider hysteresis<sup>6</sup> with Finnish annual manufacturing data (1960-1985) did not give clear evidence in favour of the existence of insider hysteresis.

According to the previous empirical evidence, the Scandinavian countries have powerful unions but no detectable insider effects. Layard et al. (1991) suggest that this might be due to the centralized nature of wage setting in these countries. In countries with centralized wage negotiations real wages are supposed to

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<sup>5</sup> Unlike the assumption of lay-offs by random draw, the assumption of seniority in lay-offs and hires is supported by the empirical evidence in many countries. Under the assumption of lay-offs by seniority it is understandable why the union is content to let the firm set employment unilaterally (Oswald 1993).

<sup>6</sup>Eriksson's (1988) study also considers the hysteresis debate from theoretical aspects other than the insider-outsider point of view. His empirical tests for the hysteresis hypothesis include tests for the effect of the long-term unemployed on the existence of hysteresis.



have a higher response to unemployment. With reference to this centralized nature of wage negotiations, one might expect little in the way of detectable effects of insider hysteresis in Finland. But, on the other hand, it might be altogether another matter were a collective agreement not to be reached and wages negotiated at a decentralized (union) level<sup>7</sup>.

The rest of the chapter is structured as follows. Section 5.2 presents the testable implications of Burda's model. Section 5.3.1. describes the methodology of unit root tests and reports the results of these tests with employment and union membership data. In section 5.3.2. the causality relationship between employment and real consumption wages, as implied by the insider-outsider approach, is examined by means of the VAR technique. Finally, section 5.4 summarizes the results and presents some conclusions.

## 5.2 Testable implications from Burda's model

In Burda's democratic model of monopoly union wage setting the union members set wages so that the expected value of employment equals the membership plus a constant drift term (see Appendix 5.2 for a more detailed description). In the model employment is allocated on a LIFO (last-in-first-out) basis and this is the only source of worker heterogeneity and of divergent preferences in the model. The preferred wage as the outcome of majority voting reflects the preferences of the median voter. The optimal time-invariant wage rule in a log form solved from Burda's model is

$$(5.1) \quad w_t^* = (1/\alpha)[\rho\epsilon_{t-1} - m_{t-1}] + \Phi,$$

where  $\alpha$  = the demand elasticity of labour with respect to the log of consumption wage  $w$ ,  $\epsilon$  = a random demand shifter,  $\Phi$  = a constant that depends on  $\lambda$  (short-run elasticity of membership with respect to employment  $n$ ),  $\beta$  (discount factor),  $F_1$ ,  $F_2$  and  $\alpha$ . In solving the time-invariant wage rule, Burda defines a voting membership equal to the Koyck distribution of lagged employment, which is a more realistic assumption than linking the voting membership strictly to current employment

$$(5.2) \quad m_t = \lambda \sum (1 - \lambda)^i n_{t-i}, \quad 0 < \lambda < 1,$$

where  $\lambda$  = the short-run elasticity of membership with respect to employment  $n$ . In Burda's model firms in an industry decide unilaterally on employment after the wage is set by a union. Given the optimal wage rule (5.1) and that the industry demand for labour is  $n_t = \epsilon_t - \alpha w_t$ , the following employment process can be

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<sup>7</sup>Moene et al. (1991, 80) consider that centralized bargaining can lower unemployment if the unions agree on how to spread the wage increase between themselves. If there is no co-operation and internal agreement, centralized bargaining can become a form of multi-level bargaining that is not centralised at all. In Finland 13 collective wage agreements were made between 1969 and 1992.

solved

$$(5.3) \quad \begin{aligned} n_t &= m_t + \alpha\Phi + v_t \\ &= \lambda \sum (1 - \lambda)^i n_{t-i} + \alpha\Phi + v_t \end{aligned}$$

Because the coefficients of employment in the membership rule (5.2) sum to one, the AR representation of employment series will have a unit root.

Another testable implication from Burda's model is a Granger causality relationship between employment and real consumption wages. Burda considers a case where  $w_t$  is taken as the realized consumption wage, which allows for unexpected movements at a price level:  $w_t = w_t^* + \xi_t$ . Because unions are assumed to have rational expectations,  $E_{t-1}\xi_t = 0$ . The optimal wage setting rule is now

$$(5.4) \quad w_t = (1/\eta)[\rho\epsilon_{t-1} - m_{t-1}] + \Phi + \xi_t$$

The substitution of the voting membership rule (5.2) for  $m_{t-1}$  and  $(n_{t-1} + \rho w_{t-1})$  for  $\epsilon_{t-1}$  yields

$$(5.5) \quad w_t = \rho w_{t-1} + (1/\alpha)[\rho n_{t-1} - \lambda \sum (1 - \lambda)^i n_{t-i}] - \Phi + \xi_t$$

Equation (5.5) implies that employment should Granger-cause real consumption wages.

### 5.3 Finnish evidence for the membership hysteresis hypothesis

#### 5.3.1 Unit root tests

We begin the analysis of membership hysteresis with tests for a unit root in the employment and union membership series. The unit root hypothesis implies that a time series is better characterized as a DS process, i.e. a non-stationary process that has no tendency to return to a trend line, than as a trend-stationary (TS) process that consists of a deterministic trend and a stationary stochastic process with mean zero (Nelsson and Plosser 1982). If the autoregressive representation of employment has a unit root it is integrated of order 1.

In testing for a unit root, we use the augmented Dickey Fuller test (ADF test), which is regarded as the most efficient test among the simple tests for integration. The ADF equation, which accounts for both a drift and a linear deterministic trend, has the following form

$$(5.6) \quad \Delta y_t = \alpha_0 + \alpha_1 y_{t-1} + \alpha_2 t + \sum \delta_i \Delta y_{t-i} + \epsilon_t$$

The null hypothesis that  $y_t$  is a univariate integrated autoregressive process is tested against the alternative that  $y_t$  has a deterministic linear trend  $t$  and a stationary AR(p) process. In the testing procedure, the student t-ratio, the ratio of

OLS  $\delta$  estimate to its calculated standard error obtained from an OLS regression, is examined. This statistic does not have a familiar Student t-distribution under the null, and the critical values for the distribution of the Student t-statistic in the Dickey-Fuller regression have to be looked at specific tables (e.g. Fuller 1976; Dickey and Fuller 1981; Davidson and MacKinnon 1993). Here, in this study we use asymptotic critical values for unit root tests, because they do not require normality or homoskedasticity of the error terms as the finite-sample critical values do. On basis of the student t-ratios, either the null hypothesis  $\alpha_1=0$  (unit root hypothesis) cannot be rejected or it is rejected in favour of the alternative  $\alpha_1 < 0$  (which implies that  $y_t$  is integrated of order zero).

We estimated the ADF equation (5.1) with annual observations on employment in the Finnish manufacturing sector (in log form) during 1954-1992 and on total employment (in log form) during 1950-1992. Besides the ADF tests for unit roots we also conducted Phillips-Perron tests for unit roots (for more details, see Phillips 1987; Phillips and Perron 1988) for the same series. The nonparametric Phillips-Perron tests for unit roots are also valid despite the serial correlation of an unknown form of error terms. The results of these tests are reported in Tables 5.1 and 5.2.

TABLE 5.1 ADF tests for a unit root in AR representations of (log of) manufacturing employment and Phillips-Perron tests for a unit root in (log of) manufacturing employment in Finland 1954-1992.

Manufacturing employment					
ADF tests			Phillips-Perron tests		
Variable: log of employment					
$\alpha_1=0$	T-test $\tau$	0.39 (-3.13)	$\alpha_1=0$	Z-test	1.46(-18.2)
$\alpha_0=\alpha_1=\alpha_2=0$	F-test $\Phi_2$	1.59 (4.03)	$\alpha_1=0$	T-test $\tau$	0.60(-3.13)
$\alpha_1=\alpha_2=0$	F-test $\Phi_3$	2.27 (5.34)	$\alpha_0=\alpha_1=\alpha_2=0$	F-test $\Phi_2$	3.77 (4.03)
			$\alpha_1=\alpha_2=0$	F-test $\Phi_3$	5.66 (5.34)
Variable: first difference of log of employment					
$\alpha_1=0$	T-test $\tau$	-3.53 (-3.13)	$\alpha_1=0$	Z-test	-23.2(-18.2)
$\alpha_0=\alpha_1=\alpha_2=0$	F-test $\Phi_2$	4.62 (4.03)	$\alpha_1=0$	T-test $\tau$	-3.86(-3.13)
$\alpha_1=\alpha_2=0$	F-test $\Phi_3$	6.78 (5.34)	$\alpha_0=\alpha_1=\alpha_2=0$	F-test $\Phi_2$	5.14(4.03)
			$\alpha_1=\alpha_2=0$	F-test $\Phi_3$	7.50 (5.34)

Notes: The figures in brackets are asymptotic critical values at the 10% significance level. The test statistics were obtained by using SHAZAM. The regressions included a constant and a trend. In testing simultaneously for the absence of a stochastic trend ( $\alpha_1 < 0$ ) and the existence of deterministic trend ( $\alpha_2 \neq 0$ )  $\Phi_3$  test statistics for  $\alpha_1 = \alpha_2 = 0$  is used (a unit root test with non-zero drift).  $\alpha_0 = \alpha_1 = \alpha_2 = 0$  is a unit root test with zero drift.

TABLE 5.2 ADF tests for a unit root in AR representations of (log of) total employment and Phillips-Perron tests for a unit root in (log of) total employment in Finland 1950-1992.

Total employment					
ADF tests			Phillips-Perron tests		
Variable: log of employment					
			$\alpha_1=0$	Z-test	-9.56(-18.2)
$\alpha_1=0$	T-test $\tau$	-0.93 (-3.13)	$\alpha_1=0$	T-test $\tau$	-1.38(-3.13)
$\alpha_0=\alpha_1=\alpha_2=0$	F-test $\Phi_2$	2.30 (4.03)	$\alpha_0=\alpha_1=\alpha_2=0$	F-test $\Phi_2$	2.48 (4.03)
$\alpha_1=\alpha_2=0$	F-test $\Phi_3$	2.74 (5.34)	$\alpha_1=\alpha_2=0$	F-test $\Phi_3$	3.11 (5.34)
Variable: first difference of log of employment					
			$\alpha_1=0$	Z-test	-26.4(-18.2)
$\alpha_1=0$	T-test $\tau$	-2.77 (-3.13)	$\alpha_1=0$	T-test $\tau$	-3.71(-3.13)
$\alpha_0=\alpha_1=\alpha_2=0$	F-test $\Phi_2$	3.27 (4.03)	$\alpha_0=\alpha_1=\alpha_2=0$	F-test $\Phi_2$	4.93(4.03)
$\alpha_1=\alpha_2=0$	F-test $\Phi_3$	4.67 (5.34)	$\alpha_1=\alpha_2=0$	F-test $\Phi_3$	7.00 (5.34)

Notes: The figures in brackets are asymptotic critical values at the 10% significance level. The test statistics were obtained by using SHAZAM. The regressions included a constant and a trend. In testing simultaneously for the absence of stochastic trend ( $\alpha_1 < 0$ ) and the existence of deterministic trend ( $\alpha_2 \neq 0$ )  $\Phi_3$  test statistics for  $\alpha_1 = \alpha_2 = 0$  is used (a unit root test with non-zero drift).  $\alpha_0 = \alpha_1 = \alpha_2 = 0$  is a unit root test with zero drift.)

According to both the ADF and Phillips-Perron tests, we cannot reject the unit root hypothesis for manufacturing employment and total employment in Finland at the 10% significance level. On the basis of the ADF and Phillips-Perron test results of a unit root in the first difference of the employment series, we reject the null hypothesis of a second unit root and thus we can conclude that the series really are integrated of the order one.

If we can find evidence on the unit root hypothesis in the employment series and if union membership is a lagged employment with a unit root, an AR representation of union membership ought to include a unit root as well. Therefore, our next step is to study the unit root hypothesis for union membership by employing both Finnish total union membership data and data from six Finnish unions. A look at the graphs of our union membership data (see Appendix 5.1) reveals that the rate of increase in trade union membership accelerated in Finland towards the end of the 1960s<sup>8</sup>. There is an evident change in the level of membership in all our sample unions, except the pharmacists' union, around 1970, which must be taken into account in the unit root tests. Perron (1989) has shown that the power of unit root tests is considerably diminished if the level or the trend has changed exogenously during the sample period; moreover, and the tests may lead to the acceptance of the unit root hypothesis even if the two parts

<sup>8</sup> " The Finnish labour market witnessed a number of institutional changes in the late 1960s and early 1970s. To simplify, institutional support provided by the left-center coalition governments as well as by the employer's central organizations toward union organization and representative unions began to increase considerably in the late 1960s." (Pehkonen and Tanninen 1995, 2).

of the sample were stationary. To avoid this problem we apply a test strategy developed by Perron (1989, 1990) to deal with the effects of a shift in the level of the series on tests for the presence of a unit root. The following table presents the results of ADF tests for a unit root, where Perron-type dummy variables are used for the breaks in the series. The critical values for the extended ADF statistics are given in Perron (1990).

The results of the extended ADF test confirm the unit root hypothesis for the total union membership series in Finland and for the union membership in four of the six sample unions during 1950-1993. Only in membership of the metal workers' union and the pharmacists' union was there no evidence of a unit root. When interpreting the unit root results, it is useful to bear in mind the limitations of the unit root test strategy. Because different tests developed to detect the unit root have a tendency to give different results and because there is room for improving the power of these tests, it is difficult to draw conclusive inferences about whether economic time series really have unit roots (Davidson and MacKinnon 1993). Moreover, in country comparisons (e.g. Coe 1990, Burda 1990b) it has not been possible to differentiate between high and low unemployment countries by unit root tests. Therefore unit root tests do not seem to offer strong evidence on hysteresis.

TABLE 5.3 ADF tests for a unit root in AR representations of (log of) total union membership and union membership in 6 unions in Finland 1950-1993.

Variable (name of the union)	in log form t-value	in first difference of log t-value
Total union membership	-1.26(0)1 -1.53(0)2	-4.56(0)* -4.50( 0)*
Manufacture of food	1.93(4) 3.17(4)	-0.57(3) -4.11(0)*
Paper industry	1.82(1) 1.26(1)	-0.87(4) -4.05(4)*
Construction	-0.56(3) -0.39(3)	-5.71(4)* -5.37(4)*
Metal industry	-0.17(1) 1.26(1)	-1.21(2) -2.17(2)
Manufacture of rubber <sup>3)</sup> and leather products	-1.84(3) -1.90(3)	-3.87(2)* -1.52(2)
Pharmacy	-3.36(2)* -7.13(2)*	- -

Notes:

Estimated model is:

$$1) t(\alpha)_1 \Delta y_t = \alpha_0 + \alpha_1 y_{t-1} + \alpha_2 t + \sum \delta_i \Delta y_{t-i} + \delta \text{DUMMY} + \epsilon_t$$

$$2) t(\alpha)_2 \Delta y_{it} = \alpha_0 + \alpha_1 y_{it-1} + \sum \delta_i \Delta y_{it} + \delta \text{DUMMY} + \epsilon_t$$

In each regression only one dummy is used. The Perron-type dummy variables used for the breaks in the regressions are: D69= dummy which receives the value 0 between 1950 and 1968 and is one elsewhere; D70= dummy which receives the value 0 between 1950 and 1969 and is one elsewhere. Only one dummy per regression is used. The number of lagged differences used in the ADF test is given in the parenthesis. An asterisk denotes a significance of at least the critical level of 5 per cent.

3): Sample ends 1992.

### 5.3.2 Granger causality tests

Another testable implication of Burda's democratic monopoly union model is that employment should Granger-cause real consumption wages. This co-movement of employment and consumption wages is due to the fact that in the model lagged employment through its effect on membership influences future wages.

According to the Granger definition of causality,  $x$  is a Granger cause of  $y$  (denoted as  $x \rightarrow y$ ), if present  $y$  can be predicted with better accuracy by using past values of  $x$  than by not doing so, other information being identical (Granger 1969). In other words, our test is based on the criterion whether the development of employment series helps to predict movements in real consumption wages. If the insider considerations in wage-setting are valid then the past levels of employment (the level of insider membership) should influence wage demands. In the democratic monopoly union model à la Burda the size of the voting membership depends on the past employment, and the smaller the past employment, the smaller will be the number of members deciding on wages. The optimal wage set by a union with the Koyck membership rule depends positively on the approbiable rents summarized by the expected position of the labour demand curve and negatively on the union membership.

The Granger causality relationship between employment and real consumption wages in the manufacturing sector during 1960-1992 is examined by means of the VAR (vector autoregressive) technique (see e.g. Sims 1980; Stock and Watson 1987). The real consumption wage is measured as the ratio of the hourly wage after taxes to the consumer price index. The advantages of the VAR technique are due to its data-driven features: there is no a priori endo-exogenous division of variables, zero restrictions are not imposed and there is no strict economic theory upon which the model is grounded<sup>9</sup>. In VAR modelling each current (non-lagged) variable in the model is regressed on all the variables in the model lagged a certain number of times.

Critical issues in the modelling concern the choice of this lag structure, the stationarity of the time series and the possible cointegratedness of the time series in the model. Therefore, before the actual test of Granger causality, we first study the stationarity of these time series by means of Phillips-Perron tests. According to the test results of Table 5.4, both the log of employment and real consumption wages are stationary in the first differences, i.e. they are integrated of order 1.

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<sup>9</sup> Of course, the theory influences the choice of the variables in the VAR model.

TABLE 5.4 Phillips-Perron tests for a unit root in (log of) real consumption wages and employment in manufacturing 1960-1992.

Phillips-Perron tests			
Variable:		LOG(E)	LOG(W)
$\alpha_1=0$	Z-test	1.66 (-18.2)	-8.35 (-18.2)
$\alpha_1=0$	T-test $\tau$	0.90 (-3.13)	-1.96 (-3.13)
$\alpha_0=\alpha_1=\alpha_2=0$	F-test $\Phi_2$	6.61 (4.03)	4.13 (4.03)
$\alpha_1=\alpha_2=0$	F-test $\Phi_3$	9.39 (5.34)	2.11 (5.34)
Variable:		$\Delta(\text{LOG}(E))$	$\Delta(\text{LOG}(W))$
$\alpha_1=0$	Z-test	-21.31 (-18.2)	-25.31(-18.2)
$\alpha_1=0$	T-test $\tau$	-3.90 (-3.13)	-3.69 (-3.13)
$\alpha_0=\alpha_1=\alpha_2=0$	F-test $\Phi_2$	5.22 (4.03)	4.77 (4.03)
$\alpha_1=\alpha_2=0$	F-test $\Phi_3$	7.59 (5.34)	7.02 (5.34)

Notes: The figures in brackets are asymptotic critical values at the 10% significance level. The test statistics were obtained by using SHAZAM. The regressions included a constant and a trend.

As the next step we study the cointegratedness of the time series, i.e. whether they obey an equilibrium relationship in the long run. If the time series are cointegrated, a pure VAR model in the differences will be misspecified, if appropriate long-run equilibrium constraints implied by the cointegration are not taken into account (Engle and Granger, 1987). In this paper we use two test statistics for testing the null hypothesis of non-cointegration against the alternative of cointegration, viz. the Durbin Watson test statistic (CRDW)<sup>10</sup> and Augmented Dickey-Fuller test statistic (ADF) (see Engle and Granger 1987). These test statistics are reported in Table 5.5.

TABLE 5.5 Test for cointegration

System	CRDW*	ADF**
e, w	0.057	-1.55 (-3.04)
w, e	0.122	-0.49 (-3.04)

Notes: e= log of employment E, w= log of wage W

\*: constant, no trend

\*\*: no constant, no trend; the ADF test statistic is the t-test value; the figure in brackets is the asymptotic critical value at the 10% significance level.

The Durbin Watson test statistics from the cointegration regressions do not exceed the critical level of 5 per cent of 0.386, and thus the null hypothesis of non-cointegration cannot be rejected. In addition, the ADF test statistics indicate that the residuals are nonstationary. In consequence, on the basis of the CRDW and

<sup>10</sup>After running the co-integration regression the Durbin Watson statistic is tested to see if the results appear stationary. If they are nonstationary, the Durbin-Watson will approach zero, and thus the test rejects non-cointegration (finds co-integration) if DW is too big." (Engle and Granger 1987, 266)

ADF test statistics, we cannot reject the null of non-cointegratedness of the time series. Due to this, a pure VAR model in differences will not suffer from omitting appropriate long-run equilibrium constraints.

As far as the lag structure of the VAR model is concerned, we are not satisfied with setting the lag-length arbitrarily, but use Schwarch (SC) and Final Prediction Error criteria (FPE) along the lines of the sequential procedure suggested by Hsiao (1981). The statistical criteria are used to select the optimum lag-length for the one-dimensional AR processes  $\Delta e$  and  $\Delta w$ <sup>11</sup>. The use of these two different criteria for choosing the optimum lag-structure gives different weights to the prediction bias/efficiency trade-off. The SC and FPE are computed by varying the maximum order of lags from 1 to 13 in the one-dimensional AR process. The results are reported in Table 5.6.

TABLE 5.6 The SC and FPE values of fitting a one-dimensional autoregressive process for  $\Delta e$  and  $\Delta w$ .

Lags	$\Delta e$		$\Delta w$	
	SC	FPE x 10 <sup>-2</sup>	SC	FPE x 10 <sup>-2</sup>
1	-6.8763*	0.0941*	-6.3262	0.1631
2	-6.7406	0.1028	-6.3654*	0.1496
3	-6.7433	0.0978	-6.3026	0.1519
4	-6.5978	0.1079	-6.2298	0.1559
5	-6.4327	0.1215	-6.2360	0.1479*
6	-6.2707	0.1366	-6.1021	0.1617
7	-6.0896	0.1570	-5.9241	0.1853
8	-5.9204	0.1793	-5.7225	0.2186
9	-6.0145	0.1586	-5.5840	0.2440
10	-6.1544	0.1359	-5.3670	0.2986
11	-6.0595	0.1503	-5.1447	0.3753
12	-6.2073	0.1355	-4.9483	0.4772
13	-6.2120	0.1512	-4.6833	0.6972

For the employment process both the SC and FPE criteria suggest 1 as the optimum lag-length. In turn, for real consumption wages we choose an optimum lag order of 2 based on the SC criterion and a lag order of 5 based on FPE criterion. Following Hsiao's procedure (1981) our next step is to treat  $\Delta e$  ( $\Delta w$ ) as the controlled variable and  $\Delta w$  ( $\Delta e$ ) as the manipulated variable which controls the outcome of  $\Delta e$  ( $\Delta w$ ). For the selection of the optimal lag structure of this bivariate VAR, we compute SCs and FPEs for the controlled variables ( $\Delta e(1)$ ;  $\Delta w(2)$ ;  $\Delta w(5)$ <sup>12</sup>), varying the lag structure of the manipulated variable ( $\Delta w(2)$  or  $\Delta w(5)$ ) or

<sup>11</sup>  $\Delta x = \log(X)_t - \log(X)_{t-1}$ ,  $X=E,W$

<sup>12</sup> The order of the controlled variable is given in the brackets.



$\Delta e(1)$ ) from 1 to 13. Table 5.7 reports the results.

TABLE 5.7 The optimum lags of the manipulated variables and the SC and FPE of the controlled variables ( $\Delta e$  and  $\Delta w$ ).

Controlled variable	Manipulated variable	The optimum lag of manipulated variable	SC	FPE $\times 10^{-2}$
$\Delta e(1)$	$\Delta w$	1	-6.805	0.0965
$\Delta w(2)$	$\Delta e$	1	-6.256	-
$\Delta w(5)$	$\Delta e$	1	-	0.1600

Notes:  $\Delta e = \alpha \Delta e_{-1} + \beta \Delta w_{-1} + \epsilon_1$

$\Delta w = \alpha_1 \Delta w_{-1} + \alpha_2 \Delta w_{-2} + \beta_1 \Delta e_{-1} + \epsilon_2$

$\Delta w = \alpha_1 \Delta w_{-1} + \alpha_2 \Delta w_{-2} + \alpha_3 \Delta w_{-3} + \alpha_4 \Delta w_{-4} + \alpha_5 \Delta w_{-5} + \beta_1 \Delta e_{-1} + \epsilon_3$

Comparison of the optimal SCs and FPEs from the one-dimensional AR processes with the optimal SCs and FPEs from the bivariate VAR processes gives the following results:

$$\text{FPE}[\Delta e(1)] = 0.000941 < 0.000965 = \text{FPE}[\Delta e(1,1)]$$

$$\text{FPE}[\Delta w(5)] = 0.001479 < 0.001600 = \text{FPE}[\Delta w(5,1)]$$

$$\text{SC}[\Delta e(1)] = -6.8763 < -6.8051 = \text{SC}[\Delta e(1,1)]$$

$$\text{SC}[\Delta w(2)] = -6.3654 < -6.2564 = \text{SC}[\Delta w(2,1)].$$

The comparison shows that the smallest FPEs of the univariate autoregressive processes do not exceed the smallest FPEs of the bivariate processes. Thus, inclusion of information on past employment does not improve the forecast for real consumption wages. In other words, employment does not seem to Granger-cause real consumption wages. The same conclusions can also be drawn on the basis of the SC criteria. In addition, we also study the hypothesis of Granger causality, i.e. that employment Granger-causes  $y$ , by estimating

$$(5.7) \quad \Delta w = (\sum \theta_i L^i) \Delta w_t + (\sum \psi_j L^j) \Delta e_t + \epsilon_t$$

and testing on the basis of an F-test whether the lagged values of employment are jointly significantly different. For this purpose we estimate the bivariate VAR model both in first differences and in log levels with a linear time trend. The lag-length in the regressions for both real consumption wages and employment is chosen according to the SC and FPE selection criteria. In addition, we also impose arbitrary lag-lengths (3-3) and (4-4) on the employment and wage series. The results of the causality tests are reported in Table 5.8. On the basis of the F-statistics results of Table 5.8, the null of no causality between employment and real wages cannot be rejected, which parallels the results from the SC and FPE comparison.

TABLE 5.8 Granger causality tests: F-statistics and P-values

$\Delta w(2), \Delta e(1)$	$\Delta w(5), \Delta e(1)$	$\Delta w(3), \Delta e(3)$	$\Delta w(4), \Delta e(4)$
0.19 (0.664)	0.07 (0.798)	0.48 (0.697)	0.42 (0.795)
$w(2), e(1)$	$w(5), e(1)$	$w(3), e(3)$	$w(4), e(4)$
0.1651 (0.688)	0.1038 (0.751)	0.0713 (0.975)	0.0726 (0.990)

Notes:  $e$ =log of employment  $E$ ,  $w$ =log of wage  $W$ ,  $\Delta$ =difference. The P value in the parentheses after F-statistics is the probability of observing a test statistic no less extreme than that actually observed. The null hypothesis is rejected if the probability value of  $H_0$  is less than the specified level of the test.

