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OVERTIME
IN FINLAND

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ABSTRACT

This study is about the incidence of overtime hours in Finland. The investigation uses unique individual-level data from the manufacturing industries from 1989 to 1995. The results reveal that the hours of overtime divided by the number of total hours decline in age of an employee. The overtime hours also 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. In addition, the overtime hours are more frequent in the population of small establishments in the Finnish manufacturing industries. There are also strong industry effects. (JEL:J21).

TIIVISTELMÄ

Tutkimuksessa tarkastellaan ylitöiden määräytymistä teollisuustyöntekijöitä kuvaavalla yksilöaineistolla vuosina 1989–1995. Tulosten mukaan ylitöiden osuus kokonaistyöajasta alenee työntekijän iän noustessa. Ylityöt myös vähenevät säännöllisen työajan tuntipalkan ja säännöllisen työajan noustessa. Miehet ja tulokkaat tekevät enemmän ylitöitä, mutta lähtijät vähemmän. Lisäksi ylityöt ovat yleisempiä pienissä ja miesvaltaisissa toimipaikoissa. Toimialojen välillä on myös suuria eroja ylitöiden osuudessa.

1.   INTRODUCTION

Europe's high unemployment trap has inspired a number of ambitious plans to solve the dilemma. One of them is known as "work-sharing". The underlying idea of work-sharing is to redistribute the available work to more people and thereby give a stake to unemployed persons. The conduct of work-sharing is closely related to the evolution and the incidence of overtime, because a rise in the paid or unpaid overtime hours can even reverse the supposed positive employment effects of work-sharing[1].

However, the underlying empirical incidence of overtime hours has not been focused upon by labour market research in Europe[2]. This may reflect, at least partly, the well-known fact that among professional economists work-sharing is not a popular measure to cure European unemployment (see, for example, Layard, Nickell and Jackman, 1991). 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. Thus, this empirical investigation fills a gap in the existing Finnish literature on working time issues.

This study appears in six parts. The first part of the study provides selected theoretical considerations on the issue of overtime hours and clarifies the key conceptual questions. In addition, the most important elements of overtime regulation in by the Finnish institutions are discussed. The second part 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, detailed elaboration is focused on the available Finnish studies on the hours of work in the manufacturing industries. The third part provides a description of the applied individual-level data. The forth part includes a characterization of paid overtime hours in a nutshell by applying kernel-density estimations and the simple scatterplots of the individual-level data. The fifth part provides an analysis of the incidence of overtime hours by applying regression techniques. In particular, the study includes a consideration of establishment characteristics to the incidence of overtime hours at the individual level, which has been largely a neglected issue in the earlier literature on overtime hours. The last part concludes with some reflections.

2.   BACKGROUND

The appearance of overtime hours can be explained as follows (see, e.g. 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 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 by different ways. There are at least two major

types of overtime (see, for example, Bauer and Zimmermann 1999, 2–3). The so-called transitory overtime hours are compensated with free time for involved employees. In this case, overtime hours are often used in order to increase the flexibility of firm's operations. On the other hand, there are definite overtime hours which are not compensated with free time. These definite overtime hours can further be divided into paid and unpaid overtime.

Thus, it is important to stress that the applied data in the following parts of the study contains only paid overtime hours. This is due to the fact there is no information at all on the number of unpaid overtime hours in the manufacturing industries. In fact, the literature on overtime hours is focused mainly on these paid definite overtime hours (see Bauer and Zimmermann 1999, 2–3). However, the focus on the incidence of overtime hours of manual workers means that the exclusion of unpaid overtime hours is not a severe problem from the point of view of this study. This is due to the fact that, among manual workers, there are hardly any incentives to perform unpaid overtime hours. Bell, Hart, Hubler and Schwerdt (2000, 3–6) provide various reasons to perform unpaid overtime hours. The reasons (for example, 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 the unpaid overtime hours during the great depression of the early 1990s.

