Petri Böckerman

EMPIRICAL STUDIES ON WORKING HOURS AND LABOUR MARKET FLOWS

HELSINKI SCHOOL OF ECONOMICS

ACTA UNIVERSITATIS OECONOMICAE HELSINGIENSIS

A-216

Petri Böckerman

EMPIRICAL STUDIES ON WORKING HOURS AND LABOUR MARKET FLOWS

HELSINKI SCHOOL OF ECONOMICS

ACTA UNIVERSITATIS OECONOMICAE HELSINGIENSIS

A-216

ISSN 1237-556X
ISBN-10: 951-791-760-0
ISBN-13: 978-951-791-760-5

E-version:
ISBN-10: 952-488-043-1
ISBN-13: 978-952-488-043-5

Helsinki School of Economics -
HSE Print 2006

Preface

This collection of essays consists of five articles from journals and an introduction that provides the selected background and the motivation for the following investigations and summarizes the contributions of the empirical studies. The list of the essays is as follows:

1. Petri Böckerman and Jaakko Kiander: ”Determination of average working time in Finland”. Labour: Review of Labour Economics and Industrial Relations, 16:3, 557–568.

2. Petri Böckerman: ”Overtime in Finland”. Finnish Economic Papers, 15:1, 36–53.

3. Petri Böckerman and Mika Maliranta: ”Regional disparities in gross job and worker flows in Finland”. Finnish Economic Papers, 14:2, 84–103.

4. Petri Böckerman: ”Unravelling the mystery of regional unemployment in Finland”. Regional Studies, 37:4, 333–342.

5. Petri Böckerman: ”Perception of job instability in Europe”. Social Indicators Research, (Forthcoming).

I am grateful to Pekka Ilmakunnas for his encouraging guidance and insightful comments during the process. I have benefited from the comments of my pre-examiners (Aki Kangasharju and Hannu Tervo). I am grateful to the Labour Institute for Economic Research, my employer. The institute has provided excellent research facilities. I am grateful to my co-authors Jaakko Kiander and Mika Maliranta for productive co-operation. I am grateful to Blackwell Publishing to be able to include an article from their journal (Labour: Review of Labour Economics and Industrial Relations). I am grateful to Carfax Publishing (Taylor & Francis Publishing Group) for an opportunity to include an article from their journal (Regional Studies). In addition, I am grateful to Kluwer Academic Publishers to be able to include a forthcoming article from their journal (Social Indicators Research). Paul A. Dillingham has kindly checked the language. Financial support from the Academy of Finland (Project 50950: Creation and Econometric Analysis of Linked Employer-Employee Data in Industrial and Labor Economics) and from the Yrjö Jahnsson Foundation (Grants 4628 and 4803) is gratefully acknowledged. This collection of essays is dedicated to the memory of my mother (1937–2001).

Helsinki, June 2nd, 2003
Petri Böckerman

Contents

1. Introduction

There is a solid foundation upon which to argue that the labour market is the most important market of modern economies (see, for example, Elliott 1991). The reason for this arises from the well-known fact that, by a wide margin, most individuals derive their current income flow from selling their labour services. This applies to the Finnish labour markets, which have gained growing interest during the 1990s.[1] The prominent reason for the interest has been the empirical feature that the unemployment rate soared during the so-called great slump of the early 1990s.[2] Since then, according to a number of commentators on public affairs, unemployment has been the most important economic and social problem in Finland. In this respect, the situation is nowadays much the same across the whole of the European labour markets.[3] As a consequence of this development of the 1990s, the issues associated with the Finnish labour markets constitute a topical research theme.

Despite the apparent importance of labour markets, there is rather limited empirical knowledge of a number of particularities that characterize the Finnish labour markets. Oswald (2000) strongly argues that the search for reliable empirical patterns in economic data should constitute the core of economic research. These notions constitute the broad starting points of the following essays.

This collection of empirical investigations consists of five essays. These essays aim to provide evidence on interesting empirical patterns of the Finnish labour markets based on various data sets. The essays fall into three categories. The first two essays investigate the selected aspects of working hours in Finland. These essays investigate the determination of average working time from the long-term perspective and overtime at the individual level in Finnish manufacturing. The following two essays concentrate on the dynamics of regional labour markets in Finland. These essays focus on gross job and worker flows of the Finnish regions and address the connection between unemployment and reorganization from the regional perspective. The last essay in this collection deals with the issue of the perception of job instability among workers in Europe by using survey data. The essay aims to provide a contribution to the ongoing discussion about the fundamental aspects of the European labour markets. The perception of job instability is related to working hours and labour market flows. The perception of job instability (i.e. the fear of nullification of hours of work entirely) constitutes an antithesis to overtime. Moreover, an investigation into the perception of job instability induced by involuntary worker flows completes the picture painted by the studies that focus on gross flows of jobs and workers from a broader perspective.

1.1. The Finnish labour markets during the 1990s

Finland is, without dispute, one of the Nordic welfare states with high labour taxes, extensive social benefits and one of the highest rates of trade union membership and coverage of collective wage agreements in the OECD. Minimum nominal increases in wages and reductions in average working time are, for the most part, determined within the framework of collective bargaining (Layard and Nickell 1999).[4] Finland provides an example, *par excellence,* of a corporatist political and economic system.[5] The Finnish labour market policy is therefore the result of a close and long-term interplay between social partners and the government. About 80% of the salaried labour force in Finland belongs to unions. The high unionisation rate is partly explained by the fact that membership fees are tax deductible and the fees are mainly collected by employers and by the involvement of the unions in the administration of unemployment insurance benefits.[6] The structure of Finnish wage bargaining usually involves a high degree of coordination between unions and employers, with a framework agreement being determined centrally on a one- or two-year basis, followed by union-level bargains.

As a consequence of collective wage agreements, the distribution of wages across individuals tends to be compressed in Finland.[7] This apparent narrowness of certain distributions of economic variables fails to extend to all dimensions of the Finnish labour markets. A certain amount of flexibility is generated into the Finnish wage formation by the so-called wage drift, which has, historically, accounted for approximately 30% of the total increase in earnings.[8] The following discussion focuses on additional aspects that have facilitated adjustment in the labour market and that are relevant for this collection of empirical investigations.

The total hours of work consists of several components. There is a rather large scope for the utililization of overtime hours at the individual level of the Finnish economy despite the fact that the so-called standard hours are stipulated by the binding collective agreements. In particular, overtime hours have traditionally been applied in manufacturing. This is due to the fact that non-manufacturing represents other forms of less stable labour relations such as part-time work and various temporary employment contracts. These instruments can be considered to be substitutes for the implementation of overtime from the perspective of companies. Paid overtime therefore constitutes an important part of the adjustment of the total hours of work in Finnish manufacturing.[9]

The adjustment of the Finnish labour markets carries an interesting regional dimension. The regional disparities of labour markets have been sharp and persistent in Finland. For instance, an empirical investigation by OECD (2000) into the issue reveals that the regional

disparities of the unemployment rates in Finland are among the highest in the European Union. In particular, the unemployment rate has been at a higher level in Eastern and Northern Finland compared with Southern Finland during the past few decades.

The following essays examine overtime and regional labour markets in Finland, especially in the turbulent decade of the 1990s. The great depression of the 1930s is usually seen as the most severe peacetime economic crisis of the twentieth century in most industrialized countries. However, Finland suffered its worst recession of the twentieth century not in the 1930s but in the early 1990s. In the years 1991–1993 output fell by 10% and the unemployment rate reached its all-time high (i.e. almost 20% of the Finnish labour force as measured by Statistics Finland). Indeed, these figures were much worse than those recorded during the great depression of the 1930s.[10]

Despite the fact that Finland's experience in the early 1990s was unique in the context of the OECD countries, other Nordic countries and the United Kingdom had certain qualitative similarities in their economic development at the same time. In particular, deregulation of financial markets lead to overlending by banks, which caused an unsustainable boom in consumption, investment spending and asset prices. In Finland, however, the slowdown of the early 1990s was much worse than elsewhere when measured by the aggregate indicators of economic activity. An exogenous factor that partially explains this is the fact that, in addition to the asset market collapse and the deep fall in domestic consumption, there was almost a complete disappearance of the Soviet trade in 1990–1991. The reasons behind the great Finnish depression of the early 1990s have, therefore, been aptly described as "bad luck, bad banking, and bad policies".

Since 1994 there has been a strong export-led recovery of aggregate economic activity in Finland. Despite this recovery, the great slump has shaped most of the economic outcomes during the period of the 1990s that is included in the empirical investigations of the following essays on the Finnish labour markets. The exceptional magnitude of the slump helps to identify interesting empirical patterns that would be hard to detect during normal business cycle fluctuations.

The macroeconomic impulses shaped the labour market outcomes. For instance, there was a notable decline in overtime in manufacturing during the great slump of the early 1990s. Due to the collapse of labour demand, there was a substantial fall in the net rate of employment change across the Finnish regions. Thus, the data that covers this period provides an opportunity to investigate the establishment-level adjustment of regional labour markets during an episode of sharp fluctuations. The evolution of employment was

associated with restructuring in terms of job creation and destruction.[11] In addition, there was an increase in the magnitude of the external reorganization of regional labour markets measured by migration flows that started in 1994 (see, for example, Pekkala and Ritsilä 2000). Concerning the impacts on self-reported subjective wellbeing of individuals, there was an increase in the perception of job instability among workers in Finland during the slump, which is a natural consequence of a rapid increase in the unemployment rate.[12] This particular pattern highlights the enormous costs associated with the high unemployment trap in the European labour markets.

1.2. The selected themes of labour markets

1.2.1. Working hours

Working hours have provided interesting puzzles and research questions to economists ever since Adam Smith (see, for example, Contensou and Vranceanu 2000). The determination of working time is usually investigated in terms of standard neoclassical economics. In principle, working time is, in this context, determined according to the supply side of the labour market. The analysis is based on the maximization of utility derived from two homogeneous commodities, which are called consumption and leisure, that eventually determine the optimal level of working time (i.e. the individual level of the labour supply).[13] In turn, this basic elaboration of working hours can be extended to cover more complicated situations that introduce various constraints for the determination of working time induced by the demand for the hours of work by companies.[14] This means that firms' decisions can put constraints on the choices of individuals.

Determination of working hours is a topical issue in the context of the European labour markets (including Finland). An important reason for this is that Europe's high unemployment trap has induced a great number of ambitious plans to solve the dilemma. One of them is known as "work-sharing". The idea of work-sharing is to redistribute the available work to more people and thereby give a stake for the unemployed persons. Work-sharing works when there is a tradeoff between average working time and employment. This means that a reduction in average working hours delivers an increase in employment.[15] The idea has been put into practice in many OECD countries, where the average annual working time has been reduced either by contracts or by legislation. There have therefore been a great number of empirical investigations into the relationship between employment and average annual working time. In a nutshell, the empirical studies on working time and employment tend to discover that the supposed positive impact of a

reduction in working time on employment is a small one (see, for example, Hart 1987; Hamermesh 1996; Kapteyn, Kalwij and Zaidi 2000).[16] This means that work-sharing schemes seem not to be the solution to the European unemployment problem.

Despite the enduring interest by the economic research on working time issues there are uncovered and neglected research questions. For instance, there have been certain interesting long-term trends and patterns in the average working time across industrialized countries. Voth (2000) observes that there was an increase in the length of the average annual working time during the early stages of industrialization. The trend was reversed during the late 1800s. This feature means that there has been a continuing decline in the average working time during the 1900s (Maddison 1995). Along with these international trends across industrialized countries, there has been a sharp decline in the average working hours in Finland during the past few decades. For instance, the length of the average working time has declined in Finnish manufacturing by approximately 400 hours during the period from 1960 to 1996. This long-term decline in the average working time needs to be explained by the economic fundamentals in the context of a Nordic welfare state.[17] The issue can be explored by using industry-level data on the average working time and economic fundamentals.

A well-known distinction in the investigation of working time deals with the adjustment margin of labour input from the perspective of companies (see, for example, Hamermesh 1996). The notion is based on the analysis of the standard profit maximization of a firm with respect to labour services, which consist of two components that are employment and working time (see, for example, Contensou and Vranceanu 2000). The extensive margin refers to the sensitivity of profits with respect to employment. On the other hand, the intensive margin refers to the sensitivity of profits with respect to working time. In principle, firms use overtime hours (in other words, the intensive margin of labour utilization in contrast to the extensive margin of labour utilization), because of the presence of the quasi-fixed cost of employment, i.e. hiring and training costs and various employee benefits that are related to employment but not to performed working hours. In contrast, from the perspective of individuals, overtime is one way to induce flexibility to the total hours of work along with dual job holding.[18]

However, the determination of the share of overtime has been one of the uncovered issues in the context of empirical studies on the European labour markets. The issue is highly interesting, owing to the stylized feature that, despite the persistent unemployment in Europe, there are a great number of employees that provide overtime hours at the same time. In other words, an interesting empirical pattern of the European labour markets is that the total hours of work are extremely unequally distributed across individuals and households. Overtime hours contribute to this particular pattern of labour markets. This

same discrepancy is evident in Finland, where the unemployment rate has been at a high level despite the recovery from the great slump of the early 1990s. At the same time, there has been a rebound in overtime hours in Finnish manufacturing. In addition, the determination of overtime is closely related to the issue of work-sharing, because a reduction in standard working hours may increase the costs per worker in relation to the cost of overtime. This means that companies may actually substitute overtime for workers. This substitution effect may reduce employment when output is fixed by demand. In response to this, there has been a discussion on the need for binding overtime ceilings. The empirical studies that uncover the determination of overtime hours need to be based on individual-level data.

The first essay on working hours explores the determination of the average working time in the context of a Nordic welfare state, Finland, from the long-term perspective (Essay 1). The motivation of the study arises from the fact that the issue of work-sharing is debated in Europe, but extremely little is known about the economic fundamentals that have contributed to a decline in the average working time during the past few decades. It is especially interesting to investigate the decline of the average working time tied in with rising productivity and increasing labour taxes, which constitute the key elements of the Nordic welfare states. The study aims to provide a coherent picture of these elements of economic progress. The issue is studied by dividing the Finnish economy into six main sectors. The sectoral panel data is based on the yearly observations from 1960 to 1996 and is obtained from National Accounts. The estimation results are based on fixed effects models. The main empirical finding of the study is that both an increase in labour productivity and a widening of the tax wedge have contributed to a decline in the average working time in Finland during the past few decades. In particular, a rise in labour productivity over time means that people become richer and as a consequence they demand more leisure. Reductions in working time are therefore one way of distributing increased prosperity. On the other hand, a widening of the tax wedge over time has meant that for workers it is more attractive to take the fruits of increased productivity as an increase in leisure. These observations are consistent with the predictions of a theoretical model that is based on the notion of equilibrium working hours.

The second essay on working hours deals with the determination of the share of overtime hours at the individual level in Finnish manufacturing (Essay 2). The total hours of work consist of two major components. The so-called standard hours are determined by binding collective agreements in Finland. On the other hand, the overtime hours are determined at the individual level of the economy. This means that the hours of overtime can vary from individual to individual for a variety of reasons. The aim of this study is to characterize the

incidence of overtime hours in Finnish manufacturing. The study also sheds light on the incidence of overtime induced by the heterogeneity of establishments. In addition, the study considers the impact of the degree of tightness in regional labour markets on overtime hours.

The study is based on individual-level data from manufacturing that covers the last quarter of the year from 1989 to 1995. The individual-level data is from the records of the Confederation of Finnish Industry and Employers (*Teollisuus ja Työnantajat,* TT). The data contain about 56000 observations. The data is based on the fact that each year TT conducts a survey among its member employers and gathers information on paid wages, salaries and the hours of work of employees. This means that the data contain detailed and accurate division of the total hours of work into various components (including overtime). The share of overtime is, by definition, a variable bounded by (0, 1). Indeed, there are a great number of employees that do not do overtime in Finnish manufacturing. Thus, the estimation results are based on Tobit specifications.

The study is able to uncover a number of interesting empirical patterns concerning the determination of the share of overtime hours in Finnish manufacturing. Overtime covers roughly 3% of the total hours of work and the share of overtime has been strongly procyclical over the period of investigation. The hours of overtime divided by the total number of hours decline as an employee ages. The overtime hours also decline in wage per straight-time hours and in straight-time hours. These results are broadly in line with those obtained from the empirical studies that use UK data of overtime hours at the individual level. In addition, the estimation results show that males and newcomers (i.e. employees that were not in the industry one year previously) tend to work more overtime, but leavers (i.e. employees that leave the industry between this year and the next) work less overtime. The share of women in the establishment has a negative effect on the incidence of overtime hours. The degree of tightness in regional labour markets had no overall impact on overtime from 1991 to 1995. This observation can be rationalized by noting that the Finnish economy experienced an extreme economic slowdown during the early 1990s. There was therefore no shortage of employees. However, the impact of the regional unemployment rate on the incidence of overtime hours differed sharply between the population of the small plants (i.e. plants that have fewer than twenty employees) and the rest of the plants in Finnish manufacturing.

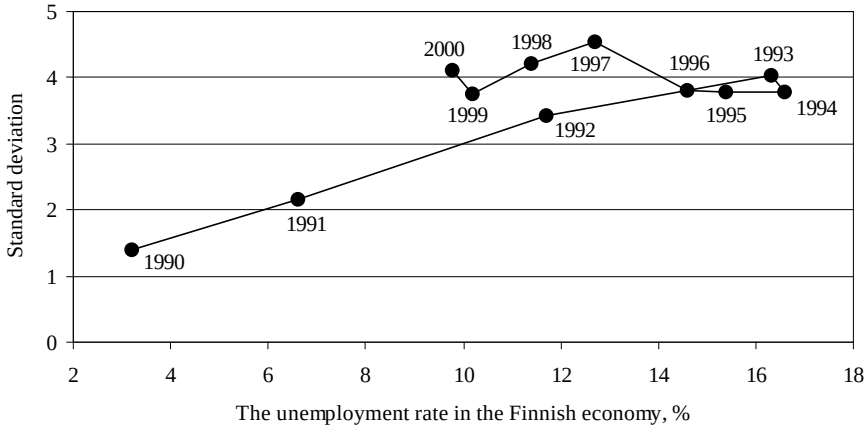
The stylized feature emerges according to which the hours of overtime are more frequent in the population of small establishments. The size effect did not collapse during the great slump of the early 1990s, but the magnitude of this effect has been procyclical from 1989 to 1995. These observations mean that the small plants seem to react differently to

variations in product demand, which mostly varies with time. The result that overtime hours are more common among small establishments is not driven by the smallest plants, either. In addition, the overtime equation was estimated separately for the five industries in Finnish manufacturing. These results support the perspective that the more flexible working hours in terms of overtime hours are used within the capital-intensive industries in order to take full advantage of establishments' accumulated capital stock in the volatile environment in which small establishments are positioned.

1.2.2. Regional labour markets

Labour markets have a distinct regional dimension. This feature is especially apparent in Finland. Regional labour markets have gained growing interest in Finland, because there has been an increase in the regional disparities of the unemployment rates as part of the export-led recovery from the great slump of the early 1990s.[19] Thus, the regional unemployment disparities across the twenty Finnish provinces measured by the standard deviation of the unemployment rates were about four times higher in 1997 compared with the situation before the recession (Figure 1). This pattern of regional adjustment has been in conflict with the earlier stylized feature of the Finnish regional labour markets, according to which there tends to be a decline in the absolute regional disparities of the unemployment rates measured by the standard deviation during the times of rapid economic growth. In

Figure 1. The standard deviation of the unemployment rates across the twenty provinces of Finland and the unemployment rate in the Finnish economy during the 1990s (Source: Statistics Finland; Labour Force Survey).



other words, the period of the late 1990s constitutes an important exception to this pattern of regional labour markets.

During the past ten years a growing body of literature within labour economics has emerged that employs longitudinal, linked employer-employee data in analysing the pace of job reallocation and worker flows (see, for example, Abowd and Kramarz 1999; Haltiwanger et al. 1999). In particular, the dynamics of labour market adjustment at the plant level of the economy can be captured by applying the measures of gross job and worker flows (see, for example, Davis and Haltiwanger 1999).[20] Joseph A. Schumpeter (1942) called this process of capitalism "creative destruction". Indeed, according to the growing number of detailed establishment-level studies, it is fair to say that the reallocation and the reorganization of scarce resources culminates in the turbulence of labour markets, where the reallocation of resources takes the form of gross job flows (i.e. job creation and destruction), and gross worker flows (i.e. hirings and separations of workers).

Gross job and worker flows decompose the net rate of employment change into components. Thus, the net rate of employment change is the job creation rate minus the job destruction rate (or the hiring rate minus the separation rate of workers). The job creation rate is defined as the sum of positive employment changes, divided by the average number of employees. In contrast, the job destruction rate is defined as the absolute value of the sum of negative employment changes, divided by the average number of employees. The sum of job creation and destruction rates is called the job reallocation rate. The excess job reallocation rate equals the job reallocation rate minus the absolute value of the net rate of employment change. This means that excess job reallocation is an index of simultaneous job creation and destruction.

Comparison of information in two consecutive years can be used for calculating the number of employees who have entered a plant during the year and are still working at the same plant. The sum of these employees over all plants is worker inflow, or hiring. In addition, it is possible to identify those employees who are no longer working at a plant. This means that the sum of these employees is worker outflow, or separation. The excess worker turnover rate (i.e. the churning rate) compares gross worker flows with gross job flows; the larger the magnitude of the churning rate the larger the worker flows (hirings and separations of workers) compared with job flows (creation and destruction of jobs).

The earlier empirical studies on regional labour markets have neglected the fact that regional economies are in a state of continuous turbulence (see, for example, Elhorst 2003). There

are therefore a great number of uncovered research questions in the investigation of regional labour markets in Finland that are linked to gross job and worker flows. In other words, the earlier empirical studies on the Finnish regional labour markets have been conducted by using aggregate data on (net) employment changes.[21] The main shortcoming of these traditional investigations of the aggregate outcome is that they entirely mask the establishment-level dynamics of labour-demand adjustment and provide an incomplete and potentially misleading picture of the Finnish regional labour markets.

Empirical studies that aim to relate the regional unemployment disparities to the economic fundamentals in Finland have not been available. A panel of the Finnish regions is highly suitable for the investigation of this issue. In particular, the existing studies exclude an evaluation of the impact of reorganization in terms of gross flows of jobs and workers on the regional unemployment rates. This same notion seems to extend to the whole of the empirical literature on regional unemployment disparities despite the fact that starting from Lowry's (1966) contribution there have been a great number of studies that focus on gross migration flows (see, for example, Elhorst 2003; OECD 2000). Indeed, the measures of gross migration flows complement the picture painted by the measures of gross job and worker flows from the perspective of regional reorganization.

The internal reorganization of the Finnish regional labour markets can therefore be captured by using the measures of gross flows of jobs and workers that are calculated from plant-level micro data. In contrast, the reorganization between regional labour markets can be described by using the measures of gross migration flows.[22] Indeed, the turnover between regional labour markets can be measured in the same way as the rate of excess job reallocation. This means that a measure of external turnover can be based on the notion that the magnitude of simultaneous gross migration flows is an appropriate measure for the intensiveness of reorganization across regional labour markets.

The first essay on regional labour markets deals with the issue of gross job and worker flows in Finland (Essay 3). The motivation of the study is based on the fact that there has been a bulk of research on gross job and worker flows based on cross-country comparisons. In contrast to available cross-country comparisons, the study provides detailed empirical evidence for the perspective that there are differences in gross job and worker flows within the same country despite the presence of the same institutional characteristics (including labour market regulations) across regions. In particular, the study explores the disparities in the regional labour market adjustment during an episode of extreme turbulence in the Finnish economy. In addition, the genuine regional elements in gross job and worker flows are separated from the effects of the industry structure.

Gross job and worker flows are calculated from establishment-level data from 1990 to 1997 and are then aggregated to the Finnish regions. The applied establishment-level data covers more than 80% of the total employment in the non-farming business sector of the Finnish economy. Thus, the data contain 1.1 million employees in about 100 000 plants. The geographical division of Finland is based on NUTS3 regions. The number of these regions is twenty.

The magnitude of gross job and worker flows is large, relative to the net employment change in the Finnish regions. This observation is consistent with stylized features of the literature. There is therefore a great deal of gross job creation in the declining regions with high average unemployment in Eastern and Northern Finland. On the other hand, there is a great amount of gross job destruction in the growing regions with low average unemployment in Southern Finland. In other words, the study provides extensive evidence for the perspective that stresses the enormous heterogeneity of regional labour market adjustment in Finland in contrast to the earlier literature that has been focused solely on (net) employment changes. The entry and exit of establishments covers about 2–3% of all employees each year. This means that the regional disparities in gross job and worker flows in Finland are driven mainly by continuing establishments.

Gross job and worker flows provide an insight into the adjustment of regional labour markets during the great slump of the early 1990s and the following recovery of economic activity. The rapid rise in regional unemployment rate disparities from 1991 to 1993 can be explained by the sharp rise in the regional disparities in job destruction rates and in separation rates of workers. There was a decline in regional disparities in job creation rates and in hiring rates of workers at the same time. The highest level of job destruction at the bottom of the slump was in the provinces of Eastern and Northern Finland. In contrast to the adjustment of labour markets in the slump, during the recovery from 1994 to 1997, there has been a decline in the regional disparities in job destruction rates and in separation rates of workers, but a rise in the regional disparities of job creation rates and hiring rates of workers.

There are genuine regional elements in gross job and worker flows despite the fact that the extreme volatility of economic activity over the period of the investigation means that much of the explained variation in gross job and worker flows can be attributed to years (and also to industries). The role of these genuine regional elements is most important in the case of the churning rate (i.e. the excess worker turnover rate). In particular, the patterns of gross job and worker flows that are characterized in this study cannot be explained by the industry structure of the Finnish regions. In contrast,

the regional differences in net employment growth rates in the period from 1990 to 1997 can be reduced mainly to the differences in the industry structures of the regions. This pattern highlights the fact that the focus on gross flows of job and workers can indeed provide important insights into the adjustment of the Finnish regional labour markets.

The second essay on regional labour markets aims to relate the regional unemployment disparities to the economic fundamentals in Finland (Essay 4). Along with the conventional economic fundamentals suggested by the available empirical literature on regional unemployment disparities, the study considers the measures of gross job and worker flows based on the establishment-level dynamics of labour-demand adjustment in the Finnish regional labour markets. In addition, the study includes an elaboration of the impact of gross migration flows on the regional unemployment rates. By doing this, the study fills an important gap in the literature on regional labour markets in Finland and provides empirical evidence for the importance of the reorganization of regional labour markets based on gross flows of jobs and workers. The evaluation of regional labour markets is based on regional panel data that is created by matching the conventional economic fundamentals with the measures based on gross flows of jobs and workers. The data covers the period from 1989 to 1996. The geographical division of Finland is based on NUTS4 regions. The number of these regions is 85. The estimation results are based on various panel data models. In particular, a dynamic model is considered, because adjustment of the key variables of interest is not necessarily immediate.

The Kernel density estimates for the distribution of the unemployment rate across the Finnish regions for the year 1991 (i.e. the bottom of the slump measured by the net rate of employment change) and the year 1996 reveal that there have not been substantial changes in the shape of the distributions of the unemployment rates despite the fact that there has been a sharp increase in the average unemployment rate with a rise in the dispersion of the unemployment rates at the same time. In particular, there is no empirical evidence for the bipolarization of the distribution of the regional unemployment rates during the 1990s. The striking empirical finding from the panel data estimations is that the reorganization of labour markets lowers the unemployment rate in the Finnish regions. In other words, the reallocation of labour resources seems to be good for regional employment. The essential role of reorganization in the determination of regional unemployment has some direct relevance for regional policy. In particular, this finding provides empirical support for the perspective that various public measures should not be aimed at aiding contracting plants since restructuring at the establishment level of the economy will eventually yield a lower unemployment rate.

1.2.3. Perception of job instability

There was an important and well-known switch from the framework of measurable cardinal utility to a theory based on a preference index of ordinal utility in microeconomics during the 1930s (see Frey and Stutzer 2002a; 2002b). Since then the mainstream perspective of economics has been that utility cannot be measured and there is usually no sense in the evaluation of various measures of self-reported subjective wellbeing by individuals. This switch has also had a deep impact on labour economics.

There is a long and equally well-established tradition of analysis that applies various subjective survey responses within the professions of psychology and sociology. Moreover, within the field of standard labour economics, it has always been common to apply labour force surveys that can be utilized, for instance, in the empirical studies of gross worker flows. However, along with the mainstream tradition of economics, labour economists have not focused on the investigation of the measures of self-reported subjective wellbeing by individuals.[23] The neglect of the measures of the subjective wellbeing of individuals is at least partly related to the fact that economists are usually sceptical about the use of this kind of individual-level survey data owing to non-random measurement errors. For instance, Berthard and Mullainathan (2001) provide selected empirical evidence on the issue that the measument error of often applied surveys tends to correlate with a large number of individuals' characteristics such as education.

However, this traditional pattern of the literature changed rapidly during the 1990s.[24] There have therefore been an increasing number of empirical studies by economists based on the self-reported measures of subjective wellbeing by individuals. These studies aim to explain, for instance, various measures of happiness and job satisfaction (see Clark and Oswald 2002; Frey and Stutzer 2002a; 2002b). In particular, within the context of labour economics, one of the most important empirical findings has been that unemployed persons report substantially lower levels of happiness than employed persons (see, for example, Oswald 1997). Indeed, this piece of empirical evidence is highly important from the economic policy perspective due to the fact that the observation underlines the notion that unemployment is involuntary by its nature for most of the unemployed.

The perception of job instability constitutes an important subjective measure of wellbeing by individuals owing to the fact that for the large majority of employees only one match with an employer comprises most of the current earnings, making their welfare closely related to the potential risk of losing their job in the presence of incomplete insurance against shocks. In other words, the very nature of the labour markets itself gives rise to a

perception of job instability among employees. This problem is apparent in the context of the persistent European unemployment problem.

The perception of job instability is not disconnected from the issues of working hours and labour market flows. In particular, the perception of job instability is related to the unequal distribution of working hours across individuals and households in Europe that is highlighted in the pattern of overtime. Indeed, the perception of job instability (i.e. the fear of nullification of hours of work entirely) constitutes an antithesis to overtime. Moreover, an investigation into the perception of job instability completes the picture painted by the studies that focus on gross flows of jobs and workers covering European countries. The recent studies that underline the enormous magnitude of gross flows of jobs and workers usually fail to differentiate between voluntary and involuntary flows. An investigation that focuses on the perception of job instability among workers is able to focus more deeply on the determination of involuntary flows of workers that are directly related to the European unemployment problem.

There have been a great number of empirical studies on job instability that aim to document and investigate the realized patterns of job instability by individuals. Those studies, for instance, focus on the tenure structure over the past few decades (see, for example, OECD 1997). In contrast, there are a rather limited number of empirical studies that aim to investigate the empirical determination of perceived job instability from individual to individual. The latter empirical studies require survey data. In particular, there have not been empirical investigations that aim to evaluate the economic fundamentals of the perception of job instability in the European labour markets. The focus of the available empirical literature on perceived job instability has been heavily on the unregulated Anglo-Saxon labour markets. Thus, there is an urgent need to understand the pattern of the perception of job instability in the context of the European labour markets that have been characterized by the persistent unemployment problem.

The last essay in this collection investigates the perception of job instability among workers in Europe (Essay 5). In particular, the aim of this study is to investigate the empirical determination of the subjective probability of the job instability of individuals by using unique survey data from all the 15 member states of the European Union and Norway. The survey was conducted in 1998 and it contains 5435 individuals. The question about the perception of job instability is formulated in the survey as follows: ”Do you worry about the security of your present work?”. The answers to the question can be either ”yes” or ”no”. Thus, the estimation results are based on Probit models. The study provides detailed empirical evidence, for example, on the individual characteristics such as age and

education that are related to the perceived job instability of individuals in European labour markets. In addition, the study includes a consideration of job and firm characteristics and their role in the determination of the perception of job instability. Thus, the survey data enables us to evaluate the whole spectrum of economic fundamentals that give rise to a perception of job instability. There tends to be a rather vague relationship between institutional features and the perception of job instability among workers. However, the patterns of perceived job instability and the institutional features of European countries are not consistent with the popular notion that the perception of job instability declines as the strictness of labour standards and the strictness of employment protection increase. This pattern emerges despite the stylized feature of the earlier literature that the magnitude of gross job and worker flows of the economies declines as the strictness of labour standards and employment protection increases. This means that the perception of job instability and the underlying gross flows of job and workers need not be closely correlated.

The estimation results reveal that perceived job instability increases with age. In other words, there is evidence for the perspective that it is the job loss wage penalty more than the job loss incidence that drives the perception of job instability among European workers. The conclusion on the role of job loss incidence is based on the fact that the turnover of workers is higher among young workers. An increase in the educational level, on the other hand, leads to a decline in the perception of job instability. There are no differences in the perceptions of job instability between males and females. An occurrence of unemployment during the past five years delivers a substantial rise in the perception of job instability. The empirical finding that the unemployment history strongly matters is consistent with the notion that an unemployment episode provides private information about the unobservable productivity of an employee. The most striking result is that a temporary contract as such does not yield an additional increase in the perception of job instability at the individual level of the economy. However, the perception of job instability is more common in manufacturing and there is some evidence for the perspective that it increases according to the size of the firm. There are also strong country effects. For instance, the perception of job instability among workers is lower in Denmark and higher in Spain than in Norway even after taking into account the controls included for the incidence of job instability at the individual level of the economy in European labour markets.

1.3. Summary of findings

• An increase in labour productivity and a widening of the tax wedge have contributed to a decline in the average working time in Finland from the long-run perspective. These observations are consistent with the predictions of a theoretical model that is based on the notion of equilibrium working hours.

• Overtime hours have an interesting role in the adjustment of total hours of work in Finnish manufacturing. The stylized feature emerges according to which overtime hours are more frequent in the population of small establishments.

• Gross job and worker flows reveal the enormous heterogeneity in the plant-level adjustment of labour demand in the Finnish regional labour markets in contrast to the earlier empirical literature that has focused on the elaboration of the net rate of employment change.

• The internal and external reorganization of labour markets lowers the unemployment rate in the Finnish regions. This means that the reallocation of labour resources at the plant-level of the regions seems to be good for regional employment in contrast to the earlier empirical literature that has stressed the notion according to which restructuring is an important source of the regional unemployment problem.

• The unemployment history of workers strongly matters for the perception of job instability in European labour markets. This pattern highlights the substantial costs associated with the high unemployment trap.

References

Abowd, J.M. and F. Kramarz (1999), “The analysis of labor markets using matched employer-employee data.” In *Handbook of Labour Economics,* Vol. 3B, 2629–2710. Eds. O. Ashenfelter and D. Card. Amsterdam: North-Holland.

Bean, C. (1994), ”European unemployment: a survey.” *Journal of Economic Literature* 32, 573–619.

Bertrand, M. and S. Mullainathan (2001), ”Do people mean what they say? Implications for subjective survey data.” *The American Economic Review* 91, 67–72.

Blundell, R. and T. McCurdy (1999), ”Labor supply: a review of alternative approaches.” In *Handbook of Labour Economics,* Vol. 3A, 1559–1695. Eds. O. Ashenfelter and D. Card. Amsterdam: North-Holland.

Böckerman, P. (2000), “Suomen työttömyys: Alueellinen näkökulma.” (in Finnish). In *Suomalaisen sosiaalipolitiikan alueellinen rakenne,* 72–92. Eds. H.A. Loikkanen and J. Saari. Helsinki: Sosiaali- ja terveysturvan keskusliitto ry.

Böckerman, P. and J. Kiander (2002a), ”Labour markets in Finland during the great depressions of the twentieth century.” *Scandinavian Economic History Review* 50, 55–70.

Böckerman, P. and J. Kiander (2002b), ”Has work-sharing worked in Finland?” *Applied Economics Letters* 9, 39–41.

Böckerman, P. and M. Maliranta (2003), ”The micro-level dynamics of regional productivity growth: the source of divergence in Finland.” Discussion Papers, (Forthcoming). The Research Institute of the Finnish Economy.

Clark, A.E. and A.J. Oswald (2002), “A simple statistical method for measuring how life events affect happiness.” *International Journal of Epidemiology* 31, 1139–1144.

Contensou, F. and R. Vranceanu (2000), *Working Time. Theory and Policy Implications.* Cheltenham: Edward Elgar.

Davis, S.J. and J. Haltiwanger (1999), “Gross job flows.” In *Handbook of Labour Economics,* Vol. 3B, 2711–2805. Eds. O. Ashenfelter and D. Card. Amsterdam: North-Holland.

Elhorst, J.P. (2003), ”The mystery of regional unemployment differentials: a survey of theoretical and empirical explanations.” *Journal of Economic Surveys,* (Forthcoming).

Elliott, R.F. (1991), *Labor Economics. A Comparative Text.* London: McGraw-Hill Book Company.

Frey, B.S. and A. Stutzer (2002a), *Happiness & Economics. How the Economy and Institutions Affect Human Well-Being.* Princeton: Princeton University Press.

Frey, B.S. and A. Stutzer (2002b), "What can economists learn from happiness research?" *Journal of Economic Literature* 40, 402–435.

Haltiwanger, J.C., J. Lane, J. R. Spletzer, J.J.M. Theeuwes and K.R. Troske (1999), (eds.) *The Creation and Analysis of Employer-Employee Matched Data.* Amsterdam: Elsevier.

Hamermesh, D.S. (1996), *Labor Demand.* Princeton: Princeton University Press.

Hart, R.A. (1987), *Working Time and Employment.* London: Allen & Urwin.

Hetemäki, M. (2002), "Työttömyyden taloudelliset ja inhimilliset kustannukset." (in Finnish). *PTT-Katsaus* 23, 19–24.

Hicks, J.R. (1963), *The Theory of Wages.* London: MacMillan.

Honkapohja, S. and E. Koskela (1999), "The economic crisis of the 1990s in Finland." *Economic Policy* 14, 400–436.

Holm, P. and J. Kiander (1993), "The effects of work-sharing on employment and overtime in Finnish Manufacturing 1960–1987." *Applied Economics* 25, 801–810.

Ilmakunnas, P. (1995), "Working time and labour demand in Finnish manufacturing: short-run and long-run effects." *Applied Economics* 27, 995–1002.

Ilmakunnas, P. and M. Maliranta (2003), "The turnover of jobs and workers in a deep recession: evidence from the Finnish business sector." *International Journal of Manpower* 24, (Forthcoming).

Ilmakunnas, S. (1997), "Female labour supply and work incentives." Studies 68. Labour Institute for Economic Research.

Ilmakunnas, S. (2001) (ed.), "Työmarkkinat testissä." (in Finnish). VATT Publications 30. Government Institute for Economic Research.

Ilmakunnas, S. and E. Koskela (2002) (eds.), "Towards higher employment. The role of labour market institutions." VATT Publications 32. Government Institute for Economic Research.

Kangasharju, A. and J. Pehkonen (2001), ”Employment-output link in Finland: evidence from regional data.” *Finnish Economic Papers* 14, 41–50.

Kapteyn, A., A. Kalwij and A. Zaidi (2000), ”The myth of worksharing.” 23/2002. CentER Discussion Papers.

Kiander, J. (2001), ”Laman opetukset.” (in Finnish). VATT-Publications 27:5. Government Institute for Economic Research.

Kiander, J. and P. Vartia (1996), “The great depression of the 1990s in Finland.” *Finnish Economic Papers* 9, 72–88.

Koskela, E. and R. Uusitalo (2003), ”The un-intented convergence: how the Finnish unemployment reached the European level.” Discussion Papers 188. Labour Institute for Economic Research.

Layard, R. and S. Nickell (1999), ”Labor market institutions and economic performance.” In *Handbook of Labour Economics,* Vol. 3C, 3029–3084. Eds. O. Ashenfelter and D. Card. Amsterdam: North-Holland.

Lilja, R. (1991), “The problematic and unproblematic second job.” Discussion Papers 107. Labour Institute for Economic Research.

Lowry, I.S. (1966), *Migration and Metropolitan Growth: Two Analytical Models*. San Francisco: Chandler Publishing Company.

Maddison, A. (1995), *Monitoring the World Economy, 1820–1992.* Paris: OECD.

Maliranta, M. (2001), “Productivity growth and micro-level restructuring. Finnish experiences during the turbulent decades.” Discussion Papers 757. The Research Institute of the Finnish Economy.

Maliranta, M. (2002), “From R&D to productivity through plant-level restructuring.” Discussion Papers 795. The Research Institute of the Finnish Economy.

Maliranta, M. (2003), “Micro-level dynamics of productivity growth. An empirical analysis of the great leap in the Finnish manufacturing productivity in 1975–2000.” (Forthcoming). The Research Institute of the Finnish Economy.

Marjanen, R. (2002), ”Palkkaratkaisujen sisältö ja toteuttaminen tulopolitiikan aikakaudella.” (in Finnish). B 188 Series. The Research Institute of the Finnish Economy.

Nätti, J., Kinnunen, U., Happonen, M. and Mauno, S. (2001), ”Perceived job insecurity among Finnish employees in 1980-2000: prevalence and antecedents.” In *1990s Economic Crisis. The Research Programme on the Economic Crisis of the 1990s in Finland: Down from the Heavens, Up from the Ashes. The Finnish Economic Crisis of the 1990s in the Light of Economic and Social Research*, 484-506. Eds. K. Kalela, J. Kiander, U. Kivikuru, H.A. Loikkanen and J. Simpura. Helsinki: Government Institute for Economic Research, Helsinki.