Burda's democratic union model implies a negative relationship between consumption wages and membership, thereby suggesting that a larger union would be more moderate in its wage demands. Below, we also test the Granger causality relationship between real consumption wages and union membership. As stated earlier, according to the model the past levels of union membership ought to help to predict movements in real consumption wages. The Granger causality relationship between union membership (proxy: total union membership in Finland) and real consumption wages in manufacturing during 1960-1992 is examined by employing exactly the same (VAR) technique as earlier. The analysis commences with checking the unit root properties and the cointegratedness of these two time series (see Appendix 2). The results indicate that the two series are integrated of order 1 and that they are not cointegrated with each other.

On the basis of the SC and FPE criteria from univariate autoregressive processes for  $\Delta m$  and  $\Delta w$  (see Appendix 5.2), we choose the optimum lag-lengths for both series. The optimum lag order of 9 for a union membership process is suggested by both the SC and FPE criteria, whereas for real consumption wages the optimum lag orders are 2 (SC criterion) and 5 (FPE criterion). The next step in the causality test strategy is to treat  $\Delta m$  ( $\Delta w$ ) as the controlled variable and  $\Delta w$  ( $\Delta m$ ) as the manipulated variable which controls the outcome of  $\Delta m$  ( $\Delta w$ ). The optimal lag structure of this bivariate VAR is again determined by the SC and FPE criteria. The results are reported in Table 5.9.

TABLE 5.9 The optimum lags of the manipulated variables and the SC and FPE of the controlled variables ( $\Delta m$  and  $\Delta w$ ).

Controlled variable	Manipulated variable	The optimum lag of manipulated variable	SC	FPE $\times 10^{-2}$
$\Delta m(9)$	$\Delta w$	4	-8.5373	0.0120
$\Delta w(2)$	$\Delta m$	1	-6.2521	-
$\Delta w(5)$	$\Delta m$	1	-	0.1590

Notes:  $w$ =log of wage  $W$ ,  $m$ =log of union membership  $M$ ,  $\Delta$ =difference.

Comparing optimal SCs and FPEs from univariate and bivariate VAR presentations yields the following results:

$$\text{FPE}[\Delta m(9)] = 0.000189 > 0.000120 = \text{FPE}[\Delta m(9,4)]$$

$$\text{FPE}[\Delta w(5)] = 0.001479 < 0.001590 = \text{FPE}[\Delta w(5,1)]$$

$$\text{SC}[\Delta m(9)] = -8.1441 > -8.5373 = \text{SC}[\Delta m(9,4)]$$

$$\text{SC}[\Delta w(2)] = -6.3654 < -6.2521 = \text{SC}[\Delta w(2,1)].$$

The comparison implies that there is a Granger causality relationship between the union membership series and real consumption wages, but this causality runs from real consumption wages to union membership and not the other way round. In other words, the inclusion of the past levels of union membership does not improve the forecast for real consumption wages. Also, the Granger causality tests based on F-statistics (see Table 5.10) are mostly congruent with the above result. This result is in accordance with Pehkonen and Tanninen's (1995) results with Finnish data during 1962-1992, according to which real wages significantly affect union density. It can be interpreted to mean that one of the employees' motives in joining the union is improvement in wages.

TABLE 5.10 Granger causality tests: F-statistics and P-values.

$\Delta w(2), \Delta m(1)$	$\Delta w(5), \Delta m(1)$	$\Delta w(3), \Delta m(3)$	$\Delta w(4), \Delta m(4)$
0.00 (0.9842)	0.13 (0.7258)	0.04 (0.9872)	0.46 (0.7615)
$w(2), m(1)$	$w(5), m(1)$	$w(3), m(3)$	$w(4), m(4)$
0.375 (0.545)	0.497 (0.489)	0.829 (0.492)	2.062 (0.126)

Notes:  $w = \log$  of wage  $W$ ,  $m = \log$  of union membership  $M$ ,  $\Delta =$  difference. The P value in the parentheses after F-statistics is the probability of observing a test statistic no less extreme than actually observed. The null hypothesis is rejected if the probability value of  $H_0$  is less than the specified level of the test.

The lag length in the regressions for both real consumption wages and union membership is chosen on the basis of the SC and FPE selection criteria. In addition, arbitrary lag-lengths (3-3) and (4-4) are also imposed on the data.  $e = \text{LOGE}$ ,  $w = \text{LOGW}$ ,  $\Delta =$  difference. The P value in the parentheses after the F-statistics is the probability of observing a test statistic no less extreme than that actually observed. The null hypothesis is rejected if the probability value of  $H_0$  is less than the specified level of the test.

## 5.4 Conclusions

This paper, using Finnish data, investigates the relevance of the membership hysteresis hypothesis suggested by the insider-outsider explanation. According to this hypothesis, insiders or unions looking after insiders' interests can induce hysteresis in the behaviour of employment, and, due to a close relationship between employment and insider status, also in the behaviour of union membership.

Two test strategies were employed in studying the membership hysteresis hypothesis; viz. unit root tests for employment and union membership data and tests for a Granger causality relationship running from employment to real consumption wages and from union membership to real consumption wages. In tests for a unit root both ADF and Phillips-Perron tests were used. In turn, tests for a Granger causality were conducted by means of the VAR technique. The advantage of our test strategies is that they do not require explicit parameter estimations.

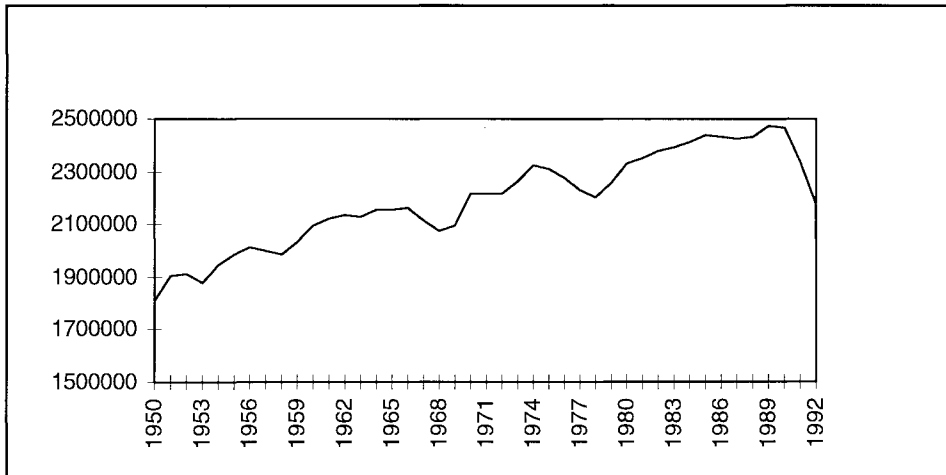
Our results can be summarized as follows. First, as far as the unit root test results are concerned, the unit root hypothesis for our employment data could not be rejected, which parallels the results gained by Coe (1990) in his country comparison also using Finnish data. Similar results emerged from the total union membership data and trade union membership data in four of our six sample unions. Union membership in two of our sample unions did not show evidence of a unit root. This might imply that membership is not that strictly controlled by the development of employment, but is also affected by the evolution of unemployment over time. Second, unlike unit root tests, our other test - the Granger causality test - for detecting membership hysteresis did not give evidence in favour of the relevance of membership hysteresis with Finnish data. Our data imply that employment does not Granger-cause real consumption wages. In other words, inclusion of the past information on employment does not improve the forecast for real consumption wages. The results of the tests for a Granger-causality relationship between union membership and real consumption wages also fail to lend support to the membership hysteresis hypothesis.

Compared with the earlier empirical evidence on insider hysteresis, our results are not surprising. Our data was not able to reject the membership hysteresis hypothesis on the basis of unit root tests. However, we cannot consider unit root test results to offer strong evidence on the membership hysteresis hypothesis. First, in country comparisons the test has not been successful in differentiating between high and low employment countries in Europe, as can be seen from e.g. the empirical results obtained by Burda (1990b) and Coe (1990). Second, because different unit root tests yield different results and because the power of these tests depends on the span of the data, confirmation of the unit root nature of a time series is rather difficult (Davidson and MacKinnon 1993).

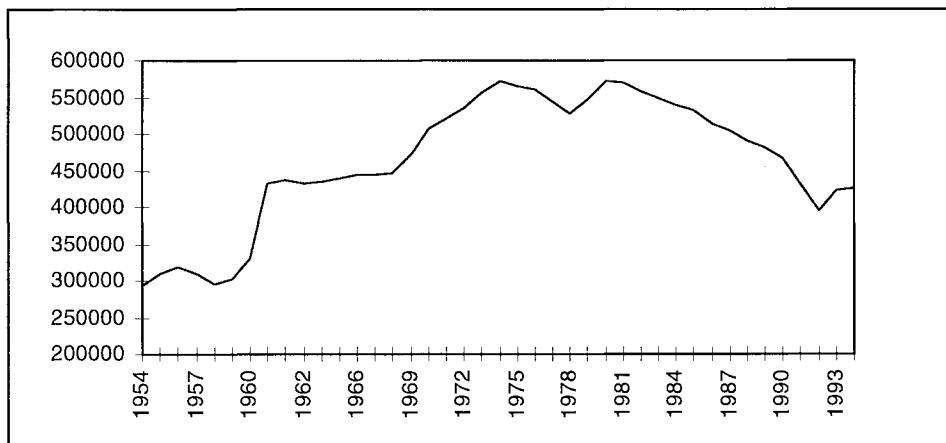
Our evidence for Finland from Granger causality tests does not offer confirmation of the membership hysteresis hypothesis. Burda's (1990b) results regarding the relevance of membership hysteresis for eight western European countries and the United States with Granger tests are somewhat similar. Countries like Sweden, Norway and Denmark, whose labour market institutions resemble Finnish ones, did not show evidence of membership hysteresis either in Burda's country comparison. The only strong support came from the union membership data from the Federal Republic of Germany. With regard to the centralized nature of wage setting, the failure of our Finnish data to find strong evidence for the membership hysteresis is not surprising either. However, one should not forget the possibility of sectoral differences with respect to membership hysteresis and in-

sider behaviour, which does not show up in our work. Finally, although the primary target of this study was to examine hysteresis effects induced by insiders, an equally interesting target would have been hysteresis effects induced by outsiders. Combining both these strands in the same empirical work might be a beneficial objective for the future work. Who are really to be considered as insiders, i.e. whom we define as insiders, should also be put under closer scrutiny in this context.

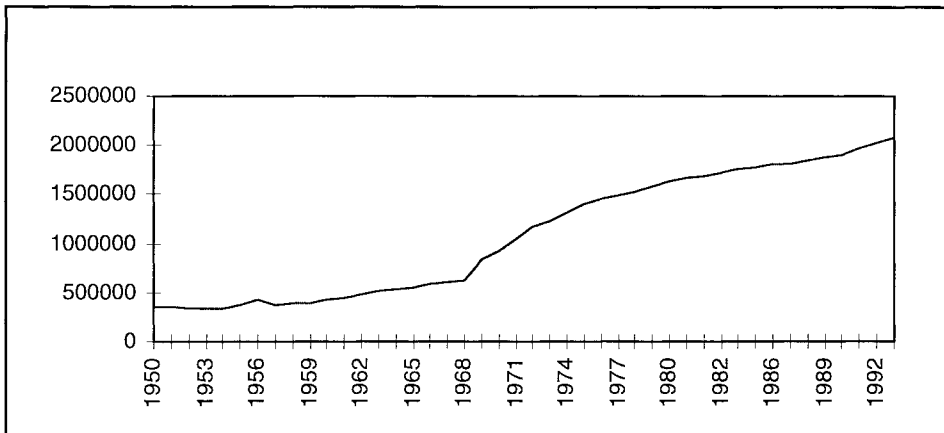
#### APPENDIX 5.1



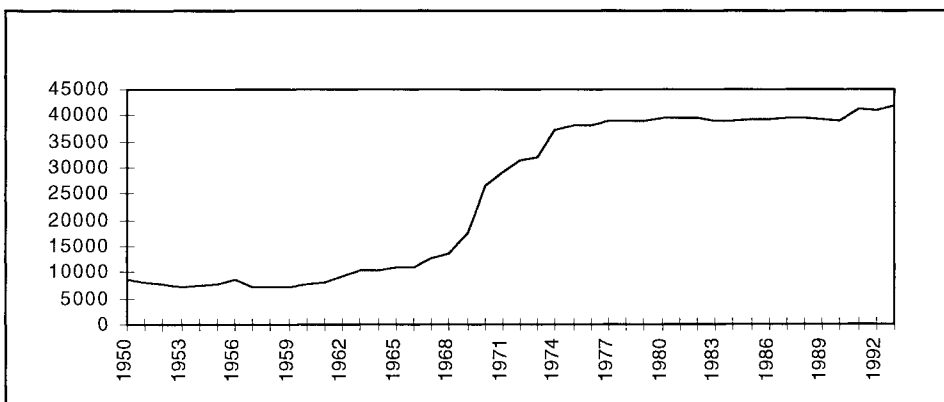
Total number of employees in Finland, 1950-1992.



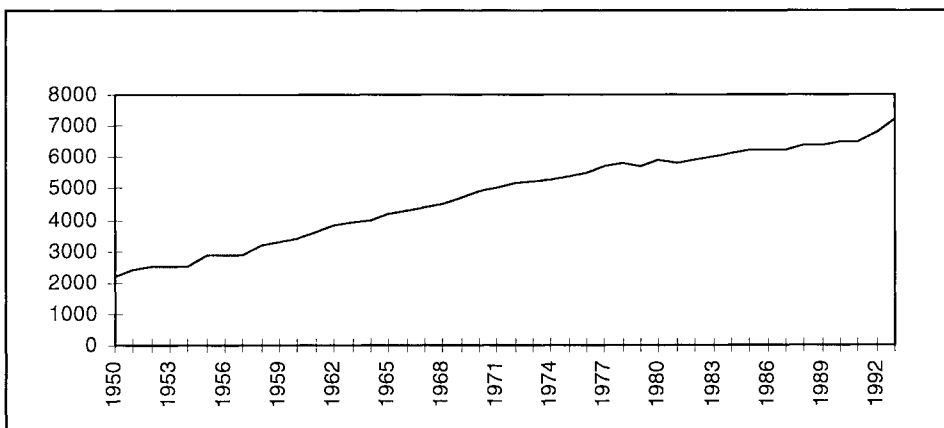
Number of employees in the total manufacturing sector, 1954-1994.



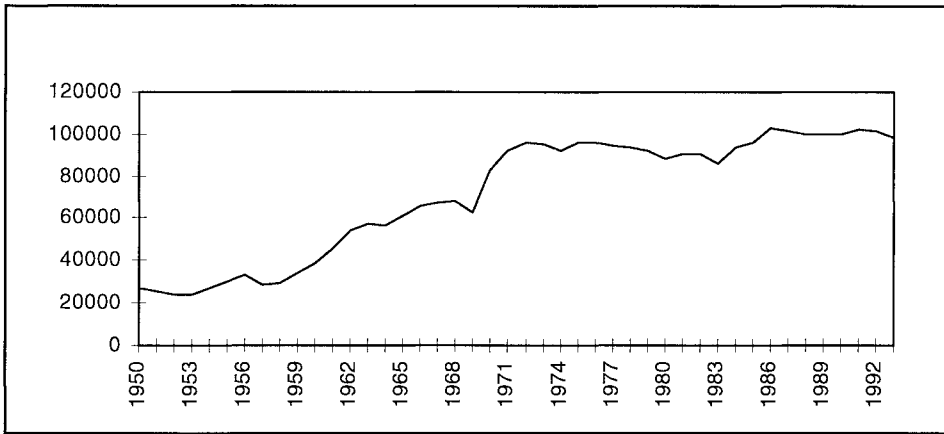
Total number of union members in Finland, 1950-1993.



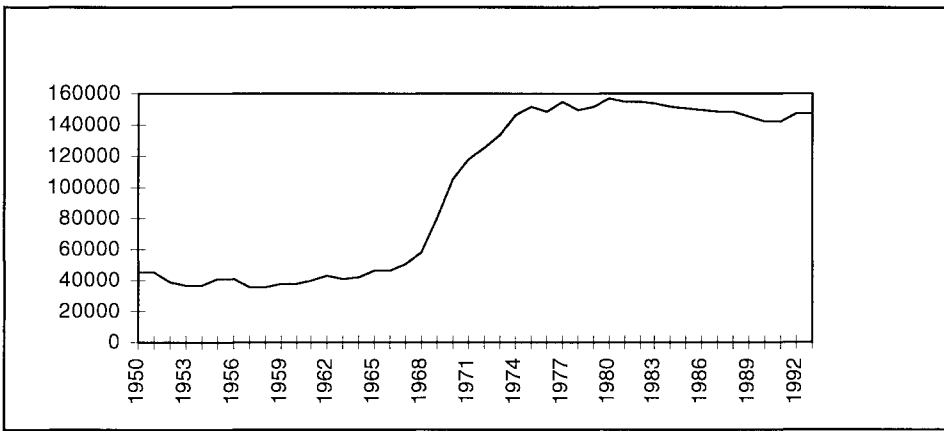
Members of the food manufacturer's union, 1950-1993.



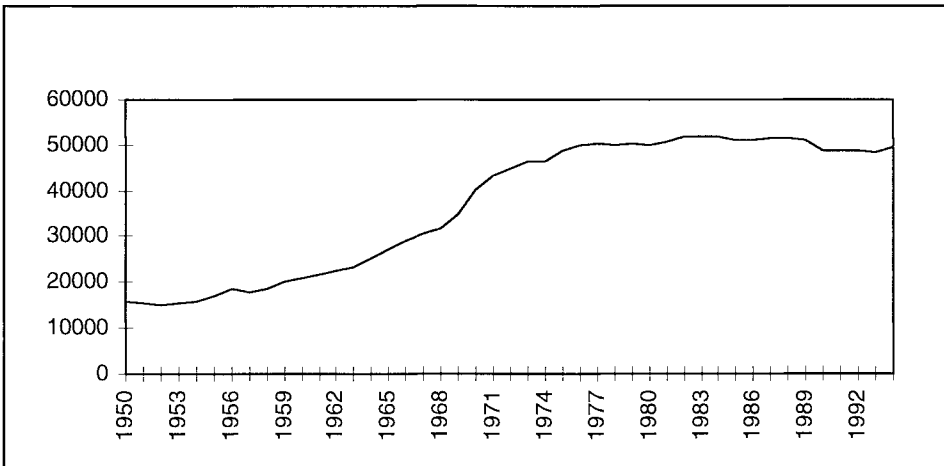
Members of the pharmacists' union, 1950-1993.



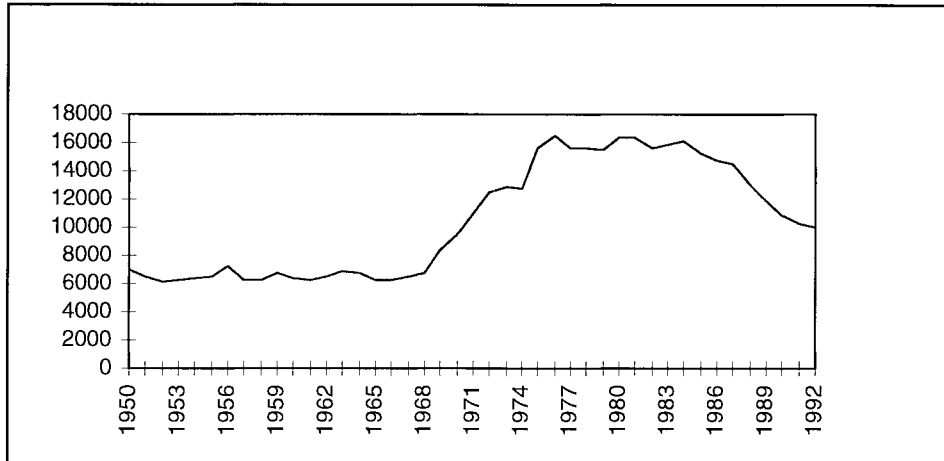
Members of the construction workers' union, 1950-1993.



Members in the metal workers' union, 1950-1993.



Members of the paper workers' union, 1950-1994.



Members of the union for the workers in the rubber and leather manufacturing, 1950-1992.

### APPENDIX 5.2 Burda's model<sup>13</sup>

In the model a monopoly union of  $M$  members is assumed to set the real consumption wages for all the workers in a particular industry. The only source of heterogeneity is seniority ranking. Employment is determined on the LIFO (last-in-first-out) basis. A worker with a seniority rank  $s$  is employed at the union wage if labour demand exceeds  $s$ . The union faces a competitive industry of wage-taking firms, who alone decide about employment after the wage is set. In the model labour demand is of the (log) form

$$(1) \quad n_t = \epsilon_t - \alpha w_t,$$

where  $n_t$  = union employment and  $\epsilon_t$  = a random shock.

The probability of union employment for a union employee with seniority ranking  $s$  is

$$(2) \quad \begin{aligned} \Pi_t &= \text{Prob}[n_t > s] \\ &= \text{Prob}[\epsilon_t - \alpha w_t > s] \\ &= \text{Prob}[\epsilon_t - E_{t-1}\epsilon > s - E_{t-1}\epsilon + \alpha w_t] \\ &= 1 - F(s - E_{t-1}\epsilon + \alpha w_t). \end{aligned}$$

The random shock  $\epsilon$  is assumed to follow an AR(1) process

$$(3) \quad \epsilon_t = \rho \epsilon_{t-1} + v_t$$

and, by assumption the distribution function of  $v$ ,  $F$ , has a nondeclining hazard rate  $F_0 + F_1 z + 0.5 F_2 z^2$ ,  $F_0, F_1, F_2 > 0$ .

Thus the probability of a union employment for a union employee with seniority ranking  $s$  can be written as

$$(4) \quad \Pi_t = 1 - F_0 - F_1(s - E\epsilon_t + \alpha w_t) - 0.5 F_2(s - E\epsilon_t + \alpha w_t)^2.$$

<sup>13</sup> See Burda (1990b) p.145-151 for a detailed description of the model.



In the intertemporal maximization problem, the union maximizes the expected utility of its members, which, similarly to Blanchard and Summers (1986), consists of the (log) real consumption wage and the probability of employment

$$(5) \quad EU = w + \gamma\Pi, \text{ where } \gamma > 0.$$

In the intertemporal maximization problem (5) is maximized subject to (4). The preferred wage as the outcome of majority voting reflects the preferences of the median voter. The optimal time-invariant wage rule in log form solved from Burda's model is

$$(6) \quad w_t^* = (1/\alpha)[\rho\epsilon_{t-1} - m_{t-1}] + \Phi,$$

where  $\alpha$  = the demand elasticity of labour with respect to the log of real consumption wage  $w$ ,  $\epsilon$  = a random demand shifter,  $\Phi$  = a constant that depends on  $\lambda$  (short-run elasticity of membership with respect to employment  $n$ ),  $\beta$  (discount factor),  $F_1$ ,  $F_2$  and  $\alpha$ .

In solving the time-invariant wage rule Burda defines a voting membership equal to the Koyck distribution of lagged employment, which is a more realistic assumption than linking the voting membership strictly to the current employment:

$$(7) \quad m_t = \lambda \sum (1 - \lambda)^i n_{t-i}, \quad 0 < \lambda < 1,$$

where  $\lambda$  = the short-run elasticity of membership with respect to employment  $n$ .

Given the optimal wage rule (6) and that the industry demand for labour is  $n_t = \epsilon_t - \alpha w_t$ , the following employment process can be solved<sup>14</sup>:

$$(8) \quad n_t = m_t + \alpha\Phi + v_t = \lambda \sum (1 - \lambda)^i n_{t-i} + \alpha\Phi + v_t.$$

---

<sup>14</sup>  $n_t = \epsilon_t - \alpha w_t$ ;  $w_t = 1/\alpha[\rho\epsilon_{t-1} - m_{t-1}] + \Phi$ ;  $\epsilon_t = \rho\epsilon_{t-1} + v_t$   
 $= \rho\epsilon_{t-1} + v_t - \rho\epsilon_{t-1} + m_{t-1} + \alpha\Phi$   
 $= m_{t-1} + \alpha\Phi + v_t$ ;  $m_t = \lambda \sum (1 - \lambda)^i n_{t-i}$ ,  $0 < \lambda < 1$   
 $= \lambda \sum (1 - \lambda)^i n_{t-i} + \alpha\Phi + v_t$ .

## 6 JOB SECURITY AND LABOUR MARKET PERFORMANCE

### Abstract

This study aims to shed light on how job security affects the functioning of the labour market on the basis of the theoretical and empirical work. A clear implication from the theoretical analyses as well as the empirical evidence is that job security stabilizes variations in employment to fluctuations in demand. Conversely, the predictions concerning the impact of job security on the average level of employment and unemployment are far more mixed.

### 6.1 Introduction

Employment protection or job security legislation relates to hiring and firing rules, and regulations governing unfair dismissals, lay-offs for economic reasons, severance payments, minimum notice periods, administrative authorisation for dismissals and prior discussion with labour representatives (OECD Jobs Study 1994). Job security is also related to the opportunities to use fixed-term contracts and employment through temporary work agencies (TWA). In addition to legislation, employment protection is also provided by collective bargaining and the private market. A distinction can also be made between institutional employment security and de facto employment security (Büchtemann 1993). The term de facto employment security is used to describe empirical findings that, even in the absence of legal or collectively bargained dismissal and layoff restraints, workers may enjoy a high degree of factual employment security involving long-term employment relationships. This suggests that continuing employment relationships may be in the interests of both firms and employees (Büchtemann 1993). For example, de facto job security may be created by e.g. the human capital the worker owns, which makes it costly for the employer to dismiss him<sup>1</sup>.

Job security legislation and rules, the so called institutional employment security, affect the performance of the labour market through the costs of adjustment. They increase employers' costs of adjustment by limiting their behavioural

options (Buttler and Walwei 1993)<sup>2</sup>. Different mechanisms can be distinguished by which job security or employment protection may affect the employment performance of the economy (Jackman et al. 1996): (i) job security impedes employment adjustment by reducing both flows from employment due to legal hurdles and flows into employment by making employers more cautious about hiring, that is, it affects the dynamics of employment; (ii) it may also influence wage determination by raising the power of insiders or by lengthening the duration of unemployment; and, finally, (iii) because of the excessive caution of employers, it may impede the absorption of new entrants into the labour market, thereby reducing participation rates and raising relative youth unemployment rates.