One of the most important features of overtime hours is that firms usually pay a substantial overtime premium. In fact, Hart and Ma (2000) provide a recent theoretical investigation into the presence of 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 set to achieve both optimal separation and optimal worker utilisation. Thus, the presence of overtime premium provides an additional instrument that can solve the problem.

The issue of overtime hours is tightly linked to the discussion of work-sharing. In fact, the underlying productivity of performed overtime hours is an important element that affects to the demand for overtime hours by firms and to the effects of work-sharing. Ilmakunnas (1994) provides detailed 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.

The institutional setup of the Finnish labour markets is highly 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 Finland. Thus, Finland provides an example, par excellence, of a corporatist political and economic system (Vartiainen 1998, 9–11). Thus, the regulation of working time in Finland is based on Working Hours Act that is prepared on a tripartite basis. This means that representatives of employers, employees and government are involved to the reforms of Working Hours Act. The Working Hours Act is a general law, supplemented in many sectors by more specific acts[3]. Under the Act, there are upper limits of 8 regular working hours per day and 40 per week. According the Working Hours Act overtime comprises the time in excess of regular hours, on either the daily or weekly basis. Employees must also pay extra for overtime in Finland. The 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.   THE EARLIER STUDIES

There are some empirical investigations into the issues of overtime hours in the context of European labour markets. 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 investigate the incidence of overtime hours. Bell, Hart, Hubler and Schwerdt (2000) observe that the quantitative significance of both paid and unpaid overtime is greater in the UK with respect to Germany[4]. They present overtime hours equations by applying 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* theoretical reasoning, it would be expected that larger firms would more typically formalise their work arrangements. This is done in an effort to redu-

ce various transaction costs associated with operations. Thus, larger firms should use more paid overtime hours, but less unpaid overtime hours due to more formal work arragements. 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.

In addition, Bell and Hart (1999) provide a detailed 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. Straight-time weekly hours are negatively related to the incidence of overtime hours. The number of overtime hours also 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 to the private sector workers, which is in line with common sense, because various production fluctuations are more frequent in the private sector of the economy[5]. In addition, the results indicate that collective bargaining agreements succeed in reducing straight-time while rising overtime hours with respect to uncovered workers[6]. This feature enchances the covered/uncovered wage differential in the UK[7].

Working time issues have also 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 also play an important role in the incidence of overtime hours. Thus, skilled blue-collar workers have a higher probability to work overtime than unskilled blue-collar workers[8]. In addition, Bauer and Zimmermann (1999) note that the share of overtime has declined sharply in Germany during the past few decades[9].

A well-known empirical regularity says that overtime hours rapidly adjust to the scale of the economic activity[10]. Hart (2000) provides an elaboration of overtime hours during the great depression of the 1930s. The results indicate that the British engineering industry adjusted to the severe falls in demand during the 1930s by cutting the hours of work. The

period of the following investigation includes the great depression of the 1990s in Finland. In fact, during the slump there was indeed a sharp decline in overtime hours also in Finland. In addition, Kalwij and Gregory (2000) investigate the issue of overtime hours in Great Britain over the period from 1975 to 1999. The main result of the study is that the decline in unionisation has not altered the use of overtime in Great Britain. As in a number of other countries the incidence of overtime shows a distinct procyclical movement during the period of investigation. The easiest way to include this feature of overtime hours is simply to introduce year dummies to the estimated overtime equations[11].

The earlier studies on the issue of overtime hours are mainly limited to the one single so-called stylized feature of the overtime hours in Finland. 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[12]. 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[13] (Fig. 1). 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.