OECD (1997), *Employment Outlook.* Paris: OECD.

OECD (2000), *Employment Outlook.* Paris: OECD.

Oswald, A.J. (1997), ”Happiness and economic performance.” *The Economic Journal* 107, 1815–1831.

Oswald, A.J. (2000), ”Defending economics.” *Royal Economic Society Newsletter* 110, 8.

Pehkonen, J. and H. Tanninen (1997), ”Institutions, incentives and trade union membership.” *Labour: Review of Labour Economics and Industrial Relations* 11, 579–597.

Pehkonen J. and H. Tervo (1998), ”Persistence and turnover in regional unemployment disparities.” *Regional Studies* 32, 445–458.

Pekkala, S. and Ritsilä, J. (2000), “A macroeconomic analysis of regional migration in Finland 1975–95.” *Review of Regional Studies* 29, 71–85.

Pohjola, M. (1998) (ed.), Suomalainen työttömyys. (in Finnish). Helsinki: Taloustieto Oy.

Prescott, E.D. (2002), ”Prosperity and depression.” *The American Economic Review* 92, 1–21.

Prime Minister’s Office (2000), ”Alueellinen kehitys ja aluepolitiikka Suomessa.” (in Finnish). Publications 2000/6. Prime Minister’s Office.

Santamäki-Vuori, T. and S. Parviainen (1996), “The labour market in Finland.” Studies 64. Labour Institute for Economic Research.

Schumpeter, J.A. (1942), *Capitalism, Socialism, and Democracy.* Harvard: Harper and Row.

Tervo H. (1998), ”The development of regional unemployment differentials in Finland in the 1990s.” *Finnish Economic Papers* 11, 37–49.

Uusitalo, R. (2002), ”Changes in the Finnish wage structure: will demand and supply do?” *Scandinavian Journal of Economics* 104, 69–85.

Van Praag, B.M.S., Frijters, P., Ferrer-i-Carbonell, A. (2001), ”The anatomy of subjective well-being.” Discussion Papers 265. DIW.

Vartiainen, J. (1998), ”The labour market in Finland: institutions and outcomes.” Publications Series, 1998/2. Prime Minister’s Office.

Voth, H.-J. (2000), *Time and Work in England 1750-1830.* Oxford: Clarendon Press.

[1] The collections of empirical studies on the Finnish labour markets include Pohjola (1998) and Ilmakunnas (2001).

[2] Kiander and Vartia (1996), Honkapohja and Koskela (1999), and Kiander (2001) provide descriptions of the great slump of the early 1990s.

[3] Bean (1994) provides a survey of the European unemployment problem. Ilmakunnas and Koskela (2002) contains a collection of articles on the European unemployment problem. Koskela and Uusitalo (2003) provides a discussion of the Finnish unemployment problem in the European context.

[4] Santamäki and Parviainen (1996), Vartiainen (1998), and Marjanen (2002) provide descriptions of the Finnish labour markets.

[5] Vartiainen (1998) provides a description.

[6] Pehkonen and Tanninen (1997) studies this issue.

[7] Uusitalo (2002) provides evidence for the perspective that the distribution of wages has been more compressed during the times of collective agreements in Finland.

[8] Marjanen (2002) documents the evolution of wage drift in Finland during the past few decades.

[9] In addition, non-manual workers provide a great number of unpaid overtime hours.

[10] Böckerman and Kiander (2002a) provide a comparision of adjustment of the Finnish labour markets during the great depressions of the twentieth century.

[11] Maliranta (2001; 2002; 2003) reports that job destruction in low productivity and job creation in high productivity plants has positively contributed to the aggregate productivity growth rate of Finnish manufacturing. Böckerman and Maliranta (2003) focus on the regional dimension of productivity growth in Finland.

[12] Nätti *et al.* (2001) provide an empirical investigation on the perception of job instability in Finland during the 1990s.

[13] Blundell and McCurdy (1999) summarizes the literature.

[14] Ilmakunnas (1997) provides an empirical study on this issue in the Finnish context.

[15] Economists have usually had a sceptical perspective concerning the positive impacts of work-sharing schemes on employment. Hicks (1963) is among the few economists who have been a modest supporter of work-sharing schemes.

[16] The Finnish studies on work-sharing include Holm and Kiander (1993), Ilmakunnas (1995), and Böckerman and Kiander (2002b).

[17] Prescott (2002) argues that the large difference in labour suppy between France and the United States can be explained due to differences in the tax systems of those countries. The argument is based on the distortion induced by the intertemporal tax wedge that is more severe in France. Hetemäki (2002) provides empirical evidence for the perspective that an increase in the tax wedge yields a decline in average working hours in the OECD countries.

[18] Lilja (1991) provides a study on dual job holding in Finland.

[19] Pehkonen and Tervo (1998), and Tervo (1998) provide studies on the regional disparities of the Finnish labour markets. Böckerman (2000) provides a summary of the literature. The Prime Minister's Office (2000) provides a summary of the development of the regional disparities during the 1990s.

[20] Ilmakunnas and Maliranta (2003) summarizes the Finnish evidence on gross flows of jobs and workers.

[21] For instance, Kangasharju and Pehkonen (2001) provide an analysis of growth and employment in the Finnish regions.

[22] The Finnish studies on migration have not focused on gross flows of migration (see, for example, Pekkala and Ritsilä 2000).

[23] Van Praag, Frijters and Ferrer-i-Carbonell (2001) provides a survey of the field.

[24] Frey and Stutzer (2002a; 2002b) provide a summary of the literature.

Determination of average working time in Finland

Petri Böckerman*
Jaakko Kiander**

*Labour Institute for Economic Research. Pitkänsillanranta 3A, FIN-00530 Helsinki, Finland. Fax: +358-9-2535 7332. Tel.: +358-9-2535 7330. E-mail: petri.bockerman@labour.fi
**Government Institute for Economic Research. Hämeentie 3, FIN-00531 Helsinki, Finland. E-mail: jaakko.kiander@vatt.fi

Abstract

This study explores the determination of average working time in the context of a Nordic welfare state. The study is focused on the Finnish case. The issue is explored by using data from six industries from 1960 to 1996. The main empirical result is that both an increase in labour productivity and a widening of the tax wedge have contributed to a decline in average working time in Finland. These observations are consistent with the predictions of a theoretical model that is based on the notion of equilibrium working hours.

JEL-code: J21
Keywords: working hours, work-sharing, tax wedge

1. Introduction

Europe's high unemployment trap has generated a great number of ambitious plans to solve the dilemma. One of them is known as "work-sharing" (see e.g. Contensou and Vranceanu 2000). The idea has also been put into practice in many OECD countries, where the average annual working time has been reduced either by contracts or by legislation.[1] The issue of work-sharing is debated in Europe, but little is known about the underlying economic fundamentals that have contributed to a decline in average working time during the past few decades.

There have indeed been certain interesting long-term trends in average working time across industrialized countries. Voth (2000) observes that there was a sharp increase in the length of average annual working time during the early stages of industrialization in England. This trend was reversed during the late 1800s. Maddison (1995) shows that average hours of work in advanced OECD countries fell from around 3000 hours a year in 1870 to between 1500 and 2000 hours a year by 1990. Evans, Lippoldt and Marianna (2001) note that the long-term decline in average annual hours has slowed down in almost all OECD countries in recent years.

In this study we focus on the determination of average working time in Finland. Economic development in Finland has been rapid since the Second World War. Rising productivity has definitely been the most important driving force of economic growth as in most other industrialized countries (see e.g. Hjerppe 1989). Along with the rapid growth in the post-war era, the public sector expanded, the tax wedge increased and average annual working time was gradually reduced. Nowadays, Finland is one of the Nordic welfare states, characterized by high labour taxes and a short average annual working time compared with the United States. These broad features of economic development mean that it is especially interesting to investigate the decline of average working time tied in with rising productivity and increasing labour taxes at the same time, which constitute the key elements of the Nordic welfare states. Thus, the following study aims to provide a coherent picture of these underlying elements of economic progress.

A standard microeconomic theory of individual labour supply suggests that labour supply and, hence, average working hours should decline when real incomes rise.[2] In reality individuals tend to supply the prevailing number of standard hours. In Finland, and in other Nordic countries, the standard hours are not decided on an individual or firm basis but instead collectively, either by binding collective agreements or by legislation. However, it can be argued that pressures for such agreements will grow when the individual demand

for leisure increases and that the pressures are reflected in collective bargaining over standard hours. In fact, an application of the representative agent framework can be motivated by noting that the following investigation is focused on the determination of average working time during the past few decades. Namely, the case can be made for the view that in democratic societies the demand for different types of working time arragements is aggregated without serious biases in the long-term. The underlying differences in preferences of individuals with respect to leisure can therefore be omitted and the issue can be elaborated by using the representative agent framework.

Thus, in this study we use a simple model of individual labour supply to capture the effects of productivity growth and labour taxation. It is assumed that the real labour cost equals labour productivity and that the desired leisure increases with total incomes. There is a public sector in the model which produces public goods and gives income transfers to households. This feature is motivated by noting that the study is about the determination of average working time in a Nordic welfare state. The public sector has a binding budget constraint and hence it has to finance its expenditure by taxing labour input. The effects of the payroll taxes and income taxes are identical in the model.

The aim of this study is therefore to elaborate the economic fundamentals that have contributed to a decline in average working time at the aggregate level in the case of Finland. The empirical investigation is conducted through the use of a panel data set consisting of six industries, from 1960 to 1996. The main empirical result of this study is that both an increase in labour productivity and a widening of the tax wedge have contributed to a decline in average working time. The study appears in five sections. The next section presents a simple model of labour demand and wage setting which tries to illuminate some basic feedback mechanisms between productivity, the tax wedge and average working time. The third section contains a short description of the data set along with an international comparison of annual hours, and provides a justification for the choice of variables. The fourth section reports the empirical results from a number of panel data estimations. The last section concludes with a few remarks.

2. The model

Consider a simple model of individual labour supply. We first assume that firms are on their labour demand curves, and hence the labour cost is equal to the marginal product of labour, or

$$(1+s)W = Q, \tag{1}$$

where W is the hourly wage and payroll tax is denoted by s. For simplicity we assume that in the long run the marginal product of labour (Q) is equal to the average product of labour. Hence Q can be interpreted as average labour productivity, which increases with time-dependent technical progress, $A(t)$, and capital-labour ratio (K/N):

$$Q = A(t)F\left(\frac{K}{N}\right), \tag{2}$$

For simplicity we take the capital stock here as an exogenous constant. The workers are assumed to get utility from consumption of goods and of leisure. For simplicity we assume that there is no saving. Hence the utility function of the workers is given by

$$V = V(C, L) = V[WH(1-t) + G, T - H], \tag{3}$$

where the income tax rate is denoted by t. The income consists of after-tax labour income and the money value of a bundle of public goods and income transfers provided by the government (G). The number of hours worked is H, and T is the number of total hours. Public expenditure is determined by a political process which is treated as exogenous.

Substituting equation (1) for equation (3) yields

$$V = V\left(\frac{QH}{\Theta} + G, T - H\right), \tag{4}$$

where $\Theta = \frac{1+s}{1-t} \geq 1$ is a measure of the tax wedge.

The government covers its expenditure by taxing employers and employees. Hence its budget constraint is given by

$$G = (s+t)WH = \frac{\Theta - 1}{\Theta} QH = \frac{\Theta - 1}{\Theta} Y, \tag{5}$$

where Y is the aggregate output per capita.

Let us use the following logarithmic specification of the utility function to derive the comparative statics results:

$$V = \log\left(\frac{QH}{\Theta} + G\right) + B(QH)\log(T - H), \tag{6}$$

where B is the weight of leisure. We assume that B is a increasing function of aggregate output:

$$B = B(QH), \quad B' > 0, \tag{7}$$

The optimal labour supply can now be derived from the first-order condition of utility maximation:

$$\frac{\P V}{\P H} = B'Q(-\log L) + \frac{Q}{QH + G\Theta} - \frac{B}{T - H} = 0 \tag{8}$$

The effect of increased productivity on individual working time can be derived by differentiating the first-order condition:

$$\begin{aligned} \frac{\P^2 V}{\P H \P Q} &= -B' \log L - B'' H \log L - \frac{B' H}{T - H} + \frac{\Theta(G - G_\Theta Q)}{(QH + G\Theta)^2} \\ &= -B' \log L - B'' H \log L - \frac{B' H}{T - H} < 0, \end{aligned} \tag{9}$$

since $G - G_\Theta Q = 0$. Whether this expression is negative or positive is an empirical question. Theoretically, it depends on the sign and the size of B". However, it is clear that the average productivity has a negative effect on working time when the total output per worker is sufficiently low. In fact, the expression (9) is always negative if we assume that the equation (6) can be maximized by treating B(QH) as given, because this leads to dropping the first terms on the RHS of the equations (8)–(9). Thus, it is evident that an increase in average productivity yields a decline in average working time.

In addition, it is interesting to examine the corner solutions of the maximization of (6) concerning B, which is the weight of leisure in the utility function of the representative agent. If B=0, then an increase in productivity has no effect at all on the determination of average working time. This result means that if the following empirical investigation shows that working time declines as productivity rises, there is, in fact, empirical evidence for the view that people put more weight on leisure as they get richer.

Similarily, it can be clearly shown that an increase in the tax wedge also reduces the working hours:

$$\frac{\P^2 V}{\P H \P \Theta} = -\frac{(G + \Theta G_\Theta)}{(QH + G\Theta)^2} < 0 \tag{10}$$

The size of this effect increases with the size of the public sector. If B=0, then an increase in the magnitude of the tax wedge still leads to a decrease in average working time.

Remembering that the average productivity consists of technical progress and capital intensity, one can write:

$$H = H\left(A(t), \frac{K}{N}, \Theta \right) \tag{11}$$

$$\frac{\P H}{\P A(t)}, \frac{\P H}{\P (K / N)} < 0 \ \ for \ \ QH < Q^* H^* \ \ and \ \ \frac{\P H}{\P \Theta} < 0 \ \ for \ all \ \Theta .$$

Or in words, the equilibrium working time depends on productivity and the tax wedge.

3. The data

An international comparison indicates that there are certain interesting differences in the evolution of standard annual hours across industrialized countries that need to be addressed (Table 1). A well-known stylized feature of international patterns is the fact that the level of average working time is lower in Europe compared with the United States. There has been a decline in annual hours for full-time manufacturing workers in most of the European Union countries. In contrast, there there has been essentially no reduction in annual hours in the United States.[3] This comparison reveals that Finland definitely belongs to the group of European countries in which there has also been a substantial decline in annual hours from 1984 to 1995. Thus, the following empirical investigation is able to contribute to the discussion on the reasons for these large disparities across countries from the perspective of a Nordic welfare state.

The determination of average working time in Finland is studied by dividing the economy into six main sectors.[4] The sectors are agriculture, forestry and logging (SIC95: A-B), manufacturing (SIC95: C-E), construction (SIC95: F), the wholesale and retail trades (SIC95: G), transportation (SIC95: I) and public activities (SIC95: L-N).[5] The study is based on the yearly observations from 1960 to 1996.

A short description and the source of the variables is provided in Table 2. Through the use of a panel data estimation, average working time is explained by labour productivity, the tax wedge and gross capital formation. The decline in hours per worker is evident in the case of all sectors from 1960 to 1996. However, it is important to note that there also exists an interesting variation in the behaviour of hours per worker across the sectors. This variation is naturally masked in the aggregate data. An important feature of the data set is that the sectoral variation in a tax wedge variable is totally generated by one component of the tax wedge, namely by “social security contributions / wages”. The reported results are robust with respect to this specification.

The study also contains a potential weakness, because it is not possible to get disaggregated data on standard hours and overtime covering the whole period from 1960 to 1996. This means that we have to use data on *actual* average working hours.[6] However, this is not a major problem, because - as noted by Holm and Kiander (1993) and Ilmakunnas (1995) – in the long run the time path of actual working hours closely follows that of standard hours, at least in the case of Finnish manufacturing.[7] Figure 1 illustrates the evolution of standard hours and actual hours per worker in the Finnish manufacturing industry from 1960 to 1996. The permanent gap between standard hours and actual hours per worker is mainly due to sickness and parental leaves. The rapid fall in actual hours per worker during the great slump of the early 1990s is a consequence of sweeping layoffs. The relationship of standard hours and actual hours per worker in other sectors of economy is not known, but there is no particular reason to think that firms could use overtime as a long-term arrangement in the other sectors of the economy. The reason is that a permanent increase in overtime is due to the high overtime premia: a far too expensive way to adjust labour input from the point of view of firms. Thus, the (minimum) premium for daily overtime is 50% for the first two hours and 100% for each following hour in Finland. The premium for weekly overtime is 50%, irrespective of the number of hours.[8]

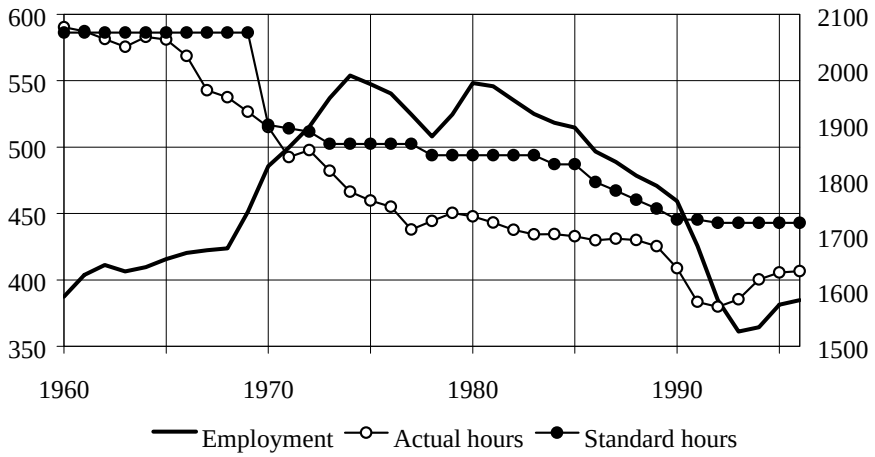
Table 1. Standard annual hours for full-time manufacturing workers in selected countries, 1995 (Hunt 1998).

Country	*Standard annual hours*	*Percent change, 1984–1995*
Finland	1716	-5.9
Denmark	1672	-7.9
Sweden	1808	0.0
Norway	1725	-6.7
Western Germany	1602	-9.0
France	1755	-1.6
Portugal	1882	-7.1
United Kingdom	1762	-1.3
United States	1896	-0.1

Table 2. The description of the variables and their sources. "Direct taxes / household income" (TAXW1) and "Indirect taxes / consumption expenditures" (TAXW2) are *not* sectoral variables. The sectoral variation in the tax wedge (TAXWEDGE = TAXW1 + TAXW2 + TAXW3) is totally generated by "social security contributions / wages" (TAXW3).[9]

Variable	*Source*
Value added in basic values (Q)	National Accounts
Direct taxes / household income (TAXW1) Indirect taxes / consumption expenditures (TAXW2) Social security contributions / wages (TAXW3)	National Accounts
TAXWEDGE = TAXW1 + TAXW2 + TAXW3	
Performed working hours (WH)	National Accounts
Employed persons (NI)	National Accounts
Gross capital formation (K)	National Accounts

Figure 1. An evolution of employment (thousand persons, left-hand scale), and standard hours and annual actual average working hours (right-hand scale) in manufacturing from 1960 to 1996 (Source: The Confederation of Finnish Industry and Employers & National Accounts).



4. The results

Since the data covers all main sectors in Finland, it is convenient to set up a fixed effects model in order to investigate the determination of average working time in Finland, as follows:

$$\text{Log}(WH/NI)_{it} = \nu_i + \mu_t + b_1\text{Log}(Q/NI)_{it} + b_2\text{TAXWEDGE}_{it} + b_3\text{LogK}_{it} + e_{it} \quad (12)$$

where WH stands for performed working hours, NI for employment, Q for value added in basic values, K for gross capital formation and ν_i is an industry factor. It captures all the industry-specific characteristics (such as the labour intensivity of production) that remain stable over time. μ_t includes all factors that are common to industries and tend to vary over time (such as interest rate hikes, recessions and the changes in taxation etc.).

The estimation results are reported in Table 3. The main result is that an increase in labour productivity and a widening of the tax wedge have both contributed to a decline in average working time in Finland.[10] These observations are therefore consistent with the earlier theoretical elaboration. The results are also in line with common sense. This is due to the fact that a rise in labour productivity over time means that people get richer and as a consequence they demand more leisure. Reductions in working time are therefore one way of distributing increased prosperity. On the other hand, a widening of the tax wedge over time has meant that for workers it is more attractive to take the fruits of increased productivity as an increase in leisure. As a crude conjecture, one might conclude that capital deepening could in principle via various substitutions effects lead to a decline in average working time. However, the estimation results are not in line with this view in the case of Finland.[11]

Table 3. The estimation results of the fixed effects model for average working time in Finland, from 1960 to 1996 (dependent variable: average working time). The estimated model includes the year dummies and a constant.

Variables	*Coefficients*	*t-statistics*
Log(Q/NI)	-0.034	-2.38
TAXWEDGE	-0.392	-3.57
LogK	0.013	1.73
R^2	0.86	
F(39, 177)	27.17	
Number of observations	216	

5. Concluding remarks

The determination of average working time in Finland was studied by means of annual data from six industries from 1960 to 1996. As a starting point for the empirical investigation we formulated a simple model of average working time determination. The basic idea of the model is that higher incomes and higher taxes induce working time reduction in the context of a Nordic welfare state. The main empirical result is that both an increase in labour productivity and a widening of the tax wedge have indeed contributed to a decline in average working time in Finland. These observations are therefore consistent with the predictions of a theoretical model that is based on the notion of equilibrium working hours and provide a coherent explanation for the decline in average working time in Nordic welfare states during the past few decades.

References

Bell L.A. and Freeman, R.B. (2001), "The Incentive for Working Hard: Explaining Hours Worked Differences in the U.S. and Germany", *Labour Economics,* 8: 181–202.

Contensou F. and Vranceanu, R. (2000), *Working Time. Theory and Policy Implications,* Cheltenham: Edward Elgar.

Evans J.M., Lippoldt, D.C. and Marianna, P. (2001), "Trends in Working Hours in OECD Countries", Labour Market and Social Policy – Occasional Papers 45. OECD.

Hjerppe R. (1989), *The Finnish Economy 1860–1985,* Helsinki: Government Printing Centre.

Holm P. and Kiander, J. (1993), "The Effects of Work-sharing on Employment and Overtime in Finnish Manufacturing 1960–1987", *Applied Economics,* 25: 801–810.

Hunt J. (1998), "Hours Reductions as Work-sharing", *Brookings Papers on Economic Activity,* 1: 339–381.

Ilmakunnas P. (1995), "Working Time and Labour Demand in Finnish Manufacturing: Short Run and Long Run Effects", *Applied Economics,* 27: 995–1002.

Jacobson T. and Ohlsson, H. (1996), "Working Time, Employment, and Work Sharing: Evidence from Sweden", Working Paper Series in Economics and Finance 135. Stockholm School of Economics.

Johansen S. (1995), *Likelihood-based Inference in Cointegrated Vector Autoregressive Models,* Oxford: Oxford University Press.

Layard R., Nickell, S. and Jackman, R. (1991), *Unemployment. Macroeconomic Performance and the Labour Market,* Oxford: Oxford University Press.

Maddison A. (1995), *Monitoring the World Economy, 1820–1992,* Paris: OECD.

Pencavel J. (1986), "Labour Supply of Men: A Survey". In Ashenfelter, O. and Layard, R. (eds.) *Handbook of Labour Economics,* Vol. 1. Amsterdam: North-Holland, 3–102.

Santamäki-Vuori T. and Parviainen, S. (1996), "The Labour Market in Finland", Studies 64. Labour Institute for Economic Research.

Voth H.-J. (2000), *Time and Work in England 1750-1830,* Oxford: Clarendon Press.

[1] In German manufacturing industries a 35-hour week was adopted in the 1980s as a result of negotiations between unions and employers. In France, a 35-hour week has been legally enforced in order to alleviate the unemployment. Hunt (1998) provides a detailed discussion of work-sharing across industrialized countries.

[2] See e.g. Pencavel (1986).

[3] Bell and Freeman (2001) argue that workers choose hours of work in order to gain promotions and advance in the distribution of earnings. This means that the more unequally distributed U.S. earnings generate more hours than the German earnings distribution.

[4] Unfortunately, it is not possible to include in an empirical investigation variables that capture the composition of the labour force in Finland. This is due to the fact that the study takes a long-term view on average working time from 1960 to 1996 based on National Accounts. Employment Statistics by Statistics Finland, which includes detailed information about the composition of the labour force, was created in 1987. Thus, the motivation for an application of the representative agent framework can be strengthened by the fact that the empirical part of the study cannot take into account the composition of the labour force in Finland. This means that an application of the representative agent framework in the theoretical part of the study is indeed consistent with the following empirical investigation of the study.

[5] SIC refers to Standard Industry Classification.

[6] In other words, we use actual average working hours as a proxy variable for standard hours.

[7] However, an application of Johansen's (1995) procedure reveals that the log of standard hours and the log of actual working hours per worker in Finnish manufacturing are not cointegrated variables. This result is not generated purely by the observations from the great slump of the early 1990s. Jacobson and Ohlsson (1996) have investigated the long-run relationship of standard hours and actual hours per worker in the case of the Swedish private sector from 1963:1–1993:4. They concluded that the log of standard hours and the log of actual hours per worker are cointegrated variables.

[8] Santamäki and Parviainen (1996) provide a detailed description of the Finnish labour markets.

[9] Layard, Nickell and Jackman (1991) prefer this specification.

[10] The results are almost identical in the case of the random effects model with respect to reported ones.

[11] The specification of capital deepening as log(K/NI) yields the coefficient 0.020 with corresponding t-statistics of 2.51. This observation provides support to the perspective that capital deepening has produced an increase in average working time in Finland. The rest of the estimation results remain the same.

Overtime in Finland*

Petri Böckerman**

*I am grateful to Mika Haapanen, Pekka Ilmakunnas, Reija Lilja and Ralf Ramm-Schmidt for comments. I am grateful to Reijo Marjanen for the information about the data. I would like to thank two anonymous referees and the editor for valuable comments and suggestions that have greatly improved the study. Paul A. Dillingham has kindly checked the language. The usual disclaimer applies.
**Labour Institute for Economic Research, Pitkänsillanranta 3A, FIN–00530 Helsinki, Finland

Abstract

The study is about the incidence of overtime hours in Finland. The investigation uses individual-level data from the manufacturing industries from 1989 to 1995. The results show that the hours of overtime divided by the number of total hours decline as an employee ages. The overtime hours decline in wage per straight-time hours and in straight-time hours. Males and newcomers tend to work more overtime, but leavers work less overtime. The overtime hours are definitely more frequent in the population of small establishments. The degree of tightness in regional labour markets had no overall impact on the incidence of overtime from 1991 to 1995. There are strong industry effects.

JEL-code: J22
Keywords: working hours, overtime, manufacturing

1. Introduction

Despite the persistent unemployment in Europe, there are also a great number of employees that perform overtime hours. This same discrepancy is evident in Finland, where the unemployment rate has been at a high level despite the recovery from the great slump of the early 1990s.[1] At the same time, there has been a rise in overtime hours in Finland. The total hours of work consist of two major components. The so-called standard hours are determined by binding collective agreements. On the other hand, the overtime hours are determined at the individual level of the economy. Thus, the hours of overtime can vary from individual to individual for a variety of reasons.

However, the underlying empirical incidence of overtime hours has not been focused upon by labour market research in Europe.[2] The aim of this study is to characterize the incidence of overtime hours in Finland by using unique individual-level data from manufacturing industries from 1989 to 1995. The study also sheds light on the incidence of overtime induced by the heterogeneity of establishments. In addition, the study considers the impact of the degree of tightness in regional labour markets on overtime hours. This empirical investigation fills therefore a gap in the existing Finnish literature on working-time issues.

The study appears in six sections. The first section of the study clarifies the key conceptual questions and provides selected theoretical considerations of the issue of overtime hours. The most important elements of overtime regulation by the Finnish institutions are also discussed. The second section provides a brief snapshot of earlier empirical investigations into the issues of overtime hours in Europe. Thus, the motivation of the selected variables in the estimated overtime equation is based on previous literature on the incidence of overtime hours at the individual level. In addition, an elaboration is focused on the available Finnish studies on the hours of work in the manufacturing industries. The third section provides a description of the individual-level data. The fourth section includes a characterization of paid overtime hours in a nutshell by illustrating the distributions of the most important variables and by applying a kernel-density estimation. The fifth section provides an analysis of the incidence of overtime hours by applying regression techniques. In particular, the study includes a consideration of establishment characteristics on the incidence of overtime hours at the individual level, which has been a largely neglected issue in the earlier literature on overtime hours. The last section concludes.

2. Background

The appearance of overtime hours can be explained by following Bauer and Zimmermann (1999). Firms use overtime hours (in other words, the intensive margin of labour utilization in contrast to the extensive margin of labour utilization), because of the presence of the quasi-fixed cost of employment, i.e. hiring and training costs and various employee benefits that are related to employment but not to performed working hours. In practice, firms can utilize overtime hours in different ways. There are two major types of overtime. The so-called transitory overtime hours are compensated for with free time for the employees involved. In this case, overtime hours are often used in order to increase the flexibility of a firm's operations. On the other hand, there are definite overtime hours which are not compensated for with free time. These definite overtime hours can further be divided into paid and unpaid overtime.

The literature usually focuses only on the paid definite overtime hours. This study is not an exception, because there is no information on the number of unpaid overtime hours in the Finnish manufacturing industries. The focus of the study on the incidence of the overtime hours of manual workers means that the exclusion of unpaid overtime hours is not a severe problem. This is due to the fact that, among manual workers, there are hardly any incentives to perform unpaid overtime hours. Bell et al. (2000) provide various reasons for performing unpaid overtime hours. The reasons (for example, the conjecture that unpaid overtime work represents a form of gift exchange à la Akerlof) point out that the incidence of unpaid overtime should be much more common among non-manual workers. However, the information compiled by Statistics Finland (1995) indicates that there was an increase in unpaid overtime hours during the great slump of the early 1990s.

Employers usually pay a substantial overtime premium. Hart and Ma (2000) provide a recent theoretical investigation into the presence of an overtime premium. The model indicates that the wage premium serves to achieve contract efficiency within the framework of asymmetric information. The result is based on the notion that with both extensive and intensive margins of labour utilization, the wage rate alone cannot be set to achieve both optimal separation and optimal worker utilization. Thus, the presence of an overtime premium provides an additional instrument that can solve the problem.

The productivity of performed overtime hours is an important element that affects the demand for overtime hours by firms. Ilmakunnas (1994) provides empirical evidence about the productivity of overtime hours for the Finnish manufacturing industries based on national accounts. The results indicate that the productivity of overtime hours is about the same as that of standard hours.

There is a potential role for establishment characteristics in the incidence of overtime hours. In particular, small establishments should use more overtime hours. This observation would be consistent with one of the well-known stylized features in the industrial organisation literature, which states that the variance of growth rates in employment, sales or some other key measures of economic activity tend to decline with the size of an establishment (see Caves 1998). Thus, small establishments should utilize more overtime, because they encounter more volatility in demand and production.

The institutional setup of the Finnish labour markets is relevant for the regulation of working time and for the overtime compensation schemes. Labour market policy is the result of a close and long-term interplay between organised agents and the government. In fact, Finland provides an example, par excellence, of a corporatist political and economic system (see, for example, Vartiainen 1998). The regulation of working time in Finland is therefore based on the Working Hours Act, which is prepared on a tripartite basis (Santamäki-Vuori and Parviainen 1996). This means that representatives of employers, employees and government are involved in the reforms of the Working Hours Act. The Working Hours Act is a general law, supplemented in many sectors by more specific acts. Under the Act, there are upper limits of 8 regular working hours per day and 40 per week.[3] According to the Working Hours Act, overtime comprises the time in excess of the regular hours, on either a daily or weekly basis. If the latter is used, overtime on individual days is not counted. Employees must also be paid extra for overtime hours in Finland. The (minimum) premium for daily overtime is 50% for the first two hours and 100% for each following hour. The premium for weekly overtime is 50%, irrespective of the number of hours.

3. Previous related studies

There are some empirical investigations into the issues of overtime hours. In particular, Green and McIntosh (2001) provide evidence on the intensification of labour effort in Europe. This snapshot of the existing literature is focused on the studies that look at the incidence of overtime hours at the individual-level of the economy.

The unregulated UK labour markets provide an interesting opportunity to investi-gate the incidence of overtime hours. Bell and Hart (1999) provide an analysis of the incidence of overtime hours in the UK by applying individual-level data on male non-managerial workers. The results can be summarized as follows. The straight-time wage exerts a negative influence on overtime incidence, which is consistent with an income effect. An increase in overtime

hours at the individual level as the wage per straight-time hours rises would be consistent with the notion of the substitution effect. Straight-time weekly hours are also negatively related to the incidence of overtime hours. The number of overtime hours rises with age up to the late 40s before declining. Thus, there is an inverted U-profile. Central and local government workers work significantly fewer weekly overtime hours compared with the private sector workers, which is in line with the notion that various production fluctuations are more frequent in the private sector of the economy.[4] In addition, the results indicate that collective bargaining agreements succeed in reducing straight time while raising overtime hours with respect to uncovered workers.[5] This feature enchances the covered/uncovered wage differential in the UK. Green (2001) reports that the dispersion of working hours has indeed recently increased in the UK. Thus, working hours have been concentrated in fewer households.

Bell et al. (2000) observe that the quantitative significance of both paid and unpaid overtime is greater in the UK with respect to Germany. They present overtime hours equations by applying the Tobit estimating procedure. The results indicate that paid overtime is more common among manual workers. In addition, the study includes company size as a potential factor in explaining overtime hours. Based on *a priori* reasoning, it would be expected that larger firms would more typically formalise their work arrangements. This is done in an effort to reduce various transaction costs associated with operations. Larger firms should therefore use more paid overtime hours, but fewer unpaid overtime hours due to more formal work arrangements. However, the empirical results by Bell et al. (2000) are mixed in this respect and do not provide solid evidence for the hypothesis that the share of paid overtime hours is higher among large firms.

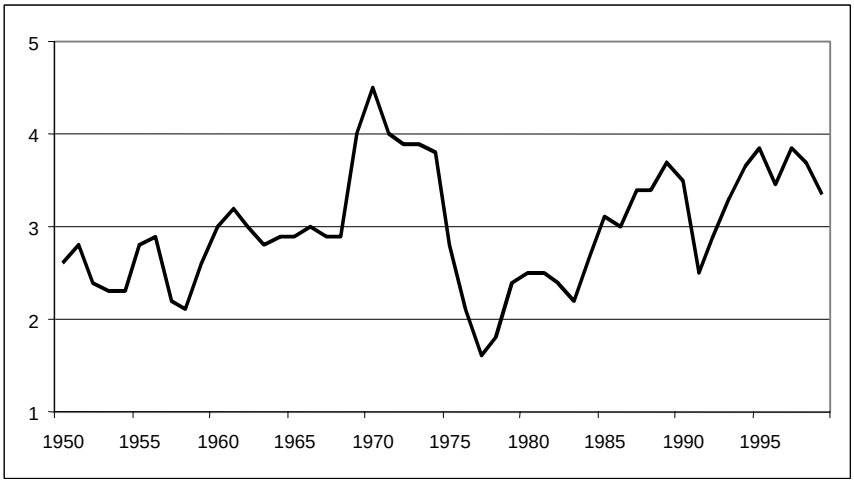
A well-known empirical regularity says that overtime hours rapidly adjust to the scale of economic activity.[6] Hart (2001) provides an elaboration of overtime hours based on a panel of 28 local labour markets for the period 1926-1938. The results reveal that the British engineering industry adjusted to the severe falls in demand during the 1930s by cutting the hours of work. Kalwij and Gregory (2000) investigate the issue of overtime hours in Great Britain during the period from 1975 to 1999. The study indicates that as in a number of other countries the incidence of overtime indeed shows a distinct procyclical movement during the period of investigation. The easiest way to capture this feature of overtime hours is simply to introduce year dummies into the estimated overtime equations.[7]

Working time issues have been debated in Germany. Thus, there are studies of overtime hours with German data. Bauer and Zimmermann (1999) provide a detailed elaboration of overtime hours in Germany by applying individual-level data. The estimated overtime

equations are similar Tobit specifications, as in the investigation by Bell and Hart (1999). The results reveal that individuals working in small firms have a higher probability of working overtime hours. Levels of skill play an important role in the incidence of overtime hours. In particular, skilled blue-collar workers are more likely to work overtime than unskilled blue-collar workers.[8] Bauer and Zimmermann (1999) also note that the share of overtime has declined sharply in Germany during the past few decades. Bell and Freeman (2001) argue that workers choose hours of work in order to gain promotions and advance in the distribution of earnings. The more unequally distributed U.S. earnings therefore generate more overtime hours than the German earnings distribution.

The earlier empirical research on working time issues has mainly focused on one feature of the overtime hours in Finland. Thus, Holm and Kiander (1993), and Ilmakunnas (1995) conclude that reductions in standard working time have had a slight employment-increasing effect, but no effect on overtime hours. This means that there has been no rise in the share of paid overtime hours within the Finnish manufacturing industries during the past few decades (Figure 1).[9] In other words, in the long run the time path of actual working hours closely follows that of standard hours working, at least in the case of the Finnish manufacturing industries. This is due to the fact that a permanent increase in overtime is a far too expensive way to adjust labour input from the point of view of firms.

Figure 1. A share of overtime hours with respect to the total working time in the Finnish manufacturing industries from 1950 to 1999 (%) (Source: The Confederation of Finnish Industry and Employers).



However, there is one earlier study that applies detailed individual-level data in the elaboration of overtime hours in the Finnish economy. Asplund (1995) has investigated the underlying incidence of overtime hours in Finland from 1980 to 1993 by applying the same individual-level data covering the manufacturing industries as in this study. However, the article by Asplund (1995) does not include tabulation of the estimation results concerning the incidence of overtime hours at the individual level. The unreported results are said to be based on various specifications of Tobit and Probit regressions. The main focus in the investigation by Asplund (1995) is on the underlying sectoral composition of overtime hours and the individual characteristics in the incidence of overtime hours. The results based on the individual-level data indicate that there are some key factors that explain most of the incidence of overtime hours within the Finnish manufacturing industries. These factors are, by nature, rather similar to the variables applied in the empirical studies by other countries' data. These variables include age (i.e. young employees tend to work more overtime hours than older ones) and gender (i.e. men tend to work more overtime than women). The results also reveal that newcomers tend to work more overtime than the rest of the personnel within manufacturing firms. In addition, there was a sharp decline in overtime hours during the great slump of the 1990s in Finland. However, the study by Asplund (1995) does not include the elaboration of establishments' characteristics (such as the size of the establishment) as a potential element of the underlying incidence of overtime hours in the manufacturing industries in Finland. The effect of establishment size on the incidence of overtime hours is an interesting question to address, because Hohti (2000) has recently discovered that there was an episode of convergence in the actual average working hours across the size categories of establishments within the Finnish manufacturing industries from 1990 to 1994.

4. The data

The empirical investigation is based on yearly observations from 1989 to 1995. The data covers the manufacturing industries in the Finnish economy. This narrow focus of the study on the manufacturing industries is dictated by the availability of data. It is a major drawback, due to the well-known empirical regularity, that in the modern industrial economies the contribution of manufacturing industries to GDP has declined considerably during the past few decades. Thus, the modern economies have strongly tended to draw away from the manufacturing industries toward the service sectors. This stylized fact of structural change in the composition of economic activity applies to Finland.

However, despite this apparent erosion in the relative strength of the manufacturing industries, manufacturing still represents a more important role in the Finnish economy

compared with most of the European countries. In addition, non-manufacturing industries represent other forms of less stable labour relations such as part-time work and various temporary employment contracts (see Kauhanen 2000), which can be considered to be substitutes for the implementation of overtime hours from the point of view of firms.

The individual-level data is from the records of the Confederation of Finnish Industry and Employers (*Teollisuus ja Työnantajat*, TT). Approximately 5600 companies are members of the Confederation. These companies employ nearly 470000 persons. The member companies account for more than 75% of the nation's industrial value added and export income. The data is based on the fact that each year TT conducts a survey among its member employers and gathers detailed information on paid wages, salaries and the hours of work of employees (see Kettunen and Marjanen 1992; Kettunen and Vartiainen 1993; Vartiainen 1993; Asplund 1994). The sample contains all the workers who are employed in a firm that is affiliated to TT. Year 1990 was chosen as the base year and within each firm the workers were put in order according to their mean pay and every 15th worker was then selected for the sample. Longitudinal data was then created from 1990 onwards and backwards by applying unique personal codes that identify the workers of the manufacturing industries in Finland. The applied version of the data covers the situation during the last quarter of each year from 1989 to 1995. Thus, the data does not contain, for example, students that work only during the summer vacations. The data contains 56 135 observations.