The critics of job security legislation have emphasized the adverse impact of job security on labour market flexibility. They have put forward the following arguments against job security. First, job security hinders the ability of employers to adjust their work force to fluctuations in output. Because job security slows down the reduction of the work force in downturns, it has been assumed to raise the shadow price of labour and, thereby, to decrease the willingness of employers to hire new workers in upturns and have a depressing impact on employment. Second, because job security diminishes both hirings and firings, it can affect negatively the employment/reemployment prospects of the unemployed outsiders, and thus increase the segmentation between incumbent insiders and unemployed outsiders. The third argument relates to structural change: job security, by decreasing the overall fluctuations in employment, may decrease the flexibility of the labour market and thus hamper desired structural change in the economy. Fourth, job security influences the type of employment firms use: it has been assumed to increase the use of atypical forms of employment such as part-time and temporary working and the use of TWAs (temporary work agencies). (Emerson 1988, Büchtemann 1993, Buttler and Walwei 1993, OECD Jobs study 1994).

The proponents of mandatory job security have emphasized the social justice arguments as well as the efficiency arguments. First, job security is considered a socially desirable transfer from firms to workers: a dismissed worker is likely to suffer more economically than a firm who retains a worker whose productivity is low. Second, a related argument is that job security is needed to remove power asymmetry between firms and workers and thereby to create preconditions for efficient market transactions. Third, firms' lay-off and dismissal decisions incur costs not only to dismissed employees but also to the whole of society in the form of unemployment benefits, retraining and other labour market measures. Job security may force firms to endogenize at least part of these costs, thus avoiding externalities. The fourth argument relates to the efficiency advantages job security and long-term employment relationships bring by encouraging firms to invest in training their workers and thereby raising productivity, and by encouraging workers to accept technological change and internal job mobility. Finally, increased job security also increases workers' loyalty to the firm and thus improves productivity. (Emerson 1988, Büchtemann 1993, Buttler and Walwei 1993, OECD Jobs study 1994).

The level of job security varies greatly across countries and over time. Many

European countries saw improvements in their job security legislation in the late 1960s and early 1970s, whereas the common trend/aim since the 1980s in Europe has been the deregulation of job security legislation<sup>3</sup>. Deregulation has been seen as one means to improve labour market flexibility, and thereby, to improve the functioning of the labour market and abolish the persistence of unemployment, which has been one of the major economic problems faced by western European countries. In many cases the deregulation of job security has taken place through the relaxation of strict rules concerning part-time and fixed-term contracts<sup>4</sup>. For example, during 1980s fixed-term employment contracts were relaxed in Spain (1984), Germany (1985) and France (1986). In the UK the deregulation of mandatory job security in the 1980s also concerned permanent employment relationships.

The purpose of this chapter is to shed light on the question how job security affects the functioning of the labour market on the basis of the theoretical and empirical work. In this paper we deal with the following areas in which job security may affect the functioning of the labour market: the impact of job security on both the dynamics of employment and its average level and, related to this, the impact of job security on the level of unemployment. With regard to the effects of job security on employment dynamics, we deal separately with the evidence provided by job turnover data. In addition, we tackle the indirect effects of job security on employment, that is, the impact it has via the determination of wages.

## **6.2 Measures of the strictness of employment protection**

### **6.2.1 Strictness indices**

The overall strictness of employment protection is influenced by the coverage of the standard employment protection regulations, for example whether they include fixed-term contracts: many countries extend employment protection regulations to fixed-term contracts after a certain number of renewals of the fixed-term contracts (e.g. Germany and Finland), thereby increasing the effective coverage of employment protection.

There are great differences in the job security/employment protection between countries. To describe the strictness of employment protection legislation in each country various summary indicators have been constructed according to which countries have been ranked. Summary indicators have been constructed, among other things, according to the following criteria: the length of notice of dismissal and the amount of severance pay, the difficulty of dismissing regular workers, restrictions on the use of fixed-term contracts and employment through TWAs (temporary work agencies), and employers' opinions about how important an obstacle job security is not to hire. We present a summary of various indices taken from OECD Jobs Study (1994) in Table 6.1.

Table 6.1 Comparison of EPL indicators in recent international studies, ranking of EPL indicators by strictness (OECD Jobs Study 1994, 74, Table 6.7)

	Maximum pay and notice period	Tables 6.5 and 6.6 of this chapter <sup>1</sup>	International organisation of employers (IOE) <sup>2</sup>	Ranking by Bertola (1990)	Average ranking based on the four preceding columns
	1993	1989	1985	1990	1985-1993
<b>EC</b>	8.50	10.50	2.5	9.0	17
Belgium	4.50	3.25	1.0	2.0	5
Denmark	3.50	9.50	2.5	8.0	14
France	4.50	12.00	2.5	6.0	15
Germany	13.25	11.00	(2.5)	(9.1)	18
Greece	14.00	2.75	1.5	(6.0)	12
Ireland	13.00	14.25	3.0	10.0	21
Netherlands	4.00	7.25	2.5	3.0	9
Portugal	17.00	12.50	2.0	(9.5)	19
Spain	15.00	11.25	3.0	(10.0)	20
United Kingdom	5.00	2.25	0.5	4.0	7
<b>EFTA</b>					
Austria	14.75	9.00	1.5	(7.6)	16
Finland	6.00	10.50	1.0	(5.5)	10
Norway	6.00	9.75	1.5	(5.9)	11
Sweden	6.00	8.50	2.0	7.0	13
Switzerland	5.00	1.75	(0.9)	(3.2)	6
<b>Non-European countries</b>					
Canada	1.25	(1.65)	(0.6)	(2.0)	3
United States	0.00	(0.36)	(0.4)	1.0	1
Japan	1.00	(3.71)	(1.0)	5.0	8
Australia	3.00	(3.26)	(0.9)	(3.1)	4
New Zealand	0.25	(0.72)	(0.4)	(1.3)	2

1. The average of Tables 6.5 and 6.6 rankings for the strictness of protection for regular and fixed-term contract workers, as reported in Panel A in OECD Jobs study (1994, 73)

2. The average of the IOE scorings of obstacles to dismissal or use of regular and fixed-term contract workers, as reported in panel A in OECD Jobs Study (1994, 73).

For other notes and explanations of the table see OECD Jobs Study 1994, 74.

Table 6.1 includes, among others, Bertola's (1990) ranking of job security provisions for 10 OECD countries. His ranking is a compilation of the rankings of various aspects of job security in Emerson (1988), which include, among other things, employers' opinions of the importance of various regulations governing employment relationships, the regulation of fixed-term contracts, the regulation of private sector temporary work agencies, lay-off and short-time working regulations, the regulation of the termination of employment contracts etc..

The second column of Table 6.1 presents a ranking constructed by Grubb and Wells (1993). For this ranking they first collected data on the following indi-

cators of job security provisions: (i) regular procedural inconveniences (procedures scaled from 0 to 3, delay to start of notice (days); (ii) notice and severance pay for no-fault individual dismissals, including notice periods and severance pay according to the tenure of employment; (iii) the difficulty of dismissal (definition of unfair dismissal (scale 0-3)), trial period, compensation at 20 years, reinstatement (scale 0-3). Thereafter they constructed separate summary indicators for each of these three main areas of dismissal regulations, according to which they ranked countries. Thus, the overall ranking for strictness of protection in Grubb and Wells (1993) is an unweighted average of the summary rankings in these three main areas.

Grubb and Wells also constructed summary indicators describing the strictness of regulations governing the use of fixed-term contracts and temporary work agency employment. They present the values of three indicators of the strictness of the regulation of fixed-term contracts: (i) valid cases other than the usual "objective", (ii) maximum number of successive contracts, (iii) maximum cumulated duration; and values for four indicators of the strictness of regulation for temporary work agency employment: (i) types of work for which TWA is legal (0-3 or general), (ii) restrictions on number of renewals, (iii) maximum cumulated duration and (iv) can final user terminate at any moment (No=0, Yes=1). The overall summary rankings for both TW and TWA are derived by the rank-average-rank procedure. The information on the basis of which indices and rankings were constructed for the 10 OECD countries related to around the year 1989. The OECD Jobs Study (1994) extended the indices for the strictness of job security as presented in Grubb and Wells (1993) to include all the OECD countries.

According to these indices, the strictest employment protection is found in Italy, Spain and Portugal and the least strict in the USA, New Zealand and Canada. Of the Nordic countries, job security in Finland, Sweden and Norway is around the European average, whereas in Denmark the level of employment protection is less strict.

There are disadvantages in using these kinds of summary indices to describe the stringency of employment protection legislation. First, the indices are formed on the basis of information covering only single years. Therefore they cannot provide a consistent series describing the development of legislation over time. Second, overall rigidity is difficult to describe and measure, because there are so many aspects of employment relationships which are subject to regulation (Alogoskoufis et al. 1995).

### **6.2.2 The measures of strictness of employment protection and indicators of labour market performance**

In the study of the role of employment protection we first analyse the relationships between various indices of strictness of employment protection and the patterns of labour market performance in the OECD countries: temporary work, the employment/population ratio, relative youth unemployment, self-employment and the incidence of long-term unemployment. The indices are both compa-

red to the latest data available (data from year 1994 or 1995) on the various measures of labour market performance and the averages of the data from the 1980s and 1990s.

Employment protection for regular contracts have been claimed to increase the use of various forms of atypical employment such as fixed-term contracts (temporary work), TWA (temporary work agency) employment and self-employment. In Figures 6.1 and 6.2 below we plot the relationship between temporary work in 1994 and job security, and then the relationship between the average of temporary work 1983-1994 and job security. Figures 6.3 and 6.4 present the relationships between self-employment in 1994 and job security and the average of self-employment 1980-1994 and job security. In Figures 6.1 and 6.2 we use the summary indicator of regulation of dismissal for regular contracts and fixed-term contracts to describe employment protection and in Figures 6.3 and 6.4 the average ranking of job security. Due to the lack of data on TWAs, similar figures on the relationship between TWAs and job security cannot be presented here.

On the basis of Figures 6.1 and 6.2, there is no evidence of a systematic relationship between temporary work and job security for regular and fixed-term contracts showing that the use of temporary work would be much higher in countries with stricter job security. An exception is constituted by Spain, where the 'deregulation' of the use of temporary contracts in 1984 tripled the use of temporary work thereafter. Also, the correlations between temporary employment and the ranking for regulation for regular and fixed-term contracts were small and turned out to be insignificant on the basis of the t-test. On the other hand, Grubb and Wells (1994) conclude that the combination of high levels of protection for permanent workers with low levels of restrictions on temporary contracts leads to a high incidence of temporary contracts. But these two usually seem to go hand in hand: where the regulation of permanent contracts is strict, it is also strict for temporary contracts (exception: Spain after the change in legislation governing temporary contracts).

If employment protection reduces employment, the reduction might be expected to result in an increase in self-employment, since this is not directly covered by employment protection legislation (OECD Jobs Study 1994). Figure 6.3, which plots the relationship between self-employment in 1994 and the average ranking of job security, shows that self-employment is higher in countries with stricter job protection. Similar findings have been reported in OECD (1992a), Grubb and Wells (1993) and OECD Jobs Study (1994). The plot of average self-employment (1984-1994) and average ranking in Figure 6.4 also confirm this<sup>5</sup>.

There also seems to be a clear systematic relationship between the incidence of long-term employment and the level of employment protection on the basis of the 1995 data on the incidence of long-term unemployment as well as on the basis of the data on the average incidence of long-term unemployment over the period 1983-1995. The stricter the protection, the higher the incidence of long-term unemployment. This would seem to confirm the theoretical implication that job protection decreases the outflows from unemployment and lengthens spells of unemployment.

The inspection of the relationship between employment as a proportion of the working-age population in 1995 and job security, and between job security and the average of the employment/population ratio (1980-1995) in Figures 6.6 and 6.7 reveal that the employment/population ratio tends to be lower in countries with stricter employment protection.

One mechanism by which employment protection may affect labour market performance is that it may impede the entrance of new employees into labour market, thereby reducing participation rates and raising relative youth unemployment rates. The following figure looks at the relationship between job security and the youth (15-24) unemployment rate relative to the adult (24-54) rate. On the basis of Figure 6.8 there does not appear to exist a systematic pattern between the relative youth unemployment rate and strictness of job security. Although the highest relative youth unemployment rates (over 3 times higher than the adult rates) are found in Italy and Greece, in countries with strict employment protection, one cannot otherwise distinguish between countries with high and those with low levels of employment protection. This is also confirmed by the inspection of the relationship between the average ranking of job security and the average of the relative youth unemployment rate (1979-1994).

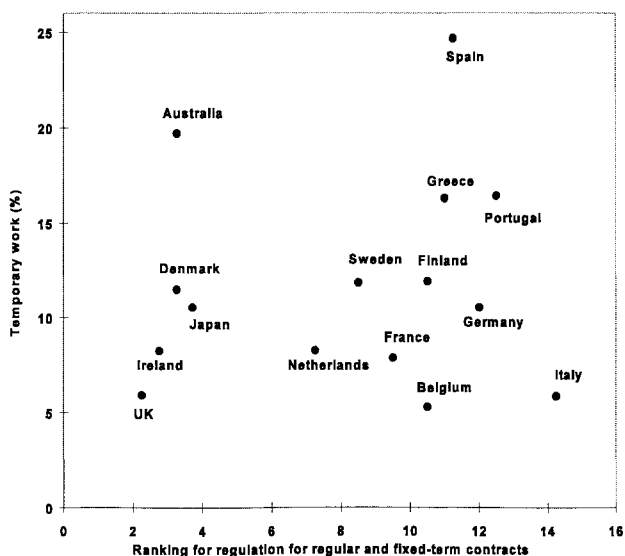


Figure 6.1 Job security and temporary work (1994).



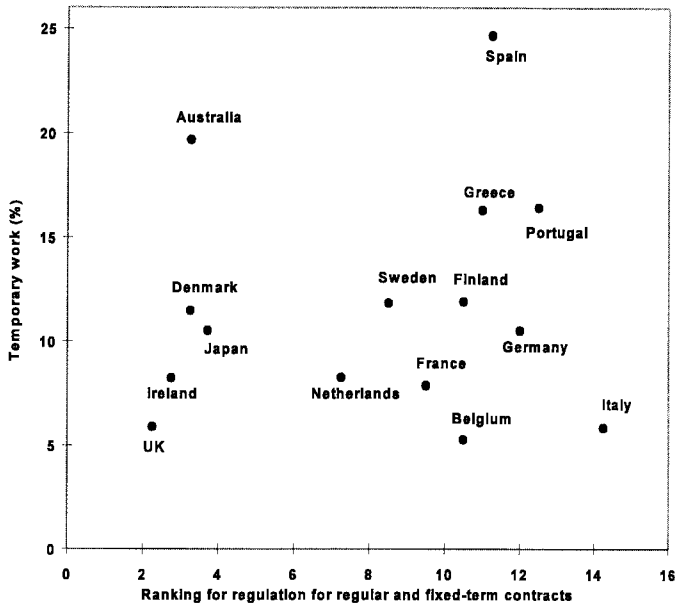


Figure 6.2 Job security and the average of temporary work (1983-1994).

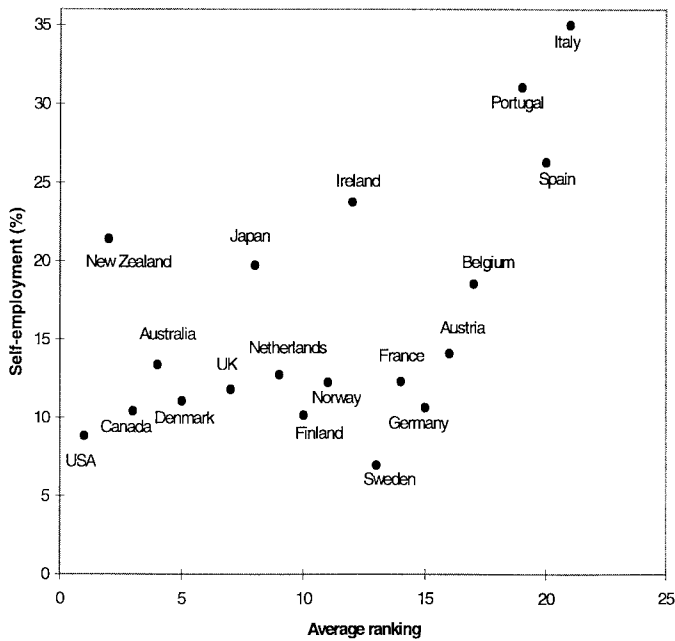


Figure 6.3 Job security and self-employment (1994).

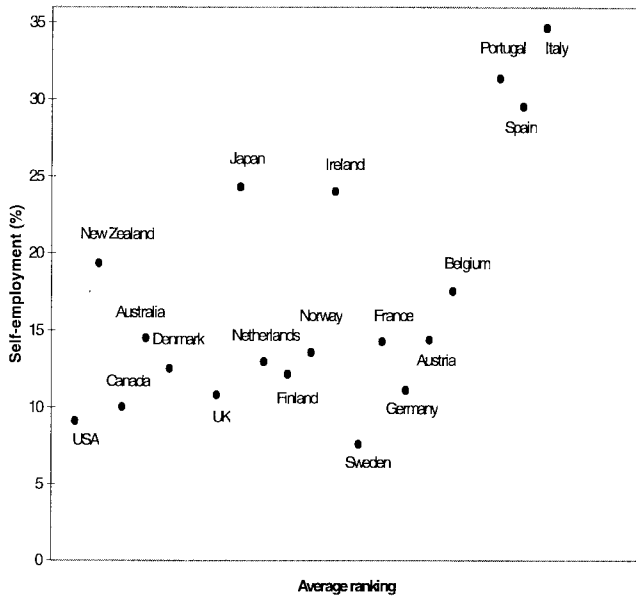


Figure 6.4 Job security and average of self-employment (1980-1994).

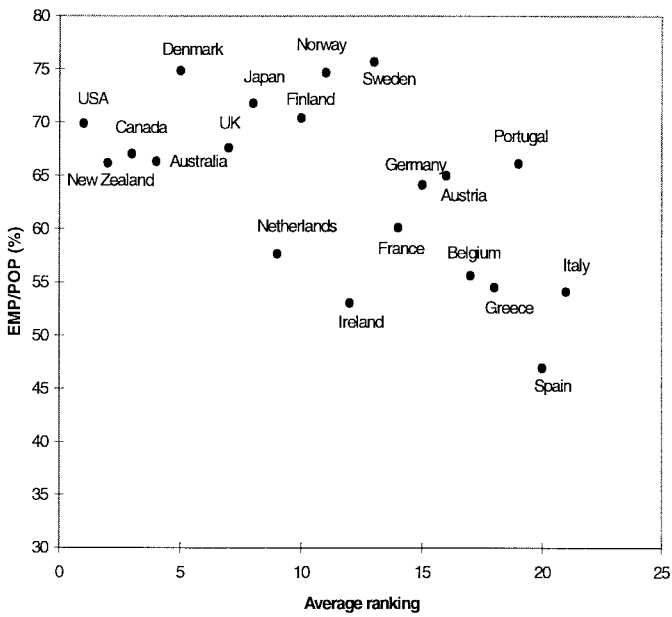


Figure 6.5 Job security and EMP/POP relation (1995).

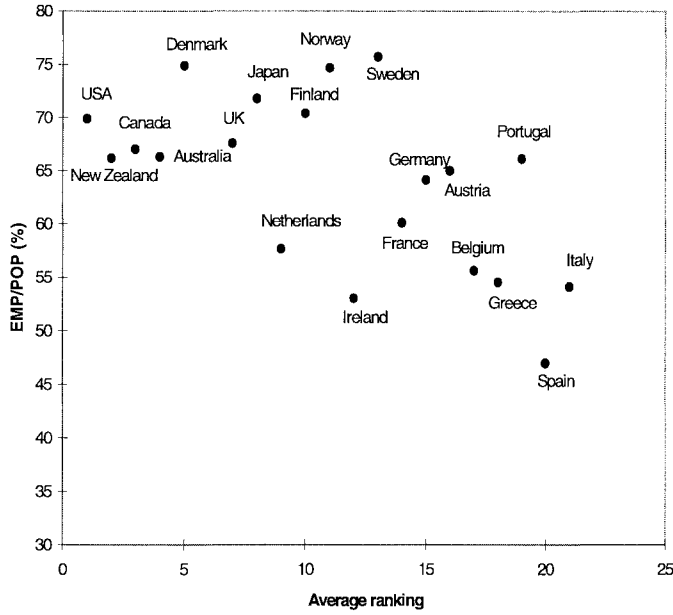


Figure 6.6 Job security and EMP/POP ratio (1980-1995).

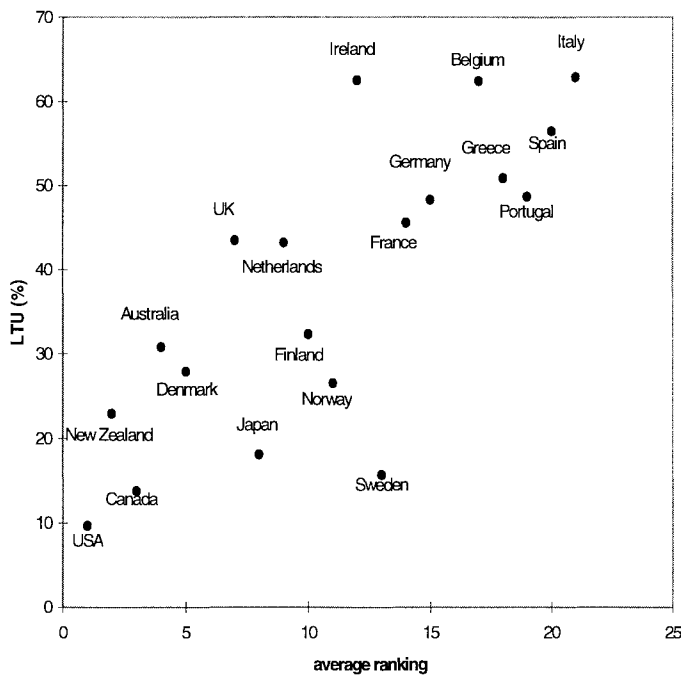


Figure 6.7 Job security and long-term unemployment (1995).

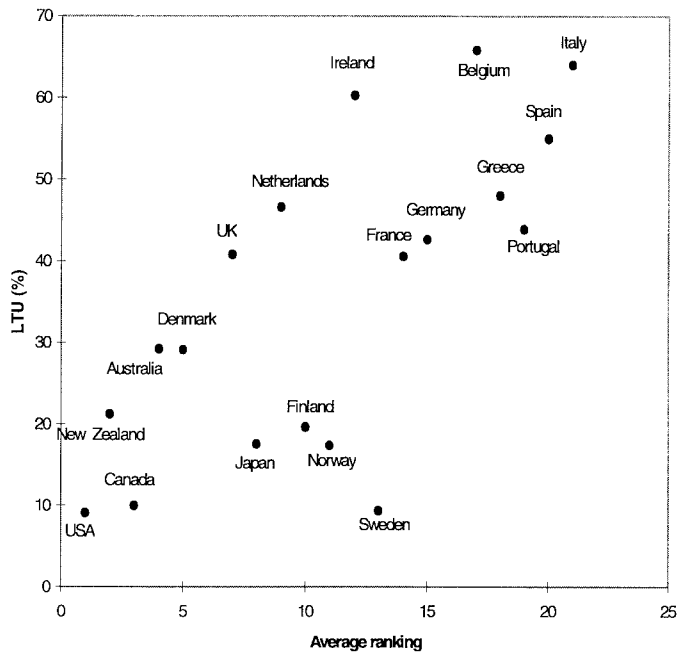


Figure 6.8. Job security and average of long-term unemployment (1983-1995).

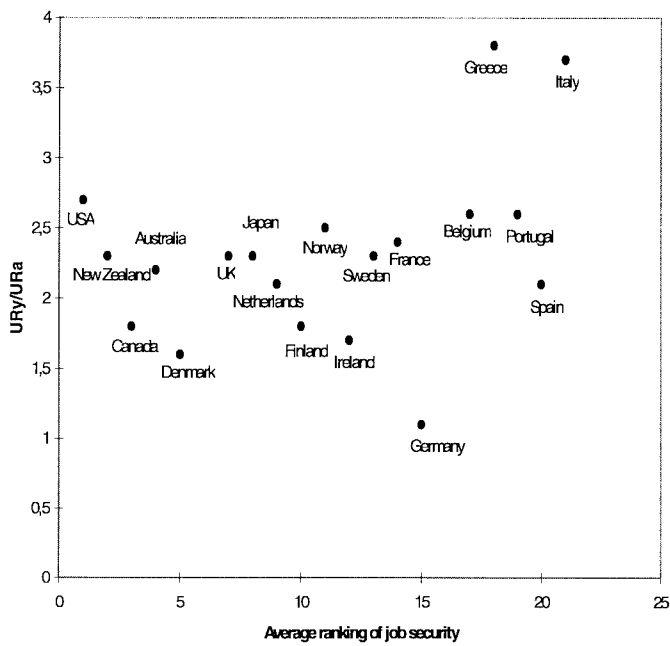


Figure 6.9 Job security and relative youth unemployment rate (1995).

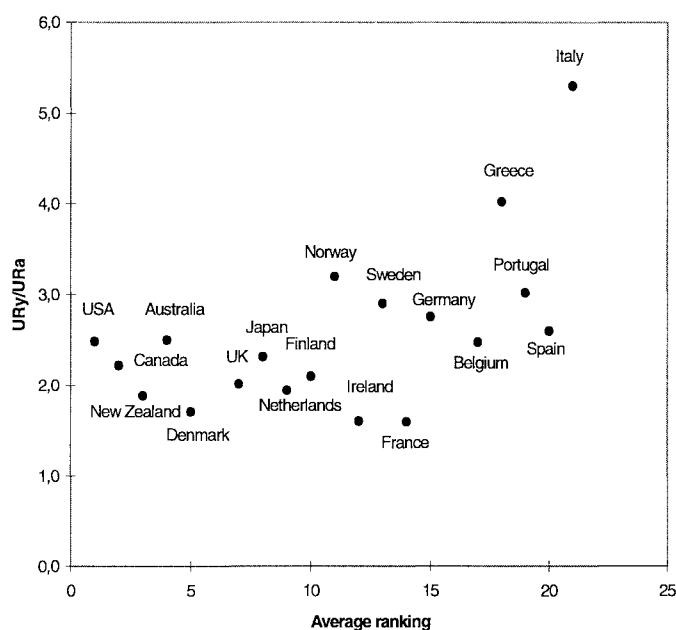


Figure 6.10 Job security and average of relative youth unemployment rate (1979-1995)

The calculated correlations between the indices of job security and the patterns of employment performance dealt with above are summarised in Table 6.2. The significance of the correlations has been tested by t-tests. The strongest correlations between the various measures of employment performance and job security are found between the incidence of long-term unemployment and job security and between the employment/population ratio and job security. It must be emphasized that it is not possible to draw any causal link between employment protection and employment level, as the results are based on simple correlations which do not hold other factors constant (OECD Jobs Study 1994, 76).