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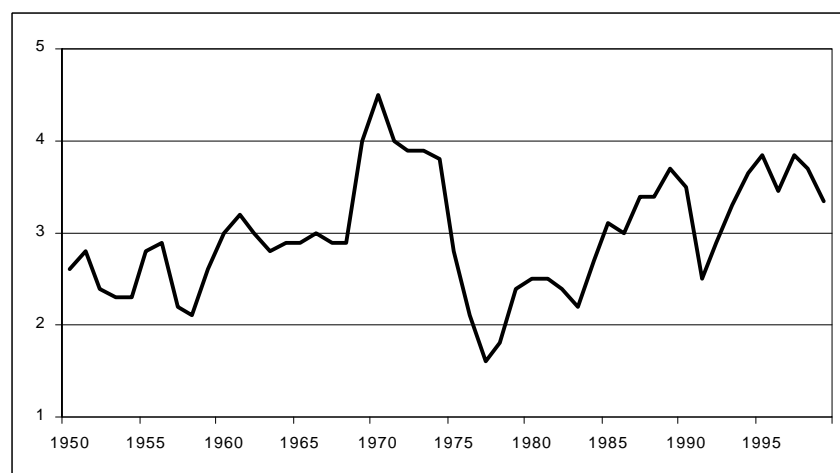
Source: The Confederation of Finnish Industry and Employers.

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[14]. 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 depression of the 1990s in Finland[15]. 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.

4.   THE DATA

The empirical investigation is based on the yearly observations from 1989 to 1995. The data covers the manufacturing industries in the Finnish economy. This narrow focus of the study, which is dictated by the availability of the data, on the manufacturing industries is, of course, 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 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 to 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), which can be considered to be substitutes for the implementation of overtime hours[16]. In addition, a casual evidence seems to indicate that unpaid overtime is more common within non-manufacturing industries.

The applied individual-level data is from the records of the Confederation of Finnish Industry and Employers[17] (*Teollisuus ja Työnantajat,* TT). 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[18]. 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 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 covers manual workers of the Finnish manufacturing industries and it 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[19]. 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. In addition, Appendix 1 of this study 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 of 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 question due to the overtime regulations in the Finnish manufacturing industries. Most of the selected varia-

bles are (almost) self-evident. The variable WAGE does not include any earnings from overtime hours, because otherwise it would be 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[20]. The case can be made that it is highly possible that the newcomers want to signal their high level of ability to their employers by extending the hours of overtime. Game theory suggests that overtime is a credible signal, because it is costly to the employee in terms of lost leisure[21]. In fact, Altonji and Paxson (1988) 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. In addition, the applied variable EXPERIENCE is a crude measure of how attached an employee is to the population manufacturing establishments in Finland[22].

TABLE 1.   The description 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 professionalilty of an individual in the manufacturing industries.
METROPOLITAN	The collective agreement stipulates slighly 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
WOMEN	Share of women in the establishment
Dummy variables	
INDUSTRIES[23]	5–1, attached to employees based on the union code of an employee
YEARS	7–1, from 1989 to 1995
OCCUPATIONS[24]	428–1, based on the classification of occupations by Statistics Finland
REGIONS	281–1, based on the counties in Finland

The applied data does not contain 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. Thus, the study includes a large number of dummy variables. These variables are attached to the industries, occupations[25], regions (i.e. counties) and years (because of the fluctuations of overtime hours due to business cycles during the 1990s).

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 applying kernels and simple scatterplots of the data. The main stylized features can be summarized as follows[26]. 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 (Fig. 2). This stylized feature means that the hours of overtime are also at the individual level an extremely flexible part of total working time. In fact, according to the data, overtime compensation covers from 1989 to 1995 in average about 1.8 % of total salary of manual workers in the Finnish manufacturing industries[27]. Thus, it seems reasonable to relate the incidence of overtime hours to various measurable characteristics held by individuals and establishments in the Finnish manufacturing industries. In addition, this feature of overtime hours means that the various reforms of taxation that affect the supply of hours of work should have a large impact on overtime hours[28].