The individual-level data is originally from 1980 to 1995. However, in this analysis of the incidence of overtime hours it is important to take into account the characteristics of establishments, which are available only from 1989 onwards. Thus, the applied version of the data in the following elaboration is from 1989 to 1995. In addition, it is important to stress that the data is not complete linked employer-employee data, because it contains only the size of establishment and the share of women in the establishment.

The applied variables of the analysis are summarized in Table 1. The Appendix provides the selected descriptive statistics for the most important variables in the estimated overtime equations. In the following analysis of the incidence of overtime hours an effort is made to explain a share of overtime hours in the total hours of work at the individual level (OVERTIME). The share of overtime is, by definition, a variable bounded by [0, 1]. However, the upper bound of the variable is reached if and only if an individual does not perform standard hours of work at all, which is in practice out of the question owing to the overtime regulations in the Finnish manufacturing industries.

Table 1. Descriptions of the selected variables.

Variable	*Definition/measurement*
Individual-level characteristics:	
OVERTIME	Hours of overtime divided by the number of total hours
AGE	Age of an employee
AGE^2	AGE squared
WAGE	A log of the wage of an employee divided by the straight-time hours
$WAGE^2$	WAGE squared
TIME	Straight-time hours
$TIME^2$	TIME squared
GENDER	1=female, 0=male
NEWCOMER	Employee that was not in the industry one year previously, 1=newcomer, 0 otherwise.
LEAVER	Employee that leaves the industry between this year and the next, leaver=1, 0 otherwise
EXPERIENCE	Total number of years in which the worker appears in the applied data from 1980 to 1995. The variable provides a crude measure of the professionality of an individual in the manufacturing industries.
METROPOLITAN	The collective agreement stipulates slightly higher pay in the metropolitan areas where the costs of living (such as housing) are presumably higher; a person is living in the metropolitan area=1, 0 otherwise.
Establishments' characteristics:	
SIZE	Size of establishment measured by the number of employees
$SIZE^2$	SIZE squared
WOMEN	Share of women in the establishment
Additional regional variable:	
UN	The regional unemployment rate (%) is for the 85 Finnish subregions (the so-called NUTS4–level of the European Union).
Dummy variables:	
INDUSTRIES	5–1, attached to employees based on the union code of an employee.
YEARS	7–1, from 1989 to 1995
OCCUPATIONS	428–1

Most of the selected variables are (almost) self-evident. The variable WAGE does not include any earnings from overtime hours, because then it would be an endogenous variable in the overtime equation. The variable NEWCOMER captures the new employees in the industry and the variable LEAVER captures the employees that leave the industry. It can be argued that the newcomers and the leavers are more "volatile persons" that represent more loose matches between employees and establishments.[10] The newcomers want to signal their high level of ability to their employers by extending the hours of overtime. Theory suggests that overtime is a credible signal, because it is costly to the employee in terms of lost leisure. Altonji and Paxson (1988; 1992) interpret the variable that indicates a quit in the hours equation as an indication of the underlying feature of labour markets that there are various hours restrictions within jobs induced by employers. This means that the desire to reduce or increase hours could not be acted upon in the current match.

The applied variable EXPERIENCE is a crude measure of how attached an employee is to the population of manufacturing establishments in Finland. The variable EXPERIENCE is calculated covering the whole period from 1980 to 1995. The applied variable is an imperfect and also downward biased measure of genuine labour market experience, because it does not capture at all employees' experience outside the manufacturing industries in Finland.

There is an additional regional variable from 1991 to 1995, namely, the regional unemployment rate (UN). In principle, there are two basic hypotheses concerning the effect of the regional unemployment rate on the incidence of overtime hours. The first hypothesis is based on the notion that the regional unemployment rate can be considered to be a proxy variable for local demand conditions. In other words, strong local demand for products of manufacturing industries could deliver a low level of unemployment and a high level of hours of overtime at the same time. However, this hypothesis is not on solid foundations, because most of the manufacturing industries are not selling their final products to the region in which they are located. The second hypothesis, which is more appealing, stipulates that the regional unemployment rate is an indicator of the degree of tightness in regional labour markets. In other words, a low level of regional unemployment could then be associated with a shortage of labour resources and deliver a strong demand for overtime hours at the establishment-level of the economy.

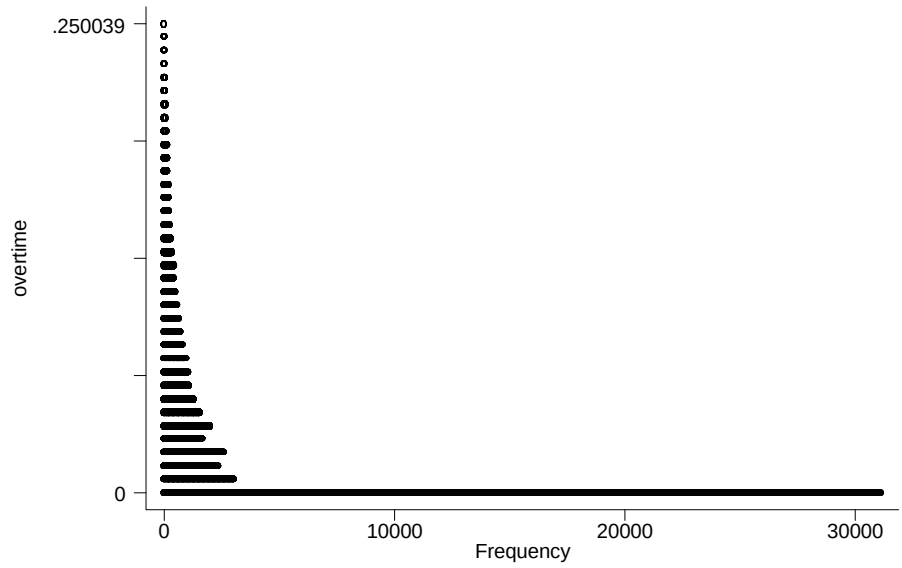
The applied data contains no industry classification as such. However, by using the code that delivers the information about the attachment of the employee to the collective agreements it is possible to create good proxies for the industry dummies. The industries of this study are as follows: (i) metal industries, (ii) textile industries, (iii) apparel industries,

(iv) manufacture of wood and wood and cork products, and (v) manufacture of paper and paper products. Thus, the study includes a large number of dummy variables. These variables are attached to the industries, occupations, regions (i.e. counties) and years (because of the fluctuations of overtime hours due to business cycles during the 1990s). The occupation dummies are not included in the following estimations due to their poor performance in the overtime equations.

5. The characterization of overtime hours at the individual level

This section of the study provides a brief characterization of overtime hours at the individual level by illustrating the distributions of the most important variables and by applying a kernel-density estimation. The main stylized features can be summarized as follows. The first fact concerns the notion that for most of the employees overtime hours represent only a small part of the total hours of work. This observation is evident in the figure showing the underlying distribution of overtime hours (Figure 2). This stylized feature means that the hours of overtime are an extremely flexible part of total working time at the individual level, because there is a large scope for the increase of paid overtime hours.

Figure 2. The distribution of OVERTIME from 1989 to 1995. The distribution is cut off at 0.25, which eliminates 406 observations.



In other words, according to the data, overtime compensation from 1989 to 1995 covers on average only about 1.8% of the total salary of manual workers in the Finnish manufacturing industries.[11] Thus, it seems reasonable to relate the incidence of overtime hours to various measurable characteristics held by individuals and establishments. The limited use of overtime means that there must be certain underlying economic fundamentals that give rise to the utilization of overtime hours and determine the distribution of overtime among individuals. This feature of overtime hours also means that the various reforms of taxation that affect the supply of hours of work should have a large impact on overtime hours.

The distributions of the share of the overtime hours at the individual level tend to give support to the notion that the share of overtime is negatively related to the age of an employee within the Finnish manufacturing industries (Tables 2a–2b). This pattern seems to be in contrast with a number of earlier empirical studies on the incidence of overtime hours that have found an inverted U-shape relation of overtime hours in terms of age in the European labour

Table 2a. The distribution of share of overtime hours across AGE groups.

AGE groups	*15–30*	*31–45*	*46–65*
Mean	0.03090	0.02870	0.02375
25th percentile	0	0	0
50th percentile	0	0	0
75th percentile	0.04270	0.03797	0.02970
95th percentile	0.13805	0.13514	0.11688
Number of observations	12 223	28 266	18 945

Table 2b. The distribution of share of overtime hours across AGE groups for the population of employees who have performed overtime hours.

AGE groups	*15–30*	*31–45*	*46–65*
Mean	0.06171	0.05974	0.05418
25th percentile	0.01887	0.01805	0.01613
50th percentile	0.04308	0.04043	0.03670
75th percentile	0.08444	0.08309	0.07523
95th percentile	0.18036	0.17684	0.15777
Number of observations	6 054	12 885	7 258

markets. However, Graversen and Smith (1998) document the inverted U-profile in terms of age for Danish men, but are unable to find it for Danish women.

Stewart and Swaffield (1997) provide an explanation for an inverted U-shape pattern of overtime hours with respect to age, which is based on the notion that over a third of manual workers in the UK would prefer to work fewer hours at the prevailing wage than they do. The inverted U-profile of overtime hours can therefore be rationalized as a result of deviations between desired and actual hours, i.e. employees are forced to work more hours than they want to because of institutional forces, job insecurity etc. Steward and Swaffield (1997) further argue that the fact that the age profile of desired hours is not matched by that in actual hours means that employers set constraints of hours above employee preferences. Ilmakunnas (1997) provides evidence that there exist a great number of disparities in desired and actual hours of work even in Finland.[12]

The share of the overtime hours at the individual level seems to be positively related to the variable WAGE (Tables 3a–3b). The distributions suggest that the overtime hours tend to rise at the individual level as the wage per straight-time hours rises, which is consistent with the notion of the substitution effect. Graversen and Smith (1998) observe the positive association for Danish workers between overtime hours and wage per straight-time hours. Finally, the share of the overtime hours seems to be negatively related to the size of the establishment (Tables 4a–4b). Thus, there is preliminary evidence that the employees in the population of small establishments tend to work more overtime than the rest of the workers in the manufacturing industries in Finland.[13]

Table 3a. The distribution of share of overtime hours across WAGE groups.

WAGE groups	*7.65–8.5*	*8.51–9.0*	*9.1–11.8*
Mean	0.01298	0.03351	0.13677
25th percentile	0	0	0.00472
50th percentile	0	0.00645	0.10420
75th percentile	0.01220	0.05048	0.22628
95th percentile	0.07356	0.14113	0.39098
Number of observations	22 769	30 224	887

Table 3b. The distribution of share of overtime hours across WAGE groups for the population of employees who have performed overtime hours.

WAGE groups	*7.65–8.5*	*8.51–9.0*	*9.1–11.8*
Mean	0.03814	0.06147	0.17814
25th percentile	0.01124	0.02041	0.06813
50th percentile	0.02778	0.04511	0.15744
75th percentile	0.05328	0.08811	0.26121
95th percentile	0.11111	0.16901	0.41304
Number of observations	7 751	16 475	681

Table 4a. The distribution of share of overtime hours across SIZE groups.

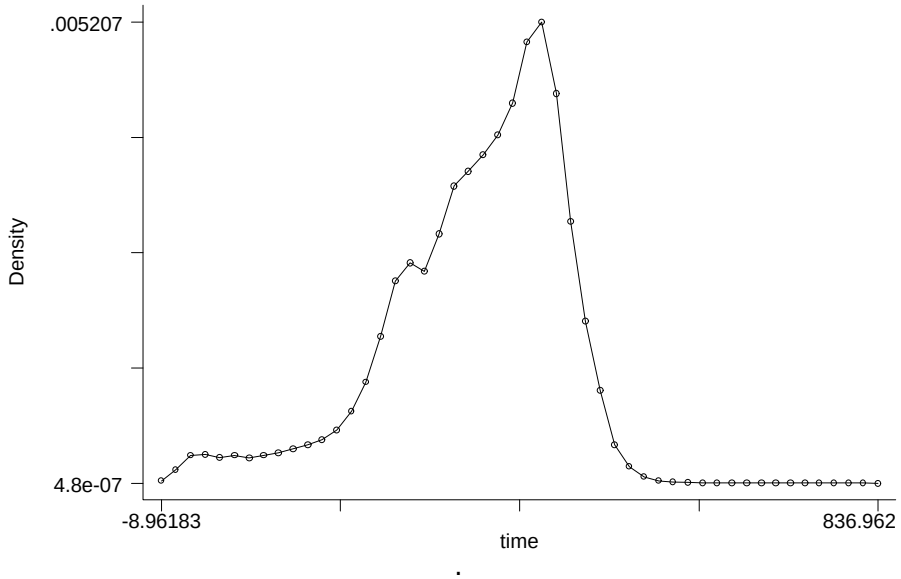
SIZE groups	*1–20*	*21–100*	*101–200*
Mean	0.02793	0.02735	0.02344
25th percentile	0	0	0
50th percentile	0	0	0
75th percentile	0.03562	0.03793	0.03226
95th percentile	0.13636	0.12453	0.10972
Number of observations	30 779	21 533	3 756

Table 4b. The distribution of share of overtime hours across SIZE groups for the population of employees who have performed overtime hours.

SIZE groups	*1–20*	*21–100*	*101–200*
Mean	0.06216	0.05581	0.04851
25th percentile	0.01786	0.01778	0.01724
50th percentile	0.04167	0.03904	0.03390
75th percentile	0.08571	0.07818	0.06612
95th percentile	0.18505	0.16117	0.14504
Number of observations	13 829	10 553	1 815

The distribution of straight-time hours reveals additional features. Thus, Figure 3 depicts the kernel-density estimate of straight-time hours from 1989 to 1995.[14] The applied variable TIME does not match the definition of so-called standard hours stipulated by the collective agreements in the Finnish manufacturing industries. The reason is that the data covers manual workers that have worked only a part of the last quarter from 1989 to 1995. Thus, the data contains, for example, workers that have had sick leaves during the period of the sample. The temporary employment contracts associated with Christmas holidays are an additional reason for the fact that the variable TIME does not correspond to standard hours during the last quarters.

Figure 3. Kernel density estimate for TIME from 1989 to 1995.



6. The results

Because the share of overtime is, by definition, a variable bounded by (0, 1), it is convenient to estimate a Tobit specification following the recent empirical studies by Bauer and Zimmermann (1999), and Bell and Hart (1999) as follows:

$$(1)\ OVERTIME_i = \begin{cases} \beta' \mathbf{X}_i + \varepsilon_i & \text{if } \beta' X_i + \varepsilon_i > 0 \\ 0 & \text{if } \beta' X_i + \varepsilon_i \leq 0, \end{cases}$$

where the dependent variable $OVERTIME_i$ refers to the share of overtime hours with respect to the individual i, $\mathbf{X}_i$ is a vector of explanatory variables, β is a vector of the estimated coefficients, and ε_i is a normal distributed error term with mean 0 and variance σ^2.

The estimation results are summarized in Table 5. The results reveal that the hours of overtime divided by the number of total hours decline as an employee ages.[15] The overtime hours tend to decline at the individual-level as the wage per straight-time hours rises. This negative effect from wage per straight-hours to overtime hours is an indication of the income effect. However, a specification of the overtime equation that includes regional dummies (reported as Model 2 in Table 5) implies that there is, in fact, an increase in the share of overtime hours as the wage per straight-time rises, which is indeed consistent with a substitution effect. An increase in the straight-time hours gives a mild decline in the overtime hours. The Finnish results are therefore in line with the observations by Bell and Hart (1999) that straight-time weekly hours are negatively related to the incidence of overtime hours in the UK.

Table 5. The results from Tobit regressions (dependent variable: OVERTIME).

	Model 1		*Model 2*	
	Coefficients	*t-statistics*	*Coefficients*	*t-statistics*
AGE	0.00118	2.33	0.00121	2.41
AGE^2	-0.02087	-3.35	-0.02028	-3.28
WAGE	0.69359	6.96	0.38551	3.89
$WAGE^2$	-2.88209	-4.90	-0.98603	-1.68
TIME	0.00027	11.65	0.00027	11.79
$TIME^2$	-0.00386	-5.12	-0.00388	-5.19
GENDER	-0.00707	-6.98	-0.00621	-6.07
NEWCOMER	0.01700	12.74	0.01620	12.34
LEAVER	-0.00368	-3.01	-0.00353	-2.91
EXPERIENCE	-0.00114	-10.91	-0.00122	-11.41
METROPOLITAN	0.00001	0.08	-0.00331	-0.69
SIZE	-0.00025	-23.86	-0.00026	-15.39
WOMEN	-0.00014	-2.21	-0.00011	-1.75
Constant	2.60830	3.01	-0.31172	-0.36
Dummy variables:				
INDUSTRIES	Yes		Yes	
YEARS	Yes		Yes	
OCCUPATIONS	No		No	
REGIONS	No		Yes	
Log-likelihood	14518.8		15906.1	
Observations	55 896		55 896	
Censored observations	29 776		29 776	

The observation that a decline in straight hours would lead (other things being equal) to an increase in overtime hours is not favourable to the conduct of work-sharing in the Finnish manufacturing industries.[16] However, the variation in the variable TIME comes, in addition

to negotiated working-time reductions, from part-time work, absence due to sick leaves, holidays etc., and from the inclusion of the employees that are newcomers and leavers during the last quarters.[17]

Males work more overtime.[18] The reason can be the division of labour within families. Thus, families like to extend the hours of work by males, because males typically have higher hourly wage prospects. Females often have looser connections to the labour market in Finland too, at least during their childbearing years, when they, to a larger extent than males, work part-time or are out of the labour force (for example, due to maternity leaves).[19]

Newcomers tend to work more overtime, but leavers work less overtime. The results are therefore in line with the notion that newcomers want to signal their high level of ability to their employers by extending the hours of overtime. The observation that leavers work less overtime is in line with the conjecture that a decline in overtime hours could serve as a signal that the employee is about to separate from the current match. The results concerning newcomers and leavers mean that the enormous magnitude of gross worker flows in the economies can perhaps partly be explained by the fact that there are hours restrictions within jobs induced by employers.[20] More experienced employees tend to work fewer overtime hours in the Finnish manufacturing industries. An explanation of this feature of the incidence of overtime hours could be that senior workers tend to work more unpaid overtime, because they occupy higher positions within establishments. The variable METROPOLITAN is not a statistically significant factor to explain the incidence of overtime hours.

As to the establishment characteristics, the hours of overtime are definitely more frequent in the population of small establishments in the Finnish manufacturing industries.[21] This particular observation is consistent with a stylized feature that was discussed earlier, according to which the variance of growth rates in the measures of economic activity tend to decline with the size of an establishment. Small establishments therefore utilize more overtime due to the fact that they encounter more volatility in demand and production.

The following focuses more closely on this establishment size effect by using different specifications and illustrating how this effect interacts with economic factors. The estimation results indicate that there is no empirical evidence for the presence of a quadratic effect for the establishment size within the manufacturing industries in Finland (reported as Model 3 in Table 6). Thus, the simple linear specification of the overtime equation captures the effect.

Table 6. The results from Tobit regressions (dependent variable: OVERTIME). The Model 4 is estimated from 1991 to 1995.

	Model 3		*Model 4*	
	Coefficients	*t-statistics*	*Coefficients*	*t-statistics*
AGE	0.00123	2.43	0.00130	1.96
AGE^2	-0.02159	-3.45	-0.02229	-2.71
WAGE	0.69170	6.94	0.75799	6.00
$WAGE^2$	-2.87012	-4.87	-3.28671	-4.38
TIME	0.00027	11.63	0.00035	11.69
$TIME^2$	-0.00384	-5.10	-0.00597	-6.21
GENDER	-0.00729	-7.13	-0.00631	-4.93
NEWCOMER	0.01707	12.78	0.02000	11.40
LEAVER	-0.00372	-3.03	-0.00432	-2.62
EXPERIENCE	-0.00112	-10.69	-0.00109	-8.63
METROPOLITAN	0.00022	0.27	-0.00017	-0.16
SIZE	-0.00019	-4.71	-0.00023	-17.89
$SIZE^2$	-0.00092	-1.61	..	..
WOMEN	-0.00019	-2.69	-0.00013	-1.77
UN	..	..	0.00007	0.47
Constant	2.59426	2.99	3.19497	2.89
Dummy variables:				
INDUSTRIES	Yes		Yes	
YEARS	Yes		Yes	
OCCUPATIONS	No		No	
REGIONS	No		No	
Log-likelihood	14520.1		8638.4	
Observations	55 896		36 795	
Censored observations	29 776		20 108	

In order to investigate the business cycle effects, the relationship of overtime hours and the size of an establishment were estimated separately for each year from 1989 to 1995 (Table 7). The year 1991 constituted the bottom of the great Finnish slump of the early 1990s measured by the net rate of employment change. The results therefore reveal that the observation that overtime hours decline in the size of an establishment also held during the great depression.

Table 7. The results from Tobit regressions (dependent variable: OVERTIME). The Tobit regressions are estimated separately for each year from 1989 to 1995. To save space only the estimated coefficients for the variable SIZE are shown. (The detailed results are available from the author upon request.) The control variables are the same (excluding year dummies) as the ones in Model 1 reported in Table 5.

Variable	*Coefficient*	*t-statistics*	*Number of observations*
SIZE (year=1989)	-0.00033	-13.59	9 868
SIZE (year=1990)	-0.00023	-8.62	9 233
SIZE (year=1991)	-0.00013	-4.31	8 155
SIZE (year=1992)	-0.00018	-5.78	7 399
SIZE (year=1993)	-0.00030	-9.71	6 799
SIZE (year=1994)	-0.00036	-13.57	7 129
SIZE (year=1995)	-0.00024	-8.20	7 313

However, the conclusion based on the 95% confidence intervals of the estimated coefficients of the variable SIZE indicates that the effect of establishments' size on overtime hours was slightly milder at the bottom of the slump of the early 1990s than before and after the depression. This feature of adjustment means that the population of small establishments tailored labour input downwards proportionally more via reducing the hours of overtime during the great slump of the early 1990s. This pattern of overtime hours is consistent with an earlier observation by Hohti (2000) for the Finnish manufacturing

industries, according to which there was an episode of convergence in the actual average working hours across the size categories of establishments from 1990 to 1994. An explanation for this feature of overtime is that the hours of overtime are, for small establishments, a natural starting point when downsizing labour input, owing to the smallness of these establishments in terms of aggregate employment when slumps occur. Thus, the stylized feature that paid overtime hours are more common among small establishments does not collapse during times of extreme economic slowdown, and the magnitude of this effect has definitely been procyclical from 1989 to 1995. These observations mean that the small plants seem to react differently to variations in product demand, which mostly varies with time.

The establishments that have less than twenty employees were omitted from the data, but the result according to which overtime hours are more common among small establishments remained.[22] In this case, the estimated coefficient for the variable SIZE is -0.00010 with corresponding t-statistics of -6.92.[23] Thus, the stylized feature according to which overtime hours are more common among small establishments is not driven by the smallest plants, either.

The overtime equation was estimated separately for the five industries of this study (Table 8). The estimations reveal that overtime hours are more common among small establishments within the metal industries, the manufacture of wood and wood and cork products, and the manufacture of paper and paper products that constitute the major parts of the Finnish manufacturing industries. In contrast, there is no relationship between overtime hours and the size of an establishment at all within the textile industries. In addition, within the apparel industries the hours of overtime are actually more common among larger establishments.

The basic difference between these industries is the fact that the metal industries, the manufacture of wood and wood and cork products, and the manufacture of paper and paper products are more capital-intensive by nature than the textile industries and the apparel industries. Thus, the more flexible working hours in terms of overtime hours are used within these capital-intensive industries in order to take full advantage of establishments' accumulated capital stock in the volatile environment in which small establishments are positioned.

Table 8. The results from Tobit regressions (dependent variable: OVERTIME). The Tobit regressions are estimated separately for each industries of the data from 1989 to 1995. To save space only the estimated coefficients for the variable SIZE are shown. (The detailed results are available from the author upon request.) The control variables are the same (excluding industry dummies) as the ones in Model 1 reported in Table 5.

Industry	Coefficient	t-statistics	Number of observations
The metal industries	-0.00026	-19.62	31 085
The textile industries	0.00028	1.10	2 650
The apparel industries	0.00085	3.42	2 356
The manufacture of wood and wood and cork products	-0.00011	-5.70	13 342
The manufacture of paper and paper products	-0.00049	-4.48	6 463

All in all, the estimation results suggest that the preferred estimate of the SIZE effect seems to be around 0.00025. The estimated effect is moderate by its magnitude, because it implies that the average share of overtime hours would be 0.04 percentage points lower in establishments that have 180 employees compared with the establishments that have only twenty employees. The magnitude of the estimated SIZE effect is therefore nicely in line with the distributions of overtime hours across the SIZE groups that were reported in Tables 4a-4b.

The results further show that the regional unemployment rate has no overall role in the determination of overtime hours (reported as Model 4 in Table 6). In other words, the degree of tightness in regional labour markets had no impact on the incidence of overtime hours from 1991 to 1995. The result can be rationalized by noting that the Finnish economy experienced an extreme economic slowdown during the early 1990s. There was therefore no shortage of employees. In fact, the regional unemployment rate has no impact on the incidence of overtime hours even when the overtime equation is estimated separately for the year 1995, which constituted the second year of the recovery from the great slump of the early 1990s measured by the net rate of employment change. Thus, in this case the

estimated coefficient for the variable UN is -0.00020 with corresponding t-statistics of -0.64.[24] An additional reason for the fact that the regional unemployment rate had no impact on the incidence of overtime hours is that there was an increase in the pace of interregional migration that started in 1994 (see, for example, Pekkala and Ritsilä 2001), which loosened the constraints given by regional labour markets.

However, an investigation of the interaction of establishment size with the regional unemployment rate reveals an interesting pattern of adjustment in overtime hours. There is, namely, a positive effect from the regional unemployment rate to the share of overtime hours in the population of the small plants that have less than twenty employees (Table 9). The result may arise at least partly due to the fact that the data of this study does not contain variables that capture features such as the profitability of an establishment. The population of the small plants can therefore be more profitable and thus utilize more overtime hours despite the fact that they are located in the regions of the high unemployment rate. Another possible interpretation is that an increase in the regional unemployment rate yields an increase in the perception of job instability that induces workers to extend their overtime in order to signal their commitment to their employer in the population of the small plants. In contrast, there is a negative relationship between the share of overtime hours and the regional unemployment rate in the population of the plants that have more than twenty employees. In other words, these plants indeed utilize less overtime in the regions of a high unemployment rate, which is consistent with an earlier notion that a low level of the regional unemployment rate is associated with a shortage of labour resources and yields a strong demand for overtime hours. The results therefore underline the feature that the small plants react differently to regional labour market tightness.

Table 9. The results from Tobit regressions (dependent variable: OVERTIME). The Tobit regression are estimated separately for the population of the small plants (i.e. plants that have less than twenty employees) and for the rest of the plants from 1991 to 1995. To save space only the estimated coefficients for the variable UN (the regional unemployment rate) are shown. (The detailed results are available from the author upon request.) The control variables are the same as the ones in Model 1 reported in Table 5.

	Coefficient	*t-statistics*	*Number of observations*
The small plants	0.00064	2.99	19 984
The rest of the plants	-0.00071	-3.21	16 135

The share of women in the establishment has a negative effect on the incidence of overtime hours in the Finnish manufacturing industries. All industry and year dummies included are statistically significant ones. Thus, there are strong industry effects. In particular, the incidence of overtime hours is (other things being equal) more frequent in the manufacture of paper and paper products. This notion is in line with common sense, because the manufacture of paper and paper products is characterized by strong fluctuations in demand and the high capital intensivity of production means that labour costs are only a minor part of the total costs for the establishments in this industry.

For the sake of robustness, the overtime equation was estimated from 1980 to 1995 without the establishments' characteristics. The period from 1980 to 1995 includes 150 161 observations. All other results remained the same except the feature that the estimation covering the period from 1980 to 1995 does not give statistically significant results for the variable LEAVER. Thus, the applied data covering the period from 1980 to 1995 is not in line with the view that leavers tend to work fewer overtime hours in the Finnish manufacturing industries.

The overtime equation was also estimated by including dummies in regions (i.e. counties) of the Finnish economy. These estimation results (reported as Model 2 in Table 5) are the same as the above except for the notion that the variables WOMEN and $WAGE^2$ are not statistically significant in this specification of the overtime equation. The inclusion of dummies in regions therefore dispels the notion that the share of women in the establishment delivers a negative effect to the incidence of overtime hours in the Finnish manufacturing industries.

7. Conclusions

The study used individual-level data based on the Finnish manufacturing industries from 1989 to 1995 to address the incidence of overtime hours. The results show that the hours of overtime divided by the number of total hours decline as an employee ages. The overtime hours also decline in wage per straight-time hours and in straight-time hours. The results are broadly in line with those obtained from the empirical studies that use UK data in overtime hours at the individual level. In addition, the estimation results show that males and newcomers tend to work more overtime, but leavers work less overtime.

As to the establishment characteristics, the hours of overtime are definitely more frequent in the population of small establishments. The share of women in the establishment has

a negative effect on the incidence of overtime hours in the Finnish manufacturing industries. The degree of tightness in regional labour markets had no overall impact on the incidence of overtime hours from 1991 to 1995, but the impact of the regional unemployment rate on the incidence of overtime hours differed sharply between the population of the small plants (i.e. plants that have less than twenty employees) and the rest of the plants.

References

Altonji, J.G. and C.H. Paxson (1988), "Labor supply preferences, hours constraints, and hours-wage trade-offs." *Journal of Labor Economics* 6, 254–276.

Altonji, J.G. and C.H. Paxson (1992), "Labor supply, hours constraints, and job mobility." *The Journal of Human Resources* 27, 256–278.

Asplund, R. (1994), "Teollisuuden työntekijöiden palkat ja inhimillinen pääoma." (in Finnish). Discussion Papers 484. The Research Institute of the Finnish Economy.

Asplund, R. (1995), "Teollisuustyöntekijöiden ylityöt 1980-1993." (in Finnish). Kansantaloudellinen aikakauskirja 91, 127–135.

Bauer, T. and K.F. Zimmermann (1999), "Overtime work and overtime compensation in Germany." *Scottish Journal of Political Economy* 46, 419–436.

Bell, D.N.F. and R.A. Hart (1999), "Overtime working in an unregulated labour market." IZA Discussion Papers 44. The Institute for the Study of Labor.

Bell, D.N.F., R.A. Hart, O. Hubler and W. Schwerdt (2000), "Paid and unpaid overtime working in Germany and the UK." IZA Discussion Papers 133. The Institute for the Study of Labor.

Bell, L.A. and R.B. Freeman (2001), "The incentive for working hard: explaining hours worked differences in the U.S. and Germany." *Labour Economics* 8, 181–202.

Calmfors, L. and M. Hoel (1988), "Work sharing and overtime." *The Scandinavian Journal of Economics* 90, 45–62.

Caves, R.E. (1998), "Industrial organization and new findings on the turnover and mobility of firms." *Journal of Economic Literature* 36, 1947–1982.

Clark, A.E. (1998), "Measures of job satisfaction. What makes a good job? Evidence from OECD countries." Labour Market and Social Policy – Occasional Papers 34. OECD, Paris.

Contensou, F. and R. Vranceanu (2000), *Working Time. Theory and Policy Implications.* Cheltenham: Edward Elgar.

Davis, S.J. and J. Haltiwanger (1999), "Gross job flows." In *Handbook of Labour Economics,* Vol. 3B, 2711–2805. Eds. O. Ashenfelter and D. Card. Amsterdam: North-Holland.

DiNardo, J. and J.L. Tobias (2001), "Nonparametric density and regression estimation." *Journal of Economic Perspectives* 15, 11–28.

Eriksson, T. and S. Fellman (1995), "Determinants of firms' operating times – Some evidence from firm-level data." Discussion Papers 542. The Research Institute of the Finnish Economy.

Evans, J.M., D.C. Lippoldt and P. Marianna (2001), "Trends in working hours in OECD countries." Labour Market and Social Policy Occasional Papers 45. OECD, Paris.

Graversen, E.K. and N. Smith (1998), "Labour supply, overtime work and taxation in Denmark." Working Papers 98–06. Centre for Labour Market and Social Research.

Golden, L. and S. Glosser (1994), "Average working hours as a leading economic variable in U.S. manufacturing." Working Papers #11–94–3–CES. The Pennsylvania State University, Department of Economics.

Green, F. (2001), "It's been a hard day's night: The role of concentration and intensification of work in late twentieth-century Britain." *British Journal of Industrial Relations* 39, 53–80.

Green, F. and S. McIntosh (2001), "The intensification of work in Europe." *Labour Economics* 8, 291–308.

Hamermesh, D.S. (1993), *Labor Demand.* Princeton: Princeton University Press.

Hart, R.A. (2001), ”Hours and wages in the Depression: British engineering, 1926–1938.” *Explorations in Economic History* 38, 478–502.

Hart, R.A. and Y. Ma (2000), ”Why do firms pay an overtime premium?” IZA Discussion Papers 163. The Institute for the Study of Labor.

Hohti, S. (2000), ”Job flows and job quality by establishment size in the Finnish manufacturing sector 1980–94.” *Small Business Economics* 15, 265–281.

Holm, P. and J. Kiander (1993), ”The effects of work-sharing on employment and overtime in Finnish Manufacturing 1960-1987.” *Applied Economics* 25, 801–810.

Hunt, J. (1998), ”Hours reductions as work-sharing.” *Brookings Papers on Economic Activity* 1, 339–381.

Hunt, J. (1999), ”Has work-sharing worked in Germany?” *The Quarterly Journal of Economics* CXII, 117–148.

Ilmakunnas, P. (1994), ”Returns to workers and hours in Finnish manufacturing.” *Empirical Economics* 19, 533–553.

Ilmakunnas, P. (1995), ”Working time and labour demand in Finnish manufacturing: short-run and long-run effects.” *Applied Economics* 27, 995–1002.

Ilmakunnas, S. (1997), ”Female labour supply and work incentives.” Studies 68. Labour Institute for Economic Research.

Kalwij, A.S. and M. Gregory (2000), ”Overtime in Great Britain over the period 1975–1999: a panel data analysis.” Working Papers 27/2000. University of Oxford, Department of Economics.

Kauhanen, M. (2000), ”Määräaikaiset työsuhteet ja sosiaaliturvajärjestelmän kestävyys.” (in Finnish). Selvityksiä, 2000:9. Sosiaali- ja terveysministeriö.

Kettunen, J. and R. Marjanen (1992), ”Suomen Työnantajain Keskusliiton palkkatilastot: Syntyhistoria, sisältö ja käyttötarkoitus.” (in Finnish). Discussion Papers 425. The Research Institute of the Finnish Economy.

Kettunen, J. and J. Vartiainen (1993), ”Suomen teollisuuden työntekijöiden palkkarakenne.” (in Finnish). Discussion Papers 431. The Research Institute of the Finnish Economy.

Kiander, J. and P. Vartia (1996), “The great depression of the 1990s in Finland.” *Finnish Economic Papers* 1, 72–88.

Lazear, E.P. (1998), ”Hiring risky workers.” In *Internal Labour Markets, Incentives and Employment,* 143–158. Eds. I. Ohashi and T. Tachibanaki. London: Macmillan Press.

Maddison, A. (1995), *Monitoring the World Economy, 1820–1992.* Paris: OECD.

Pekkala, S. and J. Ritsilä (2001), “A macroeconomic analysis of regional migration in Finland, 1975-95.” *The Review of Regional Studies* 29, 71–85.

Santamäki-Vuori, T. and S. Parviainen (1996), “The labour market in Finland.” Studies 64. Labour Institute for Economic Research.

Skans, O.N. (2001), ”The Effects of working time reductions on wages, actual hours and equilibrium unemployment.” Working Papers, 2001:8. IFAU – Office of Labour Market Policy Evaluation.

Statistics Finland (1995), ”Työvoiman liikkuvuus ja työelämän joustot.” (in Finnish). Labour Market Statistics 1995:12. Helsinki.

Stewart, M.B. and J.K. Swaffield (1997), ”Constraints on the desired hours of work of British men.” *The Economic Journal* 107, 520–535.

Torp, H. and E. Barth (2001), ”Actual and preferred working time. Regulations, incentives and the present debate on working time in Norway.” Report 3:2001. Institute for Social Research.

Vartiainen, J. (1993), ”Metalliteollisuuden työntekijöiden palkanmuodostus työehtosopimuksen valossa.” (in Finnish). Studies 44. Labour Institute for Economic Research.

Vartiainen, J. (1998), ”The labour market in Finland: institutions and outcomes.” Publications Series, 1998/2. Prime Minister’s Office.

Voth, H.-J. (2000), *Time and Work in England 1750–1830.* Oxford: Clarendon Press.

Appendix

Selected descriptive statistics (from 1989 to 1995). The descriptive statistics for the regional unemployment rate (UN) are from 1991 to 1995.

Variable	*MEAN*	*STD*	*MIN*	*MAX*
OVERTIME	0.027	0.050	0	0.93
AGE	39.5	10.1	15	65
WAGE	8.56	0.27	7.65	11.8
TIME	362.5	101.2	1	827
EXPERIENCE	10.0	4.95	1	16
SIZE	32.3	37.6	1	200
WOMEN	3.34	7.06	0	100
UN	18.3	5.7	4.8	33.4

[1] Kiander and Vartia (1996) provide a description of the great slump of the early 1990s.

[2] Contensou and Vranceanu (2000) provide an elaboration of working time issues.

[3] Voth (2000) observes that there was a sharp increase in the length of average annual working time during the early stages of industrialization in England. This trend was reversed during the late 1800s. Maddison (1995) shows that average hours of work in advanced OECD countries fell from around 3000 hours a year in 1870 to between 1500 and 2000 hours a year by 1990. Evans, Lippoldt and Marianna (2001) note that the long-term decline in average annual hours has slowed down in almost all the OECD countries in recent years. Hunt (1998) provides an international comparision of standard hours for full-time manufacturing workers in selected industrialized countries. The shortest standard weekly hours are performed in Western Germany, where standard weekly hours consists of 36.4 hours.

[4] This notion is a tautology in the case of Finland, because the output of the public sector is defined as a sum of hours by Statistics Finland. The other reasons for the low share of overtime hours within the public sector may include tight labour contracts and tight budget ceilings, which do not allow paid overtime hours. Overtime hours could be used even in the total absence of fluctuations in production, due to the fixed costs of hiring and training new employees. Fluctuations may increase the utilization of overtime hours without increasing the total working time if overtime hours are compensated for with time off instead of increased earnings. The latter case corresponds to the so-called transitory overtime hours that are used to increase the flexibility of a firm's operations.

[5] The consideration of collective agreements on the incidence of overtime hours in the Finnish manufacturing industries is not possible, because the binding collective agreements cover the whole of the manufacturing industries in Finland.

[6] Overtime hours are sometimes used as a leading indicator of economic activity. Golden and Glosser (1994) observe that the length of the average working week in the U.S. manufacturing industries has become less associated with the business cycle over the past few decades.

[7] The following analysis of overtime hours within the Finnish manufacturing industries does not incorporate macroeconomic indicators, because the focus of the study is on the incidence of overtime hours at the individual level.

[8] The consideration of education of workers on the incidence of overtime is not possible due to the fact that the data does not contain an education code at all. However, it can be argued that education is not important in the incidence of overtime hours owing to the homogeneity of the labour force within the Finnish manufacturing industries.

[9] Figure 1 implies that the average for the variable OVERTIME from 1989 to 1995 is 3.3%. In contrast, the applied version of the individual-level data implies that the average for the variable OVERTIME is 2.7% for the same period (see Appendix). This discrepancy is due to the fact that the applied individual-level data covers only the last quarter of each year from 1989 to 1995. According to Skans (2001), the share of overtime hours was on average 2.85% for daytime workers within Swedish manufacturing industries during the second quarter from 1989 to 1992 and 3.7% for 2-shift workers.

[10] In fact, Lazear (1998) argues that firms like to hire risky workers in order to cash option values. Risky workers have some additional value from the point of view of firms because a better-than-expected worker can be kept and a worse-than-expected can be forced out of the match via layoff. This feature of the optimal hiring policy is due to the fact that incomplete information between employer and employee means that the underlying quality of a new match will reveal itself only through experimentation. In particular, firms in growing

industries should prefer young, high variance workers and be characterized by high worker turnover rates.

[11] The unreported results show that overtime compensation divided by overtime hours is higher in the smaller plants in the Finnish manufacturing industries. Bauer and Zimmermann (1999) investigate the determination of overtime compensation in Germany.

[12] Clark (1998) and Evans, Lippoldt and Marianna (2001) report that the disparity between actual and desired hours is common across OECD countries. Torp and Barth (2001) report that full-time workers typically want shorter working hours and part-time workers want longer working hours. Hunt (1998) observes that the gap between actual and desired hours has been narrowed by reductions in standard hours in Germany.

[13] The impression is biased by the fact that the turnover in terms of entry and exit is much higher among small plants. Naturally, overtime hours are observed only in the case that it is a number above zero. In addition, it can be argued that the result according to which there is a decline in the share of overtime hours in the size establishment is based on simple arithmetics, because it is not possible for small establishments to make proportionately small changes in the number of their personnel. However, this discreteness of adjustment of labour input in the population of small establishments does not make the feature less interesting and it must also be noted that the distinction between paid and unpaid overtime hours complicates this simple pattern.