TABLE 6.2. Correlations between the summary indices of job security and patterns of labour market performance.

The relationship	Correlation	t-test
Temporary work (1994) and the ranking of regulation of dismissal for regular contracts and fixed-term contracts	0.32	0.70 (1.75)
Temporary work (1983-1994) and the ranking of regulation of dismissal for regular contracts	0.20	0.74 (1.77)

The relationship	Correlation	t-test
Self-employment (1994) and the average ranking of strictness of employment protection	0.56	2.83 (1.73)
Self-employment (1980-1994) and the average ranking of strictness of employment protection	0.58	2.99 (1.74)
EMP/POP ratio (1995) and the average ranking of strictness of employment protection	-0.70	-4.17 (-1.73)
EMP/POP ratio (1980-1995) and the average ranking of strictness of employment protection	-0.57	-3.00 (1.73)
Long-term unemployment (1995) and the average ranking of strictness of employment protection	0.77	5.04 (-1.74)
Long-term unemployment (1983-1995) and the average ranking of strictness of employment protection	0.70	4.12 (1.73)
Relative youth unemployment rate (1995) and the average ranking strictness of employment protection	0.37	1.67 (1.74)
Relative youth unemployment rate (1979-1995) and the average ranking strictness of employment protection	0.57	2.84 (1.74)

(The critical value is given in parenthesis.)

### 6.3 Job security and the adjustment of employment

The adjustment of labour input to demand shifts incurs adjustment costs, which are affected, among other things, by job security legislation and regulations, the power of unions and the tightness of the labour market (unemployment rate). This section summarises the theoretical and empirical implications of the impact of job security on employment performance.

Various divisions of the adjustment costs of labour can be made (Hamer-mesh 1993): gross vs. net costs, external vs. internal costs, as well as explicit vs. implicit costs. Gross costs of adjustment are those incurred by adding new workers or by the departure of current employees, i.e. costs arising from hiring or firing. Most of the literature on adjustment costs, however, deals with the net costs of adjustment, which are costs caused by changing the level of employment. External costs refer to the financial costs of hiring (e.g. mandatory listing of job vacancies) and laying-off workers and can also be classified as explicit, measurable costs. Internal costs, on the other hand, are incurred by the interruption to production/decrease in production when the level of employment is altered and are implicit in a sense that they are not directly measurable. For example, requirements concerning advance notification of layoffs affect internal costs. Most part of the adjustment costs of labour are implicit, i.e. not directly measurable.

Below we first deal with the theoretical models analysing the effects of job security and then turn to the empirical studies, which are grouped according to the following division<sup>6</sup>: (i) studies of the structure of adjustment costs in dynamic models of labour demand (e.g. Pfann and Palm 1990, Jaramillo et al. 1993); (ii) pre-post studies investigating the impact of changes in job security on the adjustment of employment, i.e. comparisons of employment dynamics before and after the time when there occurred changes in job security (e.g. Hamermesh 1988, Fallon and Lucas 1991, Abraham and Houseman 1993); (iii) studies of the impact of job security on the adjustment of employment to output changes that use specific measures of the magnitude of job security such as the amount of the severance pay (e.g. Burgess 1988, Lazear 1990), including studies on the speeds of adjustment of labour: the adjustment speeds for both hours and the number of employees (e.g. Abraham and Houseman 1993); (iv) studies of the impact of job security on the level of unemployment; (v) studies where the impact of advance notification on the spells of unemployment is investigated; and (vi) studies of the effects of job security on youth unemployment.

### **6.3.1 Theoretical analyses of the effects of job security on the adjustment of labour**

In theoretical analyses on the impact of job security the focus has mainly been on how adjustment costs, firing costs in particular, affect firms' willingness to hire new employees during upturns and to dismiss workers during downturns, i.e. on labour dynamics; and, second, how adjustment costs affect average labour demand (summarised in Table 6.3 below). In addition, the impact of statutory redundancy pay on unemployment has been studied (Booth 1995a). In most cases the analysis is carried out within the framework of dynamic labour demand (e.g. Nickell 1986, Bentolila and Bertola 1990, Bertola 1990 and 1992, Bentolila and Saint-Paul 1992, Booth 1995a), where the optimal adjustment path of employment is obtained as a solution to the firm's profit maximization problem over time. Consideration of the supply side of labour is extremely rare in these analyses, with the exception of Booth (1995a), who also takes labour supply into account in her analysis. Most of the analyses of the relationship between job security and employment concentrate on the direct impact on employment of job security, taking real wages as given, and exclude the indirect effect via wage determination. Diaz and Snower (1996) take these both channels into account.

According to the theoretical analyses, job security has the following consequences for employment performance. First, a common outcome is that adjustment (firing) costs decrease the variability of employment in response to fluctuations in demand. An increase in the firing costs decreases a firm's willingness to hire and fire at the margin (Nickell 1979, Bentolila and Saint-Paul 1992). Thus, these results imply that employment should be more stable - stay lower in booms and higher in downturns - in countries where job security regulations are stronger. Second, when job security reduces employment fluctuations, it simultaneously increases fluctuations in hours in response to demand shifts (Nickell

1979).

However, the impact of job security on average employment is ambiguous. Bentolila and Bertola (1990) find that an increase in firing costs has a small positive impact on average labour demand. Similarly, Bertola (1990, 1992) shows that firing costs may increase the average level of employment under certain circumstances. The direction of adjustment costs on average labour demand depend on the form of the revenue function, on the rates of discount and labour attrition and on the relative size of firing and hiring costs (Bertola 1992). On the other hand, Bentolila and Saint-Paul (1992) find that average steady-state labour demand will normally decrease with firing costs when these costs are small, but will increase when they are high enough.

What clearly emerges out from the analyses is that the impact of job security on labour dynamics is greater than on the average level of employment. In addition, Bertola (1990) has emphasised the role of firms' expectations affecting firms' hiring decisions together with job security. If firms have pessimistic expectations about future demand, they are more cautious about hiring, the greater the costs of firing workers ("..firms tend to hire less in good times only because they rationally expect to (and do) fire less in bad times", Bertola 1990). Diaz and Snower (1996) find that whether firing costs stimulate or reduce employment in the long run depends on the relative magnitude both of workers' bargaining power in wage negotiations and the persistence of macroeconomic fluctuations. The greater workers' bargaining power, the greater will the indirect effect of job security via wages be and the more prolonged the economic fluctuations, the greater will be the effects of firing costs on employment. In other words, these two effects work in the same direction.

TABLE 6.3 Theoretical analyses of the impact of job security on employment

Study	The purpose of the study	Model	Results
Nickell 1979	The impact of increased costs of dismissal on employment and unemployment	Dynamic labour demand model	Fluctuations in employment reduced, fluctuations in hour increase, the inflow into unemployment falls and the duration of unemployment spells and job vacancies would rise
Bentolila and Bertola 1990	The impact of firing costs on labour demand	Dynamic labour demand model with linear adjustment costs	Firing costs affect dismissal decisions more than decisions to hire new workers; increase the average level of employment in the long run



Study	The purpose of the study	Model	Results
Bertola 1990	The impact of adjustment costs on dynamic labour demand	Dynamic model of labour demand; linear, asymmetric costs of employment adjustment	Employment lowered by adjustment costs in upturns and increased in downturns; impact on average employment not necessarily negative
Bertola 1992	The effects of employment protection provisions on employment dynamics and average labour demand	Dynamic labour demand model	Adjustment costs of labour affect employment dynamics much more than the average level of employment; adjustment costs may or may not decrease average employment in a partial equilibrium model of labour demand, depending on the form of the revenue function, on the rates of discount and of labour attrition and on the relative size of hiring and firing costs
Bentolila and Saint-Paul 1992	The effects of firing costs on labour demand; willingness to hire and fire at the margin, average steady-state labour demand	Dynamic labour demand model; linear adjustment costs	(i) A rise in firing costs reduces firm's willingness to hire and fire at the margin; (ii) average steady state labour demand decreases with firing costs when these costs are small, but will increase when costs are high enough; (iii) a fall in the quit rate magnifies the effects of firing costs on average labour demand for smaller values of these costs, but dampens it when they are large
Booth 1995a	The impact of statutory firing costs; the relationship between redundancy pay and unemployment	Dynamic labour demand model	Firing costs reduce labour demand in a boom and increase it in a slump relative to a situation with no firing costs; introduction of experience-linked state-mandated redundancy pay will lower the variance of output and employment in sectors of the economy where it is in employers' interests to have long-term employment contracts

Study	The purpose of the study	Model	Results
Diaz and Snower 1996	The role of the persistence of macroeconomic fluctuations and workers' bargaining power for the impact of job security on employment	A simple insider-outsider model	The more prolonged the macroeconomic fluctuations and the greater the power of incumbent workers in wage negotiations, the greater the impact of firing and hiring costs on average employment

### 6.3.2 Empirical work on the effects of job security on employment and unemployment

What does the empirical evidence imply about the impact of job security on the adjustment of labour? To what extent does it confirm the implications of the theoretical analyses? Next we deal with the empirical evidence from various types of empirical work according to the 'classification' set out above.

Most empirical work on the effects of job security on the adjustment of labour to output fluctuations has been carried out within the framework of dynamic labour demand. Usually, the starting point for the empirically estimable dynamic labour demand equations is the intertemporal profit maximization problem of the firm. The assumptions about the structure and the size of adjustment costs are of crucial importance to the results concerning the adjustment of labour input (Nickell 1986, Hamermesh 1993). Hence, they also have an impact on the empirical results concerning the adjustment of employment to demand fluctuations.

A standard assumption of the structure of the adjustment costs of labour in dynamic labour demand models has been symmetric convex costs, implying that the costs increasing along with the change in employment. In recent years an increasing number of empirical studies has addressed the question of the nature of the adjustment costs of labour. In addition to the assumption of symmetric convex costs, the implications of the assumptions of asymmetric convex costs, piecewise linear and lumpy adjustment costs of labour have been studied. The different assumptions associated with adjustment costs imply different optimal adjustment paths of labour. The assumption of asymmetric costs of adjustment implies that the marginal costs of increasing employment are not necessarily equal to the costs of decreasing employment: employment dynamics are generated by a process that allows for differences between hiring and firing costs. Piecewise linear costs (e.g. Nickell 1978) imply a discontinuity in the optimal demand for labour. The costs are proportional to changes in employment and the marginal cost of adjustment is constant (except when the change is zero, where it is undefined). Thus it may be optimal for the firm not to change labour until the compensating benefits offset the cost of taking actions to adjust to the optimal level. As far as the lumpy adjustment costs of labour are concerned, some costs of hiring, such as advertising costs, may be partly lumpy in nature, i.e. independent of the number

of hires. In addition, hiring new employees may mean lumpy costs are incurred, where productivity is disrupted. In case of lumpy adjustment costs, it is optimal for the firm to jump to its target demand for labour, if the present value of the costs of not jumping exceeds the immediate lumpy adjustment costs of making the jump. (Pfann and Hamermesh 1996).

In the empirical work, difficulties in inferring the structure and size of adjustment costs have been caused by both spatial aggregation (use of aggregate data) and temporal aggregation (use of annual data). However, the increasing availability of micro data has enabled a more accurate picture to be drawn of the structure of adjustment. Empirical studies of the asymmetric convex costs of adjustment of labour are e.g. Pfann and Verspagen (1989), Pfann and Palm (1993), Jaramillo et al. (1993), and Alonso-Borrego (1996). Most of these studies utilise micro data and confirm asymmetry of adjustment costs, i.e. that the costs of hiring and firing are asymmetric, except for the study by Alonso-Borrego (1996), where symmetry of costs was not rejected by the Spanish data. These studies do not give a clear picture which costs (hiring or firing costs) are higher. The following table summarizes some of studies of the asymmetric convex costs<sup>7</sup>.

TABLE 6.4 Studies of the asymmetric structure of the adjustment costs of labour

Study	The purpose of the study	Data	Results
Pfann and Verspagen 1989	Estimation of average labour cost as asymmetric function of $\Delta E$	Netherlands; annual, panel, 119 manufacturing firms, 1978-1986	Evidence for asymmetry of adjustment costs; hiring costs > firing costs
Pfann and Palm 1993	The structure of adjustment costs of labour, for both production and non-production workers	UK; annual manufacturing, 1955-1986 Netherlands; quarterly manufacturing, 1971(I) - 1984 (IV)	Evidence for the asymmetry of adjustment costs of labour for both countries; firing costs of non-production workers > hiring costs; hiring costs > firing costs for production workers
Jaramillo et al. 1993	Analysis of the structure of adjustment costs; whether hiring and firing costs are asymmetric	Italy; annual panel of 52 large Italian firms 1958-1988	Hypothesis of symmetric adjustment costs rejected by the data; hiring costs < firing costs; in the model that allows for asymmetries firing costs are correctly signed, but the sign of the firing costs is not consistent with the theory

Study	The purpose of the study	Data	Results
Alonso-Borrego 1996	Analyse the structure of adjustment costs for 3 different labour inputs: production, nonproduction and temporary workers allowing for asymmetries and for interaction effects in adjustment costs	Spain; annual panel of manufacturing firms 1986-1991	Evidence on asymmetry between hiring and firing costs not clear; symmetry not rejected by the data; adjustment costs for nonproduction workers higher than adjustment costs for production workers

### 6.3.2.1 The impact of changes in job security legislation

One way to study the impact of job security is to look at how the *changes in job security legislation and regulations* affect the adjustment of labour input to fluctuations in output: are there changes in the speed of adjustment? The empirical evidence provided by pre-post studies (summarised in Table 6.5 below) is mixed. Some studies have found changes in the speeds of adjustment of employment after changes in job security legislation (e.g. Hamermesh 1988, Bentolila and Saint-Paul 1992), whereas some have not found any effects at all (e.g. Fallon and Lucas 1991, Abraham and Houseman 1993).

What is interesting is that there seem to be country-specific differences in how changes in job security affect the adjustment. In Spain the introduction of flexible contracts (temporary contracts) in 1984 speeded up the adjustment of labour and, thereby, also increased the fluctuations in employment (Bentolila and Saint-Paul 1992), which is in accordance with the theoretical implications. On the contrary, in West-Germany making the use of fixed-term contracts easier with the Employment Promotion Act of 1985 did not have similar effects and the adjustment of employment did not accelerate (Büchtemann 1989, Abraham and Houseman 1993, Kraft 1993, Hunt 1994). These different outcomes suggest that, depending on the economic and institutional conditions, the same policy measures can have very different effects<sup>8</sup>.

TABLE 6.5 The impact of changes in the job security on the adjustment of employment

Study	The purpose of the study	Data	Results
Hamermesh 1988	Pre-post study; the effects of changes in job security	12 OECD countries; annual, 1961-1985	Changes in job security - > slower adjustment of employment in response to changes in output; no effect on the adjustment speed of hours
Fallon and Lucas 1991	Pre-post study; the effects of enforcement of stricter job security	India; annual, from industries, 1959 - 1982; Zimbabwe; annual, 1960-1985	Employment declined in both countries; no evidence of slower adjustment speeds

Study	The purpose of the study	Data	Results
Houseman 1991	Pre-post study ; the effects of job security on the adjustment of labour in response to a decline in production in the European steel industry	6 EC countries; annual, 1974, 1977-1982, from steel plants	Employment reductions in response to decline in output less in countries with stronger job security than in Britain
Bentolila and Saint-Paul 1992	Pre-post study; the effect of the introduction of flexible contracts in Spain	Spain; annual, panel of Spanish non-energy firms, 1985-1988	Employment's cyclical response increased; the increase greater in recession than in boom
Abraham and Houseman 1993	Pre-post study; the effects of changes in job security legislation	West-Germany, France and Belgium; monthly and quarterly, 1973-1990	No evidence that the changes in job security would have affected the speed of labour adjustment
Kraft 1993	Pre-post study; the effects of the 1985 Employment Promotion Act on the adjustment of labour	West-Germany; annual 1970-1987, 21 manufacturing industries	A slowdown in the adjustment of labour since the enforcement of the law 1985
Hunt 1994	Pre-post study, the effect of a new law allowing the use of fixed-term contracts	West-Germany; monthly, a panel of manufacturing industries, 1977-1992	Changes in the adjustment speed of employment during 1977-1992, but the timing and direction of these changes indicate that they are unlikely to have been caused by the 1985 legislation

### 6.3.2.2 Explicit measures of the magnitude of job security

The following table summarises the empirical evidence on the effects of job security where *explicit measures of the magnitude of job security* have been used, such as expected dismissal payments (Burgess 1988) as well as the severance and notice rights of workers (Lazear 1990, Addison and Grosso 1996). Explicit measures of the magnitude of job security have been used relatively little owing to the difficulty of finding good measures or owing to the lack of appropriate data. The evidence on the effects is again mixed. Lazear (1990) and Addison and Grosso (1996) find that job security (severance pay) has a negative impact on employment (employment-population ratio), whereas Burgess' (1990) results imply that job security has no effects on the long-run level of employment. As for the dynamics of employment, the empirical evidence lends support to the theoretical implication that job security slows down the adjustment of employment to demand fluctuations (Burgess 1988). Table 6 summarises these results. We have also included in the table the study by Morgan (1996), where the impact of employment protection on labour demand is studied in 7 OECD countries. Although Morgan does not use an explicit measure of the magnitude of job security, he uses a measure of

job security that allows for the effect of changes in job security over time<sup>9</sup>. According to his results, job security may even increase the average level of employment. Similarly to Burgess (1988), he finds that job security slows down the adjustment of employment to demand fluctuations.

TABLE 6.6 Empirical studies on the impact of job security on labour demand with explicit measures of the magnitude of job security

Study	The purpose of the study	Data	The measure of the magnitude of job security	Results
Burgess 1988	The impact of hiring and firing costs on the adjustment of employment; the impact of the inclusion of various measures of hiring and firing costs	UK, manufacturing; quarterly, 1964-1982	Expected dismissal payments	Job security slows down the adjustment of employment, but does not effect its long run level; the inclusion of the adjustment cost variables improved the fit of the model of labour demand
Lazear 1990	The impact of severance pay and statutory notice on employment-population ratio, average hours worked	20 OECD countries; annual, 1956-1984	Severance and notice rights of a blue-collar worker with 10 years' service	Adverse impact of severance pay on employment-population ratio and average hours worked
Addison and Grosso 1996	The impact of severance pay and statutory notice on employment-population ratio, average hours worked	20 OECD countries; annual; 1956-1984	Severance and notice rights of a blue-collar worker with 2, 5, 10 and 20 years' service	Adverse impact of severance pay on employment-population ratio, but not on average hours worked; longer notice intervals associated with favourable labour market outcomes
Morgan 1996	The impact of employment protection on labour demand	7 EU countries; annual, 1981-1994	A measure of employment that allows changes in EP over time; based on an EU survey of employers of the flexibility of the labour market	Employment protection can slow down the adjustment of employment; it can also increase the average level of employment

### 6.3.2.3 The impact of job security on the speed of adjustment of number of workers and hours

The empirical studies on the *speeds of adjustment* of the number of workers and hours per worker do not offer us direct evidence on the effects of job security. What they make possible is the comparison of the speeds of adjustment between countries that is, whether the adjustment of employment is faster in countries with less strict job security legislation compared to countries with higher levels of job security.

As for the estimated adjustment speeds for different countries, the empirical evidence suggests that the adjustment of employment is more rapid to output shocks in the USA than in European countries with stricter employment protection. According to Abraham and Houseman's (1993) study of the adjustment of hours and workers to output changes in three European countries and USA, the adjustment for workers was clearly faster in USA, whereas the differences in the adjustment speeds of hours were quite small.

An additional explanation given for the former result (faster adjustment speeds of employment in the USA) is the relatively low unionization rate in USA. Unions can be expected to slow down the adjustment of workers to the fluctuations in output. On the other hand, the smaller differences in the adjustment speeds of ours might be partly explained by the short-time compensation system. In the European context, the existence of short-time compensation systems (e.g. in Germany), where a share of a worker's compensation for reduced work hours is paid for out of unemployment insurance, has been evaluated (Van Audenrode 1994) to shift the adjustment of labour input from adjustment through lay-offs to the adjustment through variations in working time. According to Van Audenrode's country comparison, in the European countries with the most generous short time compensation, overall labour adjustment ends up being as flexible as in the USA.

The bulk of the empirical evidence on adjustment speeds (e.g. Hamermesh 1988, Abraham and Houseman 1993, Kauhanen 1997) also confirms the theoretical prediction in relation to job security that the adjustment of the number of workers is slower than the adjustment of working hours. It is reasonable to assume that altering the level of employees incurs more costs than changing the level of hours worked by current employees. Therefore firms resort first to the adjustment of hours in response to changes in demand.

Empirical studies (e.g. Nadiri and Rosen 1969, Pfann and Verspagen 1989, Abraham and Houseman 1993) have also found that when adjustment speeds have been estimated for different groups of workers, viz. for production and non-production workers, the adjustment speeds for production workers have been more rapid than for non-production workers. This implies that in addition to the mandatory job security there also exists *de facto* job security. Non-production workers are considered to be more skilled and to possess more human capital. Therefore their dismissal and hiring also incurs greater adjustment costs. Typically, adjustment speeds have been expressed as median lags, which state

the time required for 50 per cent of the adjustment to be complete. However, the estimated speeds of adjustment seem to depend on the use of appropriate data and estimation methods. According to the empirical evidence (see Hamermesh 1993), the speeds of adjustment vary greatly according to the degree of temporal aggregation used (annual, quarterly, monthly). The longest speeds of adjustment on average have been obtained from empirical studies utilising annual data (on average 5.5 quarters from the studies summarised in Hamermesh 1993<sup>10</sup>) and the shortest ones from those utilising monthly data (on average 1.2 quarters). The range of estimates is, however, wide. Because in most firms the adjustment decisions are made over periods much shorter than a year, estimates of adjustment speeds based on annual data may give a flawed picture (Hamermesh 1993).

In addition to the level of temporal aggregation, the estimates of adjustment speeds are affected by the level of spatial aggregation and whether the adjustment of other factor inputs is taken into account. The evidence shows that studies based on highly spatially aggregated data and including other factor prices imply more rapid adjustment (Hamermesh 1993).

#### **6.3.2.4 The impact of job security on unemployment**

The simple analyses of the relationship between the severity of job security and the level of unemployment (Bertola 1990, this paper) do not support the hypothesis that unemployment is higher in countries with stricter job security legislation. This result is also supported by the more thorough empirical study of the causes of unemployment across OECD countries by Layard and Nickell 1992. They do not find any systematic relationship either between job security and the level of unemployment in the long run. In the equation for average unemployment a proxy for job security did not become significant.

Jackman et al. (1996) investigate the impact of job security on the equilibrium level of unemployment in 20 OECD countries over the period 1985-1993. The two channels by which job security may affect equilibrium unemployment are by directly influencing wage pressure and/or by affecting the impact of unemployment on wages. Jackman et al. first investigate how employment protection affects the impact of unemployment on wages. In addition to employment protection, they use the structure of the benefit system (replacement rates and benefit duration) and the extent of union and employer coordination in wage bargaining as additional explanatory variables in this estimation. Their evidence suggests that job security increases the impact of unemployment on wages. In other words, the stricter the job security, the greater will be the impact of unemployment on wages. Hence, from this channel Jackman et al.'s results indicate that job security reduces unemployment. As for the total impact of job security on unemployment, they find some weak evidence that employment protection tends overall to decrease unemployment and thereby increase employment.

Addison and Grosso (1996) provide additional evidence on the negative impact of job security on unemployment in their country comparison of 20 OECD countries over the period 1956-1984. They also find that employment protection



(severance pay and mandatory prenotification) has a decremental effect on the unemployment rate. Their results are, however, based on estimations of the simple fixed-effects model, where unemployment is explained only by severance pay and mandatory prenotification variables plus some control variables, such as a linear time trend and some demographic factors.

Differing evidence on the impact of job security on the level of unemployment is presented in the country comparisons by Lazear (1990) and OECD Employment Outlook (1993). These studies imply that job security legislation has a negative impact on unemployment, i.e. it increases unemployment. Lazear's study is also based on estimations of the fixed-effects model as was the study by Addison and Grosso (1996). In the OECD Employment Outlook (1993) the impact of job security on both the level and the incidence of long-term unemployment are investigated. Besides a measure of job security (the maximum level of dismissal costs in months), long-term unemployment is explained by the duration of unemployment benefits and by the ratio of active labour market policy expenditures relative to passive policy expenditures. According to the estimation results, both the rate and incidence of long-term unemployment are higher in countries with stricter job security and longer benefit duration. The empirical studies are summarised in Table 6.7 below.

TABLE 6.7 Evidence on the unemployment effect of job security

Study	The purpose of the study	Data	Results
Bertola 1990	The relationship between stringency of job security and the level of unemployment	10 OECD countries; separate years from the 1980s and 1990s	According to country comparison unemployment is not higher in countries with stricter job security legislation
Lazear 1990	The impact of severance pay and statutory notice on unemployment rate	20 OECD countries; annual, 1956-1984	Both severance pay and statutory notice increase the level of unemployment
Layard and Nickell 1992	To explain the average level of unemployment across countries	20 OECD countries; annual, 1983-1988	Job security did not become significant in the unemployment regression
OECD Employment Outlook 1993	The impact of the degree of job security on both the level and incidence of the long-term unemployment	19 OECD countries; annual; 1980-1993	The rate and incidence of long-term unemployment higher in countries with stricter job security and longer benefit duration

Study	The purpose of the study	Data	Results
Addison and Grosso 1996	The impact of severance pay and statutory notice on unemployment rate	20 OECD countries; annual, 1956-1984	Both severance pay and statutory notice decrease the level of unemployment
Jackman et al. 1996	The impact of job security on the equilibrium unemployment	20 OECD countries; annual, 1983-1988; 1988-1993	No strong evidence that job security affects the equilibrium level of unemployment

### 6.3.2.5 Advance notification and employment performance

In most cases job security legislation encompasses advance notice legislation according to which employers must provide for the advance notice of plant closings or of large-scale lay-offs. One strand of the empirical work on job security evaluates the impact of advance notification on employment performance. Majority of these studies deal with the US labour markets, where mandatory prenotification of dismissals and of plant closings is still lacking in many states. These studies include Addison and Portugal (1987, 1992), Ehrenberg and Jakubson (1989) and Ruhm (1992) to name a few. Cross-country studies on the impact of prenotification on the rate of unemployment include Lazear (1990) and Addison and Grosso (1996).