In addition, the scatterplots 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[29] (Fig. 3). In fact, there seems to exist an inverted U-shape relation, which is in line with the earlier studies on the incidence of overtime hours in the European labour markets. Steward and Swaffield (1997) provide an explanation for this 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. Thus, the inverted U-profile of overtime hours can be rationalized as a result of deviations between desired and actual hours, i.e. employees are forced to work more hours than they want because of institutional forces, job insecurity etc. In addition, Steward and Swaffield (1997) 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, 27–98) provides detailed empirical evidence for the view that there exists a great number of disparities in desired and actual hours of work also in the Finnish economy. Graversen and Smith (1998) document this inverted U-profile in terms of age for Danish men, but are unable to find it for Danish women.

The variable OVERTIME seems to be positively related to the variable WAGE (Fig. 4). In fact, the figure suggests that the overtime hours tend to rise at the individual-level as the wage per straight-time hours rises, which would be consistent with the notion of the substitution effect. The income effect of a straight-time wage would be consistent with a decline in overtime hours as straight-time wage increases. In addition, the variable OVERTIME seems to be negatively related to the SIZE of the establishment (Fig. 5). Thus, there some 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[30].

The distribution of straigth-time hours reveals additional features. Thus, Fig. 6 depicts the kernel density estimate of straight-time hours from 1989 to 1995[31]. In fact, the applied variable TIME does not match with the definition of so-called standard hours stipulated by the collective agreements in the Finnish manufacturing industries. This is due to the fact that the applied data covers also manual workers that have worked only a part of the last quarter from 1989 to 1995. In addition, the data contains, for example, workers that have had sickness leaves during the period of the sample.

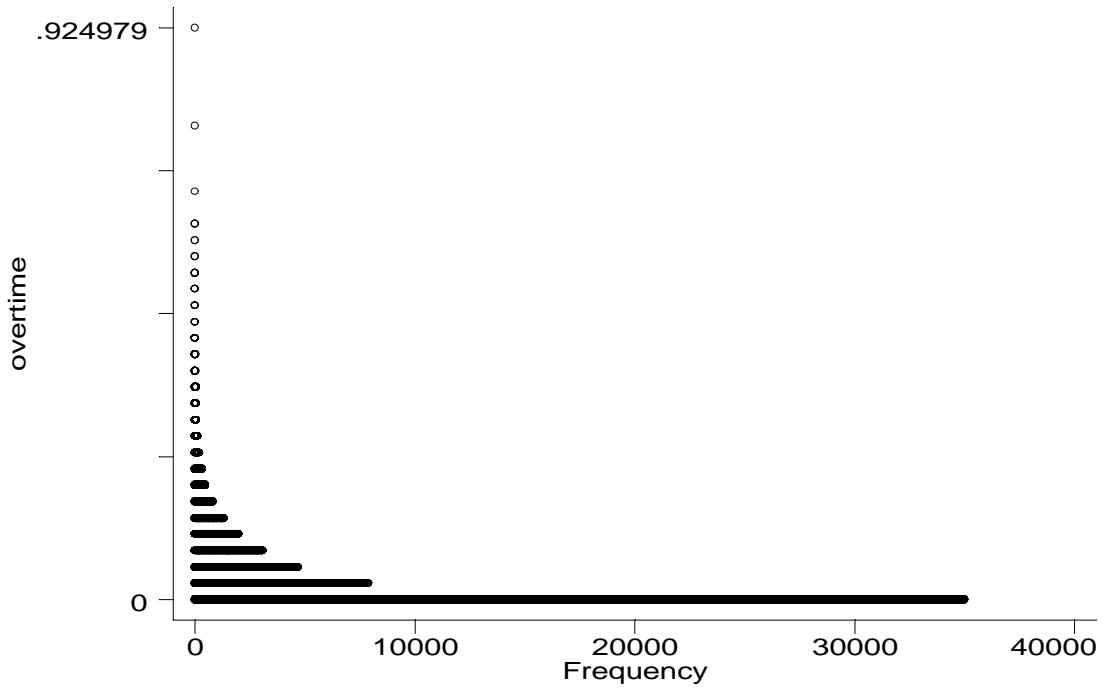**FIG. 2.   The distribution of OVERTIME from 1989 to 1995**