[14] The Epanechnikov is the applied kernel density estimate. It has the property that it is the most efficient in minimizing the mean integrated squared error. DiNardo and Tobias (2001) provide a survey of nonparametric density and regression estimation.

[15] The derivation of the estimated equation with respect to the variable AGE reveals the fact that all observations of the data are on the declining section of the estimated parable. This same pattern extends to the variables WAGE and TIME.

[16] In fact, an increase in paid or unpaid overtime hours can even reverse the supposed positive employment effects of work-sharing. Hamermesh (1993) provides a summary of the empirical studies.

[17] The inclusion of year dummies diminishes the variation in the TIME variable that comes from the reductions in standard working hours, because the Finnish manufacturing industries are characterized by binding collective agreements. Calmfors and Hoel (1988) provide a theoretical analysis of the employment effects of reduced standard working hours when overtime is allowed to adjust in firms. Calmfors and Hoel (1988) stress that a reduction in standard working hours may increase the costs per worker in relation to the cost of overtime. Thus, firms substitute overtime for workers. This substitution effect may reduce employment when output is fixed by demand. Hunt (1999) is able to exploit the cross-industry variation in standard hours in order to study the effects of work-sharing in Germany.

[18] About 73% of employees are males in the Finnish manufacturing industries.

[19] Ilmakunnas (1997) provides a recent study on Finnish female labour supply.

[20] Davis and Haltiwanger (1999) provide a survey of the literature on gross job and worker flows.

[21] The result is somewhat contradictory with the observation by Eriksson and Fellman (1995), according to which operating hours of firms tend to rise in plant size within the Finnish manufacturing industries.

[22] This restriction eliminates 29 722 observations.

[23] The specification applies the same control variables as Model 1 that is reported in Table 5.

[24] The specification applies the same control variables (excluding year dummies) as Model 1 that is reported in Table 5.

Regional disparities in gross job and worker flows in Finland*

Petri Böckerman**
Mika Maliranta***

*Financial support from the Foundation for Municipal Development (*Kunnallisalan Kehittämissäätiö*) is gratefully acknowledged. This paper is also a part of Helsinki School of Economics and Business Administration and Statistics Finland joint project: "Labour Demand and Wage Formation in SMEs and Clusters" financed by the Academy of Finland. We would like to thank two anonymous referees for valuable comments and suggestions. Paul A. Dillingham has kindly checked the language. The usual disclaimer applies.
**Labour Institute for Economic Research, Pitkänsillanranta 3A, FIN-00530 Helsinki, Finland
***Statistics Finland, FIN-00022 Helsinki, Finland

Abstract

The aim of this study is to characterize the structure and the evolution of Finnish regional labour markets in terms of gross job and worker flows using establishment-level data. There is no solid evidence that the gross job creation rate is on average lower in Eastern and Northern Finland. The rapid rise in regional unemployment disparities in the 1990s can be explained via the rise in the disparities in the gross job destruction rates across regions during the great slump of the early 1990s. There are also distinct regional differences in the adjustment of labour demand at the establishment level.

JEL-code: J23, R23
Keywords: gross flows, regional labour markets, unemployment

1. Introduction

Market economies are in a state of continuous turbulence. Joseph A. Schumpeter (1942) called this underlying process of capitalism "creative destruction". In fact, according to the growing number of establishment-level studies, it is fair to say that the continuous reallocation and the reorganisation of scarce resources culminates in the function of labour markets, where the reallocation of resources takes the form of gross job flows (i.e. job creation and destruction), and gross worker flows (i.e. hirings and separations of workers).

This reorganisation view of labour markets underlines the fact that the pool of available jobs is not stagnant over time. Instead, the labour markets are subject to simultaneous job creation and destruction. There are two broad approaches to characterize this structural change in labour markets in terms of gross job and worker flows. The so-called excess job reallocation provides a measure of structural change among the plants of the economy. In contrast, the fact that the available vacancies of the labour markets are also subject to various idiosyncratic shocks within plants is captured by the so-called churning rate. These key concepts of the underlying structural change of labour markets are defined in the following section of this study.

There has been a bulk of research on gross job and worker flows based on cross-country comparisions.[1] In particular, according to the theoretical model by Bertola and Rogerson (1997), the rate of job reallocation should be a decreasing function in wage dispersion. This feature of gross job flows explains part of the widely observed puzzle that the underlying turnover rates of the economies are roughly equal in Europe with respect to the United States despite the stylized fact that labour markets tend to be more regulated in Europe.[2] In contrast to these cross-country comparisions, the following study provides detailed empirical evidence for the view that there are differences in gross job and worker flows within the same country despite the presence of the same institutional characteristics (including labour market regulations) across regions. The major advantage of the comparision of gross job and worker flows within the same country with respect to available cross-country studies is the fact that the measurement of gross job and worker flows is based on the same data across regions. This means that the emergence of measurement problems and conceptual differences do not hamper the comparision of gross and worker flows across regions.

The issues concerning regional labour markets have gained growing interest in Finland, because there has been a rapid rise in the regional disparities in unemployment rates as a part of the export-led recovery from the great depression of the early 1990s (see, for

example, Böckerman 1998; Tervo 1998; Huovari 1999). However, the available empirical studies on Finnish regional labour markets have been conducted by using aggregate data on (net) employment changes.[2] The main shortcoming of these traditional investigations of aggregate outcome is that they mask the underlying establishment-level dynamics of labour-demand adjustment in Finnish regional labour markets. In other words, the existing empirical studies that focus solely on (net) employment changes provide an incomplete and potentially misleading picture of regional labour markets in Finland. As will be shown in the following sections of this study, the focus on (net) employment changes gives, for instance, far too dismal a picture of the nature of high unemployment in Eastern and Northern Finland.

The aim of this study is to characterize the structure and the evolution of Finnish regional labour markets in terms of gross job and worker flows. The study explores the disparities in the regional labour market adjustment during an episode of extreme turbulence in the Finnish economy. In particular, the study is focused on the blow of the great slump of the early 1990s and the following recovery from 1994 to 1997. In addition, the genuine regional elements in gross job and worker flows are separated from the effects of industry structure. Thus, this study fills an important gap in the literature on the regional labour markets in Finland. The evaluation of gross job and worker flows decomposes the net employment change and constitutes a coherent picture of regional labour markets in Finland. The study is based on detailed establishment-level analysis. The sectoral composition of the study also goes, as in Ilmakunnas and Maliranta (2000a), beyond narrow "manucentrism", which has been a typical feature of earlier empirical investigations into gross job and worker flows.

This study appears in eight sections. The first section of the study provides the applied measures of gross job and worker flows. The second section provides a brief snapshot of the so-called "basic facts" of the literature on job creation and destruction and gross worker flows. These basic facts of the literature constitute the hypotheses about gross job and worker flows. The third section of the study articulates the most important underlying properties of the establishment-level data. The fourth section is an investigation of gross job flows in Finnish regional labour markets. The fifth section of the study includes the elaboration of gross worker flows and the so-called churning rate. The sixth section provides an elaboration of genuine regional elements in gross job and worker flows by applying regression techniques. In addition, the section provides a discussion about the extent to which some important patterns of regional gross job and worker flows can be reduced to the differences in the industry structure of the Finnish regions by applying the 2-digit standard industry classification. The last section concludes the study.

2. The applied measures of gross job and worker flows

The gross flows of jobs and workers are measured as the number of jobs created or destroyed or workers moving in and out of establishments (i.e. hirings and separations of workers). This means that the measure of the job creation rate is calculated as follows:

$$(1) \quad JC_t = \sum_i \Delta E_{it}^{+} / ((\sum_i E_{it} + \sum_i E_{i,\,t-1}) /2),$$

where E denotes employment in firm i year t and the superscript "+" refers to positive changes. The number of employees is measured by the average of period t and $t-1$ employment. In other words, to convert time-t job creation and destruction measures to rates, job creation and destruction are divided by the average of employment at t and $t-1$ in order to achieve several technical advantages over more conventional growth rate measures (see, for example, Davis, Haltiwanger and Schuh 1996, 189-190).

Unlike the conventional growth rate measures, which divide employment change by lagged employment and range from –1.0 to ∞, the applied growth rate measure ranges from –2.0 to 2.0 and the growth rate measure is symmetric around zero. In addition, Baldwin and Picot (1995) argue that this average measurement also removes part of the bias induced by transitory movements of the economy.[5]

The measure of the job destruction rate is calculated as follows:

$$(2) \quad JD_t = \left| \sum_i \Delta E_{it}^{-} \right| / ((\sum_i E_{it} + \sum_i E_{i,\,t-1}) /2)$$

Thus, the job destruction rate is defined as the absolute value of the sum of negative employment changes, divided by the average number of employees. The superscript "-" refers to negative changes.

The definitions of job creation and destruction mean that the net rate of change of employment (NET) is simply the difference of the measures of job creation and destruction:

$$(3) \quad NET_t = JC_t - JD_t$$

The sum of job creation and destruction rates is called the gross job reallocation rate (JR):

$$(4) \quad JR_t = JC_t + JD_t$$

The excess job reallocation rate (EJR) equals (gross) job reallocation minus the absolute value of the net employment change:

$$(5) \quad EJR_t = JR_t - |NET_t|$$

This means that excess job reallocation is an index of simultaneous job creation and destruction in the economy. Thus, it is also a natural measure of heterogeneity in the plant-level employment outcome among plants. In other words, if excess job reallocation is above zero, then the magnitude of (gross) job reallocation is above what has been necessary to accommodate the net employment changes of the regional labour markets.

Comparison of information in two consecutive years can be used for calculating the number of employees who have entered a plant during the year and are still working at the same plant (see, for example, Ilmakunnas, Laaksonen and Maliranta 1999). The sum of these employees over all plants is worker inflow, or hiring. It is also possible to identify those employees who are no longer working at a plant. This means that the sum of these employees is worker outflow, or separation.

Dividing the worker inflow and outflow in a period of time by the average of employment in periods *t* and *t-1* delivers the worker inflow rate (WIF) and the worker outflow rate (WOF). The difference between WIF and WOF is the net rate of change in employment:

$$(6) \quad NET_t = WIF_t - WOF_t$$

Also, the worker flow rate (WF) is simply the sum of the hiring (WIF) and separation rates (WOF). In addition, the so-called churning rate (CF) can be defined as follows:

$$(7) \quad CF_t = WF_t - JR_t$$

The churning rate can also be called by the expression “excess worker turnover rate” for obvious reasons. These definitions mean that the churning rate ties worker flows and job flows together and, therefore, completes the picture of the underlying dynamics of labour adjustment at the establishment level in Finnish regional labour markets. In addition, the churning rate is a natural measure of the underlying structural change of regional labour markets within plants.

3. The "basic facts" of the literature

The empirical literature on gross job and worker flows contains a number of so-called "basic facts". It is highly important to note that due to the limited availability of data, the key empirical findings of gross job and worker flows refer mainly to the (U.S.) manufacturing industries (so-called "manucentrism").[6]

The first basic fact of the literature concerns the magnitude of measured gross job flows. For example, using annual data, roughly 1 in 10 jobs are created and another 1 in 10 are destroyed each year in the U.S. manufacturing industries. It has become clear that the gross flows are large, relative to the net employment change. Job reallocation is also a large part of the total worker reallocation. In fact, most studies indicate job reallocation is about half of the total worker reallocation.

The second basic fact of the literature on job creation and destruction is the dominant role of pure plant-specific and firm-specific factors in accounting for the largely observed magnitudes of gross job and worker flows (see, for example, Haltiwanger 1997). In other words, the idiosyncratic component is predominant and most of the excess reallocation is within narrowly defined sectors. This means that the restructuring between various sectors is only a small portion of the total reallocation of the economy (so-called "sectoral shifts").

The third fact is that most of the reallocation reflects the persistence of underlying employment changes. For example, Davis, Haltiwanger and Schuh (1996) report that roughly seven in ten newly created jobs survive for at least one year, and roughly eight in ten newly destroyed jobs fail to reappear one year later in the case of U.S. manufacturing industries. After two years, the persistence of annual job creation and destruction falls to 54% and 74%, respectively. This feature of job creation and destruction means that to the extent that plant-level employment changes are also persistent for continuing plants, they must be associated with long-term joblessness or worker reallocation across plants.

The fourth basic fact is the concentration and the lumpiness of underlying employ-ment movements. In particular, many empirical investigations find that births and deaths account for large fractions of job creation and destruction. Births and deaths are simply the extremes of an underlying growth-rate distribution. From a regional point of view, a high concentration of job creation and destruction may accentuate various negative feedback effects on local economies.[7]

The fifth basic fact is about the distinct cyclicality of job creation and destruction. In the case of U.S. manufacturing, a noteworthy feature of plant-level data is the relatively volatile nature of job destruction. In particular, job destruction is more responsive to changes in activity than is the rate of job creation (see, for example, Hall 1999). The available sample period of the longitudinal data sets for many European countries is, on the other hand, quite short, which means that a definite conclusion about relative volatility on job creation and destruction is hard to reach with existing data sets.

The sixth fact is that gross job flows indicate some systematic differences by underlying plant characteristics. In particular, the most important stylized fact is that the excess reallocation rate decreases in the size and age of the firm in the case of U.S. manufacturing industries. These systematic differences by plant characteristics are also found in a number of other countries. However, Haltiwanger and Krizan (1999) stress that the dominance of the idiosyncratic element serves as an important caution in attributing net growth to plants classified by any observable plant characteristics.

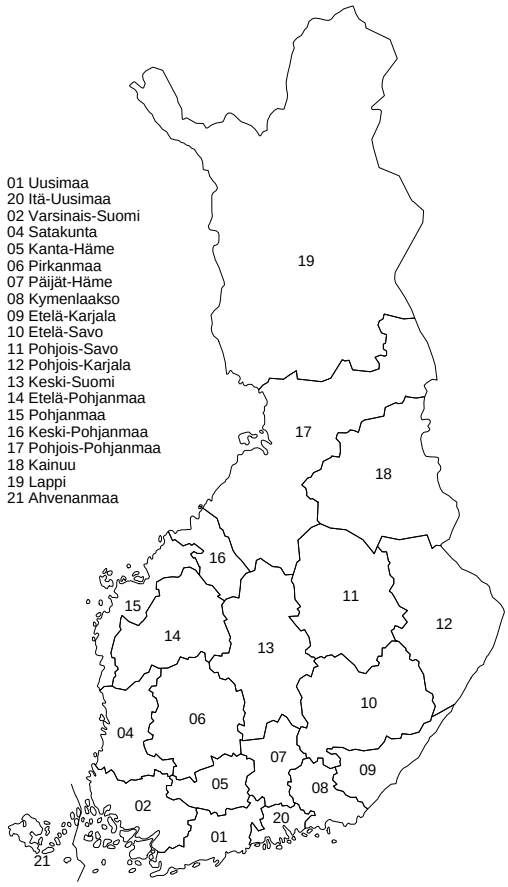
The list of these "basic facts" of the literature on gross job and worker flows reflects the underlying feature that the analysis of regional labour markets in terms of these measures is almost a neglected issue.[8] Thus, this study aims to provide the most fundamental stylized facts about Finnish regional labour markets in terms of gross job and worker flows.

4. The Data

The Nordic countries, along with Finland, seem to have a number of advantages for the use of linked employer-employee data compared with other nations (see, for example, Ilmakunnas, Maliranta and Vainiomäki 2001). In particular, the size of the country is quite small, which makes it possible to form various registers which cover the entire population of establishments and employees. This means that the linking process of the registers and other data sets is quite manageable.

This study uses a large longitudinal data of employees over the period from 1989 to 1997 (see Ilmakunnas and Maliranta 2000a).[9] The calculation of gross job and worker flows is based on detailed establishment-level analysis, and Finland is divided into 20 provinces (the so-called NUTS3-level in the EU).[10] Figure 1 shows the geographic location of these provinces in Finland. The economic activity of the Finnish economy is heavily concentrated in Southern Finland. Thus, Appendix provides selected

Figure 1. The location of provinces in Finland (Source: Statistics Finland).



background statistics in a nutshell about the underlying economic structure of the Finnish provinces.

The study provides a representative and comprehensive picture of gross job and worker flows in Finland. The public sector is excluded from the analysis owing to the great number of practical problems in deriving the measures of gross job and worker flows. Thus, the study includes the non-farming business sector of the Finnish economy excluding social and personal services.[11] The applied plant-level data covers more than 80% of the total employment in the non-farming business sector of the Finnish economy.

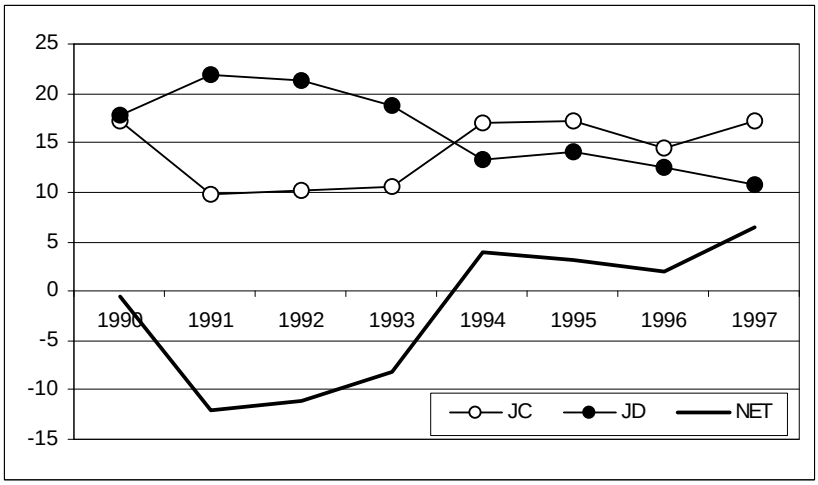
Employment Statistics constitutes the backbone of this study. It compiles information about the economic activity of individuals and their background characteristics from a

large number of administrative registers. Employment Statistics covers information on the employment status of the entire population in the last week of December. In the non-farming business sector of the Finnish economy there are more than 1.1 million employees in about 100 000 plants.

Employment Statistics is amended by several available registers held by Statistics Finland, for example, the Business Register.[12] The Business Register is a data base that covers registered employers and enterprises subject to VAT and their plants in Finland. In particular, the unique plant identification codes are taken from the Business Register. In addition, the Business Register follows changes in the demographic structure of plants. The entry and exit of establishments covers about 2–3% of all employees each year.[13] This means that the regional disparities in gross job and worker flows in Finland are driven mainly by continuing establishments.

The employer-employee links are determined in Employment Statistics. Thus, for each person an unique plant appearing in the Business Register is determined based on his/her primary employer during the last week of each year. The calculation of underlying gross job flows naturally requires the setup of a base year. Thus, the annual measures of gross job and worker flows are calculated from 1990 to 1997.

Figure 2. The evolution of gross job creation (JC), gross job destruction (JD), and the net rate of employment change (NET=JC-JD) in the Finnish economy.



The period of this study includes the great depression of the early 1990s, which dominates the evolution of regional gross job and worker flows in Finland.[14] For instance, the slump caused a rapid decline in gross job creation and a sharp rise in the gross job destruction in the Finnish economy (Figure 2). As the figure indicates, 1991 was the year of the steepest decline in employment during the recession. The recovery from the bottom level of employment started in 1994. These movements are also heavily present in the regional measures of gross job and worker flows. It is therefore interesting to investigate the underlying fluctuations of gross job and worker flows and, in particular, to explore the disparities in the regional labour market adjustment at the establishment-level of the Finnish economy.

5. Gross job flows

5.1. Creation

The job creation rate was highest in the period from 1990 to 1997 in Pohjois-Pohjanmaa, Lappi, Etelä-Pohjanmaa and Uusimaa (Table 1). The outstanding success of Pohjois-Pohjanmaa in terms of job creation can mainly be explained by the cluster of information technology around the region of Oulu. In contrast, the lowest job creation rate was in Ahvenanmaa, Satakunta and Päijät-Häme from 1990 to 1997. During the great depression of the early 1990s there was a sharp decline in the job creation rate across all provinces of Finland. In addition, Kainuu experienced a kind of "double dip" in terms of job creation during the 1990s.

One interesting fact is that there was no substantial rise in regional disparities as measured by employment-weighted standard deviation in terms of the job creation rate from 1990 to 1997. The level of regional disparities was lowest during the great depression of the 1990s. Also, the results indicate that there is no solid evidence at all for the widely held view that, compared with Southern Finland, the job creation rate is lower in Eastern and Northern Finland, where the average unemployment rate has been much higher than in Southern Finland during the past few decades.

Table 1. Job creation rate in the regions of Finland.

	1990	*1991*	*1992*	*1993*	*1994*	*1995*	*1996*	*1997*	*AVG*
Uusimaa	18.39	10.29	10.13	10.98	16.92	17.97	15.84	18.95	14.93
Varsinais-Suomi	16.59	10.51	9.62	10.56	19.99	18.49	14.60	17.85	14.78
Satakunta	13.55	9.90	10.17	8.35	18.26	12.66	10.33	13.39	12.08
Kanta-Häme	15.84	8.25	7.21	9.67	15.03	18.67	14.12	17.25	13.26
Pirkanmaa	20.29	9.66	9.66	11.11	17.00	16.59	12.99	15.40	14.09
Päijät-Häme	14.39	7.64	8.43	10.71	14.83	13.75	12.37	15.54	12.21
Kymenlaakso	13.72	9.13	8.55	11.13	15.07	16.52	12.65	13.51	12.54
Etelä-Karjala	19.56	10.11	9.54	10.74	15.88	16.79	14.22	14.81	13.96
Etelä-Savo	14.78	8.78	11.13	7.88	17.77	18.76	13.88	15.11	13.51
Pohjois-Savo	15.90	9.22	9.44	11.37	17.27	16.12	16.29	17.57	14.15
Pohjois-Karjala	15.19	9.28	8.32	10.74	16.03	17.10	12.70	14.97	13.04
Keski-Suomi	18.01	9.35	10.44	9.64	15.53	16.32	12.87	15.58	13.47
Etelä-Pohjanmaa	16.66	10.05	11.01	10.87	20.70	19.01	13.93	17.47	14.96
Pohjanmaa	16.58	9.34	10.52	11.12	16.68	14.71	16.08	16.51	13.94
Keski-Pohjanmaa	16.04	9.51	11.22	8.34	15.06	17.49	12.54	18.96	13.65
Pohjois-Pohjanmaa	15.99	11.12	11.90	12.39	19.04	22.35	16.57	19.92	16.16
Kainuu	12.76	10.04	18.43	9.53	16.02	12.14	9.86	19.26	13.51
Lappi	18.82	11.28	13.07	8.59	17.52	18.33	16.33	17.24	15.15
Itä-Uusimaa	15.08	6.52	10.01	9.45	15.78	11.08	15.66	15.42	12.38
Ahvenanmaa	14.84	7.87	12.82	5.50	8.98	8.25	7.43	12.11	9.73
STD	2.81	1.55	2.40	1.98	2.94	3.82	2.95	2.87	
AVG	17.00	9.88	11.09	10.46	17.32	17.01	14.29	17.20	
VCF	0.16	0.16	0.22	0.19	0.17	0.22	0.21	0.17	

"STD" refers to employment-weighted standard deviation, "AVG" refers to employment-weighted average and "VCF" refers to employment-weighted variation coefficient.

5.2. Destruction

The job destruction rate was, on average, highest in Lappi in the period from 1990 to 1997, and lowest in Ahvenanmaa (Table 2). In addition, there is no evidence at all for the equally widely held view that the job destruction rate is, on average, higher in Eastern and Northern Finland.

During the great depression of the early 1990s, there was a sharp rise in the job destruction rate in all provinces. The highest level of the job destruction rate was reached during

1991 or 1992; there were no clear-cut disparities in this respect across the provinces of Finland, except in Ahvenanmaa. The highest level of the job destruction rate was in Kainuu during the great slump of the 1990s.

The regional disparities in terms of the job destruction rate were highest during the depression. Thus, the results indicate that during the great slump of the early 1990s there was a decline in the disparities in the job creation rate across all provinces of Finland, but the pattern of job destruction was more concentrated across provinces.

Table 2. Job destruction rate in the regions of Finland.

	1990	*1991*	*1992*	*1993*	*1994*	*1995*	*1996*	*1997*	*AVG*
Uusimaa	16.78	21.86	20.77	19.23	14.87	14.16	12.64	12.17	16.56
Varsinais-Suomi	17.65	20.51	20.36	20.05	12.82	13.54	13.27	10.08	16.04
Satakunta	16.55	20.85	22.12	15.72	11.42	11.13	12.09	8.45	14.79
Kanta-Häme	16.58	19.78	21.03	18.51	11.78	14.76	12.85	10.44	15.72
Pirkanmaa	18.65	23.51	19.87	18.49	12.25	12.37	11.63	9.40	15.77
Päijät-Häme	19.13	21.07	21.58	19.34	11.21	12.18	12.51	9.50	15.82
Kymenlaakso	16.67	20.06	19.57	17.76	9.29	14.94	11.98	7.89	14.77
Etelä-Karjala	15.49	24.15	20.54	18.13	13.23	13.90	14.73	10.42	16.32
Etelä-Savo	17.67	22.37	22.16	18.72	13.37	19.25	13.34	10.03	17.11
Pohjois-Savo	18.69	23.58	24.31	18.22	14.46	15.18	14.08	11.83	17.54
Pohjois-Karjala	16.64	23.67	20.54	18.62	12.08	16.71	13.21	9.05	16.32
Keski-Suomi	19.68	20.67	24.03	18.77	12.12	13.99	10.01	8.81	16.01
Etelä-Pohjanmaa	17.75	24.79	24.68	20.90	12.32	15.96	10.91	9.51	17.10
Pohjanmaa	18.45	20.26	21.70	17.90	12.41	12.05	10.82	10.64	15.53
Keski-Pohjanmaa	20.79	24.40	18.59	19.22	13.27	13.81	10.33	12.85	16.66
Pohjois-Pohjanmaa	20.27	22.50	22.91	19.26	14.52	15.92	13.26	10.87	17.44
Kainuu	17.82	31.10	21.31	16.77	10.06	15.34	13.32	9.31	16.88
Lappi	22.88	25.35	23.94	20.38	14.93	17.57	13.64	12.43	18.89
Itä-Uusimaa	14.38	17.67	19.20	16.20	11.65	13.93	13.20	12.5	14.84
Ahvenanmaa	18.01	12.45	10.07	12.22	8.63	5.91	12.84	5.94	10.76
STD	2.18	3.95	3.55	2.59	2.35	2.95	1.57	2.14	
AVG	18.91	23.13	22.02	19.16	13.00	14.83	13.16	10.64	
VCF	0.12	0.17	0.16	0.14	0.18	0.20	0.12	0.20	

"STD" refers to employment-weighted standard deviation, "AVG" refers to employment-weighted average and "VCF" refers to employment-weighted variation coefficient.

5.3. Job reallocation

The magnitude of gross job reallocation was highest in Lappi, Pohjois-Pohjanmaa, and Etelä-Pohjanmaa in the period from 1990 to 1997 (Table 3). Ahvenanmaa, especially, has been “an island of sleepy life” in terms of the reallocation of regional labour markets. There is some evidence that the lowest level of regional disparities in terms of gross job reallocation was reached during the great depression of the early 1990s.

The results also indicate that the underlying fluctuations of gross job reallocation were not countercyclical in the Finnish regions from 1990 to 1997. This result of the fluctuations of gross job flows is in sharp contrast with one of the leading models on gross job flows by Davis and Haltiwanger (1990), which argues that recessions are intensive times of restructuring in labour markets.[15]

Table 3. Gross job reallocation rate in the regions of Finland.

	1990	*1991*	*1992*	*1993*	*1994*	*1995*	*1996*	*1997*	*AVG*
Uusimaa	35.17	32.15	30.90	30.21	31.79	32.13	28.49	32.83	31.71
Varsinais-Suomi	34.24	31.02	29.98	30.61	32.81	32.03	27.86	32.37	31.37
Satakunta	30.10	30.75	32.29	24.07	29.68	23.78	22.42	29.76	27.86
Kanta-Häme	32.42	28.03	28.25	28.18	26.81	33.43	26.98	31.04	29.39
Pirkanmaa	38.95	33.17	29.52	29.61	29.24	28.96	24.63	32.60	30.84
Päijät-Häme	33.52	28.71	30.01	30.05	26.04	25.93	24.88	29.88	28.63
Kymenlaakso	30.39	29.19	28.11	28.90	24.36	31.46	24.64	28.91	28.25
Etelä-Karjala	35.06	34.25	30.08	28.86	29.11	30.69	28.95	32.46	31.18
Etelä-Savo	32.45	31.16	33.29	26.59	31.14	38.01	27.22	32.68	31.57
Pohjois-Savo	34.59	32.79	33.75	29.60	31.73	31.31	30.37	32.67	32.10
Pohjois-Karjala	31.82	32.96	28.86	29.36	28.11	33.81	25.91	30.89	30.22
Keski-Suomi	37.69	30.03	34.47	28.41	27.65	30.31	22.88	31.30	30.34
Etelä-Pohjanmaa	34.42	34.84	35.69	31.77	33.01	34.97	24.83	34.71	33.03
Pohjanmaa	35.03	29.60	32.22	29.02	29.09	26.76	26.90	32.84	30.18
Keski-Pohjanmaa	36.83	33.91	29.81	27.56	28.33	31.30	22.87	31.26	30.23
Pohjois-Pohjanmaa	36.26	33.62	34.80	31.64	33.56	38.27	29.83	34.49	34.06
Kainuu	30.59	41.14	39.74	26.31	26.07	27.48	23.18	30.51	30.63
Lappi	41.70	36.63	37.01	28.96	32.45	35.89	29.97	34.41	34.63
Itä-Uusimaa	29.46	24.19	29.21	25.65	27.43	25.01	28.86	29.16	27.37
Ahvenanmaa	32.85	20.32	22.88	17.73	17.60	14.16	20.27	21.25	20.88
STD	4.34	5.11	4.32	4.28	4.92	6.33	3.94	4.14	
AVG	35.92	33.01	33.11	29.62	30.32	31.85	27.45	32.91	
VCF	0.12	0.15	0.13	0.14	0.16	0.2	0.14	0.13	

"STD" refers to employment-weighted standard deviation, "AVG" refers to employment-weighted average and "VCF" refers to employment-weighted variation coefficient.

5.4. Excess reallocation

The lowest level of excess reallocation (i.e. simultaneous job creation and destruction) was, on average, in Ahvenanmaa, Satakunta and Päijät-Häme from 1990 to 1997 (Table 4). The underlying magnitude of excess reallocation has not been stronger in Southern Finland with respect to Eastern and Northern Finland. In fact, the highest level of average excess reallocation has been in the province of Lappi.

There has been no continuous rise in regional disparities in terms of excess reallocation across provinces in Finland. However, the patterns with respect to the fluctuations of excess reallocation were not identical across provinces from 1990 to 1997. In some provinces (for example, the province of Keski-Suomi), there was a decline in excess reallocation during the depression, but in some provinces (for example, the province of Kainuu), there was, in fact, a rise in excess reallocation during the slump of the early 1990s. This means that the structural change of regional labour markets among plants was halted in Keski-Suomi during the depression, but in the province of Kainuu there was, instead, an acceleration of structural change among plants during the economic slowdown.

Table 4. Excess reallocation rate in the regions of Finland.

	1990	*1991*	*1992*	*1993*	*1994*	*1995*	*1996*	*1997*	*AVG*
Uusimaa	33.56	20.57	20.27	21.96	29.74	28.33	25.29	24.34	25.51
Varsinais-Suomi	33.18	21.02	19.24	21.12	25.63	27.09	26.53	20.17	24.25
Satakunta	27.09	19.81	20.34	16.69	22.84	22.25	20.66	16.91	20.82
Kanta-Häme	31.67	16.49	14.43	19.34	23.55	29.52	25.71	20.87	22.70
Pirkanmaa	37.30	19.32	19.31	22.22	24.50	24.74	23.27	18.80	23.68
Päijät-Häme	28.77	15.29	16.85	21.42	22.41	24.36	24.74	19.00	21.61
Kymenlaakso	27.43	18.25	17.09	22.27	18.59	29.89	23.96	15.78	21.66
Etelä-Karjala	30.99	20.21	19.08	21.47	26.46	27.80	28.43	20.84	24.41
Etelä-Savo	29.56	17.57	22.26	15.75	26.74	37.52	26.69	20.06	24.52
Pohjois-Savo	31.79	18.44	18.88	22.74	28.91	30.37	28.16	23.66	25.37
Pohjois-Karjala	30.38	18.56	16.63	21.48	24.16	33.42	25.40	18.10	23.52
Keski-Suomi	36.02	18.71	20.88	19.29	24.24	27.98	20.03	17.63	23.10
Etelä-Pohjanmaa	33.33	20.10	22.02	21.74	24.63	31.91	21.81	19.03	24.32
Pohjanmaa	33.16	18.68	21.05	22.25	24.81	24.11	21.64	21.27	23.37
Keski-Pohjanmaa	32.08	19.02	22.44	16.69	26.54	27.62	20.65	25.70	23.84
Pohjois-Pohjanmaa	31.97	22.24	23.80	24.78	29.05	31.85	26.52	21.74	26.49
Kainuu	25.52	20.07	36.86	19.07	20.12	24.28	19.72	18.63	23.03
Lappi	37.64	22.56	26.14	17.18	29.86	35.13	27.28	24.86	27.58
Itä-Uusimaa	28.75	13.04	20.02	18.89	23.29	22.15	26.39	25.00	22.19
Ahvenanmaa	29.68	15.74	20.13	11.01	17.26	11.82	14.85	11.87	16.55
STD	4.56	3.10	4.74	3.97	4.71	6.10	4.23	4.28	
AVG	33.13	19.77	21.90	20.92	25.99	29.00	25.12	21.28	
VCF	0.14	0.16	0.22	0.19	0.18	0.21	0.17	0.20	

"STD" refers to employment-weighted standard deviation, "AVG" refers to employment-weighted average and "VCF" refers to employment-weighted variation coefficient.

6. Gross worker flows

6.1 Hiring

The hiring rate is a measure of the inflow of workers into the population of establishments. There were no major changes in the hiring rate from the point of view of regional disparities from 1990 to 1997 (Table 5). The lowest level of hiring is on average in Ahvenanmaa and Satakunta, and the highest in Uusimaa and Pohjois-Pohjanmaa. During the great slump of the early 1990s there was also a sharp decline in the hiring rate in all provinces of the Finnish economy.

The hiring rate can be decomposed by the sources of worker inflow. The worker inflow rate from unemployment (WIFU) displays a distinct regional pattern (Table 6). In particular, the worker inflow rate from unemployment seems to be at a higher level in Eastern and Northern Finland compared with Southern Finland. This regional pattern of the worker inflow from unemployment is a reflection of the fact that the average duration of unemployment spells is substantially shorter in Eastern and Northern Finland compared with Southern Finland due to the allocation of various active labour market measures to the high unemployment provinces of Eastern and Northern Finland.

Table 5. Hiring rate in the regions of Finland.

	1990	*1991*	*1992*	*1993*	*1994*	*1995*	*1996*	*1997*	*AVG*
Uusimaa	35.51	22.63	20.68	21.14	28.69	31.89	29.14	32.70	27.80
Varsinais-Suomi	30.17	20.81	18.50	19.80	31.01	29.13	24.97	30.12	25.56
Satakunta	25.26	18.94	18.18	16.22	27.04	22.87	19.56	23.64	21.46
Kanta-Häme	29.55	17.59	14.86	18.78	24.31	28.00	24.01	28.43	23.19
Pirkanmaa	33.15	19.02	18.04	19.30	26.59	27.14	22.39	25.97	23.95
Päijät-Häme	27.91	17.65	16.53	18.94	25.05	24.21	22.20	25.70	22.27
Kymenlaakso	25.87	18.63	16.40	19.55	24.31	26.01	22.49	23.49	22.09
Etelä-Karjala	31.86	18.48	16.82	18.12	23.78	27.47	24.08	24.64	23.16
Etelä-Savo	27.10	17.44	18.74	15.25	26.50	28.19	22.59	24.47	22.54
Pohjois-Savo	31.72	21.56	19.75	21.74	28.18	27.64	25.40	27.33	25.42
Pohjois-Karjala	28.67	18.16	15.91	17.87	25.89	25.93	20.84	24.07	22.17
Keski-Suomi	31.13	19.58	18.52	18.70	25.07	26.16	22.56	25.63	23.42
Etelä-Pohjanmaa	28.22	19.13	19.50	18.95	29.98	28.28	22.46	26.66	24.15
Pohjanmaa	30.91	17.33	19.72	17.74	24.57	23.62	26.79	25.83	23.31
Keski-Pohjanmaa	29.22	19.39	19.25	15.11	24.16	26.71	22.23	28.10	23.02
Pohjois-Pohjanmaa	28.94	21.39	22.15	22.47	28.69	32.46	26.83	31.25	26.77
Kainuu	25.17	18.14	26.80	16.46	25.40	20.07	17.73	28.49	22.28
Lappi	31.78	22.12	21.35	16.64	27.94	28.43	26.49	28.18	25.37
Itä-Uusimaa	27.91	16.44	18.55	16.18	26.29	19.47	23.96	25.88	21.84
Ahvenanmaa	29.10	18.72	21.35	13.82	18.76	19.23	16.46	22.12	19.95
STD	4.59	2.93	3.16	3.27	3.94	5.15	4.54	4.52	
AVG	31.03	20.18	20.05	19.12	27.48	27.57	24.42	28.07	
VCF	0.15	0.15	0.16	0.17	0.14	0.19	0.19	0.16	

"STD" refers to employment-weighted standard deviation, "AVG" refers to employment-weighted average and "VCF" refers to employment-weighted variation coefficient.

Table 6. Worker inflow rate from unemployment in the regions of Finland.

	1990	*1991*	*1992*	*1993*	*1994*	*1995*	*1996*	*1997*	*AVG*
Uusimaa	0.78	0.56	1.87	3.32	6.41	5.11	3.22	5.12	3.30
Varsinais-Suomi	1.68	1.02	2.67	4.80	9.73	5.82	3.16	6.15	4.38
Satakunta	1.92	1.25	2.24	4.35	9.60	5.39	2.82	6.66	4.28
Kanta-Häme	1.08	0.87	2.35	4.46	8.51	5.48	3.40	6.91	4.13
Pirkanmaa	1.76	1.26	2.91	5.08	9.07	5.72	2.93	5.91	4.33
Päijät-Häme	1.28	0.92	2.26	5.01	8.84	5.74	3.51	7.23	4.35
Kymenlaakso	1.60	1.28	2.24	4.65	8.18	5.22	3.06	5.85	4.01
Etelä-Karjala	2.04	1.06	2.02	4.50	8.07	6.19	3.16	6.63	4.21
Etelä-Savo	2.29	1.34	2.15	5.28	10.03	5.53	3.53	7.62	4.72
Pohjois-Savo	2.34	1.34	2.09	5.31	8.83	5.63	3.34	7.51	4.55
Pohjois-Karjala	2.72	1.63	2.63	5.97	9.62	5.72	3.27	7.98	4.94
Keski-Suomi	1.71	1.46	2.42	5.15	9.76	6.86	3.61	7.03	4.75
Etelä-Pohjanmaa	2.30	1.91	2.80	6.29	13.02	6.40	3.62	8.17	5.56
Pohjanmaa	1.35	1.07	2.40	4.21	7.82	4.39	3.02	4.92	3.65
Keski-Pohjanmaa	2.07	1.61	2.59	5.52	9.53	6.77	3.90	6.71	4.84
Pohjois-Pohjanmaa	1.97	1.50	3.37	6.12	10.55	6.90	3.75	7.99	5.27
Kainuu	2.59	1.59	2.53	7.11	9.36	4.72	2.78	10.55	5.15
Lappi	2.68	1.95	3.40	6.26	9.79	6.87	4.72	8.89	5.57
Itä-Uusimaa	1.01	1.00	2.19	3.83	6.72	4.39	2.87	5.04	3.38
Ahvenanmaa	1.31	0.75	1.59	2.86	4.83	5.61	2.46	5.98	3.17
STD	0.56	0.36	0.47	1.01	1.70	0.82	0.54	1.32	
AVG	1.90	1.32	2.55	5.23	9.33	6.00	3.47	7.26	
VCF	0.30	0.27	0.18	0.19	0.18	0.14	0.16	0.18	

"STD" refers to employment-weighted standard deviation, "AVG" refers to employment-weighted average and "VCF" refers to employment-weighted variation coefficient.

6.2. Separation

The separation rate is a measure of the outflow of workers from the population of establishments. In addition, there have been no major changes in the regional disparities in separation across the provinces of Finland (Table 7). The lowest level of separation has been in Ahvenanmaa, Satakunta and Itä-Uusimaa. On the other hand, the highest level of separation has been in the provinces of Uusimaa, Lappi and Pohjois-Pohjanmaa.

Labour demand by firms can be tailored downwards during the depression at the establishment level either by reducing hirings (i.e. worker inflow) or by increasing separation (i.e. worker outflow). The results indicate that there were indeed interesting differences in the adjustment of labour demand during the great depression of the early 1990s. For example, the rapid rise in unemployment in Kainuu can be explained by a rise in the separation rate and a decline in the hiring rate during the great depression in Finland.[16] In contrast, during the same period there was no rise at all in the separation rate in the province of Uusimaa. This means that the rise in the unemployment rate in Uusimaa can be explained by a decline in the hiring rate, which, from the point of view of the province, is an "easier" mechanism to adjust the labour demand than a rise in the separation rate.