In most studies the aim is to find out whether prenotification has any impact on avoiding unemployment after displacement and whether it shortens the time in unemployment after dismissal. In addition, the impact of advance notification on predisplacement wages, i.e. whether advance notice results in lower predisplacement wages (Ehrenberg and Jakubson 1989) has been studied. Except for the study by Lazear (1990), empirical evidence finds no adverse impact of advance notification for either workers or employers. According to the empirical literature, advance notice reduces the probability that displaced workers will suffer any spells of unemployment after dismissal and may also moderate temporary increases in local unemployment. As for the effects on different groups of workers, advance notification especially reduces the joblessness of displaced male workers (Addison and Portugal 1987). On the predisplacement wages it had no

TABLE 6.8 The effect of advance notification on unemployment

Study	The purpose of the study	Data	Results
Folbre et al. 1984	The effect of advance notification of plant closings on local unemployment rates and on the size of labour force	Observations of the 15 labour market areas in Maine (USA), where in which at least one major plant closing occurred, 1974-1982	Prenotification of closing had a negative effect on local unemployment rates

Study	The purpose of the study	Data	Results
Addison and Portugal 1987	The role of advance notification in mitigating unemployment caused by plant closing;	US panel data: 1984 Displaced Worker Survey ; data on all adult workers who had been displaced between 1979 and 1984	Advance notification reduces unemployment associated with plant closing
Ehrenberg and Jakubson 1989	The effect of advance notice on the probability of a displaced worker's finding a job without any spell of unemployment and on the duration of unemployment ; the effects of advance notice on survey date wages	US panel data: 1984 Displaced Worker Survey	Advance notice reduces the probability of unemployment after displacement and may also moderate temporary increases in unemployment rates; no evidence of negative effects either to workers or firms
Nord and Ting 1991	The impact of written advance notification of plant closings on post-displacement employment and earnings	US panel data; 1988 Displaced Worker Survey	Advance notification succeeded in reducing re-employment earnings losses and the probability of post-displacement unemployment only when it was given at least two months before the plant closing
Addison and Portugal 1992	The impact of advance notification on unemployment duration	US panel data: 1984, 1986, 1988 Displaced Worker Surveys	Advance notification successful in reducing the unemployment duration of displaced workers, especially male workers
Ruhm 1992	Whether advance notification decreases post-displacement unemployment	US panel data: 1988 Displaced Worker Survey	Workers expecting terminations, in the absence of written notice, have higher probability of avoiding unemployment and shorter spell durations of unemployment than those who are not notified

### 6.3.2.6 Job turnover and employment protection

Additional evidence on the effects of job security on labour market performance can be obtained by looking at the job turnover data. As employment protection legislation can affect both firm's decisions in response to changing economic circumstances as well as to workers' decisions to leave jobs, it may also influence

job and labour turnover. By definition (OECD Jobs Study 1996), job turnover (i) at the level of an individual establishment or firm, is simply the net change in employment between 2 points in time - the total number of jobs created less the number of jobs which have disappeared; does not include job vacancies which remain unfilled and jobs that begin and end over the interval of observation, which is most often 1 year. The economy-wide job turnover rate is simply the absolute sum of net employment changes across all establishments or firms, expressed as a proportion of total employment. In turn, labour turnover is concerned with movements of individuals into jobs (hirings) and out of jobs (separations) over a particular period.

The impact of employment protection has been considered in theoretical models of job creation and job destruction (Mortensen and Pissarides 1994, Millard and Mortensen 1994, Garibaldi 1995). As employment protection may affect the costs of hiring and firing new workers, it adds to the costs of job creation and job destruction, as a result of which both are expected to be lower. According to these theoretical models, job security may also affect the cyclical sensitivity of job turnover. Job creation may be smoother than job losses because matching workers to new positions is costly and time-consuming (Mortensen and Pissarides 1994). In a stochastic dynamic search model Garibaldi (1995) shows that the cyclical variation of job reallocation, the sum of job creation and destruction, is correlated with a measure of employment protection legislation. The tighter the firing restrictions, the less volatile will job destruction be and the higher the correlation between job reallocation and net employment changes. As firing restrictions increase, they also have a decreasing effect on job creation and destruction, but do not affect the equilibrium level of unemployment.

Boer (1995) studies the impact of job security on job flows. He builds up a simple model to study the effects of job security on gross job flows. The implications of the model are the following: (i) higher firing costs tend to reduce aggregate job flows<sup>11</sup>; (ii) the tightening of employment security regulations increases the responsiveness of gross job creation (POS) relative to job destruction (NEG), thereby contributing to partly insulate NEG from aggregate shocks, and; (iii) net employment flows become less responsive to aggregate shocks.

As far as the empirical evidence on the impact of job security on job/labour turnover is concerned, there have been few empirical tests of the impact of employment protection on job turnover. First, empirical evidence has been obtained from looking at the cross-country correlations (OECD Employment Outlook 1996) between country rankings of various indices of employment protection (regulations governing regular employees only, regulations governing temporary employees only, maximum pay and length of dismissal for regular employees, international organisation of employers, ranking by Bertola (1990)) and job turnover. Correlation comparisons imply that there is a negative relationship between the various indices of employment protection and job turnover. This is in line with the theory.

However, there are two caveats in these results. First, the rankings are based on the situation of the late 1980s or early 1990s, and therefore do not always

match well with the turnover data and, second, correlations are often insignificant at conventional test levels. When the indices of job security for permanent and temporary workers are considered separately, the former correlations are not statistically significant, while the latter are larger in absolute sense and often statistically significant<sup>12</sup>. Further, the results for other indices of employment protection are mixed, though the signs are as expected.

If job security has impact on job turnover, one might also expect changes in job security legislation to cause changes in job turnover over time. However, the data on job turnover provides little support of this. For example, the liberalisations of the use of fixed-term contracts both in France in 1986 and in Germany in 1985 were not associated with an increase in job turnover.

Boer (1995) studies empirically the effects of job security on the responsiveness of job turnover to GDP growth utilising data on 8 OECD countries, divided into three groups<sup>13</sup> according to the degree of job security in those countries. The results imply that net and gross job creation increase during upturns while gross job destruction moves countercyclically. Further, there is little support that job security regulations affect the cyclical responsiveness of gross job flows. In other words, the results give little evidence that the responsiveness of job turnover as measured by net and gross job flows to GDP growth varies significantly across countries grouped according to the strictness of employment protection legislation.

Empirical evidence from 8 OECD countries on the impact of job security on the cyclical sensitivity of job reallocation; i.e. the sum of job creation and job destruction, is provided by Garibaldi (1995). He finds positive correlations between job reallocation and net employment changes. His results imply that in countries with relatively low (high) degrees of job security provisions, job destruction appears, over time more (less) volatile than job creation. Thus, in countries with stricter employment protection, job losses are not so rapid during downturns as in countries with less strict job security. Millard (1995) conducted a simulation for UK and found that when job security legislation was reduced, consistent with the prediction of increased job creation and job destruction, the incidence of unemployment increased, but the average duration of unemployment declined more, so that the unemployment rate was lower than it would have been otherwise.

### 6.3.2.7 Job security and youth unemployment

If job security has a decreasing impact on the hiring behaviour of firms, it is likely to affect younger more than older workers. The obstacles to firing are likely to change employers' hiring strategies, discouraging casual hiring, where employers intend to assess performance on the job, in favour of increased screening of job applicants (OECD Jobs Study 1994). This may worsen the position of young job applicants in the labour market because young people form a relatively large share of the new entrants to the labour market and generally have less work experience (Skedinger 1995).

When assessing the consequences of employment regulation for young

people, it is important to note that firing costs in many cases are age-dependent. A typical feature of dismissal regulations in many countries is that severance pay is smaller and/or that notice periods are shorter for young workers. Another type of regulation of potential importance is the imposition of seniority rules. Application of such rules increases a young person's risk of being laid off relative to other groups. However, there is very little evidence of the application of the last-in-first-out principle in different countries. (Skedinger 1995).

Few empirical studies are concerned with the effects on young people of employment regulation, and the evidence is mixed. On one hand, there is survey evidence indicating that firms are more concerned with the quality of recruits as a consequence of employment regulation. This should reinforce firms' unwillingness to hire young and inexperienced applicants. On the other hand, econometric studies in which young people have been analysed separately do not lend strong support to the suggestion that they are hard hit by employment regulation. Skedinger (1995) studies empirically whether the changes in job security legislation (in dismissal and fixed-term contracts regulation) have had any effect on youth unemployment. The sample of six countries (France, Germany, the Netherlands, Spain, Sweden and the United Kingdom) was chosen so that the selected countries have experienced changes in their job security legislation and the time period of estimation is around 1970-1992 in each country. The results of the estimations of the youth unemployment rate equations suggest that strict regimes are in most cases associated with high teenage unemployment, but that the effects on 20-24 year-olds are small.

## 6.4 Job security and wages

### 6.4.1 Theoretical implications

In theoretical and especially in empirical work the impact of job security on wages has received relatively little attention. We now look first at the theoretical context of job security legislation and wage setting. The channels by which employment protection may affect wage setting are: (i) through direct impact on wage determination by increasing the bargaining power of employed employees, and (ii) through indirect impact via unemployment on wage pressure.

As far as the direct impact of employment protection on wage determination is concerned, in theoretical models it has been shown that job security need not influence wage determination if considered in isolation, but other labour market imperfections such as minimum wage restrictions and restrictive union representation are necessary if turnover costs are to affect wage determination (Bertola 1990, Lazear 1990). Thus in the competitive case, where workers' bargaining power is limited, mandatory provisions will lead to an off-setting reduction in the wage rate<sup>14</sup>.

The direct impact of job security on wages has been analysed in the insider-outsider models (e.g. Lindbeck and Snower 1988, Bertola 1990). In the insider-

outsider models job security that imposes hiring and firing costs<sup>15</sup> creates quasi-rents that give insiders market power to bargain for higher wages and disregard unemployment among outsiders. The existence of turnover costs makes the distinction between insiders and outsiders possible. Lindbeck and Snower (1988) show in their insider-outsider model that the amount by which the insiders can push their wages above the outsiders' reservation wage depends on the sum of the marginal hiring, training and firing costs. Thus the higher the firing costs imposed by job security, the higher the insiders' wages. In addition, they emphasise the role played by unions in increasing the turnover costs, giving insiders new tools for rent creation (a threat to strike and work-to-rule) and, thereby, increasing their market power.

In his analysis of the impact of firing costs Bertola (1990) shows that job security (and turnover costs in general) does not necessarily yield high wages and involuntary unemployment, even when wage setting by workers or unions is explicitly modelled. Turnover costs are a necessary, but not a sufficient condition for insider-outsider issues to be relevant.

Bertola analyses in a model of atomistic insider wage setting, akin to that of Lindbeck and Snower (1988), how the entrant wage is determined by forward-looking workers. All the workers employed in the previous period exploit the bargaining power deriving from turnover costs, and if  $W^e$  is the entrant wage asked for by an unemployed worker, insiders can charge the higher wage  $W^e + H + F$  ( $H$ = hiring costs,  $F$ =firing costs) without the risk of losing job. Thus in the model insiders earn rent on turnover costs plus the reservation wage,  $\hat{w}$ .

As for the entrant wage, every worker's pay-off is given by the infinite-horizon discounted wage income he earns by being an entrant for one period and an insider thereafter, if employed:  $Y_1 = W^e (1+r/r) + (H + F)/r$  ( $r$ = discount rate) or earning the opportunity wage  $Y_0 = \hat{w} (1+r/r)$  forever, if unemployed. If  $Y_1 > Y_0$ , the unemployed worker should bid down  $Y_1$  by lowering the entrant wage,  $W^e$ . Supposing equilibrium is reached at  $Y_1 = Y_0$ , then the entrant wage  $W^e = \hat{w} - (H+F)/(1+r)$ . In this case the insider wage equals the reservation wage and the insider wage setting yields the same steady-state level of employment as in the competitive case and firing costs have no effect on employment. The only effect of potential insider wage setting is a redistribution of labour costs through time: insider wages are higher than the reservation wage  $\hat{w}$ , but they have paid for it by accepting a much lower wage on entering employment. But minimum wage legislation or capital market imperfections can prevent the entrant's wage from falling to this level. And in that case labour turnover costs (firing costs) have a decreasing impact on employment, according to Bertola's analysis.

The above dealt with situations where each worker bargains separately with the firm. Bertola (1990) also shows that in a case where wages are bargained/set by a union exploiting its monopoly power, turnover costs have no effect on wage determination if the union represents all workers, whether employed or unemployed. Restrictive membership rules, such as the union maximizing only the typical member's pay-off, are necessary for wages to be influenced by turnover costs in the same way as in the case of separately bargaining insiders.

Besides affecting wages directly by creating insider power for workers take advantage of in the wage bargaining, job security may also influence wage pressure indirectly via the impact of job security on long-term unemployment; i.e. by lengthening the duration of unemployment. The analysis of the indirect effect of job security on wage pressure is presented by Jackman et al. (1996). In their model set-up, wage setting is described by the following equation

$$(6.1) \quad \log W = \gamma_1 u - \gamma_{11} \Delta u + Z_w,$$

where  $W$  = real wage,  $u$  = unemployment and  $Z_w$  = wage pressure shocks.

Labour demand is given by

$$(6.2) \quad \log N = \lambda u_{-1} - (1-\lambda)\beta_1 \log W + (1-\lambda)Z_n,$$

where  $N$  = employment,  $Z_n$  = labour demand shifts (e.g. productivity shocks),  $\beta_1$  = long-run labour demand elasticity.

If it is assumed that the labour force is fixed and normalised to unity, the above equation can be written as

$$(6.3) \quad u = \lambda u_{-1} + (1-\lambda)\beta_1 \log W + (1-\lambda)Z_n.$$

By the elimination of real wages from (6.1) and (6.3) the following equation is obtained

$$(6.4) \quad u = \alpha_{11} u_{-1} + (1-\alpha_{11})u^*,$$

where  $u^*$  = equilibrium unemployment rate =  $(\beta_1 Z_w - Z_n) / (1 + \beta_1 \gamma_1)$ . The speed of adjustment,  $1 - \alpha_{11}$ , is given by  $1 - \alpha_{11} = (\beta_1 \gamma_1 + 1) / (\beta_1 \gamma_1 + \beta_1 \gamma_{11} + (1-\lambda)^{-1})$ .

Jackman et al. (1996) study two questions concerning the impact of job security: (i) How does job security affect the speed of adjustment ( $1 - \alpha_{11}$ ) of unemployment to its equilibrium level?; and (ii) What kind of impact does job security have on the equilibrium rate of unemployment,  $u^*$ ?

With regard to the first question there are two channels through which the speed of adjustment of unemployment to equilibrium level is affected. First, job security may be expected to raise adjustment costs of employment and this would increase labour demand sluggishness,  $\lambda$ . Second, job security may tend to increase long-term unemployment by reducing the rate of flow from unemployment, as employers are more cautious about hiring when it is more difficult and costly to dismiss workers. This will typically generate hysteresis effects in wage determination and thereby raise  $\gamma_{11}$ . Increases in both  $\lambda$  and  $\gamma_{11}$  will tend to reduce the overall speed of adjustment,  $1 - \alpha_{11}$ .

Although job security may increase long-term unemployment, its impact on equilibrium unemployment is not that straightforward. Job security does not necessarily raise the equilibrium rate of unemployment. This is because the equilibrium rate is affected by both the duration of the spells of unemployment as well as by the inflow rate into unemployment, on which job security has opposite effects. Whereas job security may increase the duration of unemployment, it also reduces the flow into unemployment.

There are many ways for job security to affect the equilibrium rate of un-



employment:  $u^* = (\beta_1 Z_w - Z_n) / (1 + \beta_1 \gamma_1)$ . First, job security may increase wage pressure,  $Z_w$ , directly by raising the power of insiders in the determination of wages. On the other hand, it can also raise the impact of unemployment on wages,  $\gamma_1$ , by making the threat of unemployment more unpleasant. But since employees are protected against dismissal to some extent, the threat of unemployment is less relevant and this will reduce  $\gamma_1$ . Thus the overall impact on  $u^*$  is ambiguous.

#### 6.4.2 Empirical evidence on the wage effect of job security

The impact of job security on wages has received relatively little attention in the empirical work. Besides, the evidence on the direct impact of job security on wages is mixed.

Bertola (1990) studies empirically the impact of job security on wage setting by looking at the relationship between the stringency of job security and real wages<sup>16</sup> in 10 OECD countries. According to the theoretical predictions of a simple insider-outsider model, if insiders succeed exploiting the bargaining power created by turnover costs, real wages ought to be the higher, the stricter job security provisions are. Bertola's results do not lend support to this prediction. In addition, in his study, Bertola (1990) examines another theoretical prediction, i.e. that wages should be less sensitive to unemployment levels, if outsiders have no say in the determination of wages. The evidence from the simple-minded wage Phillips curves for 10 OECD countries on 1963-1986 data fail to provide evidence of this.

Direct empirical evidence on the effect of job security on wages is provided by Friesen (1996) who studies the response of wages to protective legislation by utilising micro data from the 1986-87 Canadian Market Activity Survey. In Canada protective legislation does not fall under federal jurisdiction, but there exists 13 different legal regimes within Canada. Thus Friesen is able to compare the wage structure for workers covered and not covered by employment protection. Friesen estimates the wage structure for four different groups: male nonunion, male union, female nonunion, female union. Micro data on worker and job characteristics allow control of the variety of sources of wage variation, such as industry, occupation, tenure and firm size.

Contrary to the results obtained by Bertola (1990), she finds support for the theoretical proposition that protective legislation in Canada generates insider power that allows incumbent workers to bargain for higher wages. Hence, incumbent workers protected by job security legislation are able to extract higher wages than unprotected incumbent workers. Further, she finds evidence that the extent of the labour costs imposed by job security laws depend on other institutional factors as well: the costs incurred by job security may increase appreciably if starting wages are prevented from falling by a powerful union or minimum wage legislation. Thus, her results suggest that the ultimate wage effect differs according to the employees' union status: those working in the nonunion sector pay for their job security in the form of lower wages, whereas union workers seem to be able to exploit the market power created by job security.

Dolado and Bentolila (1993) present evidence with Spanish micro level data from large manufacturing firms on the impact of the partly deregulation of the job security legislation in Spain on wages, that is, on the impact of the introduction of new fixed-term labour contracts in 1983, which increased labour market flexibility. According to Dolado and Bentolila, this change created a two-tier labour market in Spain, where temporary workers had little to say in the determination of wages. The wage demands by permanent workers actually increased, since they gained extra protection against dismissal by the buffer of temporary employees. The increase in the wage demand by insiders was of the following magnitude: a percentage point increase in temporary employment raised the growth rate of permanent workers' wages by one-third of a percentage point.

As for the indirect wage effect of job security, Jackman, Layard and Nickell (1996) provide evidence on the relationship between the degrees of hysteresis in wage setting<sup>17</sup> and job security operating via long-term unemployment (LTU). In an earlier empirical study (Layard et al. 1991, OECD Employment Outlook 1993), it was explicitly suggested that there is a strong positive relationship between wages and long-term unemployment at given unemployment rates<sup>18</sup>.

Therefore Jackman et al. concentrate on the effect of job security on long-term unemployment and, thereby, obtain indirect evidence on the wage effects as well. They use two measures of LTU: 1) the 1985-1993 average proportion of unemployed with durations exceeding one year, and 2) standardization of this proportion by, when possible, measuring it with for each country when unemployment lies between 5 and 7 %, the idea of the latter being to focus on the extent of LTU at given levels of aggregate unemployment. As explanatory variables explaining long-term unemployment they use the duration of benefit availability (BD), expenditure on active labour market policies (ALMP) and employment protection (EP). The results show some evidence that stricter employment protection legislation raises long-term unemployment and thus enhances hysteresis in wage-setting. Table 6.9 below summarises the results of the above empirical studies on the impact of job security.

Table 6.9 Evidence on the impact of job security on wage determination

Study	The purpose of the study	Data	Results
Bertola 1990	The relationship between the stringency of job security and wage gaps (whether real wages are higher in countries with high job security)	10 OECD countries, several separate years from 1970s and 1980s	No evidence that real wages would be higher in high job security countries as implied by the insider-outsider theory
Dolado and Bentolila 1993	The impact of proportion of fixed-term employment on wage growth	Spain; micro level data from large manufacturing firms; annual, 1985-1988	Evidence that the proportion of fixed-term workers increased permanent workers' wage demands

Study	The purpose of the study	Data	Results
Bertola 1990	The relationship between the stringency of job security and wage gaps (whether real wages are higher in countries with high job security)	10 OECD countries, several separate years from 1970s and 1980s	No evidence that real wages would be higher in high job security countries as implied by the insider-outsider theory
Friesen 1996	The wage effects of job security laws (prenotification and severance pay) for 4 groups: male union, male nonunion, female union and female nonunion	Canada; micro level data from Canadian Market Activity Survey; annual, 1986-1987	Evidence that job security legislation creates market power for protected employees to bargain for higher wages
Jackman et al. 1996	The relationship between hysteresis in wage setting and job security operating via LTU, i.e. the impact of job security on LTU	20 OECD countries; annual, 1985-1993	Evidence that stricter job security increases LTU and thus creates hysteresis in wage setting

## 6.5 Conclusions

The aim of this chapter was to shed light on how job security legislation/employment protection affects the performance of the labour market according to both the theoretical and empirical literature. This issue is of particular interest, as there has been increasing pressure for the deregulation of job security in Europe since the 1980s.

What are the main consequences of job security as regards the performance of the labour market? A clear implication from the theoretical analyses, which is also confirmed by the empirical evidence, is that job security stabilizes the variations in employment and unemployment to demand fluctuations. In other words, although it decreases the number of hirings during upturns, it also decreases the number of dismissals during downturns. From the point of view of the insider-outsider theory, thinking of the insider membership mechanism as a cause of unemployment persistence, this is not a good thing for unemployed outsiders.

The predictions of the impact of job security on the average level of both employment and unemployment are far more mixed; there are both theoretical and empirical studies that suggest job security to have a positive effect on the average level of employment, and an adverse effect on the level of unemployment and vice versa. Differences in unemployment rates between countries have not been able explain by the degree of the strictness of job security. What job security may have contributed to, is the creation of long-term unemployment, because it diminishes the exit rate from unemployment.

Job security also seems to affect the rate at which employers adjust their labour to fluctuations in demand. It is likely to slow down the adjustment of the number of employees, because it incurs sunk adjustment costs that are not retrievable. There is some evidence that the adjustment of employment to output shifts is more rapid in the USA than in Europe, and one reason offered for this is the lower level of job security in the USA. Another consequence of job security for the adjustment of labour input is that firms are likely first to resort to altering the level of hours worked by current employees to demand fluctuations. The bulk of the empirical evidence also supports this theoretical prediction: in countries with strict job security legislation, i.e. with greater obstacles to firing, the adjustment of hours per employee is faster than the adjustment of the number of employees. In the adjustment of hours per employee to demand changes the differences do not appear to be that great between the USA and Europe. The existence of short-time compensation systems in many European countries is one explanation for this.

As for the consequences of prenotification on unemployment, the impact of advance notification on the spells of unemployment experienced after displacement has almost invariably been shown to be positive in the empirical literature (most of which deals with the USA). The empirical evidence on the impact of job security on youth unemployment is scarce and more mixed. If strict job security legislation does have effects on youth unemployment, it would seem to affect the teenage group, but not the group of 20-24 year-olds.

According to the theoretical implications (insider-outsider theory), job security may increase wage pressure by incurring higher adjustment costs of labour, and thereby creating bargaining power for current employees to exploit in the wage setting. But in the theoretical context it has been shown that job security alone is not enough to influence wages, but other labour market institutions such as minimum wage legislation are necessary for job security to have this effect. Unfortunately, empirical evidence on the direct effect of job security on wages is scarce and contradictory. In country comparisons a clear relationship between higher real wages and stricter job security has not been found. Empirical evidence on the positive effect of job security on wages has been found with Canadian micro-level data. With respect to the indirect effect of job security on wages, i.e. its impact via long-term unemployment, there is some evidence that stricter job security does increase long-term unemployment and thus enhance hysteresis in wage setting.

Experiences following the deregulation of job security are also mixed. For example, the relaxation of fixed-term employment contracts in Spain greatly increased the variation in employment in response to changes in demand, whereas in Germany employment was hardly affected at all. In the UK, deregulation also increased the variation in employment, but did not affect its average level.

When drawing conclusions about the impact of job security on the performance of the labour market on the basis of theoretical and empirical studies, it is noteworthy that labour markets are a complex set-up, influenced by many factors. We know that job security decreases the variation in employment and unemployment to fluctuations in demand, and may increase long-term unemployment.

We do not know for sure how it affects the average level of employment and unemployment or whether the strict job security increases pressure on wages. In evaluating the impact of job security, however, it is important to take into account other institutional factors.

1. Skilled workers can be assumed to enjoy a higher degree of de facto job security due to higher recruitment, screening and training costs, whereas for unskilled workers the ratio of labour hoarding costs plus anticipated rehiring costs will render dismissal the more attractive alternative for firms. (Büchtemann 1993).
2. The size of the firm may also have an effect on the size of the adjustment costs due to job security. In large firms these costs may be smaller, because there exists an interfirm labour market, which makes it possible to relocate an employee instead of firing him. Thus the costs of job security would be larger for small firms. This can be an important factor in a country such as Finland, where large firms have created most of the new jobs. If we need more small firms to create new jobs and improve employment, strict job security and high adjustment costs of labour may become a greater problem.
3. During the 1980s job security legislation has been relaxed in the UK, Spain, Germany, France and Spain.
4. Saint-Paul (1996) calls these reforms two-tier reforms, since they often preserve the interests of permanently employed employees. See Saint-Paul (1996) for more details.
5. It is noteworthy, that besides job security, the share of the agricultural industry in a country can also affect the extent of self-employment. Therefore, in some context, a division is made between agricultural self-employment and other self-employment.
6. We have partly followed the classification made by Hamermesh (1993) who divides the studies of the effects of job security into two types: pre-post studies and studies that use explicit measures of the magnitude of job security.
7. For a more thorough review of the studies of the structure of adjustment costs, see Hamermesh and Pfann (1996), where studies of lumpy and linear adjustment costs are also reviewed.
8. In Germany, the strength of the industrial sector is based on the ability of its companies to develop long-term relations and strategies. In Spain the economic conditions are more uncertain and the industrial sector is more fragile, consisting of only few medium or large companies and a large number of small firms, which survive in the international market by pursuing short-term strategies and compressing costs. (Simonazzi and Villa 1995, 23-24).
9. See Morgan 1996, 9-10.
10. The averages are based on the estimated adjustment speeds of worker-hours, employment and hours.
11. As Boer (1995) points out, this implication of the model is at odds with the data: there are relatively high job turnover rates in countries with high job security such as Italy and France, and low job turnover is found in the USA - a

country with low job security.