FIG. 3.   A scatterplot of OVERTIME and AGE from 1989 to 1995
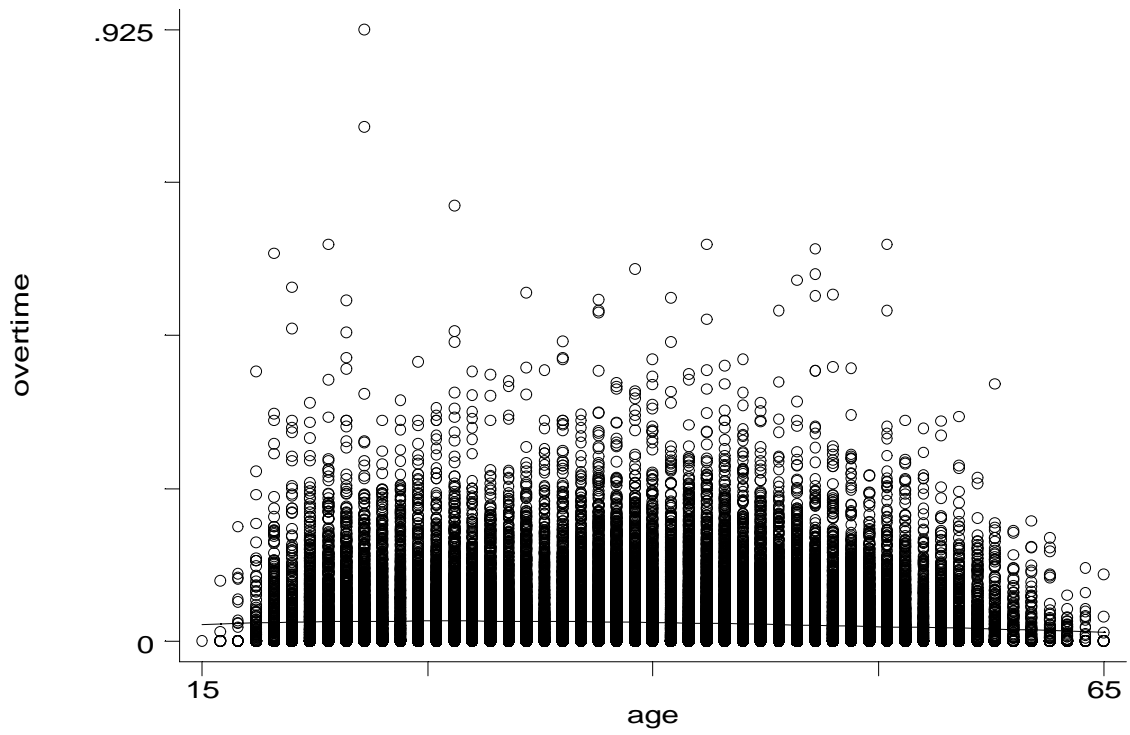
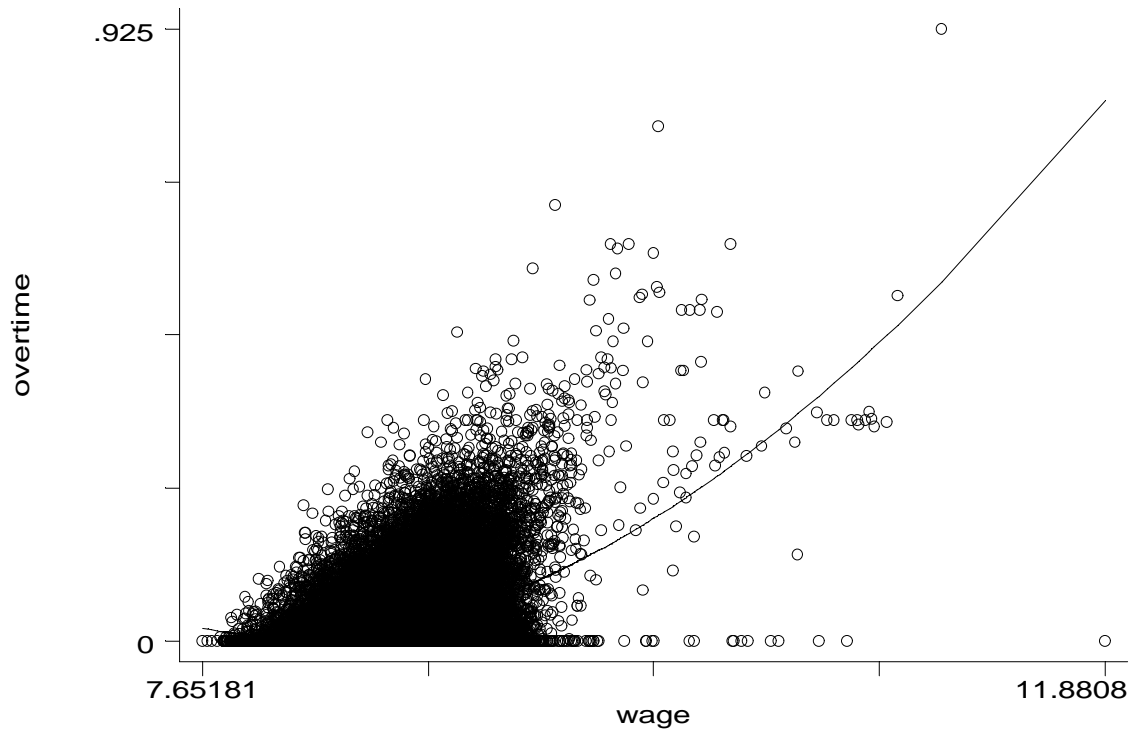**FIG. 4.   A scatterplot of OVERTIME and WAGE from 1989 to 1995**