The variation of the hiring rate instead of the separation rate is, from the point of view of union and firm insiders, a much more desirable way for establishments to tailor downwards their demand of labour during depressions. In fact, the decline in the hiring rate means that the relative bargaining position of union and firm insiders becomes even stronger during the times of economic slowdown. This is due to the fact that the inflow of unemployed workers into establishments does not in this case deteriorate the bargaining power of insiders, because the wage claims by recently unemployed workers are not as high as whose by union and firm insiders that have long-term contracts.

The separation rate can also be decomposed by the destinations of worker outflow. The worker outflow rate into unemployment (WOFU) reveals some interesting features (Table 8). The results indicate that the worker outflow rate into unemployment is highest in the province of Lappi. This observation is consistent with the earlier notion about the role of various active labour market measures in Eastern and Northern Finland.[17] In addition, it is interesting to note that by 1997 the worker outflow rate into unemployment had not yet declined to the levels before the great slump of the 1990s.

Table 7. Separation rate in the regions of Finland.

	1990	*1991*	*1992*	*1993*	*1994*	*1995*	*1996*	*1997*	*AVG*
Uusimaa	33.90	34.20	31.31	29.39	26.64	28.09	25.94	25.93	29.43
Varsinais-Suomi	31.23	30.81	29.24	29.29	23.84	24.18	23.64	22.36	26.82
Satakunta	28.26	29.89	30.13	23.59	20.20	21.34	21.32	18.71	24.18
Kanta-Häme	30.30	29.13	28.68	27.62	21.05	24.09	22.74	21.62	25.65
Pirkanmaa	31.51	32.87	28.26	26.68	21.84	22.91	21.03	19.97	25.63
Päijät-Häme	32.65	31.07	29.68	27.57	21.42	22.64	22.34	19.66	25.88
Kymenlaakso	28.82	29.57	27.42	26.18	18.53	24.43	21.82	17.87	24.33
Etelä-Karjala	27.79	32.52	27.82	25.51	21.12	24.58	24.59	20.25	25.52
Etelä-Savo	29.99	31.02	29.77	26.09	22.10	28.68	22.06	19.39	26.14
Pohjois-Savo	34.52	35.92	34.62	28.59	25.36	26.70	23.19	21.59	28.81
Pohjois-Karjala	30.12	32.55	28.13	25.75	21.94	25.54	21.35	18.15	25.44
Keski-Suomi	32.80	30.90	32.12	27.82	21.67	23.83	19.70	18.86	25.96
Etelä-Pohjanmaa	29.31	33.87	33.17	28.98	21.60	25.23	19.44	18.70	26.29
Pohjanmaa	32.78	28.24	30.90	24.52	20.29	20.97	21.54	19.95	24.90
Keski-Pohjanmaa	33.97	34.28	26.63	25.99	22.37	23.03	20.01	21.99	26.03
Pohjois-Pohjanmaa	33.23	32.77	33.16	29.34	24.18	26.04	23.53	22.20	28.06
Kainuu	30.23	39.21	29.68	23.70	19.44	23.27	21.20	18.54	25.66
Lappi	35.84	36.19	32.23	28.42	25.35	27.67	23.80	23.37	29.11
Itä-Uusimaa	27.21	27.59	27.74	22.93	22.15	22.32	21.50	22.96	24.30
Ahvenanmaa	32.27	23.30	18.60	20.54	18.41	16.89	21.87	15.94	20.98
STD	3.79	4.59	4.43	3.82	3.60	3.90	3.08	3.75	
AVG	32.94	33.42	30.99	27.81	23.15	25.39	23.3	21.51	
VCF	0.12	0.14	0.14	0.14	0.16	0.15	0.13	0.17	

"STD" refers to employment-weighted standard deviation, "AVG" refers to employment-weighted average and "VCF" refers to employment-weighted variation coefficient.

Table 8. Worker outflow rate into unemployment in the regions of Finland.

	1990	*1991*	*1992*	*1993*	*1994*	*1995*	*1996*	*1997*	*AVG*
Uusimaa	1.41	6.18	7.42	8.58	5.08	4.73	4.41	2.99	5.10
Varsinais-Suomi	2.38	6.81	8.37	11.36	5.07	5.13	6.02	3.77	6.11
Satakunta	2.77	6.20	7.17	9.65	4.75	5.74	7.42	4.47	6.02
Kanta-Häme	2.27	6.42	8.64	10.11	5.10	5.97	6.21	3.94	6.08
Pirkanmaa	2.74	7.05	7.15	10.18	5.01	5.12	6.16	3.84	5.91
Päijät-Häme	2.55	5.90	7.15	11.74	5.82	5.75	6.53	4.39	6.23
Kymenlaakso	2.76	5.25	5.35	9.75	4.57	4.92	6.50	4.16	5.41
Etelä-Karjala	2.43	5.04	5.22	10.29	5.23	5.57	8.00	4.41	5.77
Etelä-Savo	2.09	4.18	4.74	12.58	6.16	6.95	6.74	5.00	6.06
Pohjois-Savo	2.67	4.91	5.13	11.26	6.01	6.20	6.71	4.82	5.96
Pohjois-Karjala	3.08	5.06	5.20	11.27	6.48	6.59	7.72	5.39	6.35
Keski-Suomi	2.77	5.46	6.48	11.67	6.35	6.47	6.33	4.50	6.25
Etelä-Pohjanmaa	2.99	4.98	6.34	13.96	5.61	6.42	5.96	3.97	6.28
Pohjanmaa	2.18	4.99	4.47	8.83	3.44	4.23	4.74	3.19	4.51
Keski-Pohjanmaa	2.15	4.86	4.28	12.61	5.62	7.05	5.98	4.24	5.85
Pohjois-Pohjanmaa	3.10	6.18	7.76	11.37	6.61	5.84	6.32	4.82	6.50
Kainuu	2.81	4.90	6.31	10.94	6.01	8.06	9.09	5.16	6.66
Lappi	3.63	6.82	8.39	13.49	7.88	7.94	7.89	6.31	7.79
Itä-Uusimaa	2.20	5.65	6.89	7.80	4.11	5.03	4.26	3.69	4.95
Ahvenanmaa	1.22	2.54	3.52	5.74	4.30	3.76	4.39	2.23	3.46
STD	0.56	1.29	1.77	1.97	1.07	1.09	1.23	0.87	
AVG	2.62	5.77	6.65	11.17	5.73	6.14	6.66	4.46	
VCF	0.21	0.22	0.27	0.18	0.19	0.18	0.18	0.20	

"STD" refers to employment-weighted standard deviation, "AVG" refers to employment-weighted average and "VCF" refers to employment-weighted variation coefficient.

6.3. Worker reallocation

In line with earlier observations, the measure of worker reallocation does not indicate major changes in regional disparities from 1990 to 1997 (Table 9). The magnitude of worker reallocation has been highest in Uusimaa, and the lowest worker reallocation rate has been in the provinces of Ahvenanmaa, Itä-Uusimaa and Kymenlaakso. The results also indicate that the worker reallocation rate was indeed procyclical from 1990 to 1997.

Table 9. Worker reallocation rate in the regions of Finland.

	1990	*1991*	*1992*	*1993*	*1994*	*1995*	*1996*	*1997*	*AVG*
Uusimaa	69.41	56.84	51.98	50.52	55.34	59.98	55.07	58.63	57.22
Varsinais-Suomi	61.40	51.62	47.74	49.08	54.85	53.30	48.60	52.48	52.38
Satakunta	53.52	48.83	48.31	39.81	47.23	44.20	40.88	42.35	45.64
Kanta-Häme	59.85	46.72	43.54	46.40	45.36	52.10	46.75	50.06	48.85
Pirkanmaa	64.65	51.89	46.30	45.98	48.43	50.04	43.43	45.95	49.58
Päijät-Häme	60.56	48.72	46.21	46.51	46.47	46.86	44.54	45.37	48.16
Kymenlaakso	54.69	48.20	43.83	45.73	42.84	50.45	44.31	41.36	46.43
Etelä-Karjala	59.66	50.99	44.63	43.63	44.90	52.04	48.67	44.89	48.68
Etelä-Savo	57.09	48.46	48.51	41.34	48.60	56.87	44.65	43.86	48.67
Pohjois-Savo	66.23	57.48	54.38	50.32	53.55	54.33	48.59	48.92	54.23
Pohjois-Karjala	58.80	50.70	44.04	43.62	47.83	51.47	42.19	42.23	47.61
Keski-Suomi	63.94	50.48	50.64	46.52	46.74	50.00	42.26	44.48	49.38
Etelä-Pohjanmaa	57.52	52.99	52.68	47.93	51.58	53.51	41.90	45.36	50.43
Pohjanmaa	63.69	45.57	50.62	42.26	44.85	44.59	48.33	45.78	48.21
Keski-Pohjanmaa	63.18	53.67	45.88	41.10	46.53	49.74	42.24	50.09	49.05
Pohjois-Pohjanmaa	62.17	54.15	55.31	51.81	52.87	58.50	50.36	53.44	54.83
Kainuu	55.40	57.35	56.47	40.15	44.84	43.34	38.93	47.03	47.94
Lappi	67.61	58.31	53.58	45.06	53.28	56.09	50.29	51.55	54.47
Itä-Uusimaa	55.12	44.03	46.29	39.12	48.44	41.79	45.46	48.84	46.14
Ahvenanmaa	61.38	42.02	39.95	34.36	37.17	36.12	38.33	38.05	40.92
STD	8.03	7.03	6.42	6.89	7.27	8.77	7.30	8.11	
AVG	63.98	53.60	51.03	46.93	50.64	52.96	47.72	49.59	
VCF	0.13	0.13	0.13	0.15	0.14	0.17	0.15	0.16	

"STD" refers to employment-weighted standard deviation, "AVG" refers to employment-weighted average and "VCF" refers to employment-weighted variation coefficient.

6.4. Churning

The elaboration of gross job and worker flows together delivers a complete picture of labour demand adjustment in the regional labour markets of Finland. As noted earlier, the so-called churning rate is also a natural measure of underlying structural change within plants. The magnitude of structural change measured by the churning rate is high in Uusimaa compared with the other regions of Finland (Table 10). This means that the intensity of structural change within plants is indeed high in Uusimaa, where the unemployment rate

has been low with respect to the other provinces of Finland. In addition, there was a sharp decline in the churning rate in all provinces during the great depression of the 1990s. The level of the churning rate has been permanently lower since the great slump of the early 1990s.

The high churning rate in Uusimaa can be explained by the high level of education of workers, the diversity of the production structure, and the large geographical scope of regional labour markets. In addition, migration from the rest of the country to Uusimaa can give a boost to churning in Uusimaa, because most of the immigrants are young and well-educated.[18] In contrast, Kainuu has the lowest level of the churning rate, where the unemployment rate has been highest among the regions of Finland during the past few decades.

The results therefore support the view that one of the most important underlying structural features that explain the high unemployment rate of Kainuu is the fact that structural change does not "revitalize" the economic structure of the region enough. In fact, the recent empirical investigation by Ilmakunnas, Maliranta and Vainiomäki (1999) indicates that a rise in the churning rate gives a boost to the productivity at the establishment level after controlling for other key factors (such as the education of workers) that affect the productivity of establishments. This observation is in line with productivity measures based on regional GDP data that indicate that labour productivity is indeed higher in Uusimaa with respect to the other provinces of Finland. In fact, an investigation of regional disparities in labour productivity by Maliranta (1997) indicates that the level of productivity in Uusimaa is much higher compared with the other regions of Finland after controlling for other key factors. Thus, it can be argued that the underlying disparities in churning rates is one of the missing pieces of the productivity puzzle of Finnish regions.

Table 10. Churning rate in the regions of Finland.

	1990	*1991*	*1992*	*1993*	*1994*	*1995*	*1996*	*1997*	*AVG*
Uusimaa	34.24	24.69	21.08	20.32	23.55	27.85	26.59	27.51	25.73
Varsinais-Suomi	27.16	20.60	17.76	18.47	22.05	21.27	20.74	24.54	21.57
Satakunta	23.42	18.08	16.02	15.74	17.55	20.42	18.46	20.51	18.78
Kanta-Häme	27.43	18.69	15.29	18.21	18.55	18.66	19.78	22.37	19.87
Pirkanmaa	25.71	18.72	16.78	16.37	19.18	21.08	18.80	21.15	19.72
Päijät-Häme	27.04	20.01	16.20	16.46	20.44	20.93	19.66	20.33	20.13
Kymenlaakso	24.30	19.01	15.71	16.84	18.48	18.98	19.67	19.97	19.12
Etelä-Karjala	24.60	16.74	14.55	14.77	15.79	21.35	19.72	19.65	18.40
Etelä-Savo	24.63	17.30	15.22	14.75	17.46	18.86	17.43	18.72	18.05
Pohjois-Savo	31.64	24.69	20.63	20.73	21.82	23.02	18.21	19.52	22.53
Pohjois-Karjala	26.97	17.75	15.18	14.26	19.72	17.66	16.28	18.21	18.25
Keski-Suomi	26.25	20.45	16.17	18.11	19.09	19.69	19.38	20.09	19.90
Etelä-Pohjanmaa	23.10	18.15	16.98	16.16	18.57	18.54	17.07	18.38	18.37
Pohjanmaa	28.66	15.97	18.40	13.24	15.76	17.83	21.43	18.63	18.74
Keski-Pohjanmaa	26.36	19.76	16.07	13.53	18.20	18.44	19.37	18.29	18.75
Pohjois-Pohjanmaa	25.92	20.54	20.51	20.16	19.30	20.23	20.53	22.65	21.23
Kainuu	24.82	16.21	16.73	13.85	18.77	15.86	15.75	18.45	17.56
Lappi	25.92	21.68	16.57	16.10	20.84	20.20	20.32	21.89	20.44
Itä-Uusimaa	25.66	19.84	17.08	13.47	21.02	16.79	16.60	20.91	18.92
Ahvenanmaa	28.53	21.70	17.07	16.64	19.57	21.97	18.07	20.00	20.44
STD	4.59	3.67	2.99	3.32	3.21	4.27	4.00	4.09	
AVG	28.06	20.59	17.92	17.31	20.32	21.11	20.28	21.74	
VCF	0.16	0.18	0.17	0.19	0.16	0.20	0.20	0.19	

"STD" refers to employment-weighted standard deviation, "AVG" refers to employment-weighted average and "VCF" refers to employment-weighted variation coefficient.

7. The elements of gross job and worker flows

This section separates the genuine regional elements in the measures of gross job and worker flows from the effects of years and industry-structure in the Finnish regions. The ANOVA is based on the 2-digit standard industry classification that includes 46 industries in twenty provinces of Finland over the period from 1990 to 1997. The results from the employment-weighted regressions in which the regional measures of gross job and worker flows along with the net rate of employment change are explained by dummy variables that are attached to years, industries and regions are summarized in Table 11. Several

interesting conclusions can be drawn from these regressions. The dummy variables can explain from 35 up to 63% of the total variation of gross job and worker flows across regions, years and industries. The dummy variables can explain 38% of the net employment change in the Finnish regions, which is close to the results concerning the measures of gross job and worker flows.

Table 11. The results from employment-weighted regressions that evaluate and decompose the effects of years, industries and regions to the regional measures of gross job and worker flows in Finland.

	JC	*JD*	*NET*	*EJR*	*WIF*	*WIFU*	*WOF*	*WOFU*	*CF*
R^2	35.0	39.8	37.7	39.0	50.6	63.0	49.3	61.3	54.7
Decomposition:									
Years	35.3	38.0	79.5	13.8	30.4	48.1	23.2	30.6	22.1
Industries	62.7	60.5	20.0	83.5	66.0	48.1	73.8	66.8	64.9
Regions	2.0	1.5	0.4	2.7	3.6	3.8	3.0	2.6	13.1

R^2 refers to the sum of squares of the model (in which the regional measure of gross job and worker flow is explained by dummy variables attached to years, industries and regions by applying the 2-digit standard industry classification) divided by the total sum of squares. The following rows decompose the explained part of the variation in the measure of gross and worker flow to elements.

The decomposition of the explained variation (i.e. the sum of squares) into variation from years, from industry structure and from regions in gross job and worker flows provides additional patterns. Remembering the extreme volatility of economic activity from 1990 to 1997 in the Finnish economy, it is not a great surprise at all that an important part (80%) of the explained variation in net growth rates can be attributed to years. Also, industry structures have been subject to changes, indicated by the fact that divergence in employment growth rates across industries constitutes one fifth of the explained variation. Regional differences, on the other hand, have a minor role to play when one is explaining employment growth.

However, there are many differences in the intensity of intra-industry restructuring, which is best indicated by the high share of the explained variation (84%) of EJR attributable to

industry dummies.[19] Differences in EJR across regions are somewhat larger than in the case of net growth rates in relative terms, but still quite small. It is worth noting that, in contrast to other indicators of labour market dynamics, a significant proportion (13%) of the explained variation in the churning rates can be ascribed to regional effects as distinct from industry or year effects.

All in all, the regression results indicate that the underlying regional elements are minor with respect to the effects arising from years and industry structure, but despite this fact there are also some genuine regional elements in gross job and worker flows in Finland. The role of these genuine regional elements is most important in the case of the churning rate.

These regression results also shed light on some specific issues of regional labour markets in Finland.[20] Before the industry-structure of the Finnish regions has been taken into account, the net rate of employment change is lowest in the provinces of Lappi, Pohjois-Karjala, Etelä-Savo, Pohjois-Savo and Päijät-Häme (see also Tables 1 and 2). This feature is reflected in the high unemployment rate of these provinces (see Appendix). In contrast, the net rate of employment change is highest in the province of Pohjois-Pohjanmaa, Uusimaa and Varsinais-Suomi. However, a striking finding of these regression results is that, after taking into account the industry structure of the regions, the regional disparities in the net employment changes vanish almost completely. In fact, the results indicate that only the province of Lappi has had significantly poorer net employment growth than others, when the industry structure is controlled. The provinces of Uusimaa and Pohjois-Pohjanmaa remain only major positive outliers. In other words, the differences in net employment growth rates between regions in the period from 1990 to 1997 can be reduced mainly to the differences in the industry structures of the regions.

Regression analysis, however, reveals that a large share of the differences in gross job and worker flows that were described in the earlier parts of this study cannot be explained by the industry-structure of the Finnish regions. For instance, worker outflow into unemployment as well as worker inflow from unemployment has been particularly high in Lappi. Controls for industry structure even reinforce this conclusion. Some other provinces have also relatively high unemployment flows that cannot be explained by industry-structures. They include Pohjois-Pohjanmaa and Kainuu in Northern Finland, for example. In addition, the regression results with the industry controls confirm the earlier finding that the churning rate has indeed been low in the eastern parts of Finland, especially in the province of Kainuu.

8. Conclusions

The magnitude of gross job and worker flows is large, relative to net employment change in the Finnish economy from the regional point of view. This observation corresponds to the first so-called basic fact in the literature on gross job and worker flows. This means that there is a great deal of gross job creation in the declining regions with a high average unemployment rate in Eastern and Northern Finland. In addition, there is a great amount of gross job destruction in the growing regions with low average unemployment in Southern Finland. The earlier empirical literature on the Finnish regional labour markets has been totally silent about this underlying dynamics at the establishment level of the economy. Thus, this study provided extensive evidence for the view that stresses the enormous heterogeneity of regional labour market adjustment in Finland in contrast to the earlier literature that has been focused solely on (net) employment changes.

The gross job reallocation rate has not been countercyclical by using establishment-level data from the provinces of Finland. This observation is not in line with the established "basic facts" of the literature on gross job and worker flows. One explanation is that the establishment-level data of this study includes a number of non-manufacturing industries.[21] In addition, the extreme depression of the 1990s caused a sharp crash in gross job creation rates across the Finnish regions. The fluctuation of worker reallocation has been procyclical in the Finnish regions over the period of investigation as in a number of other countries. In addition, job reallocation is a large part of total worker reallocation in the Finnish regions.

The elaboration of gross job and worker flows reveals a number of regional patterns that are impossible to detect by focusing solely on (net) employment changes. These patterns of gross job and worker flows emerge despite the presence of the same institutional characteristics (including labour market regulations) across regions in Finland. However, there are distinct regional differencies, for example, in the intensity of active labour market measures. In particular, there is no solid evidence at all for the widely held view that the job creation rate is, on average, lower in Eastern and Northern Finland, where the unemployment rate has been much higher than in Southern Finland during the past few decades.

The rapid rise in regional unemployment rate disparities during the slump of the early 1990s (from 1991 to 1993) can be explained by the sharp rise in the regional disparities in job destruction rates and in separation rates of workers. In contrast, during the slump of the 1990s, there was a decline in regional disparities in job creation rates and in hiring rates of workers. The highest level of job destruction at the bottom of the slump was in

the provinces of Eastern and Northern Finland. In fact, in 1991 almost a third of the jobs in the selected industries of this study were destroyed in the province of Kainuu. In contrast to the adjustment of labour markets in the slump of the early 1990s, during the recovery of the economy (from 1994 to 1997), there has been a decline in the regional disparities in job destruction rates and in separation rates of workers, but a rise in the regional disparities of job creation rates and hiring rates of workers.

An explanation of this regional concentration of job destruction during the slump of the early 1990s is the presence of the fatter left-hand tail of low-productivity jobs in Eastern and Northern Finland. Thus, the extreme economic slowdown of the early 1990s that hit all regions of Finland caused perhaps a more intensive time of "cleansing" in Eastern and Northern Finland compared with Southern Finland, outlined in the model by Caballero and Hammour (1994), when outdated or unprofitable techniques were pruned out of the production system. Findings about the concentration of job creation, in turn, suggests that jobs destroyed during the slump are disproportionally reallocated during the recovery to regions that have favourable conditions for job creation. Those factors are likely to include a skilled labour force and technological spillovers from surrounding firms that are fuelled by agglomeration, to list the two most obvious candidates. In fact, Maliranta (2001) has argued that job destruction in low and job creation in high productivity plants have positively contributed the aggregate productivity of Finnish manufacturing since the late 1980s. These empirical findings obtained are in keeping with the conjecture that this productivity-enhancing restructuring at the plant level has had an interesting regional dimension.

There are interesting differences in the adjustment of labour demand during the great slump of the early 1990s. For example, the rapid rise in unemployment in Kainuu can be explained by a rise in the separation rate and a decline in the hiring rate during the great depression in Finland. In contrast, during the same period there was no rise at all in the separation rate in the province of Uusimaa, which constitutes the core of economic activity in Finland. This means that the rise in the unemployment rate in Uusimaa can be explained by a decline in the hiring rate, which, from the point of view of the province, is a less painful mechanism to adjust the labour demand than a rise in the separation rate.

The magnitude of structural change measured by the churning rate is high in Uusimaa compared with the other provinces of Finland. This means that the intensity of structural change within plants is indeed high in Uusimaa, where the unemployment rate has been low with respect to the other regions of Finland. On the other hand, Kainuu has the lowest level of the churning rate, and the unemployment rate has been highest during the past few decades. This observation is in line with the matching models in the tradition by

Mortensen and Pissarides (1994), according to which the high level of churning (i.e. excess worker reallocation) is a manifestation of an intensive matching process, which eventually delivers a lower equilibrium unemployment rate. The regression results indicate that these differences cannot be reduced to the industry structure of the regions. Thus, the results support the view that one of the most important underlying structural features that explain the high unemployment rate of Kainuu is the fact that the structural change within plants does not "revitalize" the economic structure of the region enough.

There are genuine regional elements in gross job and worker flows after taking account of the variation of these measures from years and from industry structure despite the fact that the extreme volatility of economic activity over the period of the investigation means that much of the explained variation in gross job and worker flows can be attributed to years (and also to industries). The role of these genuine regional elements is most important in the case of the churning rate. In particular, the patterns of gross job and worker flows that were characterized in this study cannot be explained by the industry structure of the Finnish regions. In contrast, the regional differences in net employment growth rates in the period from 1990 to 1997 can be reduced mainly to the differences in the industry structures of the regions.

References

Abowd, J.M., P. Corbel and F. Kramarz (1999), "The entry and exit of workers and the growth of employment: An analysis of French establishments." *The Review of Economics and Statistics* 81, 170–187.

Baldwin J., R. Dupuy and W. Penner (1992), "Development of longitudinal panel data from business register: Canadian experience." *Statistical Journal of the United Nations* ECE 9, 289–303.

Baldwin, J.R. and G. Picot (1995), "Employment generation by small producers in the Canadian manufacturing sector." *Small Business Economics* 7, 317–331.

Bertola, G. and R. Rogerson (1997), "Institutions and labor reallocation." *European Economic Review* 41, 1147–1171.

Burda, M. and C. Wyplosz (1994), "Gross worker and job flows in Europe." *European Economic Review* 38, 1287–1315.

Burgess, S., J. Lane and D. Stevens (1994), "Job flows, worker flows and churning." Discussion Papers 1125. Centre for Economic Policy Research.

Böckerman, P. (1998), "Alueet työttömyyden kurimuksessa." (in Finnish). Studies 14. The Foundation for Municipal Development.

- (2000), "Suomen työttömyys: Alueellinen näkökulma." (in Finnish). In *Suomalaisen sosiaalipolitiikan alueellinen rakenne,* 72–92. Eds. H.A. Loikkanen and J. Saari. Helsinki: Sosiaali- ja terveysturvan keskusliitto ry.

Böckerman, P. and H. Piekkola (2001), "On whom falls the burden of restructuring? Evidence from Finland." In *Nordic Labour Market Research on Register Data*. Eds. A. Holm and T.P. Jensen. Forthcoming.

Caballero, R.J. and M.L. Hammour (1994), "The cleansing effect of recessions." *The American Economic Review* 5, 1350–1368.

- (2000), "Institutions, restructuring, and macroeconomic performance." Unpublished. MIT.

Davis, S.J. and J. Haltiwanger (1990), "Gross job creation and destruction: Microeconomic evidence and macroeconomic implications." *NBER Macroeconomics Annual* 5, 123–168.

- (1999), "Gross job flows." In *Handbook of Labour Economics,* Vol. 3B, 2711–2805. Eds. O. Ashenfelter and D. Card. Amsterdam: North-Holland.

Davis, S.J., J. Haltiwanger and S. Schuh (1996), *Job Creation and Destruction.* Cambridge, Mass.: The M.I.T. Press.

Devereux, M.P., R. Griffith and H. Simpson (1999), "The geographic distribution of production activity in the UK." Unpublished. Institute for Fiscal Studies.

Eberts, R.W. and E. Montgomery (1995), "Cyclical versus secular movements in employment creation and destruction." Working Papers 5162. National Bureau of Economic Research.

Hall, R.E. (1999), "The concentration of job destruction." Working Papers 7025. National Bureau of Economic Research.

Haltiwanger, J.C. (1997), "Measuring and analyzing aggregate fluctuations: The importance of building from microeconomic evidence." *Federal Reserve Bank of St. Louis* May/ June, 55–77.

Haltiwanger, J.C. and C.J. Krizan (1999), "Small business and job creation in the United States: The role of new and young businesses." In *Are Small Firms Important? Their Role and Impact,* 79–97. Ed. Z.J. Acs. Boston: Kluewer Academic Publishers.

Honkapohja, S. and E. Koskela (1999), "The economic crisis of the 1990s in Finland." *Economic Policy* 14, 400–436.

Huovari, J. (1999), "Alueelliset työttömyys- ja työllisyyserot." (in Finnish). Working Papers 27. Pellervo Economic Research Institute.

Ilmakunnas, P., S. Laaksonen and M. Maliranta (1999), "Enterprise demography and worker flows." In *Statistics, Registries, and Science. Experience from Finland,* 73–88. Ed. J. Alho. Helsinki: Statistics Finland.

Ilmakunnas, P. and M. Maliranta (2000a), "Työpaikkojen syntyminen ja häviäminen ja työvoiman vaihtuvuus." (in Finnish). Studies 209. Ministry of Labour.

- (2000b), "Työpaikkojen ja työntekijöiden vaihtuvuus laman ja elpymisen aikana." (in Finnish). *Kansantaloudellinen aikakauskirja* 96, 233–248.

- (2001), "The turnover of jobs and workers in a deep recession: Evidence from the Finnish business sector." Discussion Papers 747. The Research Institute of the Finnish Economy.

Ilmakunnas, P., M. Maliranta and J. Vainiomäki (1999), "The roles of employer and employee characteristics for plant productivity." Working Papers W–223. Helsinki School of Economics and Business Administration.

Kangasharju, A. and J. Pehkonen (2001), "Employment-output link in Finland: Evidence from regional data." *Finnish Economic Papers* 14, 41–50.

Maliranta, M. (1997), "Productivity performance in regions. Some findings from Finnish manufacturing." Unpublished. The Research Institute of the Finnish Economy.

- (2001), “Productivity growth and micro-level restructuring. Finnish experiences during the turbulent decades.” Discussion Papers 757. The Research Institute of the Finnish Economy.

Mortensen, D.T. and C.A. Pissarides (1994), “Job creation and destruction in the theory of unemployment.” *Review of Economic Studies* 3, 397–415.

Nickell, S. (1998), ”Job tenure and labour reallocation.” Discussion Paper Series 32. The Labour Market Consequences of Technical and Structural Change, Centre for Economic Performance.

Ramey, V. and M. Shapiro (1998), “Displaced capital.” Discussion Papers 98–24. University of California, San Diego.

Romppanen, A. (1974), “Teollisuuden työpaikkojen uusiutuminen 1960-luvulla.” (in Finnish). Erillisselvitys 8/1974. Taloudellinen suunnitelukeskus.

Schumpeter, J.A. (1942), *Capitalism, Socialism, and Democracy.* Harvard: Harper and Row.

Tervo, H. (1998) “The development of regional unemployment differentials in Finland in the 1990s.” *Finnish Economic Papers* 11, 37–49.

Appendix

Selected background statistics for the provinces of Finland (NUTS3).

	Share of employment in the Finnish economy*, %	Average unemployment rate**, %	Employment in the primary sectors***, %	Employment in manufacturing, %	Employment in construction, %	Employment in trade and transportation, %	Employment in private services, %	Employment in public services, %
Uusimaa	32.79	8.9	0.7	14.8	5.7	28.4	27.5	23.0
Varsinais-Suomi	9.00	10.4	4.9	26.0	6.8	20.8	17.7	23.9
Satakunta	4.71	13.1	6.4	28.9	6.0	19.9	15.5	23.3
Kanta-Häme	2.89	11.3	6.0	24.7	6.5	19.7	17.2	26.0
Pirkanmaa	8.86	12.7	3.4	27.9	6.1	20.0	18.4	24.2
Päijät-Häme	4.15	14.2	4.4	28.0	6.8	20.9	17.2	22.7
Kymenlaakso	3.85	12.7	5.4	23.8	6.8	23.4	16.5	24.1
Etelä-Karjala	2.66	12.7	6.3	24.7	6.7	21.6	16.7	24.1
Etelä-Savo	2.31	13.2	11.8	17.7	5.9	20.1	15.9	28.6
Pohjois-Savo	3.73	13.8	9.5	18.2	5.3	19.7	18.3	29.1
Pohjois-Karjala	2.25	15.6	9.3	20.0	5.6	18.9	16.6	29.5
Keski-Suomi	4.09	14.7	6.3	23.4	6.2	18.5	18.5	27.1
Etelä-Pohjanmaa	2.84	12.3	12.8	23.1	5.9	19.7	14.3	24.3
Pohjanmaa	3.19	9.3	8.9	26.5	4.9	18.2	15.9	25.6
Keski-Pohjanmaa	1.07	11.7	12.5	20.2	6.3	20.2	15.4	25.4
Pohjois-Pohjanmaa	5.36	14.1	6.9	24.1	6.2	19.2	16.9	26.8
Kainuu	1.14	17.7	9.4	16.8	5.5	19.4	18.1	30.7
Lappi	2.67	17.2	6.3	16.4	6.3	22.1	18.3	30.7
Itä-Uusimaa	1.68	8.2	6.0	28.4	7.8	19.4	16.7	21.8
Ahvenanmaa	0.72	2.7	4.7	8.7	5.4	43.0	15.4	22.8

*This column refers to the average share of employment in the province from 1988 to 1997 with respect to the whole Finnish economy. (These calculations by authors cover the selected industries of this study.)

**This column refers to the average unemployment rate from 1990 to 1999 (Source: Statistics Finland).

***The following columns about the employment shares of the main sectors in the Finnish provinces (NUTS3) are based on the situation in 2000. The primary sectors cover agriculture, forestry and fishing (A; B). (Source: Statistics Finland).

[1] Davis and Haltiwanger (1999) provide a summary of the literature and a discussion about various measurement and conceptual differences that hamper available comparisions of gross job and worker flows across countries.

[2] For example, Nickell (1998) provides some evidence for this view.

[3] Kangasharju and Pehkonen (2001) provide a recent analysis of growth and employment in the Finnish regions. Böckerman (2000) provides a summary of the literature.

[4] Caballero and Hammour (2000) stress the dynamic and the cumulative nature of restructuring in the economies.

[5] An important feature of the measures of job creation and destruction is fact that all jobs are considered to be equal. In other words, these measures do not take into account the underlying quality of jobs that are created and destroyed in the Finnish regions.

[6] Davis and Haltiwanger (1999) provide a list of "basic facts" of the literature on reallocation with additional references. Burda and Wyplosz (1994) provide empirical evidence on the magnitude of gross job and worker flows in Europe.

[7] Ramey and Shapiro (1998) provide a number of interesting case studies on the fact that reallocation can be very costly to the local economy. For example, they find by using information on auction values that in the case of the closure of a Californian aerospace plant, the equipment resale prices averaged only 35 percent of net-of-depreciation purchase values.

[8] However, Eberts and Montgomery (1995) provide an analysis of job creation and destruction for the U.S. states. A major finding of the study is that over time employment fluctuations are associated primarily with job destruction, but across regions employment differences are associated more with job creation. In addition, Devereux, Griffith and Simpson (1999) provide regional measures of job creation and destruction for the UK from the point of view of agglomeration.

[9] The data covers the period from 1987 to 1997. Linking employees to plants is a laborious and challenging task to do and it seems that in the first two or three years, when the Employment Statistics system was under construction, links were not always perfect. Consequently, worker and job flows derived from this data source may be somewhat biased upward in these years. Indeed, a comparison of job flows with Business Register data suggests that job creation and destruction rates are to some degree higher in Employment Statistics up to the year 1990, but henceforth these rates are closely in agreement with each other between two data sources (see Ilmakunnas and Maliranta 2000b). The inclusion of the years 1988 and 1989 may thus yield a spurious view about the downward trend in the job reallocation rate.

[10] Romppanen (1974) provides an early investigation into gross job flows in the Finnish economy. The study covers manufacturing industries and it is based on Industrial Statistics. The study also provides some regional measures of gross job creation and destruction. However, a comparision of these results with the ones reported in the following sections of this study is not directly possible, because Romppanen (1974) has calculated the rates of gross job creation and destruction simply by dividing t-1 employment. In addition, the regions investigated by Romppanen (1974) are not the same ones as in this study.

[11] The applied definition of the non-farming business sector excluding social and personal services is, in detail, as follows: mining (C), manufacturing (D), energy etc. (E), construction (F), trade (G), hotels and restaurants (H), transportation etc. (I), finance (J), and real estate, business services etc. (K). This means that agriculture, forestry and fishing (A; B), public administration (L), education (M), health and social work (N), other social and personal

services (O), international organizations (Q), and industry unknown (X) are exluded from the evaluation of the regional gross job and worker flows. Ilmakunnas, Maliranta and Vainiomäki (1999) contains a more detailed elaboration of the applied data. In addition, Ilmakunnas and Maliranta (2001, 3–4) provide a discussion of the establishment-level data.

[12] Ilmakunnas, Maliranta and Vainiomäki (1999) provide a detailed illustration of linkage procedures in the case of Finnish manufacturing industries.

[13] This estimate is somewhat sensitive to the applied source of calculations. Business registers in Finland cover even the smallest establishments. A part of the entry and the exit of establishments is masked due to the fact exits of establishments also happen between the measurement points of the data and employment is measured as an average in business registers.

[14] Honkapohja and Koskela (1999) provide a detailed analysis of the great slump of the early 1990s in Finland.

[15] The fundamental tradeoff in the model by Davis and Haltiwanger (1990) is that a drop in present consumption due to reallocation activity delivers a rise in future consumption. In other words, in a recession, it is more valuable to invest in reallocation, which is an essential part of solid long-term growth. Thus, the structural change in the economy will be more intensive during recessions. This means that in terms of gross job flows, economic slowdowns are times of large job destruction and a mild decline in job creation.

[16] Ilmakunnas and Maliranta (2000a) conclude that the volatility of the hiring rate was stronger than the volatility of the separation rate during the great depression of the early 1990s in the Finnish economy. The observation is in line with a recent study using French establishment-level data by Abowd, Corbel and Kramarz (1999), which concludes that the adjustment of employment is made primarily by reducing hires, not by changing the separation rates.

[17] The allocation of active labour market measures is indeed heavily concentrated in Eastern and Northern Finland. The strong regional correlation of WIFU and WOFU can emerge at least for three reasons. The first reason is that the heavy doses of active labour market measures can displace other employees into the pool of unemployed persons. The second reason is that the allocation of active labour market measures can create a great number of various short-term contracts that generate the high level of worker flows into and out of unemployment. The third reason is that the during the 1990s it was possible to use active labour market measures to renew unemployment benefits that were tied to past wages.

[18] A related study, by Böckerman and Piekkola (2001), finds that the churning rate is higher for employees with a higher university education compared with employees with only basic education. The churning rate is also higher for the young employees of the Finnish economy.

[19] This finding may reflect the fact that the amount of intra-industry heterogeneity varies across industries identified in the classification scheme that is applied here. It contains industries whose plants are relatively homogeneous in the sense that the industry is specialised in the production of few types of products. Some other industries, on the other hand, are characterised by large product variety and heterogenous plants specialised in the production of different products. Divergence in the employment growth among plants can be expected to be higher when plants operate different markets.

[20] The detailed results from these regressions are available upon request from the authors.

[21] In particular, a survey of the literature by Davis and Haltiwanger (1999) indicates that manufacturing industries tend to exhibit greater volatility of job destruction relative to job creation than non-manufacturing industries.

Unravelling the mystery of regional unemployment in Finland

Petri Böckerman*

*Labour Institute for Economic Research. Pitkänsillanranta 3A,
FIN-00530 Helsinki, Finland. Fax: +358-9-2535 7332. Tel.: +358-9-2535 7330.
E-mail: petri.bockerman@labour.fi

Abstract

The study explores the determination of regional unemployment in Finland. The evaluation of regional labour markets is based on unique, linked panel data that is created by matching the conventional economic fundamentals with the measures based on gross flows of jobs and workers. The striking empirical finding is that the reorganization of labour markets lowers the unemployment rate in the Finnish regions. In other words, the reallocation of labour resources seems to be good for regional employment.

JEL-code: J23, R23
Keywords: restructuring, reorganization, unemployment, gross flows, regional labour markets

Introduction

Regional labour markets have gained a growing interest in Finland. The reason is that there has been a rapid rise in the regional disparities in unemployment rates as part of the export-led recovery from the great slump of the early 1990s (see, for example, Pehkonen and Tervo 1998; Tervo 1998). As a consequence of this development, the regional unemployment disparities across the twenty Finnish provinces measured by the standard deviation of unemployment rates were approximately four times higher in 1997 compared with the situation before the great slump of the early 1990s.[1]

Despite the apparent importance of regional labour markets, detailed empirical studies that aim to relate the regional unemployment disparities to the underlying economic fundamentals in Finland have not been available. In particular, the existing empirical studies exclude an evaluation of the impact of restructuring in terms of gross flows of jobs and workers on the regional unemployment rates.[2] This notion seems to extend to the whole of the literature on regional unemployment disparities (see, for example, Elhorst 2003).

Regional economies are in a state of continuous turbulence. The continuous reallocation and the reorganization of scarce resources culminate in the functioning of labour markets, where the reallocation of resources takes the form of gross job flows (i.e. job creation and destruction), and gross worker flows (i.e. hirings and separations of workers) (see, for example, Davis and Haltiwanger 1999). The reorganization view of regional labour markets underlines the stylized feature that the pool of available jobs is not stagnant over time. This restructuring at the plant level of the regions is most likely linked to the regional unemployment problem.

This empirical study aims, therefore, to relate the regional unemployment disparities to the economic fundamentals in Finland. Along with the conventional economic fundamentals suggested by the available empirical literature on regional unemployment disparities, the study considers the internal turnover in the regional labour markets measured by gross job and worker flows based on the establishment-level dynamics of labour-demand adjustment. In addition, the study includes an elaboration of the turnover between regional labour markets measured by gross migration flows on the regional unemployment rates.[3] By doing this, the study fills an important gap in the literature on regional labour markets in Finland and provides detailed empirical evidence for the importance of restructuring from the regional perspective.