12. OECD Employment Outlook (1996) offers two reasons for the statistically significant negative relationship between job turnover and the regulation of temporary contracts. First, restrictions for temporary contracts relate more to the hiring decisions of the firm than firing decisions. There are no firing costs in the termination of temporary contracts. Second, labour turnover may also reduce the need to fire regular workers. This makes job security legislation less burdensome for permanent employees.

13. These three groups are: (1) USA and Canada, (2) Nordic countries: Denmark, Norway and Sweden and (3) Germany, France and Italy.

14. For example, Erickson and Mitchell (1995) show in a simple model of a firm upon which a severance mandate is imposed that at the micro level the firm can shift some of the cost of mandatory severance to its employees by lowering wages/accepting a higher quit rate. In their view the key to inflexibility is not mandatory severance pay but what prevents downward wage adjustment at the firm level.

15. In the insider-outsider model by Lindbeck and Snower (1988) job security is regarded as one source of turnover costs that give insiders market power to exploit in wage negotiations. The other two sources considered are costs associated with insiders co-operation and harassment activities and costs from the impact of labour turnover on workers' effort.

16. To ascertain whether wages are high in any country one has to compare them also to labour productivity. Therefore Bertola (1990) studies the relationship between the stringency of job security and wage gaps.

17. The idea of the hysteresis arising from membership dynamics is that when employment falls as a consequence of a negative shock, the number of employees, i.e. insiders, in the wage bargain is smaller in the subsequent period. This generates upward pressure on wages, because a smaller group of insiders has a higher probability of retention. This prolongs the effect of the shock. "In terms of the aggregate wage equation, we saw that this effect translated into a positive coefficient on lagged unemployment. ... It is this we term the 'hysteresis effect in wage-setting'", (Layard et al. 1990, 201).

18. Because LTU is negatively related to unemployment rates in the short-run, this asserts a positive relationship between long-term unemployment and hysteresis effects in wage setting (Jackman et al. 1996).

## **7 THE IMPACT OF JOB SECURITY PROVISIONS ON THE ADJUSTMENT OF LABOUR: EVIDENCE FROM FINLAND**

### **Abstract**

This study investigates the adjustment of labour input to fluctuations in demand in the Finnish manufacturing sector and three separate industries; focusing on the speed of adjustment. To establish the dynamics of labour demand, an error-correction model specified by the 2-step Engle-Granger method is utilised. According to the estimated adjustment speeds, the adjustment of working hours /employee is faster than the adjustment of the number of workers to changes in output in Finnish manufacturing. In comparison to estimates for other countries, the estimated adjustment speeds are not exceptionally slow. The reparameterization results show that both the unionization rate and unemployment rate are also important for the adjustment of labour input.

### **7.1 Introduction**

Job security provisions have received an increasing attention in recent years as one possible source of unemployment persistence and labour market inflexibility. Job security legislation and rules affect the employment performance of the labour market through the adjustment costs they impose on the use of labour input. Because job security limits employers' behavioural options, it also increases the costs of adjusting labour input to fluctuations in output (Buttler and Walwei 1993). On the demand side, the main argument advanced in favour of the adverse effect of job security legislation and rules on employment is as follows: job security hinders employers' adjustment of the work force to fluctuations in output. Because job security slows down the reduction of the work force in downturns, it has been assumed to raise the shadow price of labour and, thereby, to decrease the willingness of employers to hire new workers in upturns and hence to exert a further depressing influence on employment.

In Finland, where we have suffered from a persistently high level of unem-

ployment over the past decade or so, levelling at 13-18 per cent in the 1990s, demands have also been made to loosen job protection in the name of increasing the flexibility of the labour market and stimulating job creation. In a questionnaire about the obstacles to employing people (Ministry of Labour 1996), Finnish employers named job protection as the second most important obstacle after the demand for output. But does job security really worsen employment performance in Finland?

The aim of this study is to investigate the impact of job security provisions (legislation and regulations) on the adjustment of labour with data from the Finnish manufacturing sector and three separate industries, taking into account of both aspects of the adjustment of labour input, that is, adjustment in the number of employees and in the number of hours per employee. In particular, we address this issue within the framework of dynamic labour demand model (i) by studying the adjustment speeds of labour input to fluctuations in output and (ii) by inspecting changes in the speed of adjustment of labour along with changes in job security legislation. In addition, we also pay attention to the structure of the adjustment costs by reparameterizing the coefficient for the speed of adjustment.

None of the earlier studies with Finnish data have considered the role played by job security protection in the speed of adjustment of labour to fluctuations in demand. Overall, the role of job security in employment performance has received surprisingly little empirical attention in Finland, and the evidence is mixed. Rahiala and Teräsvirta (1988) concentrated in their study on the relationship between a firm's adjustment costs and labour hoarding (the tendency to hold excess labour) and found evidence of hoarding in the Finnish manufacturing sector. Pehkonen (1993) received a significant, positive coefficient for the job security variable in explaining long-term unemployment in Finland. But in Eriksson and Pehkonen's (1995) study on the inflows into and outflows from unemployment during 1969-1994, a dummy for job security legislation became positively significant in the outflow equations, implying that job security increased/speeded up the outflow from unemployment. Pehkonen and Eriksson interpreted the positive sign as an effect arising from the longer period available for on-the-job search prior to job loss.

Our method of estimating the impact of job protection by studying the adjustment speeds is indirect and is based on the idea that high adjustment costs are likely to give rise to a more sluggish adjustment of employment but a faster adjustment of working hours per employee. The reason for this is that all the adjustment costs caused by job security cannot be directly observed or measured (see Hamermesh 1993 for the division of costs into gross and net adjustment costs).

From the international perspective, the role of job security has been a relatively popular target of both theoretical as well as empirical work in recent years (see chapter 6 for a survey). However, the evidence on the impact of job protection employment performance is mixed. Job security has been found to decrease fluctuations in employment, but its impact on the average level of employment, or unemployment for that matter, is ambiguous. In addition, changes in job security have caused different adjustment outcomes in different countries, thus sug-



gesting that economic and other institutional factors also contribute to the adjustment of labour input (see e.g. Fallon and Lucas 1991; Bentolila and Bertola 1992; Abraham and Houseman 1993; Hunt 1994).

The remainder of this chapter is organized as follows. Section 7.2 consists of two parts: first, the main changes in job security during our sample period (7.2.1) are reported, and then the data and model (7.2.2). The estimation results are reported and discussed in section 7.3. Section 7.4 presents concluding remarks.

## **7.2. Job Security Regulations and Data**

### **7.2.1 Job Security Regulations in Finland**

In this section we first briefly describe the most important regulations governing job security which cause costs of adjustment for firms in Finland. The main regulations in this area are contained in the Severance Payment Act of 1970 and the Employment Contracts Act of 1970. The former determines severance payments for employees dismissed for economic or production reasons. Severance payments were further raised to three to twenty months' earnings in the Dismissal Procedures Act of 1984, but the exact amount of compensation was left to the courts to decide. The Employment Contracts Act laid down a minimum prenotification of dismissal of two weeks and a maximum of 75 days temporary lay-off time. There have since been several amendments to this Act, in the years 1978, 1984, 1986 and 1989, each of which have lengthened the period of pre-notification of dismissal. The last of these amendments (1989) prescribes two to six months' notice of dismissal, depending on the employee's length of service. Other important laws in this area are the Co-operation Within Enterprises Act of 1978 (supplemented in 1981 and 1986 by general agreements and in 1991 by legislation), according to which firms employing over 30 employees must consult the latter before making decisions affecting either the position or their number. According to various rankings of job security (OECD 1994), job security in Finland is around the average European level.

### **7.2.2 Model and data**

In this study we utilize the framework of the dynamic labour demand model to study the impact of job security on the adjustment of labour input. The labour demand equation is obtained as a solution to the firm's cost-minimizing problem in which the present value of future costs is minimized<sup>1</sup>. Since we are interested in the adjustment of labour input to fluctuations in demand, an error-correction representation of the dynamic labour demand model suits our purposes well, combining both short-run dynamics and conditions for long-run equilibrium in

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<sup>1</sup> See e.g. Hamermesh and Pfann (1996) for the derivation of the dynamic labour demand model as a solution to the firm's profit-maximizing/cost-minimizing problem.

a single equation<sup>2</sup>

(7.1)  $\Delta \log N_t = \alpha + \mu(\log N_{t-1}^* - \log N_{t-1}) + \text{short-run dynamics} + \epsilon_t$   
 where  $\log N^*$  denotes the optimal/desired level of employment and the difference between  $\log N_{t-1}^*$  and  $\log N_{t-1}$  is an error-correction term.

The error-correction term measures the extent to which the long-run equilibrium relationship between  $\log N_t^*$  and  $\log N_t$  has not been satisfied in the previous period, that is, how much employment deviates from its desired level. The desired level,  $\log N^*$ , is affected in our model by real wages ( $W_r$ ), output ( $O$ ), the real price of raw materials ( $P_m/P$ ) and the capital stock ( $K$ ). From this presentation we get the adjustment speeds we are interested in directly from the coefficient of the error-correction term, which describes the extent of adjustment to the deviation during one period. When we estimate the adjustment of working hours per employee, we simply replace  $N$  with the hours variable ( $H/N$ ) in equation (7.1). In this case the desired level of hours per employee is also affected by the number of workers.

The empirical analysis is based on quarterly data from the total manufacturing sector during 1971I-1994IV and from three industries during 1976I - 1994IV: the paper and pulp industry, the manufacture of metal products and the textile and clothing industry. The data sources are ASTIKA and Bank of Finland BOF4. We use quarterly data in our estimations in order to better track the timing of the employer's decisions<sup>3</sup>. The chosen industries differ from each other in that the paper and pulp and the manufacturing industries are much more capital intensive than the textile and clothing industry, which is more labour-intensive. The basic properties of the data are given in Table 7.1. During our sample period, of the three industries, employment declined most in the textile and clothing industry, where the number of employed fell to about one fifth of what it had been in 1976. This sharp decline is connected to the decline of Finland's trade with the Soviet Union.

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<sup>2</sup> The error-correction framework used to model dynamic labour demand does not explicitly take into account the role of devaluations in the adjustment. Devaluations have played an important role in the adjustment of wages in Finland. During our sample period 1971-1994, the Finnish mark was devaluated several times. Bigger devaluations were carried out in the years 1977-78 and 1991. In this study we have not tested separately the impact of devaluations on the speed of adjustment. However, we might expect devaluations to speed up the adjustment of labour, since it decreases real wages and thereby has a positive impact on labour demand.

<sup>3</sup> According to Hamermesh (1993), in most industries the decisions are made over periods much shorter than a year. Therefore estimates of adjustment speed based on annual data may give a flawed picture of the true speed of adjustment.

TABLE 7.1 Descriptive statistics

Employment	The manufacture of metal products	The paper and pulp industry	The textile and clothing industry
Mean	16788.03	51870.03	47913.1
Min	12330	41870	16030
Max	23386	65011	72984
Output (volume index 1985=100)	The manufacture of metal products	The paper and pulp industry	The textile and clothing industry
Mean	95.93	101.8	134.95
Min	45.9	75.2	66.05
Max	140.8	121.7	201.1
Hours per employee	The manufacture of metal products	The paper and pulp industry	The textile and clothing industry
Mean	434.31	428.67	421.15
Min	322.71	361.15	308.06
Max	579.83	543.83	533.13

Although the adjustment of hours induces less costs and is thus easier for employers, it is restricted by law in Finland. There are three areas in which employers are entitled to adjust the number of working hours performed, i.e. overtime working, lay-offs and a shortened working week. The maximum amount of overtime permitted is 480 hours. Correspondingly, the maximum period for which employee can be laid off if his regular work decreases temporarily and the employer cannot reasonably provide him with suitable other work or training is ninety days. It is also possible to extend lay-off time by collective agreement and under the terms of the Codetermination in Companies Act.

Some idea of the adjustment that took place in working hours during our sample period can be obtained by looking at the relative shares of overtime and lay-offs in the manufacturing sector and the three separate industries. The data for overtime and lay-offs derives from questionnaires concerning working time and absences in the Finnish manufacturing sector carried out by TT (Teollisuuden ja Työnantajien Keskusliitto).

Let us first look at lay-offs in the manufacturing sector as a whole. Figure 7.1 displays lay-off time during 1980-1995. The figure reveals that the use of lay-offs increased markedly in the early 1990s when Finland was faced with a deep recession. In the three deepest recession years in the 1990s, the average lay-off time of a blue-collar worker rose to over 80 hours, i.e. approximately 10 working days, whereas the average lay-off time for the whole of the 1980s was 17.9 hours. Expressed as percentage shares, lay-off time in the 1980s averaged 0.8 % of the theoretical, regular working time<sup>4</sup> as against over 4 % in the years 1991, 1992 and

<sup>4</sup>Theoretical regular working time means working time according to the agreed working time or working hours system, including annual leave.

1993. In the three separate industries: paper and pulp, metal and TeVaNaKe (textile, clothing, leather and footwear), we can detect differences in the utilization of lay-offs (see Figure 7.2 below). During the period 1987-1995, lay-offs were used most in TeVaNaKe and least in the paper industry<sup>5</sup>. The recession at the beginning of the 1990s shows up as a considerable increase in lay-offs in all three industries.

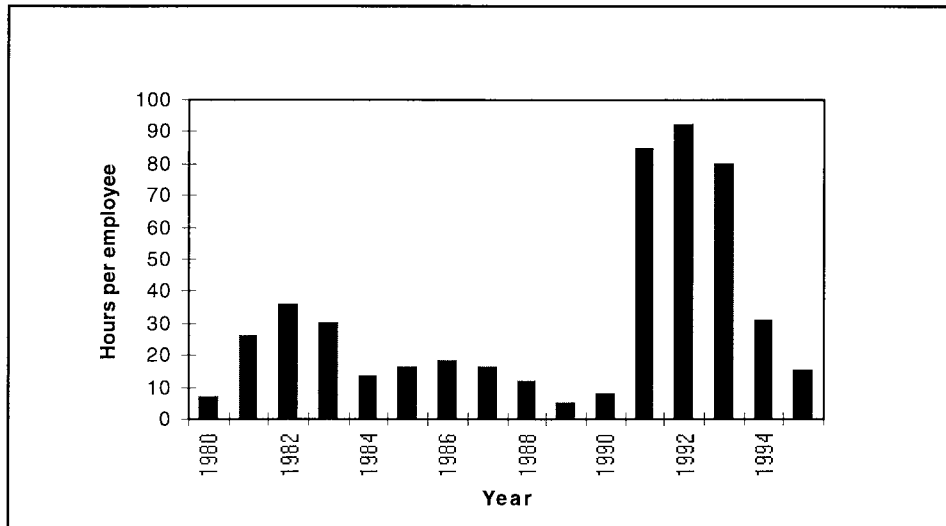


Figure 7.1 Lay-offs in the manufacturing, 1980-1995.

Data on the use of the shorter working week in the manufacturing sector in the 1970s and 1980s were not obtainable. But as far as the situation in the first half of the 1990s is concerned, the Working Life Barometers (1992, 1993, 1994) suggest that the use of a shorter working week was not as generally applied as a means of adjustment in manufacturing as the use of lay-offs. Figure 7.3 describes lay-offs and the use of the shorter working week in all sectors during 1971-1995. It shows that before year 1990 there were no great differences in the relative use of lay-offs and the shorter working week, but with the recession of the 1990s, and owing to its severity, lay-offs were resorted to much more than to the use of the shorter working week. The recession of the 1990s was so deep that it was not expected to go by very quickly.

<sup>5</sup> One reason for lower level of lay-offs in the paper and pulp industry is that is that the paper workers' union is very powerful.

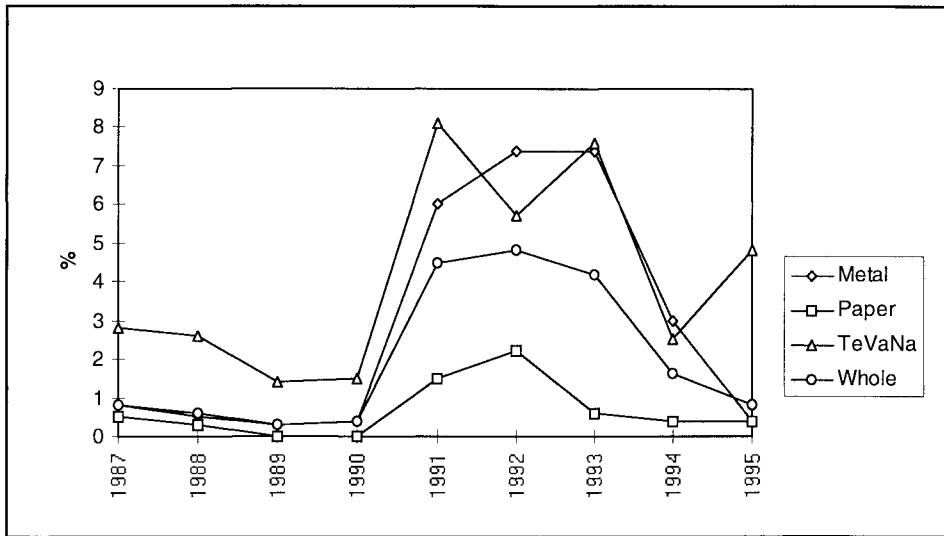


Figure 7.2. Lay-offs in the separate industries, 1987-1995.

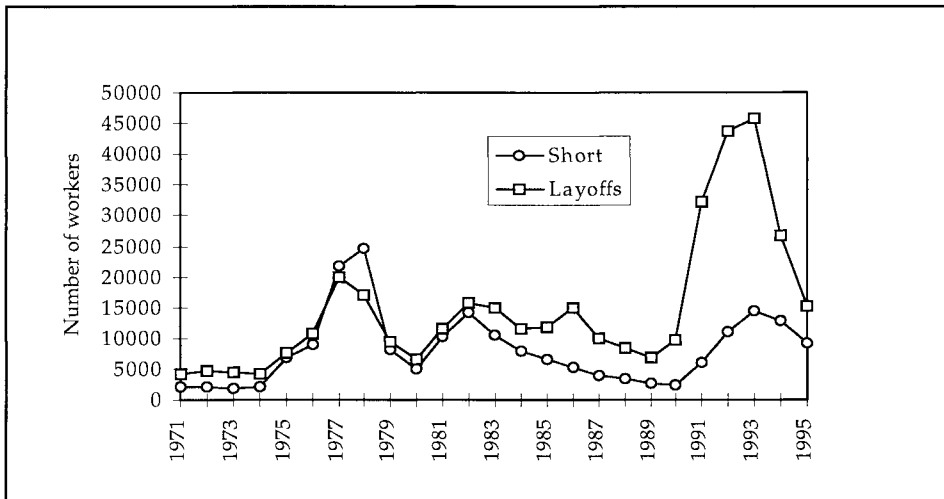


Figure 7.3 Lay-offs and shortened work week in the whole economy, 1971-1995.

Turning to the use of overtime, Figure 7.4 below presents overtime expressed as a percentage share of regular working time during 1987-1995 in the manufacturing sector as a whole and in the three selected industries. Of the three separate industries, the use of overtime hours was greatest in the metal industry during this period, whereas the least use of overtime was made in TeVaNaKe. In all three industries, the recession at the beginning of the 1990s had a negative effect on overtime hours. In 1991, the use of overtime fell to two percent in the paper and pulp and metal industries, after which, although the recession was not over, the share of overtime started to gradually grow again in these two industries. A

longer perspective for the share of overtime in manufacturing sector as a whole is given in Figure 7.5. Here we see that the drop in the use of overtime during the recession years 1975-1978 in manufacturing was much greater than during the recession years 1990-1992.

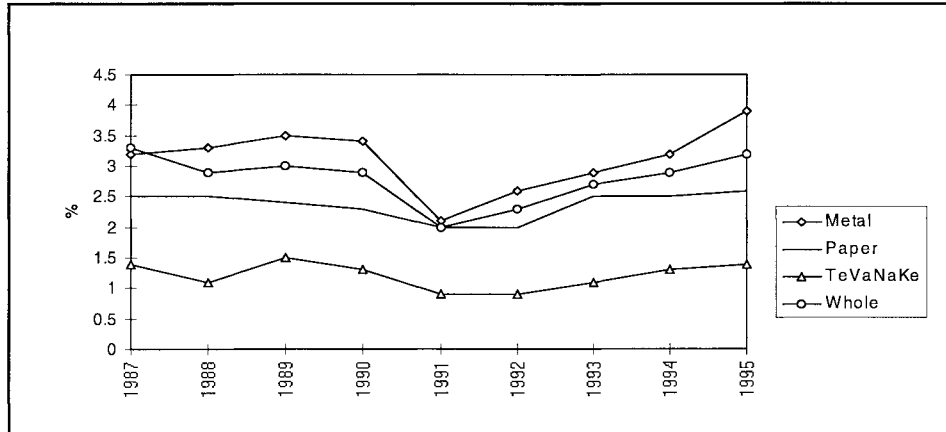


Figure 7.4 Overtime (%) in the separate industries, 1987-1995.

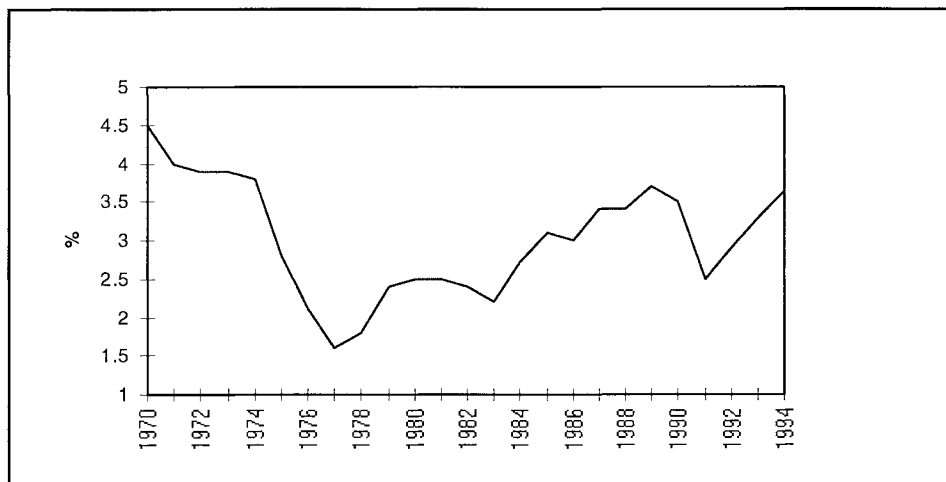


Figure 7.5 Overtime (%) in manufacturing, 1970-1994.

As far as the adjustment of working hours is concerned, we must also remember that there were general reductions in working time during our sample period. These reductions mostly took the form of shorter weekly working hours and longer holiday entitlements. During the period 1979-1983 the average annual working time fell as the fifth holiday week gradually became more general. There were further reductions in annual working time in the latter half of the 1980s, when the annual number of hours for those working more than 40 hours per week was gradually cut by 68 hours (the so-called Pekkassvapaat). Since the reductions in

working time have occurred gradually and there are differences between industries (see Eriksson and Fellman 1991), it is difficult to take them into account by including dummies for single years.

## 7.3 Results

### 7.3.1 Speeds of adjustment

In the estimation of the error correction models for the different industries we employed the so-called Engle-Granger two-step procedure<sup>6</sup>, the stages of which include first the estimation of a cointegrating regression and then the estimation of the dynamic error-correction model, which uses the residuals from the cointegrating regression as an error-correction term. The prerequisite for a valid error-correction representation is that the set of variables used are cointegrated, i.e. together form a linear combination that is stationary (Granger 1991). The cointegrated variables obey an equilibrium relationship in the long run, although they may diverge from it in the short run.

One advantage of using the Engle-Granger two-step procedure compared with the "free estimation" is that in this procedure we make sure at the first stage that there exists a cointegrating vector between the dependent variable and the set of explanatory variables. Another advantage is that if the variables are cointegrated, then the first-stage estimates are super-consistent. Here, super-consistency implies that these OLS estimates approach their true value at a rate faster than normal OLS estimates (see Stock 1987)<sup>7</sup>.

According to the augmented Dickey-Fuller (ADF) tests (see Appendix 7.1), the individual time series used in the models were integrated of the order 1 or order 2. Also, in cases where the order of the integration of the dependent variable was lower, the set of variables fulfilled the condition that at least two explanatory variables were integrated of the highest order<sup>8</sup>. In the first stage we ran the co-integrating regression to obtain the long-run parameters of the ECM. The criterion for the variables of this regression was that they were correctly

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<sup>6</sup> An alternative procedure in the specification of the ECM is to estimate all the parameters in one step. However, these two procedures yield different estimates (see Holden and Perman 1994, 82).

<sup>7</sup> It is also relevant to pay attention to the disadvantages of the application of the Engle-Granger procedure. According to Harvey (1990, 295) one drawback of this method - as implied by the evidence presented in Stock (1987) - is that the bias in the cointegrating regression estimation can be substantial. This, in turn, may cause the inferences to be very misleading. There is a possibility, therefore, of erroneous decisions regarding the variables to be included and restrictions to be imposed. Further, there is the risk that the bias in the estimation will also affect the error-correction term at the second stage.

<sup>8</sup> "If variables in the long run relationship are of a different order of integration and the order of integration of the dependent variable is lower than the highest order of integration of the explanatory variables, there must be at least two explanatory variables integrated of this highest order if the necessary condition for stationarity of the error term is to be met." (Charemza and Deadman 1992, 147).

signed. Thereafter, the residuals from the cointegrating regression were used to test for the null of non-cointegration against the alternative of cointegration.

To test for cointegration we used two test statistics advocated in Engle and Granger (1987): the Durbin-Watson (CRDW) test statistic and Phillips-Perron (PP) test statistic. The basic idea in the residual-based cointegration test is that the residual vector should have a unit root if the variables included in the cointegrating regression are not cointegrated with each other. The results of the tests for cointegration are reported in Table 7.2 for employment regression and in Table 7.3 for hours-per-employee regression. Additional evidence in favour of cointegration was gained from the significance of the error-correction terms in the estimated ECM with one lag. According to the both test statistics, there exists a cointegration relationship between the dependent variable and the chosen set of variables in the manufacturing sector and in the three separate industries. In addition, the error-correction terms from the estimated ECMs also turned out to be significant and correctly signed in all cases, thus providing further evidence in favour of the cointegration relationship.