The rest of the study is organized as follows. The second section provides the definitions of gross flows of jobs and workers. The third section provides a survey of the literature that has analyzed the connection of restructuring and unemployment from the regional perspective. The fourth section provides a theoretical background and motivation for the role of restructuring based on gross flows of jobs and workers. The fifth section of the study includes a description of the linked data that is used to address the determination of the unemployment rate in the Finnish regions. The sixth section reports the results and the last section concludes.

Gross flows of jobs and workers

The gross flows of jobs and workers are measured as the number of jobs created or destroyed or workers moving in and out of establishments (i.e. hirings and separations of workers) (see Davis, Haltiwanger and Schuh 1996). This means that the measure of the job creation rate is calculated as follows:

$$JC_t = \sum_i \Delta E_{it}^{+} / ((\sum_i E_{it} + \sum_i E_{i,\,t-1}) /2), \quad (1)$$

where E denotes employment in plant i year t and the superscript "+" refers to positive changes. To convert time-t job flow measures to rates, job creation and destruction are divided by the average of employment at t and $t-1$ in order to achieve technical advantages over more conventional growth rate measures.[4]

The measure of the job destruction rate is calculated as follows:

$$JD_t = \left| \sum_i \Delta E_{it}^{-} \right| / ((\sum_i E_{it} + \sum_i E_{i,\,t-1}) /2) \quad (2)$$

Thus, the job destruction rate is defined as the absolute value of the sum of negative employment changes, divided by the average number of employees. The superscript "-" refers to negative changes. Appendix 1 provides an example of the calculation of regional gross flows of jobs.[5]

The definitions of job creation and destruction mean that the net rate of change of employment (NET) is simply the difference of the measures of job creation and destruction:

$$NET_t = JC_t - JD_t \quad (3)$$

The sum of job creation and destruction rates is called the gross job reallocation rate (JR):

$$JR_t = JC_t + JD_t \quad (4)$$

The excess job reallocation rate (EJR) equals (gross) job reallocation minus the absolute value of the net employment change:

$$EJR_t = JR_t - |NET_t| \quad (5)$$

This means that the excess job reallocation rate is an index of simultaneous gross job creation and destruction. Caballero (1998) notes that, for this reason, it is appropriate to measure the magnitude of restructuring by the excess reallocation rate. In other words, so-called excess job reallocation provides a coherent measure of structural change or restructuring among the plants of the regions. In addition, it is a natural measure of heterogeneity in the plant-level employment outcome among plants. If excess job reallocation is above zero, then the magnitude of gross job reallocation is above what has been necessary to accommodate the net employment changes of regional labour markets.[6]

The excess job reallocation rate is, therefore, a measure that captures the internal reorganization of the regions. The novelty of the following empirical investigation is that the turnover between regional labour markets is measured in the same way as the rate of excess job reallocation. This means that the applied measure of external turnover is based on the notion that the magnitude of simultaneous gross migration flows is an appropriate measure for the intensiveness of reorganization across regional labour markets.

Comparison of information in two consecutive years can be used for calculating the number of employees who have entered a plant during the year and are still working at the same plant. The sum of these employees over all plants is worker inflow, or hiring. It is also possible to identify those employees who are no longer working at a plant. This means that the sum of these employees is worker outflow, or separation.

Dividing the worker inflow and outflow in a period of time by the average of employment in periods *t* and *t-1* delivers the worker inflow rate (WIF) and the worker outflow rate (WOF). The difference between WIF and WOF is the net rate of change in employment:

$$NET_t = WIF_t - WOF_t \quad (6)$$

The worker flow rate (WF) is simply the sum of the hiring (WIF) and separation (WOF) rates. In addition, the so-called churning rate (CF) can be defined as follows:

$$CF_t = WF_t - JR_t \quad (7)$$

These definitions mean that the churning rate ties worker flows and job flows together and, therefore, completes the picture of the dynamics of labour adjustment at the establishment level. In particular, the churning rate is an appropriate measure of the internal reorganization of the regional labour markets, because the measure captures the fact that the available vacancies of regional labour markets are subject to various idiosyncratic shocks within plants. This is due to the comparision of worker flows with job flows. The churning rate can indeed be called the "excess worker turnover rate". Thus, an increase in the rate of churning means that there is more reshuffling by workers that is not directly related to job creation and destruction.

Previous related studies

Naturally, there have been a great number of earlier empirical studies on the nature and consequences of the so-called structural change on the levels of employment and unemployment. Those studies heavily emphasize the notion that the reallocation of labour resources is one of the most important sources of unemployment. Restructuring is typically associated with shifts in the shares of industries or certain components of labour demand. In particular, Lilien (1982) documented a strong, positive time-series relationship between aggregate unemployment and the cross-industry dispersion of employment growth rates as an indication of large-scale sectoral shifts of the U.S. economy. Afterwards, Abraham and Katz (1986) questioned this interpretation of the correlation.[7]

However, the available empirical applications based on the tradition started by Lilien (1982) tend to apply aggregate data. In addition, the number of empirical studies that look at restructuring and employment from the regional perspective is limited. The main conclusion of the existing literature is that an increase in the rate of labour reallocation is also a source of regional unemployment. However, the literature has certainly not stressed the issue of restructuring by applying the concepts of gross flows of jobs and workers that can be used to capture structural change at the plant level of the regions.

The existing literature can be summarized in a nutshell as follows. Holzer (1991) pays attention to restructuring in connection with regional unemployment. The study analyzes

the effects of demand shifts within and between local labour markets on employment and unemployment outcomes. The study is based on sales growth data at the firm or industry level in the U.S. states. The key finding of the study is that demand shifts between local areas account for large fractions of the observed variation in the unemployment and employment levels. Samsom (1994) considers the role of demand shifts in the determination of regional disparities of unemployment in Canada. The study is based on the shifts of the Beveridge curves and it applies quarterly data on the vacancy rates and the unemployment rates in the Canadian provinces. The study shows that the reallocation of labour resources tends to yield an increase in the unemployment rates and the vacancy rates.

In particular, Hyclak (1996) has applied the measures of gross flows in the investigation of restructuring by using data from 200 U.S. metropolitan areas. The measures of restructuring include job reallocation. The evidence is, therefore, based on the measures of gross job creation and destruction. However, Hyclak (1996) does not measure the magnitude of restructuring by using the excess job reallocation rate. In addition, the study does not pay attention at all to gross flows of workers. The evidence is limited to manufacturing firms. Hyclak (1996) discovers empirical evidence for the notion that structural changes in labour demand have played an important role in increasing the U.S. urban unemployment rates in the first half of the 1980s. In contrast, the following empirical investigation that applies data from the Finnish regions provides a different perspective on the role of restructuring in the determination of unemployment rates. The turnover between regional labour markets is captured by using the measures of gross flows of migration, and the investigation of the Finnish case covers all regions of the country.

Theoretical underpinnings

The creation and destruction of jobs require workers to switch employers and to shuffle between employment and joblessness. This means that unemployed workers are in a state of reallocation. Reallocation of resources is indeed essential for the growth of modern economies. Caballero and Hammour (1994) stress that restructuring of labour resources is associated at the plant level of the economy with the adaptation of technology. In particular, Caballero and Hammour (1994) argue that the newest technology can be obtained only by creating new jobs, and the adoption of superior new technology requires the destruction of old relationships. Under this perspective cyclical variation in job creation and destruction is tightly linked to technological advance and obsolescence. This means that restructuring by means of gross flows of jobs and workers revitalizes the economy.[9] Moreover, Contini and Revelli (1997) argue that the underlying movements of jobs and

workers are tightly connected via the so-called “vacancy chain”. This mechanism means that the hiring of a worker who is employed in another firm launches a whole sequence of separations and hirings and, thereby, adjustment of jobs and workers at the establishment level of the regions. This adjustment cannot be captured in detail by applying solely the measure of the net rate of employment change. In particular, this adjustment of labour demand can eventually cause large cumulative effects on employment and unemployment. In addition, Acemoglu (2002) argues that churning is associated with the adaptation of new vintages of technology. Technological progress at the plant-level of the regions provides employment opportunities. In a nutshell, these features of economic progress mean that the impact of restructuring at the plant level on unemployment is an empirical matter.

The data

Finland is divided into 85 sub-regions (the so-called NUTS-4 level in the European Union), the borders of which follow those of commuting districts quite closely. The yearly observations cover the period from 1989 to 1996. The variables that are used to explain regional unemployment rates can be divided into four broad categories. Thus, there are variables that characterize (i) the industry structure of the regions, (ii) the structure of labour force and gross migration flows, (iii) the intensity of restructuring at the establishment level of the regions, and (iv) macroeconomic evolution of the Finnish economy during the period of the investigation. In addition, there are selected additional regional variables that include the productivity of the Finnish regions. The motivation for these variables directly arises from the existing empirical studies that have investigated the determination of the regional unemployment problem (see Elhorst 2003). Table 1 contains a description of the variables and Appendix 2 provides selected descriptive statistics.

Table 1. The description of the applied variables.

V*ariable*	*Definition/measurement*
UN	The number of unemployed in region i / labour force in region i (i.e. unemployment is measured as fractions. For example, 34-percent unemployment is represented as 0.34)
a. The measures of industry structure:	
AGRI	Value added by agriculture in region i / GDP in region i (reference)
MANU	Value added by manufacturing industries in region i / GDP in region i
META	Value added by metal industries in region i / GDP in region i
ELEC	Value added by electronics in region i / GDP in region i
SERV	Value added by private services in region i / GDP in region i
PUBL	Value added by public sector in region i / GDP in region i
HIGH	Value added by high-tech manufacturing in region i / GDP in region i
HISE	Value added by high-tech services in region i / GDP in region i
b. The measures of labour force and gross migration flows:	
AGED	The number of employees aged from 55 to 65+ in labour force in region i / labour force in region i
UNSK	The number of employees with basic education only in labour force in region i / labour force in region i
DENS	The number of employees in region i divided by surface area in region i (km^2)
MIG1	Gross inward migration of employees with higher university degrees to region i / gross inward migration of employees (total) to region i
MIG2	(Gross inward migration to region i + gross outward migration from region i) – | gross inward migration to region i – gross outward migration from i | divided by average population in region i. Thus, MIG2 is an index of simultaneous gross inward and outward migration.
c. The measures of restructuring at the establishment level of the regions:	
EJR	The excess job reallocation rate in region i
CF	The churning rate in region i
d. The additional regional variables:	
PROD	Value added in region i divided by average population in region i
DEBT	Long-term municipal debt held in region i divided by average population in region i
e. The macroeconomic indicators:	
TERM	Terms of trade (export price index divided by import price index) (Source: Statistics Finland)
REAL	Real average lending rate by the Finnish banks (deflated by production price index) (Source: Bank of Finland and Statistics Finland)

The variables that characterize the industry structure and the properties of the labour force (including gross migration flows) across regions are collected by using aggregate data from Statistics Finland. The measurement of regional gross job and worker flows is based on large longitudinal data of employees during the period from 1988 to 1996 (see Böckerman and Maliranta 2001). This kind of data is indeed rarely available for the elaboration of regional dynamics. For instance, it is not at all possible to calculate gross flows of workers at the state level of the U.S. economy (see Shimer 2001). The applied measures of gross job and worker flows cover the non-farming business sector of the Finnish economy excluding social and personal services, which includes more than 1.1 million employees in about 100 000 plants.

The following evaluation of regional labour markets in Finland is based on this linked panel data set that is created by matching the conventional economic fundamentals with the measures based on gross job and worker flows of the regions. The business cycle movements of the Finnish economy are captured by including the key macroeconomic indicators. However, the inclusion of year dummies instead of the macroeconomic indicators yields the same results as the ones reported in the following section of this study (i.e. Table 3 and Appendix 3), because the coefficients of the macroeconomic variables are estimated by using time-series variation only in the following regression models.

Based on the applied data, regional disparities are definitely sharp in Finland. Figure 1 provides the Kernel density estimates for the distribution of the unemployment rate for the year 1991 (i.e. the bottom of the great slump of the early 1990s) and the year 1996.[10] The figure reveals that there have not been major changes in the shape of the distributions of the unemployment rates across the Finnish regions despite the fact that there has been a sharp increase in the average unemployment rate with a rise in the dispersion of the unemployment rates at the same time. In particular, there is no empirical evidence for the bipolarization of the underlying distribution of the regional unemployment rates during the 1990s. Figures 2 and 3 provide the distributions of the excess job reallocation rate and the churning rate in 1991 and in 1996.[11] There is evidently a great deal of variation in these measures of restructuring. In particular, the excess job reallocation rate shows procyclical movements. There is also a certain amount of persistence in the applied measures of reallocation. In particular, the churning rate has been at a lower level in Eastern and Northern Finland compared with Southern Finland over the period of investigation. In contrast, the underlying regional disparities of the excess job reallocation rate have not been as persistent as the churning rate. Table 2 provides the correlation coefficients between the applied measures of restructuring and the unemployment rate. There seems to be selected preliminary empirical evidence for the perspective that an intensive pace of

restructuring at the plant level of the Finnish regions is associated with low levels of the unemployment rate, which would be in conflict with the earlier empirical literature that has heavily underlined the role of restructuring as an important source of the regional unemployment problem.

Fig. 1. Kernel density estimates for the distribution of the unemployment rate in the Finnish regions for the year 1991 and the year 1996.

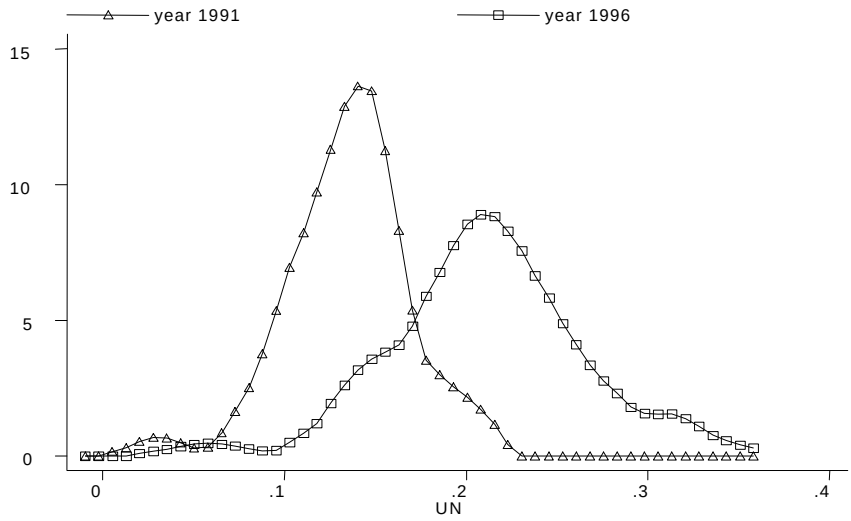


Fig. 2. The distribution of the excess job reallocation rate across the Finnish regions in 1991 and 1996.

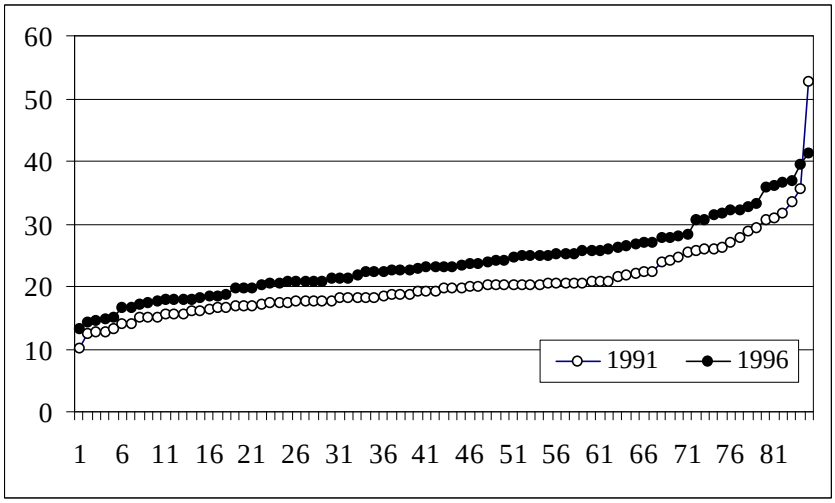


Fig. 3. The distribution of the churning rate in the Finnish regions in 1991 and 1996.

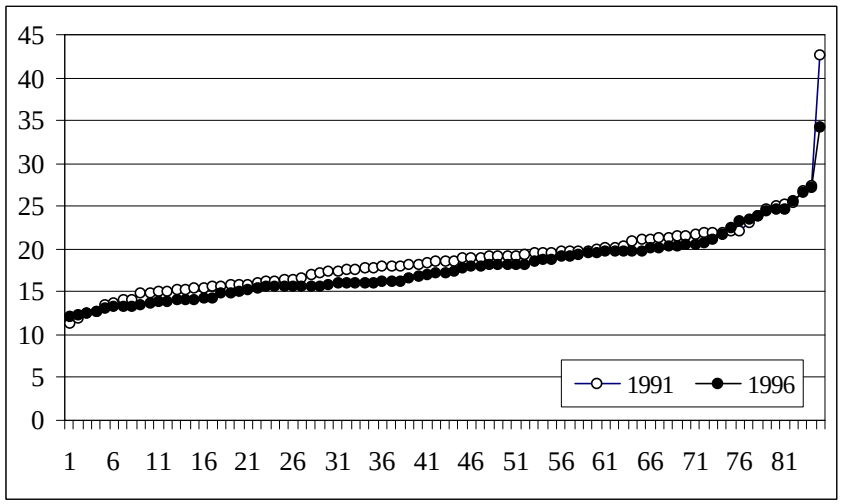


Table 2. The correlation coefficients.

	UN	*EJR*	*CF*	*MIG2*
UN	1.00			
EJR	-0.25	1.00		
CF	-0.50	0.37	1.00	
MIG2	0.04	0.09	0.12	1.00

Empirical strategy and the results

Since the linked panel data of the study cover all NUTS4 regions in Finland, the determination of the regional unemployment rates can be captured by applying a fixed effects model, as follows:

$$UN_{it} = a + \nu_i + b'\mathbf{X}_{it} + e_{it} \quad (8)$$

where i = 1,…,85; t = 1,…,8, and UN stands for the applied measure of the unemployment rate. **X** is a vector of the conventional regional economic fundamentals and the measures

of restructuring based on gross flows of jobs and workers. In addition, ν_i represents fixed effects measure by the regional dummies and e_{it} is a normally distributed error term.

The estimation results that are robust for the inclusion of the macroeconomic indicators can be summarized as follows (Table 3). The high volume of simultaneous gross inward and outward migration lowers the regional unemployment rate in Finland owing to more efficient matching between employees and establishments. The measures of job and worker turnover are indeed linked to the regional unemployment problem. In particular, the results concerning structural change indicate that the high level of restructuring in terms of excess job reallocation and churning lowers the unemployment rate. In other words, there is empirical evidence for the notion that a high degree of simultaneous gross job creation and destruction and excess worker turnover pushes down the unemployment rate in the Finnish regions.

Table 3. The results from the fixed effects model (dependent variable: UN).

Variables	*Coefficients*	*t-statistics*
Constant	1.1806**	16.30
MANU	0.0077	0.16
META	0.0073	0.17
ELEC	-0.0944	-1.08
SERV	0.0386	0.56
PUBL	0.2147**	2.90
HIGH	0.0804	0.92
HISE	-0.6440**	-3.99
AGED	1.4910**	10.00
UNSK	-1.3774**	-21.18
DENS	-0.0009**	-2.04
MIG1	0.0161	0.40
MIG2	-1.2519**	-8.13
EJR	-0.0243**	-2.15
CF	-0.1103**	-5.11
PROD	-0.4956**	-2.42
DEBT	0.0048**	5.39
TERM	-0.0060**	-18.81
REAL	-0.0033**	-8.57
R^2	0.94	
F(18,663)	595.53	

Notes: ** (*) indicates that the parameter estimate is statistically significant at the 5 (10) per cent significance level. The inclusion of year dummies instead of the macroeconomic indicators (i.e. the variables TERM and REAL) produces the same results as the ones reported in the table.

The empirical evidence, therefore, supports the perspective that restructuring at the establishment level of the economy in terms of the so-called “creative destruction” by Schumpeter (1942) seems to yield a decline in the regional unemployment rates in Finland. These results differ from the earlier empirical studies that emphasize the role of

restructuring as an important source of the regional unemployment problem. This means that the measures that capture a plant-level adjustment of labour demand can indeed provide an interesting perspective on the nature and the consequences of the underlying reorganization of regional labour resources.

The rest of the estimation results from Table 3 can be summarized in a nutshell as follows. The industry structure is not an important determinant of the regional unemployment rates. However, the results support the view that a high share of the public sector pushes up the unemployment rate. This result is in line with a simple correlation applying aggregate data from the Finnish provinces, because the share of the public sector is higher in Eastern and Northern Finland, where the unemployment rate has indeed been higher than in Southern Finland during the past few decades. However, this feature does not necessary imply strong policy conclusions, because the role of the industry structure in modelling the determination of the unemployment rate across the Finnish regions is rather that of a control variable. As Appendix 2 reveals, there is a large regional variation in the share of subsectors of manufacturing industries (i.e. metal industries and electronics) across the Finnish regions. However, there is no effect from these subsectors on regional unemployment rates. An increase in the share of rapidly growing high-tech services pushes down unemployment, owing to the labour-intensive character of these activities.[13] In addition, an increase in the share of so-called aged employees raises unemployment, but an increase in the share of unskilled employees pushes down the unemployment rate.[14] The result remains in the case where the share of unskilled employees is divided by the average population. This seems to suggest that the so-called "discouraged worker effect" is not behind the result that an increase in the share of unskilled employees pushes down the unemployment rate. There is empirical evidence that an increase in the density of economy activity leads to a decline in the unemployment rate. This effect is probably due to the so-called thick market externalities via regional labour market pooling.[15] A high level of productivity lowers the unemployment rate. In contrast, a high level of public debt held by municipalities leads to an increase in the unemployment rate. This effect is most likely due to the fact that the high level of regional public debt tends to coincide with the high level of taxation that depresses economic activity. Another possible interpretation of the result is that a sluggish economic growth with an increase in unemployment yields a decline in tax revenues and therefore induces a rise in regional public debt.

In addition to an application of the earlier static model that is based on the fixed effects that are measured by the regional dummies, the regional unemployment problem can elaborated by means of the following dynamic specification:[16]

$$UN_{it} = \sum_{k=1}^{P} \alpha_p UN_{i,t-k} + \sum_{k=0}^{P} \beta_p X_{i,t-k} + \eta_i + \varepsilon_{it} . \quad (9)$$

The model set up in the equation (9) can be estimated by employing the GMM method presented by Arellano and Bond (1991) for the first differenced equation. Although differencing eliminates the regional effects, it induces a negative correlation between the lagged dependent variable, ΔY_{it-1}, and the disturbance term $\Delta\varepsilon_{it}$. The lagged values of the variables in levels are therefore used as instruments. Strongly exogenous variables are allowed to influence the rate of regional unemployment from periods t-1 and t-2. In the case of endogenous variables, the effects are allowed to arise from the current period, t, and from the period t-1.

In the context of regional unemployment, there are three endogenous variables, viz. the excess job reallocation rate, the churning rate and the measure of simultaneous gross migration flows across the regions of Finland. There is earlier empirical evidence that the regional excess job reallocation rates exhibit procyclical movements over the period of the investigation (see Böckerman and Maliranta 2001). In particular, an increase in the unemployment rate may induce a decline in the excess job reallocation rate. This means that there is a potential two-way causal relationship between the unemployment rate and the excess job reallocation rate that needs to be taken into account. In other words, the specification is able to incorporate the dynamics and the endogeneity of the variables that are used to capture the reorganization of regional labour markets.

The estimation results of the equation (9) are reported in Appendix 3. The reported specification survives the Sargan test for the validity of the instruments. The estimation results support the perspective that the industry structure of the regions is not an important element in the determination of regional unemployment in Finland. In particular, the earlier conclusion about the role of simultaneous gross migration flows and the churning rate survives a dynamic specification of the relationship. In other words, there is additional empirical evidence for the notion that an intensive pace of reorganization in regional labour markets is indeed linked to the low level of unemployment in Finland. However, based on the dynamic specification reported in Appendix 3, there is, in fact, no empirical evidence for the view that an increase in the excess job reallocation rate is able to yield a decline in the regional unemployment rates. This result arises most likely due to the endogeneity of the excess job reallocation rate.[17] Moreover, the share of unskilled employees yields a different conclusion as a lagged variable in comparison with the earlier static model that incorporates the fixed effects.

Conclusions

The study explored the determination of the unemployment rates by using data from the regions of Finland. The striking empirical finding based on gross flows of jobs and workers is that the internal and the external reorganization of labour markets lowers the unemployment rate in the Finnish regions. The essential role of restructuring in the determination of regional unemployment has some direct relevance for regional policy. In particular, these findings provide empirical support for the perspective that various public measures should not be aimed at aiding contracting plants since restructuring at the establishment level of the economy will eventually yield a lower unemployment rate. In a nutshell, the reallocation of labour resources seems to be good for regional employment.

Acknowledgements – I am grateful to Pekka Ilmakunnas, Reija Lilja and Mika Maliranta for comments. In addition, I would like to thank two anonymous referees for valuable comments and suggestions. Paul A. Dillingham has kindly checked the language. The usual disclaimer applies.

Appendix 1.

The calculation of gross flows of jobs and the net rate of employment change.

Let us assume that there are two regions and two plants in the economy. The plants are called A and B. Plant A has 7 employees in Region 1 and 3 employees in Region 2 in the period *t-1.* Plant B has 1 employee in Region 1 and 4 employees in Region 2 in the period *t.* The set-up of the example is given in the following table:

Plant	*Period t-1*		*Period t*	
	Region 1	Region 2	Region 1	Region 2
A	7	3	14	6
B	2	8	1	4
SUM	9	11	15	10

This means that the total number of jobs has doubled in Plant A. In contrast, in the case of Plant B, the total number of jobs has decreased by 50%. The applied measures of gross job flows and the net rate of employment change for the regions are as follows:

	Region 1	*Region 2*
JC	(14-7)/((9+15)/2)=0.58	(6-3)/((11+10)/2)=0.29
JD	|(1-2)|/((9+15)/2)=0.08	|(4-8)|/((11+10)/2)=0.38
NET	0.58-0.08=0.5	0.29-0.38=-0.10
EJR	(0.58+0.08)-|0.5|=0.17	(0.29+0.38)-|-0.1|)=0.57

Appendix 2.

The selected descriptive statistics.

Variables	*Mean*	*STD*	*MIN*	*MAX*
UN	0.17	0.08	0.01	0.34
AGRI	0.15	0.09	0.00	0.42
MANU	0.32	0.12	0.07	0.64
META	0.05	0.06	0.00	0.54
ELEC	0.03	0.03	0.00	0.41
SERV	0.32	0.07	0.18	0.64
PUBL	0.19	0.06	0.07	0.39
HIGH	0.01	0.03	0.00	0.35
HISE	0.01	0.01	0.00	0.06
AGED	0.11	0.02	0.07	0.21
UNSK	0.36	0.05	0.21	0.53
DENS	10.89	20.25	0.20	186.24
MIG1	0.15	0.03	0.07	0.27
MIG2	0.05	0.02	0.02	0.11
EJR	0.26	0.08	0.10	0.84
CF	0.21	0.06	0.07	0.52
PROD	0.20	0.04	0.10	0.41
DEBT	4667	1431	1374	10608
TERM	97.30	3.33	91.70	101.50
REAL	7.53	2.72	4.18	12.47

Appendix 3.

The GMM estimation results (dependent variable: UN).

Variables	*Coefficients*	*t-statistics*
Constant	0.0186**	3.85
$Dependent_{t-1}$	0.2825**	2.67
$MANU_{t-1}$	-0.0394	-0.85
$MANU_{t-2}$	-0.0092	-0.19
$META_{t-1}$	0.0252	0.48
$META_{t-2}$	0.0140	0.28
$ELEC_{t-1}$	0.1076	1.47
$ELEC_{t-2}$	-0.0246	-0.31
$SERV_{t-1}$	0.1143	1.36
$SERV_{t-2}$	0.0014	0.02
$PUBL_{t-1}$	0.1141*	1.65
$PUBL_{t-2}$	0.0030	0.04
$HIGH_{t-1}$	-0.0392	-0.60
$HIGH_{t-2}$	-0.0100	-0.19
$HISE_{t-1}$	-0.0968	-0.66
$HISE_{t-2}$	-0.0555	-0.35
$AGED_{t-1}$	-0.1990	-0.76
$AGED_{t-2}$	0.7298**	3.42
$UNSK_{t-1}$	0.8232**	3.19
$UNSK_{t-2}$	-0.1150	-0.44
$DENS_{t-1}$	-0.0005	-0.40
$DENS_{t-2}$	0.0003	0.30
$MIG1_{t-1}$	1.2910**	3.12
$MIG1_{t-2}$	0.7169*	1.78
$MIG2^{+}_{t}$	-5.0125**	-2.85
$MIG2^{+}_{t-1}$	-4.9203**	-2.66
EJR^{+}_{t}	0.0159	0.77
EJR^{+}_{t-1}	0.0130	0.95
CF^{+}_{t}	-0.1121**	-2.55
CF^{+}_{t-1}	-0.0027	-0.10
$PROD_{t-1}$	-0.0390**	-5.23
$PROD_{t-2}$	0.0008	0.13
$DEBT_{t-1}$	-0.0001	-0.12
$DEBT_{t-2}$	-0.0004	-0.36

$TERM_{t-1}$	-0.0027**	-4.43
$TERM_{t-2}$	0.0006	1.45
$REAL_{t-1}$	-0.0014**	-2.16
$REAL_{t-2}$	0.0059**	9.63
Test statistics		
WALD	8140.71	
SARGAN	0.21	
AR(2)	0.98	
Instruments		
Lag length	1	

Notes: ** (*) indicates that the parameter estimate is statistically significant at the 5 (10) per cent significance level. The reported estimation results correspond to the 1-step estimates. The WALD test is a test for the joint significance of the explanatory variables. The SARGAN test is a test for overidentifying restrictions and it refers to the 2-step estimates. The AR(2) test refers to the second order autocorrelation of the residuals that correspond to the 2-step estimates. The SARGAN and the AR(2) test statistics are reported as p-values. The superscript '+' indicates that the variable is instrumented. Instruments indicate the number of lags of the dependent variable (i.e. the regional unemployment rate). The inclusion of year dummies instead of the macroeconomic indicators (i.e. the variables TERM and REAL) produces the same results as the ones reported in the table.

References

Abraham, K. G. and Katz, L. F. (1986), Cyclical unemployment: sectoral shifts or aggregate disturbances?, *J. Pol. Econ.* 84, 367–388.

Acemoglu, D. (2002), Technical change, inequality and the labor market, *J. Econ. Lit.* 40, 7–72.

Arellano, M. and Bond, S. R. (1991), Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations, *Review of Economic Stuies* 58, 277–297.

Bond, S. (2002), Dynamic panel data models: a guide to micro data methods and practice. Working paper CWP09/02. The Institute for Fiscal Studies, London.

Böckerman, P. and Maliranta, M. (2001), Regional disparities in gross job and worker flows in Finland, *Finnish Economic Papers* 14, 84–103.

Böckerman, P. and Piekkola, H. (2001), On whom falls the burden of restructuring? Evidence from Finland, in Jensen T. P. and Holm A. (eds.) *Nordic Labour Market Research on Register Data,* 73–117. Nordic Council of Ministers, TemaNord 2001:593, Copenhagen.

Caballero, R. (1998), Comments, in Fuhrer J. C. and Schuh S. (Eds) *Beyond Shocks: What Causes Business Cycles?,* 338–348. Federal Reserve Bank of Boston, Conference Series 42, Boston.

Caballero, R. and Hammour, M. (1994), The cleansing effect of recessions, *Am. Econ. Rev.* 84, 1350–1368.

Chalmers, J. A. and Greenwood, M. J. (1985), The regional labour market adjustment process: determinants of changes in rates of labor force participation, unemployment, and migration, *The Annals of Regional Science* 19, 1–17.

Contini, B. and Revelli, R. (1997), Gross flows vs. net flows in the labour market: what is there to be learned?, *Labour Economics* 4, 245–263.

Davis, S. J. and Haltiwanger, J. (1999), Gross job flows, in Ashenfelter O. and Card D. (Eds) *Handbook of Labour Economics*, Vol. 3B, 2711–2805. North-Holland, Amsterdam.

Davis, S. J., Haltiwanger, J. and Schuh, S. (1996), *Job Creation and Destruction.* The MIT Press, Cambridge, MA.

De Long, J. B. (1990), Liquidation cycles: old-fashioned real business cycle theory and the Great Depression. Working Papers 3546. National Bureau of Economic Research, Cambridge, MA.

DiNardo, J. and Tobias, J. L. (2001), Nonparametric density and regression estimation, *Journal of Economic Perspectives* 15, 11–28.

Elhorst, J. P. (2003), The mystery of regional unemployment differentials: A survey of theoretical and empirical explanations, *Journal of Economic Surveys,* (Forthcoming).

Fujita, M., Krugman, P. and Venables, A. J. (1999), *The Spatial Economy.* The MIT Press, Cambridge, MA.

Holzer, H. J. (1991), Employment, unemployment and demand shifts in local labor markets, *The Review of Economics and Statistics* 73, 25–32.

Hyclak, T. (1996), Structural changes in labor demand and unemployment in local labor markets, *J. Reg. Science* 36, 653–663.

Ilmakunnas, P. and Pesola, H. (2002), Matching functions and efficiency analysis. Working Papers W–308. Helsinki School of Economics.

Kiander, J. and Vartia, P. (1996), The great depression of the 1990s in Finland, *Finnish Economic Papers* 9, 72–88.

Lilien, D. M. (1982), Sectoral shifts and cyclical unemployment, *J. Pol. Econ.* 80, 777–793.

Loungani, P., Rush M. and Tave, W. (1990), Stock market dispersion and unemployment, *Journal of Monetary Economics* 26, 367–388.

Pehkonen, J. (1999), Unemployment and home-ownership, *Applied Economic Letters* 6, 263–265.

Pehkonen, J. and Tervo, H. (1998), Persistence and turnover in regional unemployment disparities, *Reg. Studies* 32, 445–458.

Samsom, L. (1994), The Beveridge curve and regional disparities in Canada, *Applied Economics* 26, 937–947.

Schumpeter, J. A. (1942), *Capitalism, Socialism, and Democracy.* Harper and Row, Harvard.

Shimer, R. (2001), The impact of young workers on the aggregate labor market, *The Quarterly Journal of Economics* 116, 969–1007.

Tervo, H. (1998), The development of regional unemployment differentials in Finland in the 1990s, *Finnish Economic Papers* 11, 37–49.

[1] Kiander and Vartia (1996) provide a survey of the great slump of the early 1990s in Finland.

[2] Pehkonen (1999) provides an empirical evaluation for the factors in the Finnish regional unemployment rates by applying cross-sectional data from 1991 that covers thirteen labour districts. The study does not include a consideration of the industry structure nor the elaboration of restructuring at the establishment level of the Finnish regions.

[3] There have been some earlier empirical studies that investigate the effect of net in-migration on the regional unemployment rates (see Elhorst 2003), but these studies exclude the use of gross migration flows as a measure of reorganization between regions. In particular, Chalmers and Greenwood (1985) argue that the effect of net in-migration on regional unemployment is an empirical question and cannot be solved by theoretical considerations owing to the fact that net in-migration causes both regional labour supply and demand to increase.

[4] Unlike the conventional growth rate measures, which divide employment change by lagged employment and range from -1.0 to ∞, the applied growth rate measure ranges from -2.0 to 2.0 and the growth rate measure is symmetric around zero.

[5] The measures of gross job and worker flows are calculated from a plant-level micro data and they are then aggregated to correspond to the so-called NUTS-4 level of the European Union.

[6] In addition, the external turnover of regional labour markets is measured by the share of gross inward migration of employees with higher university degrees. The motivation for this is that the underlying mobility rates have been found to be higher for employees with a higher university education compared with employees with only basic education (see Böckerman and Piekkola 2001).

[7] There has been a large body of empirical research to find better proxies for allocative shocks. For example, Loungani, Rush and Tave (1990) argue that dispersion in stock prices could be used to identify allocative shocks across sectors. In particular, they claim that the stock market dispersion index is less contaminated by aggregate demand influences than the employment dispersion index by Lilien (1982) because sectoral stock prices are likely to react to disturbances that are perceived to be permanent by nature, which need not be true of sectoral employment changes.

[8] Thus, the model neglects the notion that new technologies can also be adopted by people within their jobs.

[9] In fact, the way of thinking that economic slowdowns tend to revitalize the economy was prominent in pre-Keynesian economic theory (see, for example, De Long 1990).

[10] Epanechnikov is the applied kernel density estimate. It has the property that it is the most efficient in minimizing the mean integrated squared error. DiNardo and Tobias (2001) provide an introduction to kernel density estimates.

[11] The figures may give an impression that there are certain outliers in the distributions of the excess job reallocation rate and the churning rate. However, it must be remembered that some of the NUTS4 regions are indeed small measured by the number of employees and therefore large fluctuations can be understood as a consequence of an episode of extreme business cycle movements in Finland during the 1990s.

[12] A related empirical study by Ilmakunnas and Pesola (2002) discovers that a high churning flow improves matching in the Finnish regions.

[13] The so-called new economy would be a dubious cure for the regional unemployment problem in Finland owing to the fact these high-tech services typically require skills that unemployed persons lack.

[14] The reported specification includes selected measures of industry structure and the measures of gross migration flows. The results concerning the variable that captures the share of unskilled employees are therefore not directly affected by the regional dispersion of the industry structure. In other words, the share of unskilled employees is not simply a proxy variable for the industry structure of the regions.

[15] The models based on the ideas of the so-called new economic geography stress these effects (see, for example, Fujita, Krugman and Venables 1999).

[16] Bond (2002) provides a summary of dynamic panel data models.

[17] The fixed effects and the GMM estimation results differ for two reasons. The first point is that the fixed effects model assumes that the explanatory variables are strictly exogenous, i.e. uncorrelated with the past, present and future realisations of e_{it}. The second point is that the within-group estimator generates inconsistent estimates in dynamic specifications if the number of time periods is fixed.

Perception of job instability in Europe*

Petri Böckerman**

*Financial support from the Yrjö Jahnsson Foundation is gratefully acknowledged. I am grateful to the European Foundation for the Improvement of Living and Working Conditions for allowing me to use their Employment Options Survey Data in this study. I am grateful to Pekka Ilmakunnas, Erkki Koskela and Reija Lilja for comments. In addition, I am grateful for comments at the 17th Annual Congress of the European Economic Association in Venice. Paul A. Dillingham has kindly checked the language. The usual disclaimer applies.
**Labour Institute for Economic Research, Pitkänsillanranta 3A, FIN-00530 Helsinki, Finland.

Abstract

The perception of job instability is an important measure of the subjective wellbeing of individuals, because most people derive their income from selling their labour services. The study explores the determination of the perception of job instability in Europe. The study is based on a large-scale survey from the year 1998. There are evidently large differences in the amount of perceived job instability from country to country. The lowest level of perceived job instability is in Denmark (9%). In contrast, the highest level of perceived job instability is in Spain (63%). Perceived job instability increases with age and an earlier unemployment episode. An increase in the educational level, on the other hand, leads to a decline in the perception of job instability. In addition, a temporary contract as such does not yield an additional increase in the perception of job instability. The perception of job instability is more common within manufacturing industries and there is some evidence for the view that it increases according to the size of the firm.

JEL-code: J63
Keywords: gross flows, job instability, job insecurity

1. Introduction

The empirical evidence on the dynamics of labour demand by firms suggests that market economies are definitely in a state of continuous turbulence. Each year, on the one hand, many businesses expand (and succeed), while, on the other hand, many others contract (and fail). Joseph A. Schumpeter (1942) called this underlying process of capitalism by the expression "creative destruction". The reallocation and the reorganisation of resources therefore culminates in the functioning of labour markets, where the reallocation of scarce resources takes the form of gross job and worker flows.[1] The magnitude of these gross flows is enormous in comparison to the net rate of employment change. Davis and Haltiwanger (1999) report that in most Western economies roughly ten per cent of jobs are created/destroyed each year. Gross worker flows are even larger in magnitude. Gottschalk and Moffitt (1998) stress that the implicit normative assumption behind much of the public discussion of job and worker turnover is that turnover is undesirable, because it is either "involuntary" or leads to worsened outcomes, such as an increase in the probability of unemployment or a decrease in wages.

However, this apparent job instability implied by the enormous magnitude of job turnover and gross worker flows is not as such a malaise, because a large part of the gross worker flows is, in fact, inherently voluntary by nature. For example, the voluntary turnover of workers is often related to career concerns of individuals. In fact, this feature of labour markets suggests that the realized patterns of gross job and worker turnover and the perception of job instability among workers are not necessarily closely correlated with each other. However, the perception of job instability is closely linked to the underlying welfare of individuals, which should be the ultimate focus of any economic policy exercise. This is due to the fact that for the large majority of employees only one match with an employer comprises most of the current earnings, making their welfare closely related to the potential risk of losing their job in the presence of incomplete insurance against shocks (i.e. the so-called replacement rate of unemployment insurance is almost always less than 100%).[2] The perception of job instability therefore constitutes an important measure of the subjective wellbeing of individuals. This means that it is indeed interesting to investigate what the most important underlying fundamentals that determine the distribution of the perception of job instability at the individual level are. By doing this, the following empirical investigation complements the picture of European labour markets painted by a large number of recent empirical studies on gross job and worker flows.

The aim of this study is therefore to investigate the empirical determination of the perception of job instability by using unique survey data from all the 15 member states of the European

Union and Norway.[3] This means that the following study provides detailed empirical evidence, for example, on the individual characteristics such as age and education that are related to the perceived job instability of individuals in European labour markets. In addition, the study includes a consideration of job and firm characteristics and their role in the determination of the perception of job instability. In other words, this unexploited data makes it possible to evaluate the whole spectrum of economic fundamentals that give rise to the perception of job instability among European workers. The following empirical results are indeed somewhat different with respect to ones obtained recently by using U.S. surveys. Thus, the study is able to contribute to the current discussion on the differences of European-style labour markets compared with the U.S. labour markets.[4]

This study appears in four sections. The first section of the study provides a brief overview of earlier empirical investigations into the perceived job instability of individuals. The motivation of the selected variables in the estimated equation is therefore broadly based on previous empirical literature on the incidence of perceived job instability at the individual level of the economy. The second section provides a description of individual-level survey data that is used to assess the current characteristics of job instability in the context of European labour markets. The third section of the study provides a detailed analysis of the incidence of perceived job instability by applying Probit models. In addition, it contains an elaboration of the robustness of the empirical patterns. The fourth section concludes.

2. Previous related studies

There have indeed been a great number of empirical studies on with the aim to document and investigate the realized patterns of job instability.[5] However, there are a rather limited number of empirical investigations that aim to investigate the empirical determination of perceived job instability of individual workers. The latter studies require detailed survey data. In addition, the focus of the available empirical literature on the perceived job instability has been heavily on the unregulated Anglo-Saxon labour markets. The following investigation concerning the determination of perceived job instability in all the 15 member states of the European Union and Norway provides an interesting opportunity for cross-country comparison and fills an important gap in the earlier literature.[6]

The perception of job insecurity is indeed a fact of life and it is not possible to remove a major part of job instability by holding a diversified portfolio of publicly traded assets. For example, Davis and Willen (1999) have studied the correlation between earnings shocks and asset returns in the context of the U.S. labour markets. According to the

results, the correlation between returns on the S&P 500 and earnings shocks exceeds 0.4 for older, college-educated women, ranges from 0.1 to 0.3 over most of the life cycle for college-educated men and is roughly -0.25 for men who did not finish high school. This means that trade in a broad-based equity index enables individuals to hedge only a small portion of the group-level earnings risk induced by the underlying heterogeneity of individuals.

There has been a lively discussion on the issue of perceived job instability in the U.S. Schmidt (1999) provides empirical evidence for the commonly held view that there has been a rise in the perception of job loss among workers as a whole during the 1990s. Aaronson and Sullivan (1998) present empirical evidence of individual characteristics that are related to the incidence of job insecurity. Dominitz and Manski (1996), and Gottschalk and Moffitt (1998) present additional empirical evidence. Manski and Straub (2000) provide the most recent detailed investigation on the issue. Worker perceptions of job insecurity peaked in 1995.[7] According to the results concerning individual characteristics of American workers, the expectations of job insecurity are not related to the age of individuals. Subjective probabilities of job loss tend to decline with additional years of schooling, which is strongly in line with common sense.[8] In other words, education seems to provide at least a partial ”shield” against job instability in the U.S. labour markets. In addition, the perceptions of job loss vary little by gender. However, the subjective probability of job loss among black people is almost double that of white people.

The UK empirical evidence in terms of perceived job instability can be summarized as follows. Green et al. (2000) provide empirical evidence for the view that the perceived risk of job loss, in aggregate, changed rather little between 1986 and 1997 in the UK. Green et al. (2000) further show that the overall perception of job insecurity was fairly stable between 1996 and 1997, but it did indeed rise, relative to the overall rate of unemployment, which was substantially lower in 1997 than in 1996. There has also been the same kind of redistribution of job insecurity as in the U.S. (i.e. professional workers have become much more insecure about the jobs they hold). In particular, the results reported by Green et al. (2000) indicate that unions have no observable impact on the magnitude of job insecurity. In addition, Green et al. (2001) provide detailed empirical evidence on the determination of the perception of job loss. The perception of job loss is definitely common in the UK. Thus, in 1996 and 1997, approximately 1 in 10 British workers thought that it was either likely or very likely that they would lose their job within 12 months.

However, Green et al. (2001) argue that workers tend to overestimate the likelihood of job loss. In particular, the empirical investigation of the perception of job instability by

Green et al. (2001) includes four sets of potential determinants: the workers' personal unemployment experience and environment, the objective characteristics of the jobs they hold, human capital indicators and, finally, relevant attitudinal variables. The empirical results presented by Green et al. (2001) indicate that the past unemployment experience increases the subjective probability of job loss among men. An increase in the regional unemployment rate yields a rise in the subjective probability of job loss. In addition, the perception of job insecurity is not related to the establishment size. The older workers express higher levels of job insecurity. The attitudinal variables included are also important in the determination of the perception of job instability. The empirical evidence therefore indicates that job dissatisfaction is strongly associated with job insecurity in the UK.[9]

3. The data

The data of this study is drawn from a large-scale survey (Employment Options for the Future). The survey covers the 15 European Union members and Norway.[10] The survey was originally designed to find out who wanted to work and who did not want to work. Thus, the major strength of the survey is that it contains a great number of detailed questions about the underlying preferences of individuals with respect to labour market conditions in Europe. In addition, the survey also includes more detailed information than has been typical in the earlier investigations about job characteristics, which has a potential role in the empirical determination of the perception of job instability. The survey was conducted in 1998 and it was framed for the residential population aged from 16 to 64 years. The fieldwork was carried out between May and September 1998 in all 16 countries included.

The survey was done for about 1500 individuals for most of the countries included in Europe. Table A1 contains the tabulation of the number of interviews in each country included in the survey. However, the individuals unemployed and the economically inactive persons at the time of the interview are omitted from the data, because the perception of job instability is not relevant for those persons.[11] In addition, the following analysis includes only employees. In other words, self-employed persons are omitted from the following analysis due to the notion that the empirical determination of the perception of job instability ought to be different among them with respect to employees.[12] This means that the data that is used in the following estimations covers 5435 persons after also eliminating a small number of inconsistent answers to the questions of the survey.

The key variable of the survey from the point of view of this study is, of course, the perception of job instability at the individual level of the economy. This question of the survey is formulated

as follows: ”Do you worry about the security of your present work?” In particular, in the conduct of the survey the notion that ”job security” was equal to ”job stability” was heavily underlined. The answers to the question can be either ”yes” or ”no”. The formulation of the question means that the applied measure of the perception of job instability confounds two components, which are the chance of job loss and the consequences of job loss (see, for example, Dominitz and Manski, 1997). This particular feature of the applied measure of the perception of job instability have to be taken into account in the discussion of the following estimation results. One potential problem of the applied question of the survey is that it does not define the exact time span of fear about job instability. However, the following analysis of the survey also includes a number of variables (such as education) that can broadly be interpreted as indicators of the individuals' time preference.

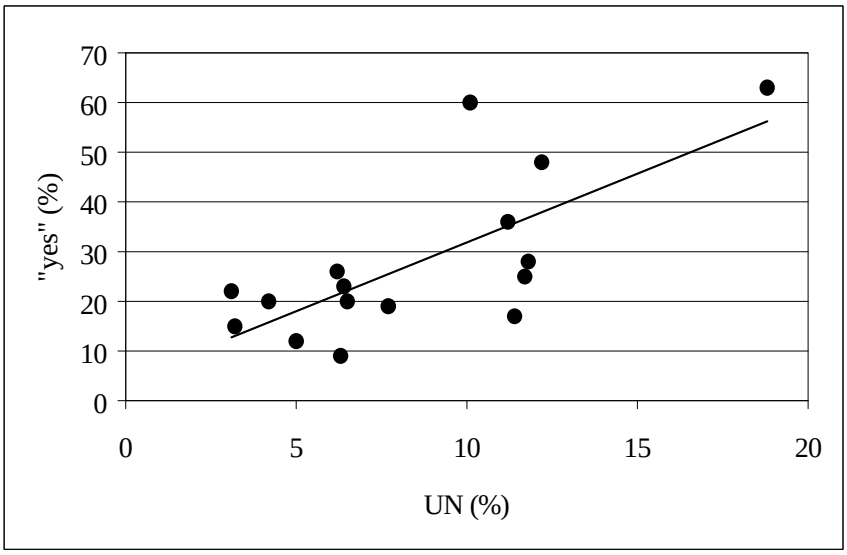
The basic distribution of perceived job instability in Europe based on the applied survey of this study is shown in Table 1. There are indeed large differences in the amount of perceived job instability from country to country. The lowest level of perceived job instability is in Denmark (9%). In contrast, the highest level of perceived job instability is in Spain (63%). According to the survey, the perception of job instability is more common in the UK than the empirical results reported in Green et al. (2001) indicate for 1997 and 1998.

Table 1. The frequence of worry about the security of one's present work in Europe (i.e. an answer to the question: "Do you worry about the security of your present work?"). "UN" refers to the standardized unemployment rate in 1998 (Source: OECD, 1999).

Country	*"YES"*	*"NO"*	*UN (%)*
Austria	23	77	6.4
Belgium	25	75	11.7
Denmark	9.0	90	6.3
Finland	17	83	11.4
France	28	72	11.8
Germany	36	63	11.2
Greece	60	39	10.1
Ireland	19	81	7.7
Italy	48	52	12.2
Luxembourg	22	78	3.1
Netherlands	20	80	4.2
Portugal	12	84	5.0
Spain	63	36	18.8
Sweden	20	80	6.5
United Kingdom	26	74	6.2
Norway	15	85	3.2

The average unemployment rate in the countries included in the survey is in positive relation with the perception of job instability (Figure 1). The underlying correlation of the perception of job instability and the unemployment rate is in line with the recent notions based on gross flows of jobs and workers, because the rate of worker outflow into unemployment tends to be at the higher level in the segments of the economy that are characterized by the high unemployment rate. However, the correlation of the perception of job instability and the unemployment rate is far from perfect across the countries of the survey.[13] Thus, there tends to be about the same amount of perceived job instability among workers despite the fact that the average unemployment rate is far from equal in certain pairs of countries. For instance, the perception of job instability among employed workers is at about the same level in Finland and Norway despite the fact that the unemployment rate was 11.4% in Finland in 1998 and only 3.2% in Norway.

Figure 1. A scatterplot of ”yes” answers (to the question: ”Do you worry about the security of your present work?”) and the standardized unemployment rate (UN) in 1998 in European countries.



Figures 2–3 relate the incidence of job instability to the strictness of labour standards and to the strictness of employment protection.[14] These figures are not consistent with the popular notion that the perception of job instability declines as the strictness of labour standards and the strictness of employment protection increase in European labour markets.[15] This pattern emerges despite the stylized feature of the literature that the underlying magnitude of gross job and worker flows of the economies declines as the strictness of labour standards and employment protection increases.[16] An explanation for this particular pattern is that strong employment protection may be associated with lower job loss probabilities but with greater difficulty in finding an equally good job conditional on losing the current one.

Figure 2. A scatterplot of ”yes” answers (to the question: ”Do you worry about the security of your present work?”) and an index of labour standards (Source: Nickell and Layard, 1999).

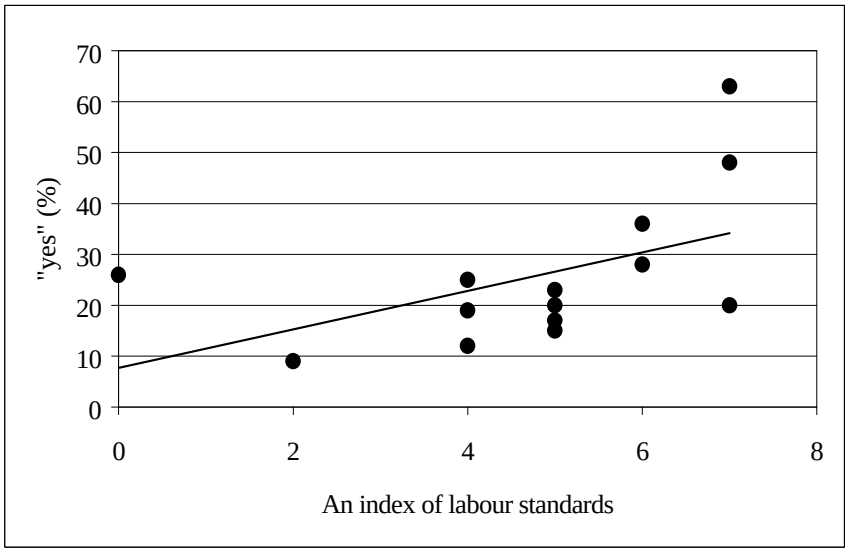
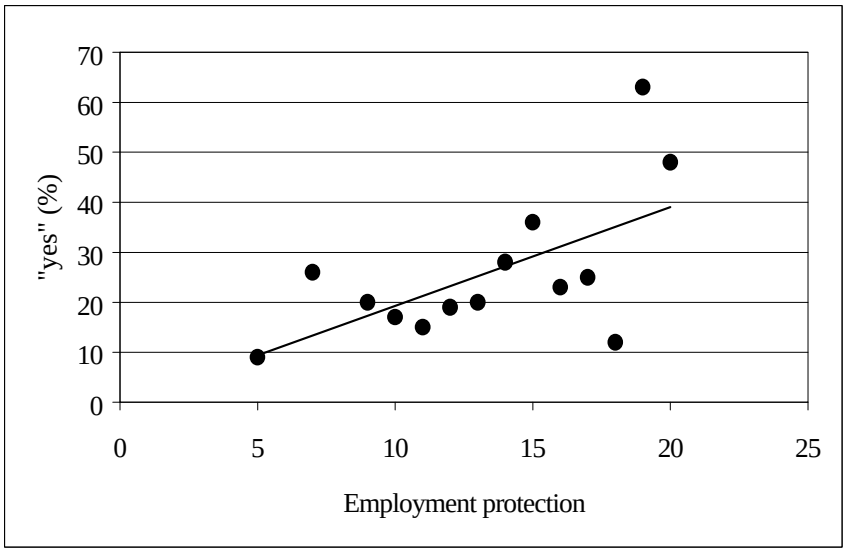
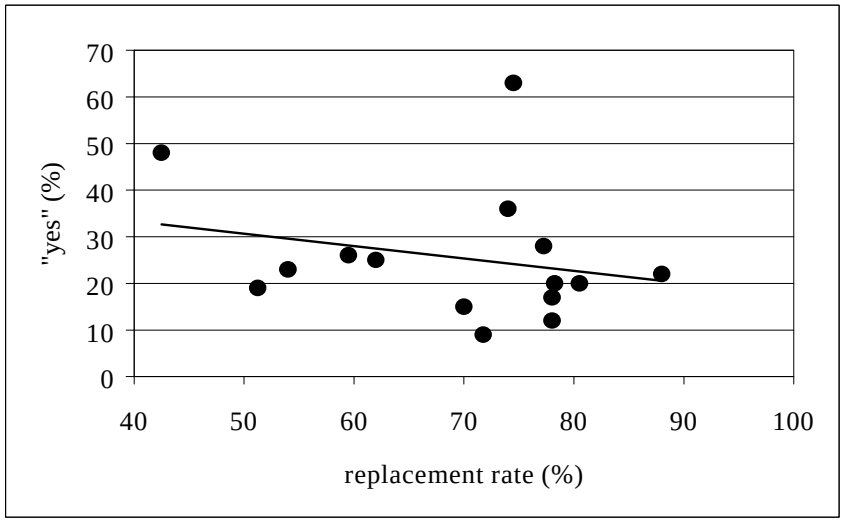


Figure 3. A scatterplot of ”yes” answers (to the question: ”Do you worry about the security of your present work?”) and an index of employment protection (Source: Nickell and Layard, 1999)



In addition, Figure 4 depicts the relationship between the incidence of the perception of job instability and the replacement rate across countries.[17] There therefore seems to be some weak empirical evidence for the view that the perception of job instability is at a lower level in the countries that have high replacement rates. In particular, in the UK there is a low replacement rate and also a high level of the perception of job instability compared with the Nordic countries.

Figure 4. A scatterplot of ”yes” answers (to the question: ”Do you worry about the security of your present work?”) and an index of the replacement rate (Source: OECD, 1998)



The survey includes a great number of individual characteristics and other variables that facilitate the investigation of the determination of the perceived job instability in Europe. The applied variables of the following analysis are summarized in Table 2. In addition, Table A2 provides summary statistics of the most important variables. Most of the applied variables are (almost) self-evident. The variables are divided into three broad categories. Thus, there are variables that characterize (i) individuals (such as education), (ii) jobs that individuals hold (such as the number of jobs that an individual currently holds) and also (iii) variables that capture some key characteristics of firms (such as the size of the company at which the individual is currently working). In addition, the following Probit models

include country dummies owing to the fact that there are evidently large differences in the perceived job instability from country to country within Europe.

Table 2. The description of the selected variables.

Variable	*Definition/measurement*
Individual characteristics:	
WORRIED	Individual is worried about the security of his/her present job=1, otherwise=0
AGE	Age of an employee
AGE^2	AGE squared
GENDER	1=male, 0=female
DEGREE	Individual has a university degree/college degree=1, otherwise=0
MARRIED	Individual is married=1, otherwise=0
PARTNER	Partner is not currently in paid work=1, otherwise=0
CHILDREN	Individual has children=1, otherwise=0
EXPERIENCE	Individual has been in paid work over 10 years=1, otherwise=0
TENURE	Individual has worked over 10 years for current employer=1, otherwise=0
UNEMPLOYED	Individual has been unemployed during the past five years=1, otherwise=0
GENOPTIMISTIC	Individual thinks that the general economic situation is currently 'very good'=1, otherwise=0
PEROPTIMISTIC	Individual thinks that his/her personal economic situation is currently 'very good'=1, otherwise=0
Job characteristics:	
JOBS	Individual has currently only one job=1, otherwise=0
HOME	Individual would like to work at home=1, otherwise=0
PART	Individual has currently a part-time job=1, otherwise=0
OVERTIME	Individual has recently done paid or unpaid overtime=1, otherwise=0
TEMPORARY	Individual has currently a temporary contract=1, otherwise=0
MANUAL	Individual has a manual job=1, otherwise=0
MANAGER	Individual has managerial duties in his/her current job=1, otherwise=0
HOURS	The number of hours that individual works per week on average
METROPOLITAN	Individual is living in or close to a large city with more than 100 000 inhabitants=1, otherwise=0
Firm characteristics:	
MANU	Individual is currently employed in manufacturing industries (including mining and construction)=1, otherwise=0

SERVICE	Individual is currently employed in service sectors (including public services)=1, otherwise=0
SIZE1	Size of company measured by the number of employees is less than 9=1, otherwise=0
SIZE2	Size of company measured by the number of employees is from 10 to 49=1, otherwise=0
SIZE3	Size of company measured by the number of employees is from 50 to 499, otherwise=0
SIZE4	Size of company measured by the number of employees is more than 500=1, otherwise=0 (reference)
Country dummy variables:	
AUSTRIA	Individual is currently living in Austria=1, otherwise=0
BELGIUM	Individual is currently living in Belgium=1, otherwise=0
DENMARK	Individual is currently living in Demark=1, otherwise=0
FINLAND	Individual is currently living in Finland=1, otherwise=0
FRANCE	Individual is currently living in France=1, otherwise=0
GERMANY	Individual is currently living in Germany=1, otherwise=0
GREECE	Individual is currently living in Greece=1, otherwise=0
IRELAND	Individual is currently living in Ireland=1, otherwise=0
ITALY	Individual is currently living in Italy=1, otherwise=0
LUXEMBOURG	Individual is currently living in Luxembourg=1, otherwise=0
NETHERLANDS	Individual is currently living in the Netherlands=1, otherwise=0
PORTUGAL	Individual is currently living in Portugal=1, otherwise=0
SPAIN	Individual is currently living in Spain=1, otherwise=0
SWEDEN	Individual is currently living in Sweden=1, otherwise=0
UNITED KINGDOM	Individual is currently living in the United Kingdom=1, otherwise=0
NORWAY	Individual is currently living in Norway=1, otherwise=0 (reference)

4. The results

Owing to the fact that the applied variable WORRIED can, by definition, have only two values (0 or 1), it is convenient to estimate a Probit specification as follows:[18]

$$\text{Prob}(\text{WORRIED}_i=1) = \Phi(\beta'\mathbf{x}) + \varepsilon_i, \qquad (1)$$

where WORRIED_i is a dichotomous variable obtaining the values of an answer to the question: "Do you worry about the security of your present work?" for the individual i of the survey. Thus, if WORRIED_i is 1, then an individual is worried about his/her present job, and if WORRIED_i is 0, then an individual is not worried about his/her present job. **x**

is a vector of explanatory variables, β is a vector of the estimated coefficients and Φ is the cumulative standard normal distribution function. ε_i is a normally distributed error term with mean 0 and variance σ^2.

The estimation results are summarized in Tables 3–4. The following assessment of the estimation results is focused on the results that cover the whole population (reported in Table 3). The probit model was also estimated separately for the subpopulation of females (reported in Table 4).[19] This is due to the fact females hold quite different jobs compared with the jobs that are held by males. In particular, most of the part-time workers included in the survey are females.

Table 3. The estimation results from the Probit model with marginal effects (DF/dx) for the whole population of workers (dependent variable: WORRIED). DF/dx is for dummy variables an impact of discrete change from 0 to 1 on the probability of the perception of job instability.

	DF/dx	*z-statistics*
AGE	0.02389	4.37
AGE^2	-0.00023	-3.51
GENDER	0.02156	1.50
DEGREE	-0.03529	-2.14
MARRIED	-0.05703	-0.44
PARTNER	-0.05537	-0.44
CHILDREN	0.00811	0.47
EXPERIENCE	-0.02951	-1.44
TENURE	0.03447	2.06
UNEMPLOYED	0.06930	4.27
GENOPTIMISTIC	-0.03335	-1.32
PEROPTIMISTIC	-0.07363	-3.43
JOBS	-0.00205	-0.07
HOME	0.00359	0.17
PART	-0.04574	-2.05
OVERTIME	0.04981	3.50
TEMPORARY	-0.14925	-7.87
MANUAL	0.02408	1.64
MANAGER	-0.03664	-2.63
HOURS	-0.00136	-1.61
METROPOLITAN	-0.01313	-0.97

MANU	0.05723	2.09
SERVICE	0.00860	0.32
SIZE1	-0.02820	-1.45
SIZE2	-0.0297349	-1.70
SIZE3	-0.0275853	-1.68
AUSTRIA	0.10857	2.54
BELGIUM	0.13760	3.03
DENMARK	-0.13490	-3.58
FINLAND	-0.05126	-1.27
FRANCE	0.14227	3.73
GERMANY	0.20757	5.42
GREECE	0.42901	7.77
IRELAND	0.06135	1.35
ITALY	0.32619	7.44
LUXEMBOURG	0.11059	2.01
NETHERLANDS	0.03921	1.01
PORTUGAL	-0.08627	-2.09
SPAIN	0.46465	10.00
SWEDEN	0.00542	0.13
UNITED KINGDOM	0.13144	3.30
Pseudo R^2	0.113	
Log-likelihood	-2900.000	
Number of observations	5435	

Base case is a male, living in Norway, who is employed in agriculture.

Table 4. The estimation results from the Probit model with marginal effects (DF/dx) for the subpopulation of females (dependent variable: WORRIED). DF/dx is for dummy variables an impact of discrete change from 0 to 1 on the probability of the perception of job instability.

	DF/dx	*z-statistics*
AGE	0.01887	2.46
AGE^2	-0.00022	-2.25
DEGREE	-0.06498	-2.68
MARRIED	-0.20308	-1.28
PARTNER	-0.16004	-1.08
CHILDREN	0.03467	1.37
EXPERIENCE	-0.00189	-0.07
TENURE	0.00854	0.34
UNEMPLOYED	0.03895	1.67
GENOPTIMISTIC	-0.06214	-1.30
PEROPTIMISTIC	-0.08399	-2.40
JOBS	0.01953	0.49
HOME	0.01208	0.36
PART	-0.02461	-0.81
OVERTIME	0.04812	2.33
TEMPORARY	-0.17390	-6.42
MANUAL	0.00093	0.04
MANAGER	-0.02302	-1.06
HOURS	0.00015	0.11
METROPOLITAN	-0.03247	-1.56
MANU	0.11134	2.55
SERVICE	0.05415	1.37
SIZE1	-0.03263	-1.15
SIZE2	-0.05722	-2.14
SIZE3	-0.06804	-2.67
AUSTRIA	0.10379	1.54
BELGIUM	0.17152	2.40
DENMARK	-0.15936	-2.68
FINLAND	-0.01736	-0.27
FRANCE	0.13734	2.25
GERMANY	0.22063	3.57
GREECE	0.41291	5.23

IRELAND	-0.01420	-0.19
ITALY	0.33785	4.76
LUXEMBOURG	0.18643	2.19
NETHERLANDS	-0.00101	-0.02
PORTUGAL	-0.11909	-2.02
SPAIN	0.44884	6.10
SWEDEN	0.02801	0.39
UNITED KINGDOM	0.07185	1.16
Pseudo R^2	0.126	
Log-likelihood	-1316.268	
Number of observations	2472	

Base case is living in Norway and employed in agriculture.

The individual characteristics are obviously an important element in the empirical determination of the perception of job instability in Europe. In particular, the results reveal that the perception of job instability is indeed higher among older workers than among young workers despite the stylized feature of labour markets that the turnover of jobs and workers is more intensive among young employees.[20] The results are therefore consistent with the popular notion that job instability is more of a problem for aged employees and that the turnover of jobs among young employees is mainly due to the voluntary quits, which are often related to career concerns. The result is also in line with a recent investigation by Blanchflower and Oswald (1999), according to which there is an increase in the perception of job insecurity as an employee ages. In addition, the observation is in line with the stylized fact that job displacements tend to cause much larger wage losses for the older worker (see, for example, Kuhn, 2001). This variation of wage losses across age groups of workers may reflect the feature that a greater fraction of older workers' skills are specific to an occupation or industry, thus exposing them to a much "thinner" labour market, compared with the young workers with more general labour market engagement. In other words, the result is in line with the notion that it is the job loss wage penalty more than the job loss incidence that drives the perception of job instability among workers in Europe.

There are no differences in the perceptions of job instability between males and females. This result is nicely in line with observations by Manski and Straub (2000) for the U.S., Green et al. (2001) for the UK and OECD (1997) for Europe, but in disagreement with

an empirical study by Clark (1997), according to which males rank job security more highly than females, applying the British Household Panel Survey.

The perception of job instability does decline as an individual gets additional years of schooling. In other words, education provides a kind of ”shield” against job instability in Europe. This particular result is in line with earlier empirical studies from Anglo-Saxon labour markets elaborated in the earlier section of this study. In other words, the European labour markets, as a whole, and the Anglo-Saxon labour markets seem to be similiar in this respect. The breakdown of job insecurity by OECD (1997) reveals only weak empirical evidence for the view that there are differences in the perception of job instability based on the years of education in Europe.[21]

In principle, there should be less perception of job instability if an individual is married and, in particular, if the partner is currently in paid work. This is due to the fact that the partner's income provides at least a partial shield against job insecurity in the presence of imperfect private insurance markets. However, the estimation results are not in line with this line of thinking. In addition, the results do not support the view that the presence of children increases the perception of job instability. In principle, the perception of job instability, other things being equal, should rise if the individual has children, because childrens' wellbeing is almost totally dependent on the stability of their parents' income stream. The hypothesis that the presence of children should, other things being equal, yield an increase in the perception of job instability does not hold even for the subpopulation of females (see Table 4).

According to the results, a long attachment to labour markets in terms of general experience fails to deliver a decline in perceived job instability among European workers. The convential wisdom says that job tenure can be considered to be a proxy variable for the firm-specific human capital of individuals. This means that a long tenure should yield a decrease in job instability at the individual level of the economy, because firms typically follow the policy of ”last in, first out”. In fact, Green et al. (2000) provide empirical evidence for this kind of reasoning in the context of the UK. However, the results indicate that a long tenure (i.e. a long-term attachment to the same firm of the economy) does not yield a decline in the perception of job instability in European labour markets.[22] In other words, the results are therefore in keeping with the view that human capital is mostly general by its nature.

An occurrence of unemployment during the past five years yields a substantial rise in the perception of job instability. However, this pattern does not hold for females (see Table 4). The results is therefore closely in line with the recent observations by Green et al. (2001) for the UK. In addition, Aaronson and Sullivan (1998) have discovered that

individuals that have previously had an unemployment period are more prone to job insecurity in the U.S. labour markets.[23] In principle, there can be both real and psychological reasons for this correlation. The real reasons arise from the fact that there is an episode of deaccumulation of human capital during the periods of unemployment. The occurrence of unemployment therefore yields a decline in the future probability of finding a job. On the other hand, the psychological effects are based on the notion that past experience tends to heighten the ”availability” of that particular option to the individual.[24] In addition, the result concerning the effect of past unemployment on the perception of job instability is connected to the emerging economic literature that stresses the notion that unemployment is a significant contributor to the unhappiness of individuals across industrialized countries (see, for example, Di Tella et al., 2001). A part of the contribution of unemployment to unhappiness can therefore be realized via the increase in the perception of job instability in the case that individuals are risk-averters.

The empirical finding that the unemployment history strongly matters for the perception of job instability is also consistent with the notion that an unemployment episode provides private information about the unobservable productivity of an employee. Thus, a layoff of an individual worker in contrast to a quit or a closure of whole plant is indeed a credible signal about the low productivity of an employee (see, for example, Gibbons and Katz, 1991).[25] This means that unemployment tends to bring future unemployment at the individual level of the economy (see, for example, Arulampalam et al., 2001). The welfare losses associated with unemployment episodes can manifest themselves in extreme form. In fact, Charles and Stephens (2001) observe that a layoff yields an increase in the future divorce probability of individuals in the U.S.

The results further reveal that an optimistic view of the general economic conditions in the country of an individual has no effect at all on the perception of job instability, but an optimistic view about one’s personal economic conditions is associated with a decline in the perception of job instability. The estimation results therefore underline the view that the perception of job instability is a deeply personal matter.

There are a number of job characteristics that are essential in the determination of the perception of job instability in the context of the European labour markets. In principle, the fact that an individual holds more than just one current job should decrease the perception of job instability, because the presence of multiple jobs should diversify various risks induced by labour markets, owing to the fact that the idiosyncratic shocks that affect these jobs are not perfectly correlated with each other.[26] However, this line of reasoning is not in line with the estimation results.

Green et al. (2001) observe that the various measures of job dissatisfaction are positively related to the perception of job instability in the unregulated UK labour markets. In addition, Blanchflower and Oswald (1999) discover that both U.S. evidence and European data point out that there is a strong positive correlation between feeling secure and saying one is satisfied with a job. In fact, the HOME variable of this study can be interpreted as an indication of job dissatisfaction. The estimation results are therefore not in line with the earlier UK empirical evidence.

The perception of job instability is negatively related to the presence of a part-time contract and positively related to the past overtime hours.[27] In principle, the presence of earlier overtime hours could put more faith in the stability of the current match, because overtime hours are often implemented in the case of robust demand for the products and services of the particular firm, but the estimation results are not in line with this kind of reasoning. In contrast, the estimated impact of overtime hours on the perception of job instability is in line with the notion that hours of work are adjusted before the adjustment of the number of employees, as there is an increase in demand. Thus, the implementation of overtime hours reflects, in fact, the underlying uncertainty about the firms' current environment that is also reflected in the perception of job instability among employees. The results further indicate that the effect of a part-time contract on the perception of job instability disappears within the subpopulation of females (see Table 4).

However, the most striking result of this study is that the perception of job instability is negatively related with the variable that captures the individuals that have a temporary contract.[28] The estimation result also holds for the subpopulation of females (see Table 4). The result can be interpreted as an indication of the feature in the European labour markets that persons who have started a temporary contact have already discounted the high-subjective probability of job loss when they accept that type of contract. This means that a temporary contract as such does not yield an additional increase in the perception of job instability at the individual level of the economy, other things being equal. The above result is not in line with the observations by Green et al. (2001), according to which individuals holding short-term employment contracts are found to report the greatest levels of job insecurity in the UK. However, the result can be rationalized by noting that temporary contracts often provide a path towards more stable employment relationships.[29] This effect is especially relevant in the context of the European unemployment problem.

The perception of job instability is not related at all to the fact that an individual is a manual worker, but negatively related to the feature that an individual has managerial duties in his/her current job. The latter can be rationalized by the notion that individuals

who have managerial duties also have at least some power to decide about the separations of employees. In addition, the weekly hours of work are not related to the perception of job instability, despite the fact that long hours of work by employees could serve as an indicator that the demand for firms' goods and services is relatively robust in the current market conditions. The perception of job instability is not more common in large cities with more than 100 000 inhabitants. This may reflect the stylized feature that an increase in the density of economy activity leads to more efficient matching within regional labour markets via the so-called thick market externalities, despite the fact that large cities have pockets of high unemployment rates.

The survey includes a limited number of variables that aim to characterize the firms' position in the economy. The results show that the perception of job instability is more common within manufacturing industries. This result is in line with the observations by Aaronson and Sullivan (1998) for the U.S., according to which job insecurity is substantially higher in the manufacturing sector than in all other major industries, but the breakdown of job insecurity by OECD (1997) is not able to find differences in the magnitude of the perception of job instability between industries and services in the context of European labour markets. However, the above result, according to which the perception of job instability is more common within manufacturing industries, is not in line with the stylized features presented in the recent literature on gross job and worker flows. The magnitude of gross job and worker flows tends to be higher in non-manufacturing industries compared with manufacturing industries (see, for example, Davis and Haltiwanger, 1999).

In addition, there is some empirical evidence for the view that the perception of job instability by individuals increases according to the size of the firm. This effect is most notable for the subpopulation of females (see Table 4). The perception of job instability therefore seems to be less common in small establishments. This result is not in line with the realized patterns of turnover, either, because the turnover of jobs and workers tends to decline as firms' size increases.[30] However, this observation can be rationalized by noting that there is almost always a low hierarchy in small firms compared with large companies with a great number of separate establishments, which facilitates a more efficient and detailed flow of information about the position of firms in the population of small firms.

Finally, the country dummies that we included indicate that there are genuine differences in the perception of job instability from country to country in Europe after taking account of various factors that contribute to the incidence of job instability. For instance, the perception of job instability is lower in Denmark and higher in Spain than in Norway even

after taking into account the controls included for the incidence of job instability at the individual level of the economy. This same pattern of job instability holds for the subpopulation of females (Table 4). There are also unobservable idiosyncratic elements that affect the incidence of job instability in European labour markets.

4.1. The robustness of the reported results

Along with the reported estimation results in Tables 3-4, a version of the Probit model was estimated that included the gender-specific unemployment rate by Eurostat (2000) for the European Union countries in 1998. The unemployment variable was not statistically significant with the country dummies including the same control variables as the models reported in Tables 3–4. The reason for this feature is that there is no temporal variation in unemployment rates within countries at all, because the applied survey of this study provides cross-country information only for the single year 1998. This feature of estimation naturally extends to another variables by a similiar nature (including the variables that capture the institutional characteristics of European labour markets that were discussed at the end of the third section of the study). This means that there is no point in trying to include institutional features as an additional explanatory variable to the reported Probit models of the study.

Without the country dummies, the results indicated that an increase in the gender-specific unemployment rate yields an increase in the perception of job instability among workers, which is, of course, deeply in line with common sense. The result is also in line with Figure 1. The rest of the results remained the same as the reported ones in Tables 3–4. The same results as the ones with the gender-specific unemployment rate hold in the case that the unemployment rate was replaced by the gender-specific share of long-term unemployed of all unemployed individuals for the European Union countries excluding Luxembourg and Ireland provided by Eurostat (2000). The motivation for that particular specification was the fact that long-term unemployment definitely yields extremely high private costs to individuals in terms of lost human capital in the context of European labour markets.

Another point concerning the robustness of the reported results in Tables 3–4 can be summarized in a nutshell as follows. Without the country dummies, the estimation results remained the same, but the GENOPTIMISTIC variable turned out to be statistically significant with a negative sign as *a priori* expected. Thus, an increase in the optimistic perception about the aggregate economy definitely delivers a decline in the perception of job instability at the individual level of the economy. In addition, the JOBS variable did

get a negative sign. This means that there is some evidence for the view that an increase in the number of jobs is able to reduce the perception of job instability at the individual level of the economy. The exclusion of the PEROPTIMISTIC and GENOPTIMISTIC variables yielded the same results as the reported ones in Tables 3–4.

The survey includes a question about the employee's view about his/her labour market position from five years after the interview (the question 109a in the manual of the interview, see Infratest Burke Sozialforschung, 1999a). The estimation results showed that the perception of job instability is highly correlated with the notion that an employee thinks that he/she is in the pool of unemployed individuals from five years after the interview. This fact is in line with thinking that workers are indeed able to deliver consistent answers to the questions about the perception of job instability at the individual level of the economy.

5. Conclusions

The study explored the empirical determination of perceived job instability in Europe. The study was based on the large-scale survey from the year 1998 covering 15 member states of the European Union and Norway. All in all, there tends to be a rather vague relationship between institutional features and the perception of job instability among workers. However, the patterns of perceived job instability and the institutional features of European countries are not consistent with the popular notion that the perception of job instability declines as the strictness of labour standards and the strictness of employment protection increase in European labour markets. This pattern emerges despite the stylized feature of the earlier literature that the underlying magnitude of gross job and worker flows of the economies declines as the strictness of labour standards and employment protection increases. This means that the perception of job instability and the underlying gross flows of job and workers need not be closely correlated.

The results show that perceived job instability increases with age. In other words, there is evidence for the view that it is the job loss wage penalty more than the job loss incidence that drives the perception of job instability among workers. An increase in the educational level, on the other hand, leads to a decline in the perception of job instability. There are no differences in the perceptions of job instability between males and females. An occurrence of unemployment during the past five years delivers a substantial rise in the perception of job instability. The empirical finding that the unemployment history strongly matters for the perception of job instability is consistent with the notion that an unemployment episode provides private information about the unobservable productivity of an employee.

The most striking result was that a temporary contract as such does not yield an additional increase to the perception of job instability at the individual level of the economy. However, the perception of job instability is more common within manufacturing industries and there is some evidence for the view that it increases according to the size of the firm. There are also strong country effects.

Table A1. The number of interviews across countries.

Country	*Number of interviews*
Austria	1501
Belgium	1510
Denmark	1485
Finland	1504
France	3026
Germany	2998
Greece	1506
Ireland	1400
Italy	2992
Luxembourg	822
Netherlands	1500
Norway	1500
Portugal	1501
Spain	3000
Sweden	1312
United Kingdom	3000

Table A2. Selected descriptive statistics for the whole population of employees.

Variable	*MEAN*	*STD*	*MIN*	*MAX*
WORRIED	0.27703	0.44755	0	1
AGE	38.43222	10.93591	16	64
GENDER	0.51688	0.49974	0	1
DEGREE	0.29214	0.45477	0	1
MARRIED	0.65463	0.47551	0	1
PARTNER	0.34134	0.47418	0	1
CHILDREN	0.61717	0.48610	0	1
EXPERIENCE	0.71911	0.44945	0	1
TENURE	0.41225	0.49226	0	1
UNEMPLOYED	0.19785	0.39840	0	1
GENOPTIMISTIC	0.09970	0.29961	0	1
PEROPTIMISTIC	0.10992	0.31280	0	1
JOBS	0.93188	0.25196	0	1
HOME	0.09980	0.29975	0	1
PART	0.19287	0.39457	0	1
OVERTIME	0.64088	0.47976	0	1
TEMPORARY	0.83084	0.37491	0	1
MANUAL	0.36214	0.48064	0	1
MANAGER	0.37767	0.48483	0	1
HOURS	39.03729	12.0639	1	88
METROPOLITAN	0.42980	0.49507	0	1
MANU	0.24377	0.42938	0	1
SERVICE	0.71599	0.45096	0	1
SIZE1	0.17435	0.37944	0	1
SIZE2	0.24815	0.43197	0	1
SIZE3	0.29471	0.45595	0	1

References

Aaronson, D. and D.G. Sullivan (1998), 'The decline in job security in the 1990s: displacement, anxiety, and their effect on wage growth', Federal Bank of Chicago, Economic Perspectives 22, 17–43.

Agell, J. (1999), 'On the benefits from rigid labour markets: Norms, market failures, and social insurance', *The Economic Journal* 109, F143–F164.

Alesina, A., E. Glaeser and B. Sacerdote (2001), 'Why doesn't the U.S. have a European style welfare system?', Working Paper 8524 (National Bureau of Economic Research, Cambridge MA).

Arulampalam, W., P. Gregg and M. Gregory (2001), 'Unemployment scarring', *The Economic Journal* 111, F577–F584.

Bell, D., R.E. Wright and R.A. Hart (1997), Multiple job holding as a 'hedge' against unemployment, Discussion Paper 1626 (Centre for Economic Policy Research, London).

Bertola, G. (1992), 'Labour turnover costs and average labour demand', *Journal of Labor Economics* 10, 389–411.