TABLE 7.2 Testing for cointegration: number of employees

The manufacturing sector, 1971(1)-1994(4)	The manufacture of metal products, 1976(1)-1994(4)	The paper and pulp industry, 1976(1)-1994(4)	The textile and clothing industry, 1976(1)-1994(4)
System: LE, LO, LWr, LK, LHa, Tr *) R <sup>2</sup> = 0.96 CRDW = 0.83 PP = -5.38(-4.43) EC <sub>-1</sub> = -0.28(-3.83)	System: LE, LO, LWr, LK, LPfr, LHa R <sup>2</sup> = 0.69 CRDW = 0.82 PP = -4.41(-4.43) EC <sub>-1</sub> = -0.37(-3.94)	System: LE, LO, LWr, LK, LPr/Pp, Tr R <sup>2</sup> = 0.81 CRDW = 1.05 PP = -5.11(-4.43) EC <sub>-1</sub> = -0.40(-4.26)	System: LE, LO, LWr, LK, LPfr R <sup>2</sup> = 0.97 CRDW = 1.08 PP = -5.10(-4.43) EC <sub>-1</sub> = -0.26(-4.09)

L=log; E= employment, O= output, Wr=real wages, K=capital stock, Pr/Pp= the real price of raw materials, Pfr=the real price of raw materials and fuels, Ha=performed working hours per employee, Tr= a trend. CRDW = the Durbin-Watson test statistic, PP= Phillips-Perron test statistic, EC=error correction term. The figures in parentheses are t-values. The asymptotic critical values for ADF and PP at the 10% level are -4.43 in the above cases.\*) In the total manufacturing sector the LPr/Pp was omitted from the 'final' regression.

In the second stage of the Engle-Granger procedure, the dynamic error-correction models were estimated in which the residuals from the cointegrating regressions were used as error-correction terms. The dynamic structures of the ECMs were determined by following the general to simple modelling methodology (see Hendry 1995). The point of departure was the specification of an ECM model with four lags on each variable, which was simplified until a parsimonious representation was obtained. In the cases of the three separate industries seasonal dummies were also included in the ECMs.



TABLE 7.3 Testing for cointegration: performed working hours/employee

The manufacturing sector, 1971(1)-1994(4)	The manufacture of metal products, 1976(1)-1994(4)	The paper and pulp industry, 1976(1)-1994(4)	The textile and clothing industry, 1976(1)-1994(4)
System: LHa, LE, LO, LW <sub>r</sub> , LK, LP <sub>fr</sub> , D75 R <sup>2</sup> =0.82 CRDW=0.97 PP= -6.07(-4.70) EC <sub>-1</sub> =-0.42 (-4.28)	System: LHa, LE, LO LW <sub>r</sub> , LP <sub>fr</sub> , LK R <sup>2</sup> =0.47 CRDW=1.62 PP=-7.13(-4.70) EC <sub>-1</sub> =-0.76 (-7.65)	System: LHa, LE, LO LW <sub>r</sub> , LP <sub>f</sub> /P <sub>p</sub> R <sup>2</sup> =0.36 CRDW=1.99 PP=-8.60(-4.70) EC <sub>-1</sub> =-0.87 (-10.26)	System: LHa, LO, LW <sub>r</sub> , LK, LP <sub>r</sub> /P <sub>p</sub> R <sup>2</sup> =0.60 CRDW=1.93 PP=-8.42(-4.43) EC <sub>-1</sub> = -0.60 (-5.96)

L=log; Ha=performed working hours per employee, E=employment, O=output, Wr=real wages, K=capital stock, Pr/Pp= the real price of raw materials, Pfr= the real price of raw materials and fuels, D75 a dummy. CRDW= the Durbin-Watson test statistic, PP= Philips-perron test statistic. The figures in parentheses are t-values. The asymptotic critical values for ADF and PP at the 10% level are -4.70 in the above cases.

Table 7.4 reports the results of the dynamic error-correction models for the number of workers and Table 7.5 for the number of working hours performed per employee. The estimated models seem overall well-behaved. If we take a closer look at the ECMs for the three separate industries estimated individually by OLS, we notice that there seems to be a systematic pattern in the intercept coefficients as well as in the residuals. The systematic behaviour in the residuals implies that the residuals are correlated across cross-section units. Therefore, to take advantage of the additional information included in all three equations and, thereby, to obtain more efficient estimates, we re-estimate the error-correction models for the three separate industries as a system by the method of seemingly unrelated regression (SUR). In this we use the individually estimated OLS regressions as a starting point. The results of SUR estimations are reported in Tables 7.6 and 7.7.

TABLE 7.4 Error-correction models for the number of workers estimated by OLS

	The whole manufacturing sector 1972(2)-1994(4)	The manufacture of metal products 1977(2)-1994(4)	The paper and pulp industry 1977(2)-1994(4)	The textile and clothing industry 1977(2) - 1994 (4)
	Dependent variable $\Delta LE_t$	Dependent variable $\Delta LE_t$	Dependent variable $\Delta LE_t$	Dependent variable $\Delta LE_t$
	Parameter estimate	Parameter estimate	Parameter estimate	Parameter estimate

CONST	-0.007 (-4.36)	-0.016 (-1.5)	-0.05 (-5.62)	0.04 (3.38)
EC <sub>1</sub>	-0.25 (-3.33)	-0.35(-3.49)	-0.34 (-3.81)	-0.17 (-2.79)
$\Delta LW_{r,2}$	-	-0.73 (-2.53)	-0.29 (-3.81)	-
$\Delta LW_{r,4}$	-	-	0.24(2.04)	-
$\Delta 4\Delta LW_r$	-0.19 (-5.08)	-	-	-
$\Delta LO$	0.26 (4.62)	-0.21 (-2.44)	-	0.19 (4.55)
$\Delta LO_{-1}$	-	-	0.18(2.33)	0.29 (4.07)
$\Delta LO_{-2}$	0.18 (2.95)	-	-	-
$\Delta LO_{-4}$	0.14 (2.55)	-	-	-
$\Delta LK_{-3}$	-	-	-	0.64 (2.96)
$\Delta LPr/Pp_{-3}$	-	-	-	-
$\Delta 4LHa$	-0.19 (-5.43)	-	-	-
Seasonal	-	-	-	-0.15 (-5.59)
Seasonal 1	-	0.086 (3.0)	0.06(5.57)	-0.06 (-3.74)
Seasonal 2	-	-	0.12 (5.17)	-
R <sup>2</sup>	0.46	0.32	0.51	0.46
SE	0.014	0.065	0.034	0.043
DW	2.46	2.09	1.89	2.29
SC	X <sup>2</sup> (5)=11.22	X <sup>2</sup> (5)=1.43	X <sup>2</sup> (5)=6.09	X <sup>2</sup> (5)=4.08
ARCH	X <sup>2</sup> (4)=5.63	X <sup>2</sup> (5)=7.44	X <sup>2</sup> (4)=6.87	X <sup>2</sup> (5)=6.37
NORM	X <sup>2</sup> (2)=24.89	X <sup>2</sup> (2)=1.14	X <sup>2</sup> (2)=4.22	X <sup>2</sup> (2)=1.76

All the variables are in logarithmic form (L= LOG), SE= the equation standard error, DW= Durbin Watson, SC= serial correlation, ARCH= the Lagrange Multiplier test for autocorrelated squared residuals, NORM= normality (the Jarque and Bera statistic). The figures in parentheses give the t-values.

TABLE 7.5 Error-correction models for working hours/employee estimated by OLS

	The whole manufacturing sector 1972(2)-1994(4)	The manufacture of metal products 1977(2)-1994(4)	The paper and pulp industry 1977(2)-1994(4)	The textile and clothing industry 1977(2) - 1994(4)
	Dependent variable $\Delta LH_t$	Dependent variable $\Delta LH_t$	Dependent variable $\Delta LH_t$	Dependent variable $\Delta LH_t$
Regressor	Parameter estimate	Parameter estimate	Parameter estimate	Parameter estimate

CONST	-0.018 (-4.48)	0.13 (4.56)	0.12 (6.28)	0.30 (20.6)
EC <sub>1</sub>	-0.296 (-2.80)	-0.27 (-2.57)	-0.55 (-5.23)	-1.12 (-9.74)
$\Delta LH_1$	-0.23 (-3.18)	-0.42 (-3.27)	-	-
$\Delta LH_2$	-0.19 (-3.04)	-0.34 (-2.83)	-	-
$\Delta LH_3$	-	-0.43 (-3.94)	-	-
$\Delta LH_4$	0.33 (4.39)	-0.34 (-3.60)	-	-
$\Delta LWr_3$	-0.52 (-9.24) a)	-0.37 (-1.91)	-	-
$\Delta LWr_4$	-	-	-	-
$\Delta LO$	0.54 (4.02)	-	0.25 (2.86)	-
$\Delta LO_1$	-	-	-	0.15 (2.57)
$\Delta LO_2$	-	-	-	-
$\Delta LO_4$	-	0.20(2.50)	0.16 (2.00)	-
$\Delta LK$	1.94 (3.39)	-	-	-0.79 (-3.89)
$\Delta LK_1$	-	-	-	-
$\Delta LK_3$	-	-	-	-
$\Delta LPf/Pp_4$	0.21 (4.01)	-	-	-
$\Delta LE$	-0.92 (-5.53)	-	-	-
D75	-0.02 (-2.16)	-	-	-
Seasonal 1	-	-0.12 (-3.0)	-0.08 (-4.41)	-0.36 (-12.0)
Seasonal 2	-	-0.17 (-4.33)	-0.08 (-4.10)	-0.33 (-19.88)
Seasonal 3	-	-0.23 (-5.08)	-0.20 (-11.2)	-0.52 (-36.4)
R <sup>2</sup>	0.71	0.93	0.87	0.97
SE	0.025	0.039	0.038	0.03
DW	2.33	2.26	2.13	2.10
SC	X <sup>2</sup> (5)=13.38	X <sup>2</sup> (5)=8.86	X <sup>2</sup> (5)=8.97	X <sup>2</sup> (5)=6.25
ARCH	X <sup>2</sup> (4)=6.95	X <sup>2</sup> (4)=13.15	X <sup>2</sup> (5)=8.74	X <sup>2</sup> (5)=0.52
NORM	X <sup>2</sup> (2)=1.78	X <sup>2</sup> (2)=0.55	X <sup>2</sup> (2)=5.14	X <sup>2</sup> (2)=1.13

All the variables are in logarithmic form (L= LOG), SE= the equation standard error, DW= Durbin Watson, SC= serial correlation, ARCH= the Lagrange Multiplier test for autocorrelated squared residuals, NORM= normality (the Jarque and Bera statistic). The figures in parentheses give the t-values.a)coefficient for  $\Delta 4\Delta LWr$  .

TABLE 7.6 Error-correction models for number of employees for the three separate industries estimated by SUR

	The manufacture of metal products 1977(2)-1994(4)	The paper and pulp industry 1977(2)-1994(4)	The textile and clothing industry 1977(2)-1994(4)
	Dependent variable $\Delta LEm_t$	Dependent variable $\Delta LEp_t$	Dependent variable $\Delta LE_t$
Regressor	Parameter estimate	Parameter estimate	Parameter estimate
Constant	-0.10(-2.20)	-0.05(-2.59)	0.04 (1.28)
ECm <sub>1</sub>	-0.37 (-3.23)	0.15(3.03)	-0.05 (-0.74)
ECp <sub>1</sub>	0.15 (0.68)	-0.42 (-4.43)	0.02 (0.193)
ECt <sub>1</sub>	0.02 (0.24)	0.10 (2.40)	-0.17 (-2.59)
$\Delta LWrp_4$	0.20 (0.86)	0.23(2.26)	0.06 (0.39)
$\Delta LOm_3$	-0.24 (-1.65)	-0.11 (-1.87)	-0.11 (-1.21)
$\Delta LOt$	0.26 (1.89)	0.08 (1.33)	0.19 (2.05)
$\Delta LOt_1$	0.04 (0.32)	0.13 (2.52)	0.29 (3.69)
$\Delta LKt_3$	-0.66 (-1.38)	-0.24 (-1.17)	0.68 (2.16)
Seasonal	0.08 (1.28)	0.011 (0.41)	-0.15 (-3.61)
Seasonal1	0.07 (1.98)	0.04 (1.54)	-0.02 (-1.98)
Seasonal2	0.25 (3.12)	0.14 (4.06)	0.03 (0.56)
SE	0.068	0.029	0.044

All the variables are in logarithmic form (L= LOG), SE= the equation standard error, SC= serial correlation. The figures in parentheses give the t-values<sup>9</sup>.

TABLE 7.7 Error-correction models for working hours/employee for the three separate industries estimated by SUR

	The manufacture of metal products 1977(2)-1994(4)	The paper and pulp industry 1977(2)-1994(4)	The textile and clothing industry 1977(2)-1994(4)
	Dependent variable $\Delta LH_{m,t}$	Dependent variable $\Delta LHP_t$	Dependent variable $\Delta LH_t$
Regressor	Parameter estimate	Parameter estimate	Parameter estimate
Constant	-0.21 (-2.47)	-0.26 (-3.54)	-0.058(-0.92)
EC <sub>m,t-1</sub>	-0.43 (-4.79)	-0.07 (-0.974)	-0.08 (-1.24)
EC <sub>p,t-1</sub>	0.06 (0.53)	-0.50 (-4.70)	-0.05 (-0.58)
EC <sub>t,t-1</sub>	-0.34 (-2.16)	-0.04 (-0.28)	-1.10 (-9.48)
$\Delta LH_{m,t-3}$	-0.21 (-2.47)	-0.26 (-3.54)	-0.06 (-0.92)
$\Delta LH_{m,t-4}$	-0.24 (-2.64)	-0.21 (-2.73)	-0.13 (-1.98)
$\Delta LO_{m,t-4}$	0.23 (2.72)	0.11(1.62)	0.08 (1.36)
$\Delta LO_{p,t-1}$	0.10 (1.00)	0.34 (4.03)	0.06 (0.91)
$\Delta LO_{t,t-1}$	0.19 (2.15)	0.12 (1.64)	0.17 (2.74)
$\Delta LK_t$	-0.45 (-1.52)	-0.13 (-0.54)	-0.84 (-4.07)
Seasonal	-0.35 (-6.0)	-0.17 (-3.55)	-0.37 (-10.8)
Seasonal1	-0.32 (-7.65)	-0.19 (-5.07)	-0.35 (-13.6)
Seasonal2	-0.42 (-8.92)	-0.19 (-4.22)	-0.53 (-11.8)
SE	0.04	0.035	0.029

All the variables are in logarithmic form (L= LOG), SE= the equation standard error, SC= serial correlation. The figures in parentheses give the t-values<sup>10</sup>.

According to the estimated ECM by OLS, in the total manufacturing sector 25 % of the adjustment of the number of workers to a discrepancy between the actual number and the desired level occurred in one quarter (see Table 7.8 below). Corresponding adjustment percentages obtained for the three separate industries from SUR estimations are as follows: 42% in the paper and pulp industry, 37 % in the manufacture of metal products and 17 % in the textile and clothing industry. On the basis of the standard deviations, the range of variation for these adjustment coefficients is between -0.23 - -0.27 for the manufacturing sector as a whole, between -0.33 - -0.51 for the paper and pulp industry and between -0.26 - -0.48 for the manufacture of metal products. In addition, for the textile and clothing industry, the adjustment coefficient for total hours varies between -0.11 - -0.23. We also checked for the behaviour of the estimated adjustment coefficients over time by the method of recursive least squares. The graphs of the estimated recursive least squares coefficients are presented in Appendix 7.3. From the graphs it can be seen that the adjustment coefficients in the paper and pulp industry, in the manu-

<sup>9</sup>According to the diagnostic tests for the system congruency, the system seems acceptable.

<sup>10</sup>According to the diagnostic tests for the system congruency, the system seems acceptable.

ufacture of metal products and in the manufacturing sector as a whole remained rather stable during the sample period. The adjustment coefficient in the textile and clothing industry, on the other hand, showed more variation.

Table 7.4 also reports the calculated median lags of adjustment which give the time required for the fifty per cent of the adjustment to be completed, and thus help to evaluate the speed of adjustment. According to our results, the adjustment of the number of employees to labour demand shocks is fastest in the paper and pulp industry and slowest in the textile and clothing industry.

The estimated adjustment shares for working hours performed per employee are clearly bigger than those for the number of employees, and are thus in accordance with the theoretical predictions. In the total manufacturing sector the adjustment share was 30% (1.7 median lags), in the manufacture of metal products 43% (1.2 median lags), in the paper and pulp industry 50% (1 median lag) and in the textile and clothing industry 100% (0 median lag). The range of variation of the coefficients is between -0.27 - -0.33 for the manufacturing sector as a whole, between -0.40 - -0.60 for the paper and pulp industry, between -0.36 - -0.50 for the manufacture of metal products and between -0.99 - -1.21 for the textile and clothing industry.

The recursive least squares estimates for the error-correction terms (see Appendix 7.3) imply that the estimated adjustment coefficients remained rather stable over the sample period. Most variation can be detected in the textile and clothing industry.

Of the three separate industries the adjustment speed of working hours per employee was over twice as rapid in the textile and clothing industry compared to the other two industries. The differences in the adjustment speeds between industries might be explained partly by the production technology used and the capital intensiveness of the production process. For reasons of technology, certain processes in manufacturing involve high costs of starting and stopping production. The higher these costs are, the longer the operating times preferred by the firm (Eriksson and Fellman 1995). The characteristics of the product such as storability and the costs of keeping it in stock also affect the operating hours preferred by firms, and, thereby, also the adjustment of hours to fluctuations in demand.

In the international comparison, our results that hours per employee are adjusted quicker than the number of employees to the changes in output are in accordance with results obtained from other empirical studies (e.g. Topel 1982; Fair 1985; Abraham and Houseman 1993). The adjustment speeds of hours for the manufacturing sector and for separate industries are of a similar magnitude to those reported in empirical studies for many European countries utilising quarterly data<sup>11</sup>. E.g. Abraham and Houseman report median lags of the order zero for

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<sup>11</sup>The earlier empirical evidence (see Hamermesh 1993) has shown that the results concerning the speed of adjustment vary greatly according to the type of data used. The evidence on the median adjustment lag of the number of employees with annual data is 5.5 quarters on average, which implies a slower adjustment than with quarterly data. The shortest median lags have been obtained from empirical studies utilising monthly data, where the mean of the median lags is 1.2 quarters.

production hours adjustment in German, Belgian and US manufacturing during 1973-1990, and median lags varying from 0 to 3 for the separate industries. In comparison with these results, the adjustment speeds of working hours in the Finnish manufacturing sector do not seem exceptionally slow.

TABLE 7.8 Adjustment speeds of the number of employees and hours per employee

	Number of employees	Performed working hours per employee
	The extent of adjustment per a quarter, %	The extent of adjustment per a quarter, %
The total manufacturing sector, 1972(2)- 1994(4)	25 (2)	30 (1.7)
The manufacture of metal products, 1977(2)-1994(4)	37 (1.4)	43 (1.2)
The paper and pulp industry, 1977(2)-1994(4)	42 (1.2)	50 (1)
The textile and clothing industry, 1977(2)-1994(4)	17 (3)	110 (0)

Median lags are given in the parentheses.

### 7.3.2 Reparameterization of the adjustment speed coefficient

In this section we go further and reparameterize the adjustment speed coefficients in the estimated ECMs with variables that might explain the speed of adjustment. This kind of procedure is interesting because only few attempts have been made to investigate the structure of adjustment costs (e.g. Burgess 1988; Burgess and Dolado 1989; Kraft 1993). In the reparameterization, besides employment protection, we take into account two other sources of adjustment costs: the role of unions and the tightness of the labour market, and estimate the ECM of the form

$$(7.2) \quad \Delta \log X = \text{constant} - (\alpha_0 + \alpha_1 \text{DIS} + \alpha_2 \text{PROT} + \alpha_3 \text{LU} + \alpha_4 \text{LUNION} + \alpha_5 \text{TREND}) * (\text{EC}_{-1}) + \text{the short-term dynamics};$$

where X is either E or Ha,  $\alpha_0$  = a constant, DIS = a dummy taking value zero before 1984 and 1 afterwards, describing a change in the Dismissal Procedures Act 1984 which raised the compensation for unfair dismissal from three to twenty months' earnings, PROT = a dummy, which describes statutory changes in the length of prenotification of dismissal and takes the value zero in 1971/1976-1977, 0.5 in 1978-1985, 0.75 in 1986-1988 and 1 thereafter<sup>12</sup>, LU = a log of unemployment rate, LUNION = a log of the unionization rate, EC = the error-correction term.

<sup>12</sup>This dummy variable was constructed by Pehkonen (1994).

We use two dummies to proxy for job security legislation. By adding these dummy variables we aim to see if the above-mentioned changes in job security legislation had any impact on the adjustment of labour input. The significant, negative coefficients of these variables would imply that they speeded up the adjustment of the number of working hours per employee. Making the adjustment of employment more difficult or costlier can be expected to increase the substitution of number of workers by hours worked per employee, in other words to increase the adjustment of working hours. Due to the high rate of unionization and the considerable power of unions in Finland, we also include a proxy for the role of unions, the unionization rate (unionized employees divided by the number of workers). The unions can be expected to slow down the downward adjustment of labour to fluctuations in demand and therefore the expected sign of this variable is positive in case of the number of workers. Instead, in the case of working hours per employee, the expected sign on the unionization rate might be even negative, as the unions can be expected to encourage the adjustment of working hours instead of the adjustment of the number of employees. This is because the adjustment of hours decreases job turnover and thus provides job security. During our sample period, in particular in the 1990s, the unionization rate grew in all three separate industries as well as in the total manufacturing sector. This growth is related to the mass unemployment and severe recession faced by Finland in the 1990s. Following Kraft (1993) we use a time trend to study whether the adjustment speed changed over time. A significant, negative coefficient of this variable would suggest that the adjustment of hours became more flexible over time. The unemployment rate is used to proxy for the tightness of the labour market.

The results of the reparameterization of the adjustment coefficients in the ECMS are reported in Tables 7.9 and 7.10 for the number of workers and in Tables 7.11 and 7.12 for the performed working hours per employee. The estimation method for the whole manufacturing sector is MLE (maximum likelihood), which is suitable for estimating nonlinear specifications. The idea behind the maximum likelihood estimation is to find a set of parameter estimates which maximizes the likelihood of the given observations. The nonlinear system for the three separate industries is estimated by the method of nonlinear 3SLS (three-stage least squares) in SHAZAM<sup>13</sup>.

In the manufacturing sector as a whole our reparameterization results suggest that both the unionization rate and the unemployment rate affect the speed of adjustment of both number of employees and hours per employee. As expected, the unionization rate seems to slow down the adjustment and, in turn, the unemployment rate seems to speed it up. In addition, in the estimations, the trend obtained a negative significant coefficient in the ECM for the number of employees, which implies that the adjustment of number of employees has become more

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<sup>13</sup>"The estimation of nonlinear models requires the use of a numerical optimization algorithm. SHAZAM uses a Quasi-Newton method also known as a variablemetric method" (SHAZAM user's reference manual, 223).

flexible over time. When the trend was left out of the set of employment protection adjustment cost variables, PROT obtained a negative, significant coefficient.

Of the three separate industries, in the paper and pulp industry both the unionization rate and the dummy DIS affected adjustment speed significantly, the unionization rate slowing down the adjustment of the number of workers and DIS speeding it up. In the other two industries, the adjustment cost variables did not obtain significant coefficients in the nonlinear system estimation. In the nonlinear system for working hours per employee, the adjustment cost variables did not obtain significant coefficients at the conventional significance levels.

TABLE 7.9 Results of the maximum likelihood estimation for the number of employees for the whole manufacturing sector<sup>14</sup>

The total manufacturing sector 1972(2)-1992(4)	
Dependent variable $\Delta LE_t$	
Regressor	Parameter estimate
CONST	0.01 (6.40)
$\alpha_0$	6.31 (2.95)
$\alpha_1$ (DIS)	-
$\alpha_2$ (PROT)	-
$\alpha_3$ (LU)	-0.73 (-1.85)
$\alpha_4$ (LUNION)	8.66 (2.75)
$\alpha_5$ (TREND)	-0.04(-3.09)
$\Delta 4\Delta LW_r$	-0.19 (-2.53)
$\Delta LO$	0.26(4.62)
$\Delta LO_2$	0.18(2.94)
$\Delta LO_4$	0.14(2.55)
$\Delta 4\Delta LHa$	-0.19(-5.43)
R <sup>2</sup>	0.36 <sup>15</sup>
DW	2.11

All the variables are in logarithmic form (L= LOG), DW= Durbin Watson.  
The figures in parentheses give the t-values.

TABLE 7.10 Nonlinear estimation results for number of employees for the three separate industries estimated by 3SLS<sup>16</sup>

	The manufacture of metal products 1977(2)-1994(4)	The paper and pulp industry 1977(2)-1994(4)	The textile and clothing industry 1977(2)-1994(4)
	Dependent variable $\Delta LEm_t$	Dependent variable $\Delta LEp_t$	Dependent variable $\Delta LE_t$

<sup>14</sup> For computational reasons, in the nonlinear estimation the coefficients of the short-term dynamics are constrained to be the same as in the previous estimation. However, this restriction has not been tested.

<sup>15</sup> The question is about the local maximum instead of the global one.

<sup>16</sup> Due to the computational reasons, in the nonlinear estimation the coefficients of the short-term dynamics are forced to be the same as in the previous estimation. However, this restriction has not been tested.



Regressor	Parameter estimate	Parameter estimate	Parameter estimate
Constant	0.09 (10.2)	0.09 (10.2)	0.09 (10.2)
$\alpha_0$	-	-	-
$\alpha_1$ (DIS)	-	-2.58(-2.52)	-
$\alpha_2$ (PROT)	-	-	-
$\alpha_3$ (LUR)	-	-	-
$\alpha_4$ (LUNION)	-	10.93 (2.29)	-
$\alpha_5$ (TREND)	-	-	-
ECm <sub>1</sub>	-0.37 (-3.23)	0.15(3.03)	-0.05 (-0.74)
ECp <sub>1</sub>	0.15 (0.68)	-0.42 (-4.43)	0.02 (0.193)
ECt <sub>1</sub>	0.02 (0.24)	0.10 (2.40)	-0.17 (-2.59)
$\Delta$ LWrp <sub>4</sub>	0.20 (0.86)	0.23(2.26)	0.06 (0.39)
$\Delta$ LOm <sub>3</sub>	-0.24 (-1.65)	-0.11 (-1.87)	-0.11 (-1.21)
$\Delta$ LOt	0.26 (1.89)	0.08 (1.33)	0.19 (2.05)
$\Delta$ LOt <sub>1</sub>	0.04 (0.32)	0.13 (2.52)	0.29 (3.69)
$\Delta$ LKt <sub>3</sub>	-0.66 (-1.38)	-0.24 (-1.17)	0.68 (2.16)
Seasonal	0.08 (1.28)	0.011 (0.41)	-0.15 (-3.61)
Seasonal1	0.07 (1.98)	0.04 (1.54)	-0.02 (-1.98)
Seasonal2	0.25 (3.12)	0.14 (4.06)	0.03 (0.56)
SE	0.068	0.029	0.044

All the variables are in logarithmic form (L= LOG), SE= the equation standard error, SC= serial correlation. The figures in parentheses give the t-values<sup>17</sup>.