Blanchflower, D. G. and A.J. Oswald (1999), Well-being, insecurity and the decline in American job satisfaction, Unpublished paper (Department of Economics, University of Warwick).

Burda, M. and C. Wyplosz (1994), 'Gross worker and job flows in Europe', *European Economic Review* 38: 1287–1315.

Charles, K.K. and M. Stephens (2001), Job displacement, disability and divorce, Working Paper 8578 (National Bureau of Economic Research, Cambridge MA).

Clark, A.E. (1997), 'Job satisfaction and gender', *Labour Economics* 4, 341–372.

Davis, S.J. and J. Haltiwanger (1999), 'Gross job flows', in O. Ashenfelter and D. Card (eds.), *Handbook of Labour Economics,* Vol. 3C (North-Holland, Amsterdam), 2711–2805.

Davis, S.J. and P. Willen (1999), Using financial assets to hedge labor income risks: Estimating the benefits, Unpublished paper. (Department of Economics, University of Chicago).

Di Tella R., R.J. MacCulloch and A.J. Oswald (2001), 'Preferences over inflation and unemployment: Evidence from survey of happiness', *The American Economic Review* 91, 335–341.

Domenighetti, G., B. D'Avanzo and B. Bisig (2000), 'Health effects of job insecurity among employees in the Swiss general population', *International Journal of Health Services* 30, 477–490.

Dominitz, J. and C.F. Manski (1996), Perceptions of economic insecurity: Evidence from the survey of economic expectations, Discussion Paper 1105–96 (Institute for Research on Poverty, The University of Wisconsin-Madison).

Dominitz, J. and C.F. Manski (1997), 'Perceptions of economic insecurity', *Public Opinion Quarterly* 61, 261–287.

Eurostat (2000), Eurostat Yearbook. A Statistical Eye on Europe. Data 1988–1998 (European Commission, Brussel).

Farber, H.S. (1999), 'Mobility and stability: The dynamics of job change in labor markets', in O. Ashenfelter and D. Card (eds.), *Handbook of Labour Economics,* Vol. 3C (North-Holland, Amsterdam), 2439–2483.

Garibaldi, P. (1998), 'Job flow dynamics and firing restrictions', *European Economic Review* 42, 245–275.

Garibaldi, P., J. Konings and C. Pissarides (1997), 'Gross job reallocation and labour market policy', in D.J. Snower and G. de la Dehesa G. (eds.), *Unemployment Policy: Government Options for the Labour Market* (Cambridge University Press, Cambridge), 467–498.

Gibbons, R. and L. F. Katz (1991), 'Layoffs and lemons', *Journal of Labor Economics* 4, 351–380.

Givord, P. and E. Maurin (2001), Changes in job stability and their causes: An empirical analysis method applied to France, 1982–2000, Unpublished (INSEE, Paris).

Gottschalk, P. and R. Moffitt (1998), Job instability and insecurity for males and females in the 1980s and 1990s, Working Papers in Economics 408 (Department of Economics, Boston College).

Green, F., A. Felstead and B. Burchell (2000), 'Job insecurity and the difficulty of regaining employment: An empirical study of unemployment expectations', *Oxford Bulletin of Economics and Statistics* 62, 857–885.

Green, F., D. Campbell, A. Carruth, and A. Dickerson (2001), An analysis of subjective views of job insecurity, Working Paper 08/01 (University of Kent at Canterbury).

Hall, R.E. (1995), 'Lost jobs', *Brookings Papers on Economic Activity* 1, 221–256.

Horowitz, J.L. and N.E. Savin (2001), 'Binary response models: Logits, probits and semiparametrics', *Journal of Economic Perspectives* 15, 43–56.

Houseman S.N. (1998), 'Why employers use flexible staffing arrangements: Evidence from an establishment survey, Working Papers 01–67 (W.E. Upjohn Institute, Michigan).

Infratest Burke Sozialforschung (1999a), Employment options of the future. Representative survey in all 15 member states and in Norway – documentation of questionnaires. Volume 1–2, (IBS, Munich).

Infratest Burke Sozialforschung (1999b), Employment options of the future. Representative survey in all 15 member states and in Norway. Additional cross-tabulations – Volume A-B, (IBS, Munich).

Infratest Burke Sozialforschung (1999c), Employment options of the future. Representative survey in all 15 member states and in Norway. Field report and cross-Tabulations, (IBS, Munich).

Infratest Burke Sozialforschung (1999d), Employment options of the future: High demand for new jobs in Europe – high interest in non-standard work-forms. First results from a representative survey in all 15 member states and in Norway, (IBS, Munich).

Keyssar, A. (1986), *Out of Work: The First Century of Unemployment in Massachusetts* (Cambridge University Press, Cambridge).

Kletzer, L. (1998), 'Job displacement', *Journal of Economic Perspectives* 12, 115–136.

Kuhn, P. (2001), 'Summary and Synthesis', in P. Kuhn P. (ed.), *Losing Work, Moving On: Worker Displacement in an International Perspective,* (W.E. Upjohn Institute for Employment Research, Michigan), 1–72.

Lupi, C. and P. Ordine (2002), 'Unemployment scarring in high unemployment regions', *Economics Bulletin* 10, 1–8.

Manski, C.F. and J.D. Straub (2000), 'Worker perceptions of job insecurity in the mid-1990s. Evidence from the survey of economic expectations', *The Journal of Human Resources* 35, 447–479.

Neumark, D., D. Polsky and D. Hansen (1999), 'Has job stability declined yet? New evidence for the 1990s', *Journal of Labor Economics* 17, S29–S64.

Nickell S. and R. Layard (1999), 'Labor market institutions and economic performance', in O. Ashenfelter and D. Card (eds.), *Handbook of Labour Economics,* Vol. 3C (North-Holland, Amsterdam), 3029–3084.

Nickell, S., T. Jones and G. Quintini (2002), 'A picture of job insecurity facing British men', *The Economic Journal* 112, 1–27.

OECD (1997), Employment Outlook, (OECD, Paris).

OECD (1998), Benefit Systems and Work Incentives, (OECD, Paris).

OECD (1999), OECD Economic Outlook, (OECD, Paris).

Ruhm, C. (1991), 'Are workers permanently scarred by job displacements?', *The American Economic Review* 81, 319–324.

Ryan, P. (2001), 'The school-to-work transition: Cross-country perspective', *Journal of Economic Literature* 39, 34–92.

Salvanes, K.G. (1997), 'Market rigidities and labour market flexibility: An international comparison', *Scandinavian Journal of Economics* 99, 315–333.

Schmidt, S.R. (1999), 'Long-run trends in workers' beliefs about their own job security: Evidence from the general social survey', *Journal of Labor Economics* 17, S127–S141.

Tversky, A. and D. Kahneman (1982), 'Chapter one', in A. Tversky A. and D. Kahneman (eds.), *Judgement and Uncertainty: Heuristics and Biases* (Cambridge University Press, Cambridge), 1–27.

Van Praag, B.M.S., P. Frijters and A. Ferrer-i-Carbonell (2001), The anatomy of subjective well-being, Discussion Paper 265 (DIW, Berlin).

[1] Davis and Haltiwanger (1999) provide a survey of the literature on gross job and worker flows. Burda and Wyplosz (1994) provide empirical evidence on the magnitude of gross job and worker flows in Europe.

[2] In addition, Aaronson and Sullivan (1998) argue that the trends in job security are much more relevant to the discussion of whether special factors might be restraining wage inflation than are the trends in realized job stability. In particular, if declines in job stability are less dramatic than declines in job security, it must largely be because workers are less likely to leave jobs voluntarily, and a decreased tendency to quit jobs may itself signal worker insecurity.

[3] The survey was commissioned by the European Foundation for the Improvement of Living and Working Conditions, Dublin, and the Norwegian Royal Ministry of Labour and Government Administration, Oslo. Fieldwork was co-ordinated by Infratest Burke Sozialforschung, which also prepared the initial analyses of the survey.

[4] Alesina et al. (2001) provide a recent study on the differences of European and U.S. welfare systems.

[5] Neumark et al. (1999) summarize the evidence on job instability in the United States. OECD (1997) provide empirical evidence on the evolution and the causes of job instability for Europe. In addition, Givord and Maurin (2001) provide recent evidence on the rise in magnitude of job instability in France.

[6] OECD (1997) provides a breakdown of perceived job insecurity in Europe based on the Eurobarometer Survey for 1996. Blanchflower and Oswald (1999) provide an investigation into job insecurity by applying the ISSP (International Social Survey Program) including a large group of countries. In addition, Domenighetti et al. (2000) provide empirical evidence for the view that job insecurity generates substantial negative health effects (for example, sleeplessness).

[7] Aaronson and Sullivan (1998) provide additional evidence on this issue.

[8] However, the empirical evidence presented by Aaronson and Sullivan (1998) reveals that an increase in the perceived likelihood of job loss has been especially great among white-collar workers during the 1990s. Thus, there has been a kind of ”democratization” of job insecurity in the U.S.

[9] Green et al. (2001) also find that increased job insecurity, relative to the aggregate unemployment rate, has contributed in part to wage restraint in the UK. Aaronson and Sullivan (1998) have earlier reported similiar empirical results for the U.S. by using the General Social Survey (GSS). Nickell et al. (2002) provide additional evidence on the issue of job insecurity in the UK.

[10] Infratest Burke Sozialforschung (1999a, 1999b, 1999c, 1999d) provides the detailed documentation of the survey.

[11] The total number of telephone-assisted interviews was 30557. The number of non-employed individuals and economically inactive persons was 17908.

[12] Self-employed persons are defined as persons who declare themselves to be self-employed.

[13] Green et al. (2001) present similiar scatterplots by using the International Social Survey Programme (ISSP) and find that there is a positive association between job insecurity and the aggregate unemployment rate across countries.

[14] Greece and Luxembourg are excluded from Figures 2-3 due to the fact that indexes of labour standards and employment protection are not available for these countries. These indexes are adapted from Nickell and Layard (1999, p. 3040). The index of labour standard strictness is originally by OECD. Each country is scored from 0 (lax or no legislation) to 2 (strict legislation) on five dimensions: working hours, fixed-term contracts, employment protection, minimum wages and employees' representation rights. The scores are then totalled, generating an index ranging from 0 to 10. The OECD employment protection index is based on the strength of the legal framework governing hiring and firing of workers. Countries are ranked from 1 to 20, with 20 being the most strictly regulated.

[15] Another possible interpretation of the correlation is that the demand for employment protection rises if there is a great deal of perception of job instability among employees. Agell (1999) provides an elaboration along this line of thinking.

[16] Bertola (1992), Garibaldi et al. (1997), Salvanes (1997) and Garibaldi (1998) provide presentations of this view of labour market adjustment.

[17] Greece is excluded from the figure owing to the fact that the replacement rate is not available for that particular country. The replacement rates are adapted from OECD (1998) and calculated as an average of the first four columns in Table 3.1, which report replacement rates for four family types (i.e. single, married couple, couple with two children and lone parent with two children).

[18] Horowitz and Savin (2001) provide a survey of binary response models.

[19] A limited number of observations does not make it possible to estimate the specifications separately for each country of the survey.

[20] Ryan (2001) provides a survey of these issues.

[21] However, the measure of education in the investigation by OECD (1997) is far from perfect, because education is proxied by the age at which the individual first left full-time education.

[22] This result is not in line with a stylized fact in the literature on gross worker flows, according to which the probability of a job ending, in fact, declines with tenure (see, for example, Farber, 1999). A potential problem with the conclusion that a long tenure does not yield a decline in the perception of job instability is the fact that the age of an employee and the length of the tenure tend to be positively correlated across individuals.

[23] A related study by Ruhm (1991) finds that job losers continue to experience lasting wage reductions in the U.S. This suggests that there are significant worker attachments to specific jobs. In addition, Hall (1995) focuses on the permanent effects of job losses in the U.S. Kletzer (1998) provides a summary of empirical findings.

[24] Tversky and Kahneman (1982) provide a discussion of these effects.

[25] Lupi and Ordine (2002) report that individual unemployment experiences tend to scarring only in the northern regions of Italy, where the aggregate unemployment rate is relatively low compared with that in southern parts of the country.

[26] Another possibility is that employees that have, by nature, a substantial risk of losing their jobs should they hold more than just one current job. Bell et al. (1997) observe by using the British Household Panel Study that multiple job holding is an incomplete 'hedge' against financial insecurity in the UK. Keyssar (1986) provides an interesting discussion of unemployment in Massachusetts in the 19th century. According to Keyssar (1986) many people held many jobs as a mechanism of self-insurance.

[27] The results concerning the effect of a part-time job on insecurity is in conflict with the observations by Green et al. (2000) for the UK, according to which part-time jobs tend to yield an increase in the perception of job insecurity in low wage occupations.

[28] Temporary employment is defined as non-permanent employment (including fixed-term and temporary agency contracts).

[29] Houseman (1998) provides empirical evidence on this feature of labour markets for the U.S.

[30] Davis and Haltiwanger (1999) provide a survey of the literature.

HELSINGIN KAUPPAKORKEAKOULUN JULKAISUJA
Publications of the Helsinki School of Economics

A-SARJA: VÄITÖSKIRJOJA - DOCTORAL DISSERTATIONS. ISSN 1237-556X.

A:184. JUKKA VESALA: Technological Transformation and Retail Banking Competition: Implications and Measurement. 2001. ISBN 951-791-518-7.

A:185. JOHANNA MOISANDER: Representation of Green Consumerism: A Constructionist Critique. 2001. ISBN 951-791-602-7.

A:186. JUHANI VAIVIO: Non-financial Measurement in an Organizational Context. Three Perspectives. 2001. ISBN 951-791-604-3.

A:187. ARJA JUNTUNEN: Audience Members' Goals of Media Use and Processing of Advertisements. 2001. ISBN 951-791-608-6.

A:188. TIMO KUOSMANEN: The Role of Production Assumptions in Data Envelopment Analysis. 2001. ISBN 951-791-610-8.

A:189. ISMO TEIKARI: Poisson Mixture Sampling in Controlling the Distribution of Response Burden in Longitudinal and Cross Section Business Surveys. 2001. ISBN 951-791-611-6.

A:190. LIISA ROHWEDER: Ympäristökasvatus ammattikorkeakoulussa. Opetussuunnitelma-teoreettisen mallin kehittäminen liiketalouden koulutukseen. 2001. ISBN 951-791-613-2.

A:191. PEKKA SULAMAA: Essays in Deregulated Finnish and Nordic Electricity Markets. 2001. ISBN 951-791-617-5.

A:192. SUSAN MERILÄINEN: Changing Gendered Practices: A PAR Project within an Academic Work Community. 2001. ISBN 951-791-640-X.

A:193. A. MAARIT I. KALLIO: Studies on Competition in the Finnish Wood Market. 2001. ISBN 951-791-643-4.

A:194. KALEVI EURO: Locational Changes of Headquarters of Multinational Corporations. A Theoretical Study on The Motives and Reasons for Relocating Finnish Divisional Headquarters Abroad. 2001. ISBN 951-791-646-9.

A:195. VELI-PEKKA HEIKKINEN: Modelling Timber Harvesting Decisions as a Part of the Management of a Mixed Asset Portfolio. 2001. ISBN 951-791-656-6.

A:196. NIINA PAUTOLA-MOL: The Baltic States' Integration into the European Union – Institutional Approach. 2001. ISBN 951-791-657-4.

A:197. ANSSI ÖÖRNI: Consumer Search in Electronic Markets. 2002. ISBN 951-791-680-9.

A:198. ARI MATIKKA: Measuring the Performance of Owner-Managed Firms: A systems approach. 2002. ISBN 951-791-685-X.

A:199. RIITTA KOSONEN: Governance, the Local Regulation Process, and Enterprise Adaptation in Post-Socialism. The Case of Vyborg. 2002. ISBN 951-791-692-2.

A:200. SUSANNE SUHONEN: Industry Evolution and Shakeout Mechanisms: The Case of the Internet Service Provider Industry. 2002. ISBN 951-791-693-0.

A:201. MATTI TUOMINEN: Market-Driven Capabilities and Operational Performance. Theoretical Foundations and Managerial Practices. 2002. ISBN 95-791-694-9.

A:202. JUSSI KARHUNEN: Essays on Tender Offers and Share Repurchases. 2002. ISBN 951-791-696-5.

A:203. HENNAMARI MIKKOLA: Empirical Studies on Finnish Hospital Pricing Methods. 2002. ISBN 951-791-714-7.

A:204. MIKA KORTELAINEN: EDGE: a Model of the Euro Area with Applications to Monetary Policy. 2002. ISBN 951-791-715-5.

A:205. TOMI LAAMANEN: Essays on Technology Investments and Valuation. 2002. ISBN 951-791-716-3.

A:206. MINNA SÖDERQVIST: Internationalisation and its Management at Higher-Education Institutions. Applying Conceptual, Content and Discourse Analysis. 2002. ISBN 951-791-718-X.

A:207. TARJA PIETILÄINEN: Moninainen yrittäminen. Sukupuoli ja yrittäjänaisten toimintatila tietoteollisuudessa. 2002. ISBN 951-791-719-8.

A:208. BIRGIT KLEYMANN: The Development of Multilateral Alliances. The Case of the Airline Industry. 2002. ISBN 951-791-720-1.

A:209. MIKAEL EPSTEIN: Risk Management of Innovative R&D Project. Development of Analysys Model. A Systematic Approach for the Early Detection of Complex Problems (EDCP) in R&D Projects in Order to Increase Success in Enterprises. 2002. ISBN 951-791-717-9.

A:210. SAMI KAJALO: Deregulation of Retail Hours in Finland: Historical and Empirical Perspectives. 2002. ISBN 951-791-734-1.

A:211. TOMMI KASURINEN: Exploring Management Accounting Change in the Balanced Scorecard Context. Three Perspectives. 2003. ISBN 951-791-736-8.

A:212. LASSE NIEMI: Essays on Audit Pricing. 2003. ISBN 951-791-751-1.

A:213. MARKKU KAUSTIA: Essays on Investor Behavior and Psychological Reference Prices. 2003. ISBN 951-791-754-6.

A:214. TEEMU YLIKOSKI: Access Denied: Patterns of Consumer Internet Information Search and the Effects of Internet Search Expertise. 2003. ISBN 951-791-755-4.

A:215. PETRI HALLIKAINEN: Evaluation of Information System Investments. 2003. ISBN 951-791-758-9.

A:216. PETRI BÖCKERMAN: Empirical Studies on Working Hours and Labour Market Flows. 2003. ISBN 951-791-760-0.

A-SARJA: MUITA JULKAISUJA - OTHER PUBLICATIONS

Väitöskirjojen tiivistelmät 1996-2001. Helsingin kauppakorkeakoulun 12. promootion juhlajulkaisu. 2001. ISBN 951-791-617-5.

ANNE HERBERT: The Paradoxes of Action Learning: An Interpretive and Critical Inquiry into Vocational Educators' Professional Development. 2002. ISBN 951-791-684-1.

B-SARJA: TUTKIMUKSIA - RESEARCH REPORTS. ISSN 0356-889X.

B:31. HEIDI MOISIO – ANNUKKA JYRÄMÄ: Helsingin kulttuurikaupunkisäätiön ja tuotantoyhtiöiden välinen yhteistyö. 2001. ISBN 951-791-607-8.

B:32. KRISTIINA KORHONEN: Role of government intervention in foreign direct investment: Case of South Korea. 2001. ISBN 951-791-620-5.

B:33. MINNA SÖDERQVIST: The Internationalisation and Strategic Planning of Higher-Education Institutions. An Analysis of Finnish EPS Strategies. 2001. ISBN 951-791-623-X.

B:34. KATJA LEPPÄLÄ – HANNA PÄIVIÖ: Kauppatieteiden opiskelijoiden moraalijärjestys: Narratiivinen tutkimus kolmen eri pääaineen opiskelusta Helsingin kauppakorkeakoulussa. 2001. ISBN 951-791-629-9.

B:35. EERO W. ARTTO: Performance and International Competitiveness of Listed Paper Industry Groups 1992-2000. Finland vs Sweden, Canada and USA. 2001. ISBN 951-791-635-3.

B:36. ARJA KALMARI – JOHANNA MARKKANEN: Erektiohäiriölääke Viagran saama julkisuus Suomessa vuosina 1998 - 2000. 2001. ISBN 951-791-647-7.

B:37. ANTERO HONKASALO: Ekotehokkuus, tuotepolitiikka ja ympäristöpolitiikan ohjauskeinot. 2001. ISBN 951-791-653-1.

B:38. KRISTIINA KORHONEN(ed.): Current Reflections on the Pacific Rim. 2002. ISBN 951-791-661-2.

B:39. RISTO Y. JUURMAA: Performance and International Competitiveness of Listed Metal and Telecommunication Industry Groups 1992 - 2000. Finland vs Sweden and Germany. 2002. ISBN 951-791-668-X.

B:40. KAIJA TUOMI – SINIKKA VANHALA (toim.): Yrityksen toiminta, menestyminen ja henkilöstön hyvinvointi. Seurantatutkimus metalliteollisuudessa ja vähittäiskaupan alalla. 2002. ISBN 951-791-674-4.

B:41. ANNE ÄYVÄRI: Verkottuneen pienyrityksen markkinointikyvykkyys. 2002. ISBN 951-791-682-5.

B:42. RIKU OKSMAN: Intohimoa ja ammattitaitoa: puheenvuoroja tuottajan työstä. 2002. ISBN 951-791-700-7.

B:43. RISTO TAINIO – KARI LILJA – TIMO SANTALAINEN: Organizational Learning in the Context of Corporate Growth and Decline: A Case Study of a Major Finnish Bank. 2002. ISBN 951-791-717-1

B:44. ELINA HENTTONEN – PÄIVI ERIKSSON – SUSAN MERILÄINEN: Teknologiayrittämisen sukupuoli. Naiset miesten maailmassa. 2003. ISBN 951-791-737-6.

B:45. KIRSI KORPIAHO: "Kyllä siinä pitää elää mukana!" Kirjanpitäjien tarinoita työstä, osaamisesta ja oppimisesta työyhteisönäkökulmasta analysoituna. 2003. ISBN 951-791-742-2.

B:46. NIILO HOME (toim.): Puheenvuoroja ECR-toiminnasta. Discussions on ECR – Summaries. 2003. ISBN 951-791-749-X.

B:47. PÄIVI KARHUNEN – RIITTA KOSONEN – MALLA PAAJANEN: Gateway-käsitteen elinkaari Venäjän-matkailussa. Etelä-Suomi Pietarin-matkailun väylänä. 2003. ISBN 951-791-756-2.

CKIR-SARJA: HELSINKI SCHOOL OF ECONOMICS. CENTER FOR KNOWLEDGE AND INNOVATION RESEARCH. CKIR WORKING PAPERS. ISSN 1458-5189.

CKIR:1. SATINDER P. GILL: The Engagement Space and Parallel Coordinated Movement: Case of a Conceptual Drawing Task. 2002. ISBN 951-791-660-4.

CKIR:2 PEKKA ISOTALUS – HANNI MUUKKONEN: How Do Users of Pda's React to an Animated Human Character in Online News? 2002. ISBN 951-791-664-7.

E-SARJA: SELVITYKSIÄ - REPORTS AND CATALOGUES. ISSN 1237-5330.

E:100. JUHA KINNUNEN: Opiskelijoiden valikoituminen pääaineisiin Helsingin kauppakorkeakoulussa. Pääainetoiveita ja niihin vaikuttavia tekijöitä kartoittava kyselytutkimus vuosina 1995-2000 opintonsa aloittaneista. 2002. ISBN 951-791-669-8.

E:101. Research Catalogue 2000 – 2002. Projects and Publications. 2002. ISBN 951-791-670-1.

N-SARJA: HELSINKI SCHOOL OF ECONOMICS. MIKKELI BUSINESS CAMPUS PUBLICATIONS. ISSN 1458-5383

N:1 PÄIVI KARHUNEN: Etelä-Savon yritysten ulkomaankauppa 2000. 2001. ISBN 951-791-648-5.

N:2. PÄIVI KARHUNEN: Etelä-Savon yritysten Venäjän-kauppa 2002. 2001. ISBN 951-791-649-3.

N:3. RIITTA ERONEN: Selvitys venäläismatkailua koskevasta tutkimustiedosta. 2001. ISBN 951-791-650-7.

N:4. MARITA HEIKKINEN-RUMMUKAINEN: Venäläläismatkailu Etelä-Savossa. 2001. ISBN 951-791-651-5.

N:5. PÄIVI KARHUNEN: Metalliteollisuuden alinhankintamahdollisuudet Venäjällä. Eteläsavolaisten ja pietarilaisten yritysten kokemuksia tuotannollisesta yhteistyöstä. 2001. ISBN 951-791-652-3.

N:6 JUHA SIIKAVUO: Taloushallinon opas alkavalle yrittäjälle. 2002. ISBN 951-791-686-8.

N:7. JOHANNA NISKANEN: Etelä-Savon pk-yritysten vienti Tanskaan: ulkomaankaupan erityisraportti 2001. 2002. ISBN 951-791-687-6.

N:8. MIKKO NUMMI: Etelä-Savon pk-yritysten vienti Saksaan: ulkomaankaupan erityisraportti 2001. 2002. ISBN 951-791-688-4.

N:9. NOORA RUOHONEN – RIIKKA OLLI: Etelä-Savon pk-yritysten vienti Tsekkiin: ulkomaankaupan erityisraportti 2001. 2002. ISBN 951-791-689-2.

N:10. ANNA HÄKKINEN – ESKO LÄIKKÖ: Etelä-Savon pk-yritysten vientikohteena USA: ulkomaankaupan erityisraportti 2001. 2002. ISBN 951-791-690-6.

N:11. JUHA SIIKAVUO: Verkko-oppimisympäristön kehittäminen. Esimerkkinä HA Boctok Venäjän-kaupan erikoistumisopintojen yksi moduuli, vuosi: 2002. 2002. ISBN 951-791-695-7.

N:12. JUHO PETTER PUHAKAINEN: German Venture Capitalists' Decision Criteria in New Venture Evaluation. 2002. ISBN 951-791-650-7.

N:13. MILJA LEMMETYINEN: Suomalaisyrityksen etabloituminen Saksaan. Ulkomaankaupan erityisraportti 2002. 2002. ISBN 951-791-730-9.

N:14. TAPIO PALLASVIRTA: Pk-yritysten vienti Espanjaan. Ulkomaankaupan erityisraportti 2002. 2002. ISBN 951-791-731-7.

N:15. ELINA HAVERINEN: Etelä-Savon pk-yritysten Viron kauppa. Ulkomaankaupan erityisraportti 2003. ISBN 951-791-732-5.

N:16. REETA RÖNKKÖ: Latinalainen Amerikka markkina-alueena Argentiina ja Brasilia. Ulkomaankaupan erityisraportti 2003. ISBN 951-791-733-3.

N:17. JAAKKO VARVIKKO – JUHA SIIKAVUO: Koulutus, oppiminen ja akateeminen yrittäjyys. 2003. ISBN 951-791-745-7.

W-SARJA: TYÖPAPEREITA - WORKING PAPERS . ISSN 1235-5674.

W:275. JOHANNA MOISANDER – LIISA UUSITALO: Motivation and Social Contingency of Environmental Consumer Choices. 2001. ISBN 951-791-516-0.

W:276. MIRJAMI FAGERSTRÖM: Suhdemarkkinoinnin hyödyntäminen kuluttajatuotteiden markkinoinnissa. Kuluttajasuhdemarkkinoinnin tutkimuksen kirjallisuusanalyysi. 2001. ISBN 951-791-518-7.

W:277. JUHANI VAIVIO: "Provocative" Non-Financial Measures in Knowledge Creation. 2001. ISBN 951-791-603-5.

W:278. HANNU KIVIJÄRVI – MARKKU KUULA: A Finnish Forest Sector Model. 2001. ISBN 951-791-606-X.

W:279. VIRPI KRISTIINA TUUNAINEN (Edit.): Proceedings of The Third Electronic Grocery Shopping (EGS) Workshop. Brisbane, Australia, December 13, 2000. In Connection with The 21st International Conference on Information Systems (ICIS). 2001. ISBN 951-791-609-4.

W:280. JUSSI V. KOIVISTO: Conceptualising Cross-Culturall Organisations: Cultural Crossing with its Locus, Modus And Focus. 2001. ISBN 951-791-612-4.

W:281. JUKKA KALLIO – TIMO SAARINEN – MARKKU TINNILÄ: Efficient Change Strategies-matching Drivers and Tracers in Change Projects. 2001. ISBN 951-791-614-0.

W:282. JUKKA KALLIO – TIMO SAARINEN – MARKKU TINNILÄ – VIRPI TUUNAINEN: Elektronisen kaupankäynnin vaikutukset kaupan ja palveluiden arvoketjuihin, liiketoimintaprosesseihin ja työtehtäviin. 2001. ISBN 951-791-615-9.

W:283. TIMO KUOSMANEN: Stochastic Dominance Efficiency Tests Under Diversification. 2001. ISBN 951-791-618-3.

W:284. EERO KIVIMÄKI: Yritysstrategian mittaus. Strategia-analyysien luotettavuus ja käyttökelpoisuus kilpailukyvyn, laadun- ja pienyrityksen näkökulmista. 2001. ISBN 951-791-619-1.

W:285. INKERI HIRVENSALO – TERO LAUSALA: Foreign Direct Investments in the Russian Territories of the Barents Region. 2001. ISBN 951-791-621-3.

W:286. SEPPO SALO – OLLI TAHVONEN: Optimal Evolution of Forest Age-Classes and Land Allocation Between Forestry and Agriculture. 2001. ISBN: 951-791-622-1.

W:287. TARU LEHTONEN: In Search of Efficiency – Norddrg Based Pricing and Case-Mix Accounting. 2001. ISBN 951-791-625-6.

W:288. JUSSI V. KOIVISTO – MATTI LAMPINEN: Crossing National and Corporate Cultures.In-Depth Analysis of the Cross-Cultural Organisation in the Integration of a Finnish Firm´s Acquisition Case in Hong Kong. 2001. ISBN 951-791-627-2.

W:289. ANU H. BASK – JARI JUGA – JOUNI LAINE: Evolution of Container Transport: Services, Management and Technologies. 2001. ISBN 951-791-631-0.

W:290. MATTI LISKI – ANNE TOPPINEN: Stochastic versus Deterministic Trends in Carbon Dioxide Time Series. 2001. ISBN 951-791-632-9.

W:291. MATTI LISKI: Market Opening in Search Equilibrium: Should Licences to Pollute be Tradable? 2001. ISBN 951-791-633-7.

W:292. MATTI LISKI – OLLI TAHVONEN: Can Carbon Tax Eat Opec's Rents? 2001. ISBN 951-791-634-5.

W:293. PEKKA KORHONEN – MIKKO SYRJÄNEN: Resource Allocation Based on Efficiency Analysis. 2001. ISBN 951-791-636-1.

W:294. BIRGIT KLEYMANN: A Resource Dependence Perspective on Multilateral Alliances. The Case of the Airline Industry. 2001. ISBN 951-791-637-X.

W:295. JUSSI V. KOIVISTO – MATTI LAMPINEN: Acquisition of Strategic Technology through International Corporate M&A in Finnish High Technology Sectors. 2001. ISBN 951-791-638-8.

W:296. PERTTI HAAPARANTA – LEENA KERKELÄ – MATTI LISKI – TONI RIIPINEN – PEKKA SULAMAA: Climate Change Policies, World Markets and Finland - Simulation Results. 2001. ISBN 951-791-639-6.

W:297. MAARIT KALLIO – MARKKU KALLIO: Nonparametric Models for Evaluating Economic Efficiency and Imperfect Competition – with an Application to Competition in the Forest Sector. 2001. ISBN 951-791-641-8.

W:298. TOMI DAHLBERG – JENS HØRLÜCK: Internet Hype Overreaction - And What We Can Learn from it. 2001. ISBN 951-791-642-6.

W:299. ANTTI SÄÄSKILAHTI: Epäjatkuvuuden hallinta. 2001. ISBN 951-791-644-2.

W:300. VELI-PEKKA HEIKKINEN: Timber Harvesting Decisions Based On Multi-period Stochastic Portfolio Optimisation. 2001. ISBN 951-791-645-0.

W:301. PEKKA KORHONEN – SARI RYTÖKOSKI – MIKKO SYRJÄNEN: Multiple Objective Approach as an Alternative to Radial Projection in DEA. 2001. ISBN 951-791-654-X.

W:302. JUSSI KARHUNEN: What Determines Actual Open Market Repurchases? Evidence from Finland. 2001. ISBN 951-791-658-2.

W:303. JUSSI KARHUNEN: Who Accepts Tender Offers? 2001. ISBN 951-791-659-0.

W:304. PETRI BÖCKERMAN – KARI HÄMÄLÄINEN – MIKA MALIRANTA: Explaining Regional Job and Worker Flows. 2002. ISBN 951-791.662-0.

W:305. PEKKA KORHONEN – MIKKO SYRJÄNEN: Evaluation of Cost Efficiency in Finnish Electricity Distribution. 2002. ISBN 951-791-663-9.

W:306. SATU NURMI: The Determinants of Plant Survival in Finnish Manufacturing. 2002. ISBN 951-791-665-5.

W:307. JUSSI KARHUNEN: Taking Stock of Themselves. An Analysis of the Motives and the Market Reaction in Finnish Share Repurchase Programs 2002. ISBN 951-791-666-3.

W:308. PEKKA ILMAKUNNAS – HANNA PESOLA: Matching Functions and Efficiency Analysis. 2002. ISBN 951-791-671-X.

W:309. MARKKU SÄÄKSJÄRVI: Software Application Platforms: From Product Architecture to Integrated Application Strategy. 2002. ISBN 951-791-672-8.

W:310. MILLA HUURROS – HANNU SERISTÖ: Alliancing for Mobile Commerce: Convergence of Financial Institutions and Mobile Operators. 2002. ISBN 951-791-673-6.

W:311. ANSSI ÖÖRNI: Objectives of Search and Combination of Information Channels in Electronic Consumer Markets: An Explorative Study. 2002. ISBN 951-791-675-2.

W:312. ANSSI ÖÖRNI: Consumer Search in Electronic Markets: Experimental Analysis of Travel Services. 2002. ISBN 951-791-676-0.

W:313. ANSSI ÖÖRNI: Dominant Search Pattern in Electronic Markets: Simultaneous or Sequential Search. 2002. ISBN 951-791-677-9.

W:314. ANSSI ÖÖRNI: The Amount of Search in Electronic Consumer Markets. 2002. ISBN 951-791-678-7.

W:315. KLAUS KULTTI – TUOMAS TAKALO – TANJA TANAYAMA: R&d Spillovers and Information Exchange: A Case Study. 2002. ISBN 951-791-681-7.

W:316. OLLI TAHVONEN: Timber Production v.s. Old Growth Conservation with Endogenous Prices and Forest Age Classes. 2002. ISBN 951-791-691-4.

W:317. KLAUS KULTTI – JUHA VIRRANKOSKI: Price Distribution in a Symmetric Economy. 2002. ISBN 951-791-697-3.

W:318. KLAUS KULTTI – TONI RIIPINEN: Multilateral and Bilateral Meetings with Production Heterogeneity. 2002. ISBN 951-791-698-1.

W:319. MARKKU KAUSTIA: Psychological Reference Levels and IPO Stock Returns. 2002. ISBN 951-791-699-X.

W:320. MERVI LINDQVIST: Possible Research Issues in Management and Control of New Economy Companies. 2002. ISBN 951-791-701-5.

W:321. MARKO LINDROOS: Coalitions in Fisheries. 2002. ISBN 951-791-702-3.

W:322. MIKKO SYRJÄNEN: Non-discretionary and Discretionary Factors and Scale in Data Envelopment Analysis. 2002. ISBN 951-791-705-8.

W:323. KLAUS KULTTI – HANNU VARTIAINEN: VonNeumann-Morgenstern Solution to the Cake Division Problem. 2002. ISBN 951-791-708-2.

W:324. TOM LAHTI: A Review of the Principal-agent Theory and the Theory of Incomplete Contracts: An Examination of the Venture Capital Context. 2002. ISBN 951-791-709-0.

W:325. KRISTIAN MÖLLER – PEKKA TÖRRÖNEN: Business Suppliers' Value-Creation Potential: A Capability-based Analysis. 2002. ISBN 951-791-710-4.

W:326. KRISTIAN MÖLLER – ARTO RAJALA – SENJA SVAHN: Strategic Business Nets – Their Types and Management. 2002. ISBN 951-791-711-2.

W:327. KRISTIAN MÖLLER – SENJA SVAHN – ARTO RAJALA: Network Management as a Set of Dynamic Capabilities. 2002. ISBN 951-791-712-0.

W:328. PANU KALMI: Employee Ownership and Degeneration. Evidence from Estonian case studies. 2002. ISBN 951-791-713-9.

W:329. ANNELI NORDBERG: Yrittäjyys, johtajuus ja johtaminen – uuden talouden innovatiivisia haasteita. 2002. ISBN 951-791-721-X.

W:330. LEENA LOUHIALA-SALMINEN: Communication and language use in merged corporations: Cases Stora Enso and Nordea. 2002. ISBN 951-791-722-8.

W:331. TOMMI KASURINEN: Conceptualising the Encoding Process Related to Institutionalisation in Organisations. From Key Performance Indicator Scorecard to a Strategic Balanced Scorecard. 2002. ISBN 951-791-723-6.

W:332. PEKKA KORHONEN – HELENA TOPDAGI: Performance of the AHP in Comparison of Gains and Losses. 2002. ISBN 951-791-724-4.

W:333. TARJA JORO – PEKKA KORHONEN – STANLEY ZIONTS: An Interactive Approach to Improve Estimates of Value Efficiency in Data Envelopment Analysis. 2002. ISBN 951-791-725-2.

W:334. JUHA-PEKKA TOLVANEN – JEFF GRAY – MATTI ROSSI (edit.): Proceedings of the Second-Domain Specific Modeling Languages Workshop. 2002. ISBN 951-791-726-0.

W:335. SATU NURMI: Sectoral Differences In Plant Start-up Size. 2003. ISBN 951-791-738-4.

W:336. SATU NURMI: Plant Size, Age And Growth In Finnish Manufacturing. 2003. ISBN 951-791-739-2.

W:337. PETRI HALLIKAINEN – HANNU KIVIJÄRVI: Appraisal of Strategic it Investments: Payoffs And Tradeoffs. 2003. ISBN 951-791-740-6.

W:338. SENJA SVAHN: Knowledge Creation in Business Networks – A Dynamic-capability Perspective. 2003. ISBN 951-791-743-0.

W:339. KRISTIAN MÖLLER – SENJA SVAHN: Role of Knowledge in the Value Creation in Business Nets. 2003. ISBN 951-791-744-9.

W:340. ELI MOEN – KARI LILJA: European Works Councils in M-Real and Norske Skog: The Impact of National Traditions in Industrial Relations. 2003. ISBN 951-791-750-3.

W:341. KJELD MÖLLER: Salatulla ”arvopaperistamisella” tuhottiin yrittäjyyttä. 2003. ISBN 951 791-752-X

W:342. ATSO ANDERSEN: Competition Between European Stock Exchanges. 2003. ISBN 951-791-753-8.

W:343. MARKO MERISAVO: The Effects of Digital Marketing on Customer Relationships. 2003. ISBN 951-791-757-0.

W:344. KLAUS KULTTI – JUHA VIRRANKOSKI: Price Distribution in a Random Matching Model. 2003. ISBN 951-791-759-7.

Y-SARJA: HELSINKI SCHOOL OF ECONOMICS.
CENTRE FOR INTERNATIONAL BUSINESS RESEARCH. CIBR RESEARCH PAPERS.
ISBN 1237-394X.

Y:6. MIKA GABRIELSSON – V. H. MANEK KIRPALANI – REIJO LUOSTARINEN: Multiple Channel Strategies in the European PC Industry. 2001. ISBN 951-791-628-0.

Y:7. ZUHAIR AL-OBAIDI – MIKA GABRIELSSON: Multiple Sales Channel Strategies in Export Marketing of High Tech SMEs. 2002. ISBN 951-791-703-1.

Z-SARJA: HELSINKI SCHOOL OF ECONOMICS.
CENTRE FOR INTERNATIONAL BUSINESS RESEARCH. CIBR WORKING PAPERS. ISSN 1235-3931.

Z:9. V.H. MANEK KIRPALANI – MIKA GABRIELSSON: Worldwide Evolution of Channels Policy. 2002. ISBN 951-791-704-X.

Kaikkia Helsingin kauppakorkeakoulun julkaisusarjassa ilmestyneitä julkaisuja voi tilata osoitteella:

KY-Palvelu Oy
Kirjakauppa
Runeberginkatu 14-16
00100 Helsinki
Puh. (09) 4313 8310, fax (09) 495 617
Sähköposti: kirjak@kyyppari.hkkk.fi

Helsingin kauppakorkeakoulu
Julkaisutoimittaja
PL 1210
00101 Helsinki
Puh. (09) 4313 8579, fax (09) 4313 8305
Sähköposti: julkaisu@hkkk.fi

All the publications can be ordered from

Helsinki School of Economics
Publications officer
P.O.Box 1210
FIN-00101 Helsinki
Phone +358-9-4313 8579, fax +358-9-4313 8305
E-mail: julkaisu@hkkk.fi