TABLE 7.11 Results of the maximum likelihood estimation for the performed working hours per employee for the whole manufacturing sector<sup>18</sup>

The total manufacturing sector 1972(2)-1992(4)	
Dependent variable $\Delta$ LHa <sub>t</sub>	
Regressor	Parameter estimate
CONST	0.017 (6.60)
$\alpha_0$	1.97 ( 2.42)
$\alpha_1$ (DIS)	-
$\alpha_2$ (PROT)	-
$\alpha_3$ (LU)	-0.57 (-1.91)
$\alpha_4$ (LUNION)	2.29 (2.33)
$\Delta$ LH <sub>1</sub>	-0.23 (-3.18)
$\Delta$ LH <sub>2</sub>	-0.19 (-3.04)
$\Delta$ LH <sub>4</sub>	0.33 (4.39)
$\Delta$ 4 $\Delta$ LWr	-0.52 (-9.24))
$\Delta$ LO	0.54 (4.02)
$\Delta$ LK	1.94 (3.39)
$\Delta$ LPfr <sub>4</sub>	0.21 (4.01)
$\Delta$ LE	-0.92 (-5.53)
D75	-0.02 (-2.16)
R <sup>2</sup>	0.71 <sup>19</sup>
DW	2.32

<sup>17</sup> According to the diagnostic tests for the system congruency the system seems acceptable.

<sup>18</sup> For computational reasons, in the nonlinear estimation the coefficients of the short-term dynamics are constrained to be the same as in the previous estimation. However, this restriction has not been tested.

<sup>19</sup> The question is about the local maximum instead of the global one.

All the variables are in logarithmic form (L= LOG), DW= Durbin Watson. The figures in parentheses give the t-values.

Table 7.12 Nonlinear estimation results for the working hours performed per employee for the three separate industries estimated by 3SLS<sup>20</sup>

	The manufacture of metal products 1977(2)-1994(4)	The paper and pulp industry 1977(2)-1994(4)	The textile and clothing industry 1977(2)-1994(4)
	Dependent variable $\Delta LHm_t$	Dependent variable $\Delta LHp_t$	Dependent variable $\Delta LH_t$
Regressor	Parameter estimate	Parameter estimate	Parameter estimate
Constant	0.34 (13.58)	0.29 (19.3)	0.29 (77.1)
$\alpha_0$	-3.26 (-1.72)	-1.85 (-3.44)	0.77 (2.37)
$\alpha_1$ (DIS)	-	1.74 (1.64)	-
$\alpha_2$ (PROT)	-	-	-
$\alpha_3$ (LU)	1.49 (.153)	-	-
$\alpha_4$ (LUNION)	-	-	-
$\alpha_5$ (TREND)	40.9 (1.68)	-	-
ECm <sub>-1</sub>	-0.43 (-4.79)	-0.07 (-0.974)	-0.08 (-1.24)
ECp <sub>-1</sub>	0.06 (0.53)	-0.50 (-4.70)	-0.05 (-0.58)
ECt <sub>-1</sub>	-0.34 (-2.16)	-0.04 (-0.28)	-1.10 (-9.48)
$\Delta LHm_{-3}$	-0.21 (-2.47)	-0.26 (-3.54)	-0.06 (-0.92)
$\Delta LHm_{-4}$	-0.24 (-2.64)	-0.21 (-2.73)	-0.13 (-1.98)
$\Delta LOm_{-4}$	0.23 (2.72)	0.11 (1.62)	0.08 (1.36)
$\Delta LOp$	0.10 (1.00)	0.34 (4.03)	0.06 (0.91)
$\Delta LOt_{-1}$	0.19 (2.15)	0.12 (1.64)	0.17 (2.74)
$\Delta LKt$	-0.45 (-1.52)	-0.13 (-0.54)	-0.84 (-4.07)
Seasonal	-0.35 (-6.0)	-0.17 (-3.55)	-0.37 (-10.8)
Seasonal1	-0.32 (-7.65)	-0.19 (-5.07)	-0.35 (-13.6)
Seasonal2	-0.42 (-8.92)	-0.19 (-4.22)	-0.53 (-11.8)
SE	0.040	0.035	0.029

All the variables are in logarithmic form (L= LOG), SE= the equation standard error, SC= serial correlation. The figures in parentheses give the t-values<sup>21</sup>.

## 7.4 Conclusions

The adjustment of labour to fluctuations in demand can take place by adjusting either the number of workers or the number of hours worked per employee or both. The adjustment of hours and workers imply different adjustment costs. The purpose of this paper was to study the impact of employment protection on the adjustment of these both aspects of labour input to fluctuations in demand. In particular, we investigated how job security provisions affect the speed of adjustment. That is, whether changes in job protection legislation show in the speed of

<sup>20</sup> Due to the computational reasons, in the nonlinear estimation the coefficients of the short-term dynamics are forced to be the same as in the previous estimation. However, this restriction has not been tested.

<sup>21</sup> According to the diagnostic tests for the system congruency the system seems acceptable.

adjustment of labour input and whether differences exist in the adjustment speeds of working hours and workers. These questions were studied within the framework of dynamic labour demand. To establish the dynamics of labour demand, an error-correction model was specified by using the Engle-Granger two-step procedure.

Our results show that adjustment in the number of hours worked per employee is quicker than adjustment in the number of workers in the manufacturing sector and three separate industries. With the same data set we found that the speed of adjustment in the number of workers expressed as median lags was 4 lags at most, whereas the rate of adjustment of working hours was 2 median lags at most. That the adjustment of working hours per employee is faster is in line with the theoretical considerations and with earlier empirical evidence from other countries. The speed of adjustment of working hours showed more variation than that of the number of workers. According to our results, adjustment was faster in the textile and clothing industry (0 median lags) than in the manufacturing sector as a whole or in the other two industries we investigated. The slowest adjustment was in the manufacturing (2 median lags). The differences in the adjustment speeds of working hours between industries might partly be explained by the production technology used and the capital intensiveness of the production process. Compared with the reported median lags in empirical studies from other European countries, the adjustment speeds of hours worked or of the number of workers in Finland do not seem exceptionally slow.

The structure of the adjustment costs was also studied by reparameterization of the adjustment coefficient in the estimated ECMs with a set of adjustment cost variables. In the manufacturing sector as a whole our reparameterization results suggest that both the unionization rate and the unemployment rate affect the speed of adjustment of both number of employees and hours per employee. As expected, the unionization rate seemed to slow down the adjustment and, in turn, unemployment rate seemed to speed it up. In addition, in the estimations, the trend obtained a negative significant coefficient in the ECM for the number of employees, which implies that the adjustment of number of employees has become more flexible over time. When the trend was left out of the set of adjustment cost employment protection variables, PROT also obtained a negative, significant coefficient.

Of the three separate industries, in the paper and pulp industry both the unionization rate and the dummy DIS affected the adjustment speed of the number of workers, the unionization rate slowing down the adjustment of the number of workers and DIS speeding it up. In the other two industries, the adjustment cost variables did not obtain significant coefficients in the nonlinear system estimation.

## APPENDIX 7.1 Legislative changes in job security in Finland 1970-1990

### 1) Severance Payments Act, 1970

- lump-sum payments to employees who have been dismissed for economic or production reasons

- compensation paid from collective fund

### 2) Employment Contracts Act, 1970

- an employment contract may be concluded for a predetermined period in order to carry out a specified job or for an unlimited time; in the latter case there has to be a valid reason for termination of contract

- employees can be laid off for a maximum of 75 days; dismissal is allowed thereafter only if the reduction in work is permanent

- minimum pre-notification of dismissal and temporary lay-offs is two weeks

### 3) Amendments to the Employment Contracts Act, 1978

- pre-notification of dismissal extended to one to four months, depending on length of service

- in the case of temporary lay-offs, notification extended to three months

### 4) Co-operation Within Enterprises Act, 1978

- concerns all firms which employ 30 persons or more

- the employer's side must consult employees before making decisions concerning the position of the employees or their number

- the law does not prescribe joint-determination, but final decisions can be made by the firm alone

- the act has been supplemented by the central organisational general agreements of 1981 and 1986

### 5) Dismissal Procedures Act, 1984

- lays down a thorough procedure to investigate grounds for individual dismissals and imposes a conditional compensation scheme to encourage reinstatement or re-engagement

- the employer has an interpretation prerogative in cases of disagreement

- compensation for unfair dismissals raised to three to 20 months' earnings; the courts determine the exact amount of compensation

### 6) Amendment to the Employment Contracts Act, 1984

- the employers' right to dismiss is restricted in cases of change in enterprise ownership

- fixed-term employment contracts allowed only when work is temporary in nature or the contract concerns traineeship or there are other valid reasons

### 7) Amendment to the Employment Contracts Act, 1986

- minimum pre-notification of dismissal extended to 2 months

- notification depends on length of service: fewer years of service than earlier entitle an employee to receive a pre-notification of dismissal three to four months earlier

### 8) Amendment to the Employment Contracts Act, 1989

- pre-notification of dismissals further lengthened in cases of long employment relationships

- the following minimum notifications mandatory:

Years of service	Months of notice
Less than 5	2
5-9	3
9-12	4
12-15	5
over 15	6

9) Amendment to the Co-operation Within Enterprises Act, 1989

- employers' obligation to consult employees is strengthened: minimum periods (2 or 3 months) defined for negotiations if there is disagreement between parties (Source: Lilja et al. 1990, 113-117)

## APPENDIX 7.2

Table 1. Results of stationarity testing based on Augmented Dickey-Fuller tests for unit roots

Manufacturing sector, 1971(1)-1992(4)	Manufacture of metal products, 1976(1)-1994(4)	Paper and pulp industry, 1976(1)-1994(4)	Textile and clothing industry, 1976(1)-1994(4)
LE - I(2) LO - I(1) LWr - I(2) LK - I(2)	LE - I(1) LH - I(1) LO - I(2) LWr - I(1) LK - I(2) LPfr - I(1)	LE - I(2) LO - I(2) LWr - I(2) LK - I(2) LPr/Pp - I(2)	LE - I(2) LO - I(2) LWr - I(2) LK - I(2) LPfr - I(1)

L=log; E=employment, O=output, Wr=real wages, K=capital stock, Pr/Pp= the real price of raw materials, Pfr= the real price of raw materials and fuels, H= performed working hours/employee. I(1)=integrated of order 1.

The results of the augmented Dickey-Fuller (ADF) test are based on an estimation of the equation which accounts for both a drift and a linear deterministic trend:  $\Delta y_t = \alpha_0 + \alpha_1 y_{t-1} + \alpha_2 t + \sum \delta \Delta y_i + \epsilon$ . Here the null hypothesis of  $y_t$ , which is a univariate integrated autoregressive process ( $H_0: \alpha_1 = 0$  - unit root hypothesis), is tested against the alternative that  $y_t$  has a deterministic linear trend  $t$  and a stationary AR(p) process<sup>22</sup> ( $H_1: \alpha_1 < 0$  -  $y_t$  integrated of order zero).

## DATA APPENDIX

DATA SOURCE: The data set ASTIKA operated by Central Statistical Office of Finland unless otherwise mentioned.

<sup>22</sup>In the testing procedure, Student t-ratio, the ratio of the OLS estimate to its calculated standard error obtained from an OLS regression, is examined. This statistic does not have the familiar Student t-distribution under the null and the critical values for the distribution of the Student t-statistic have to be obtained from specific tables (e.g. Dickey and Fuller 1981, Davidson and MacKinnon 1993).

**List of variables**

E: Employment, 100 persons.

Hp: Performed working hours, 1000 hours.

W: Hourly wage. Source: Bulletin of Statistics, various issues.

s: Employer's social security contribution rate, manufacturing. Source: BOF4 (The data set of the Bank of Finland).

P: Producer price index in manufacturing, 1990=100. Source: ASTIKA and Bulletin of Statistics, various issues.

$P_m$ : Import prices of raw materials, 1985=100. Source: BOF4.

$P_f$ : Import prices of fuels, 1985=100. Source: BOF4.

O: The volume index of industrial production, 1990=100. Source: ASTIKA and Bulletin of Statistics, various issues.

K: net capital stock, mmk.

U: Aggregate unemployment rate. Source: BOF4.

UR: Unionization rate; union members/employment. Source: Industrial relations - time series 1907-1988, Ministry of Labour and Statistical Yearbook of Finland.

**Definitions:**

Wr: Hourly real wage rate;  $Wr = W(1+s)/P$ .

H: Working hours per employee;  $H = Hp/E$ .

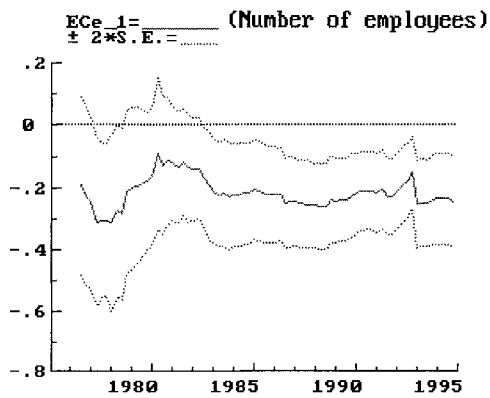
Pfr: The real price of raw materials and fuels;  $Pfr = (P_f + P_m)/P$ .

DIS: Dummy variable, takes value zero before 1984 and 1 afterwards. It describes a change in the dismissal procedures act which raised compensations for unfair dismissals from three to twenty months' earnings.

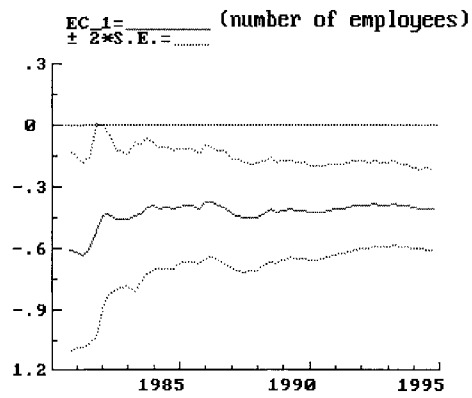
PRENO: Dummy variable, which describes legislative changes in the length of pre-notification of dismissal. Takes the value zero in 1971/1976-1977, 0.5 in 1978-1985, 0.75 in 1986-1988 and 1 thereafter.

D75: Dummy for a change in private sector employment statistics, gets value 1 1971(1)-1975(4) and zero afterwards (Tyrväinen 1995).

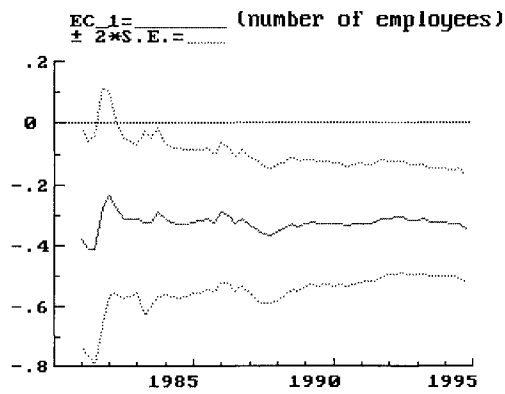
APPENDIX 7.3 Recursive least squares coefficients



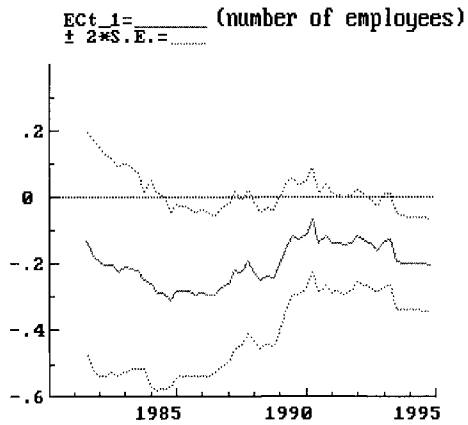
The whole manufacturing sector,  
1976(I)-1994(IV)



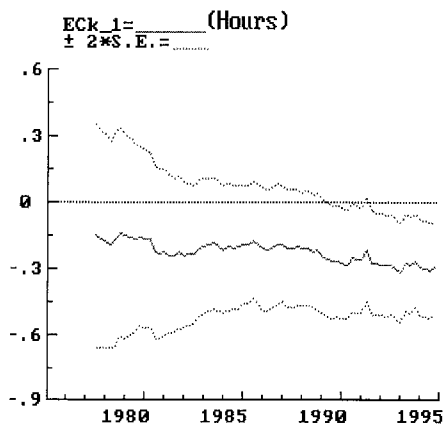
The manufacture of metal products,  
1976(I)-1994(IV)



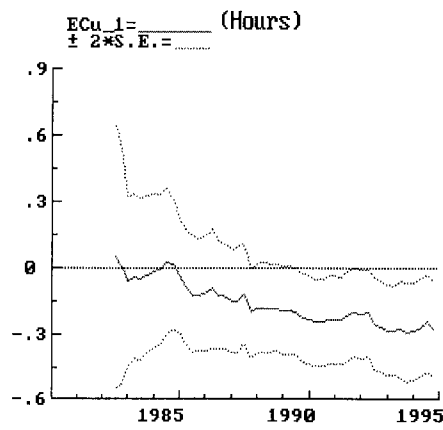
The paper and pulp industry,  
1976(I)-1994(IV)



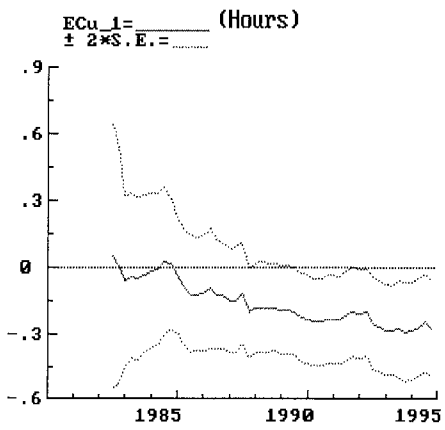
The textile and clothing industry,  
1976(I)-1994(IV)



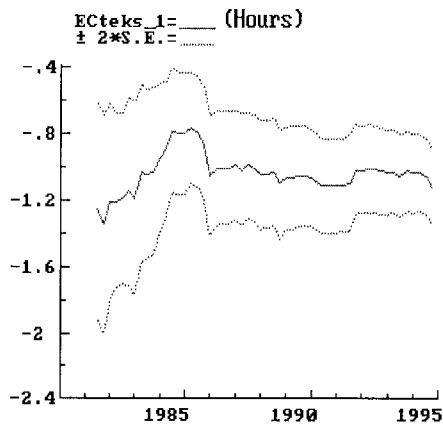
The whole manufacturing sector,  
 1971(I)-1994(IV)



The manufacture of metal products,  
 1976(I)-1994(IV)



The manufacture of metal products,  
 1976(I)-1994(IV)



The textile and clothing industry,  
 1976(I)-1994(IV)



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## YHTEENVETO (Finnish Summary)

Tutkimus koostuu kahdesta kirjallisuuskatsauksesta ja neljästä Suomen työmarkkinoita koskevasta empiirisestä työstä, joissa käsitellään kahta työttömyyden pysyvyyttä selittävää mekanismia: sisäpiiriteoriaa ja työsuhdeturvaa. Nämä kaksi mekanismia liittyvät läheisesti toisiinsa siten, että työsuhdeturva on yksi vaihtuvuuskustannusten aiheuttaja, joka antaa työllisille sisäpiiriläisille markkinavoimaa vaatia Walrasilaista tasapainoa korkeampia palkkoja.

Luku kaksi on kirjallisuuskatsaus, joka käsittelee sisäpiiriteorioiden antamaa työttömyyden pysyvyyden selitystä teoreettisten sekä empiiristen töiden perusteella. Sisäpiiriteorioiden mukaan väliaikaiset talouden häiriöt voivat aiheuttaa pysyviä muutoksia työttömyyteen tai aiheuttavat sen, että työttömyyden paluu ennen häiriötä vallinneelle tasolle on hyvin hidasta. Pysyvyytsvaikutuksia syntyy, jos työllisyyden muutos muuttaa sisäpiirin jäsenistöä ja sitä kautta sisäpiiriläisten tavoitefunktiota palkkaneuvotteluissa. Palkat sisäpiirimalleissa määräytyvät lähinnä sisäpiiriläisten ja yritysten välissä neuvotteluissa eikä työttömällä ole sananvaltaa. Työvoiman vaihtuvuuskustannukset sekä järjestäytyminen antavat sisäpiiriläisille markkinavoimaa neuvotella tasapainotasoa korkeammista palkoista. Pysyvyytsvaikutukset ovat sitä suurempia mitä läheisemmin sisäpiiriasema (ketuja palkkaneuvotteluissa ajetaan) on kytköksissä työllisyysasemaan. Puhdas hystereesitulos eliminoiduu, jos malleissa työnantajapuolella on myös neuvotteluvoimaa tai työttömällä outsidersilla on jonkinlaista vaikutusta sisäpiiriläisten tavoitefunktioon. Empiirinen evidenssi puhtaasti hystereesivaikutuksenpuolesta on vähäistä. Sen sijaan on todisteita sen puolesta, että häiriöiden jälkeen työllisyyden palautuminen entiselle tasapainotasolle on hidasta. Lisäksi on olemassa evidenssiä ns. outsider hystereesin puolesta, jonka mukaan pitkäaikaistyöttömien tehotomuus työnhaussa aiheuttaa pysyvyytsvaikutuksia. Empiirisesti on myös havaittu, että palkat reagoivat epäsymmetrisesti positiivisiin ja negatiivisiin talouden häiriöihin.

Luvussa kolme tutkitaan empiirisesti GMM-menetelmällä kuinka toimialan sisäiset (kuten tuottavuus ja ammattiliiton neuvotteluvoima) ja ulkoiset tekijät (kuten työttömyys, muualla vallitseva palkkataso, korvaussuhde) vaikuttavat toimialatason palkkoihin. Aineistona on suomalainen, 180 tehdasteollisuuden ja kaivosteollisuuden alatoimialaa käsittävä paneeli vuosilta 1985-1994. Tulosten mukaan molemmilla tekijöillä on merkitystä toimialatason palkanmuodostuksessa, kuitenkin siten, että ulkoisilla tekijöillä on enemmän vaikutusta ja sisäisillä tekijöillä ainostaan pieni positiivinen vaikutus. Tämä tulos on samansuuntainen kuin on saatu muista keskitetyn sopimusjärjestelmän maista. Yksittäisistä tekijöistä muualla vallitsevalla palkkatasolla on suurin vaikutus.

Neljäs luku tutkii palkkojen ja työllisyyden sopeutumisen luonnetta talouden positiivisiin ja negatiivisiin shokkeihin Suomen tehdasteollisuuden aikasarja-aineistolla vuosina 1960-1992. Yksinkertaisen palkkasumma-analyysin perusteella palkat ja työllisyys reagoivat epäsymmetrisesti ylöspäin ja alaspäin sisäpiirin implikoimalla tavalla. Sitä vastoin switching regression-estimointien perusteella

ei saatu näyttöä työllisyyden epäsymmetrisestä sopeutumisesta. Aineiston aggregaatti luonne kuitenkin saattaa vaikuttaa siihen, että näitä vaikutuksia ei tule esille.

Viidenessä luvussa tutkitaan ammattiliittojen jäsenmäärien ja työllisyyden välistä dynamiikkaa testaamalla ns. jäsenyyshystereesihypoteesia (membership hysteresis) käyttäen aineistona aikasarjoja työllisyydestä ja ammattiliittojen jäsenmääristä vuosina 1950-1993. Jäsenyyshystereesiä tutkitaan kahden eri testin avulla: yksikköjuuritestin (ADF ja Phillips-Perron) sekä Granger-kausalisuustestin. Granger kausalisuustestauksessa käytetään vektoriauoregressiivistä tekniikkaa (VAR). Tulosten mukaan yksikköjuuritestien perusteella ei voida hylätä hystereesihypoteesia, mutta on hyvä muistaa testin rajoitukset. Granger-kausalisuus-testi ei tue hystereesihypoteesia eli se ei osoita, että työllisyydestä tai ammattiliiton jäsenyydestä olisi kausalisuussuhde palkkoihin.

Kuudes luku on työsuhdeturvaa koskeva kirjallisuuskatsaus, jossa tarkastellaan teorian ja empiiristen töiden perusteella kuinka työsuhdeturva vaikuttaa työmarkkinoiden toimintaan. Sekä teoreettisten töiden että empiirisen evidenssin perusteella työsuhdeturva vähentää työllisyyden vaihteluita kysynnän vaihteluihin: nousukautena palkataan vähemmän ihmisiä töihin, mutta toisaalta laskukautena vastaavasti irtisanotaan vähemmän. Vaikutus keskimääräiseen työllisyyteen ja työttömyyteen on sen sijaan vähemmän selvä. Pitkäaikaistyöttömyyttä työsuhdeturva näyttäisi lisäävän, koska se vähentää poistumavirtoja työttömyydestä samalla kuin tulovirtojakin. Palkkoihin työsuhdeturva vaikuttaa kahta kanavaa kautta: (i) suora vaikutus tulee sitä kautta, että se lisää työllisten neuvotteluvoimaa (sisäpiiriteoriat) ja (ii) epäsuora vaikutus tulee pitkäaikaistyöttömyyden kautta. Empiirinen evidenssi palkkavaikutuksista on vähäistä. Työsuhdeturvan muutosten vaikutukset ovat olleet erilaisia eri maissa. Siksi on tärkeää ottaa huomioon maan muut institutionaaliset tekijät vaikutuksia arvioitaessa.

Seitsemännessä luvussa tarkastellaan työsuhdeturvan vaikutuksia työvoiman kysynnän molempiin komponentteihin (työntekijöiden lukumäärään sekä työtunteihin per työntekijä), erityisesti sopeutumisnopeuksiin. Aineistona on neljännesvuosiaineisto Suomen teollisuudesta vuosina 1971-1994 sekä kolmelta teollisuuden toimialalta (tekstiili- ja vaatetus, paperi ja sellu sekä metallien valmistus) vuosina 1976-1994. Sopeutumisnopeuksien lisäksi pyritään selvittämään onko sopeutumisessa tapahtunut muutoksia työsuhdeturvassa tapahtuneiden muutosten myötä. Estimoinneissa käytetään virheenkorjausmallia, joka on spesifioitu kaksivaiheista Engle-Granger-menetelmää hyväksikäyttäen. Tulosten mukaan työtuntien per työntekijä sopeuttaminen kysynnän muutoksiin on nopeampaa kuin työntekijöiden sopeuttaminen, mikä on sopusoinnussa niin teorian kuin muista maista saatujen empiiristen tulosten kanssa. Estimoidut sopeutumisnopeudet eivät ole mitenkään poikkeuksellisen hitaita verrattuna muille maille estimoitujen sopeutumisnopeuksien kanssa.



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