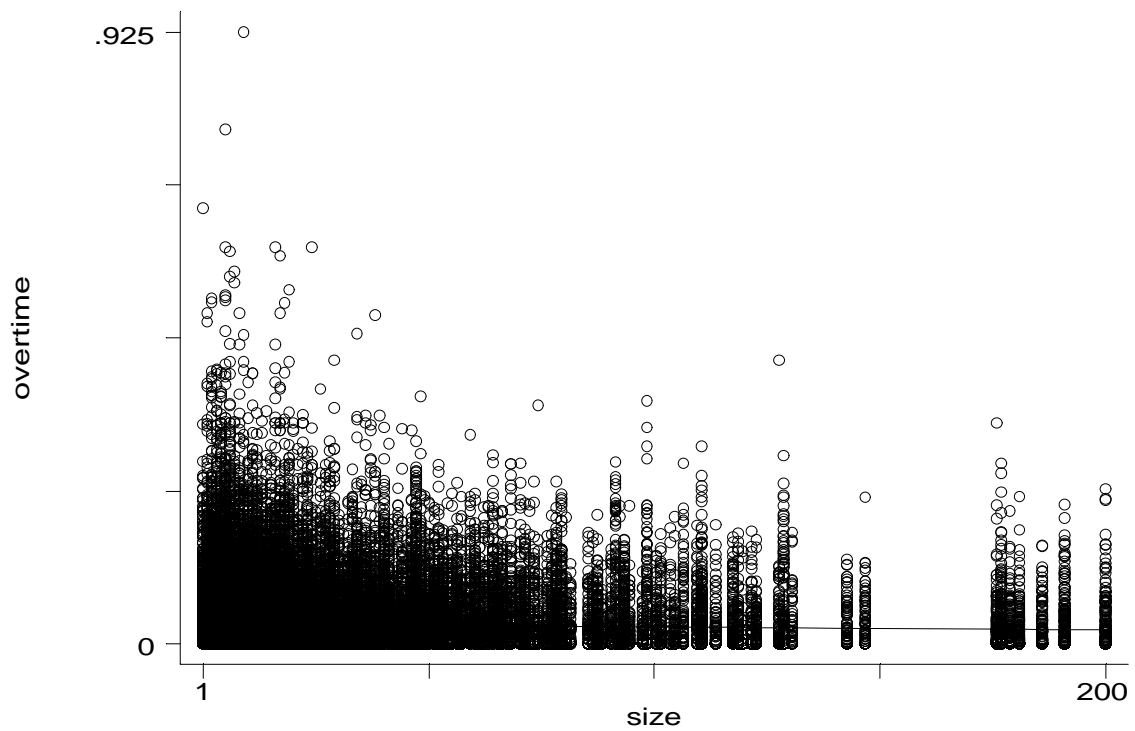
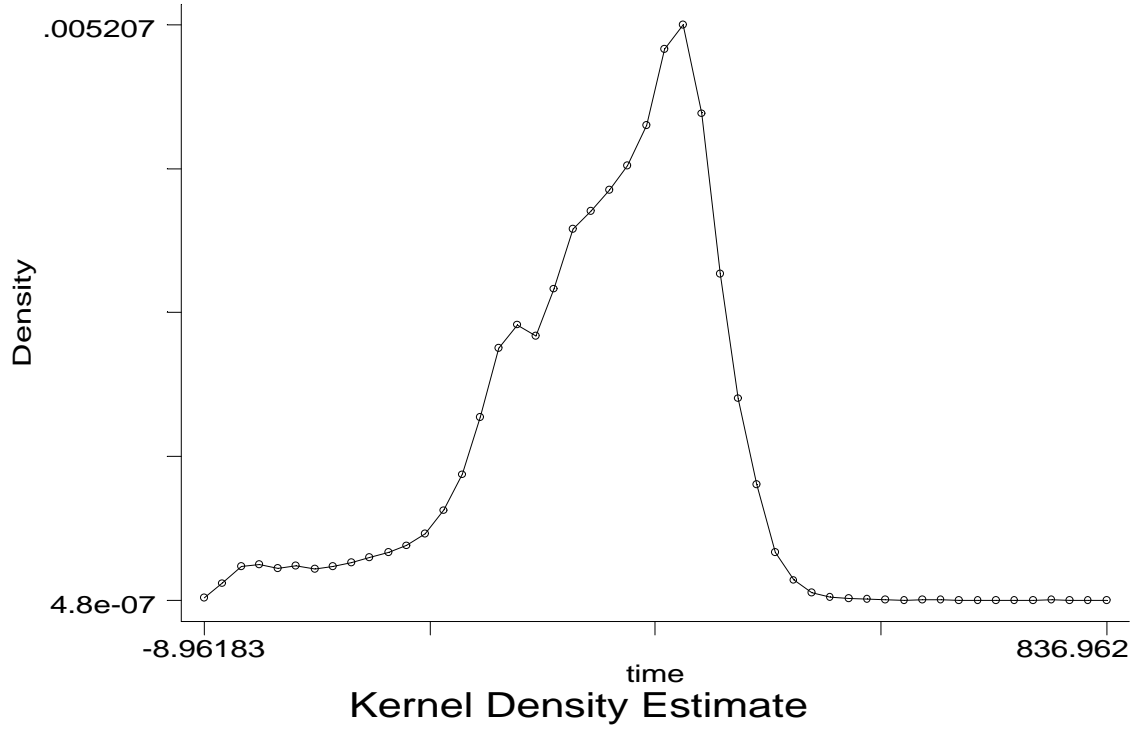**FIG. 5.   A scatterplot of OVERTIME and SIZE from 1989 to 1995**

FIG. 6. Kernel density estimate for TIME from 1989 to 1995

Kernel Density Estimate

6.   THE RESULTS

Owing to the fact that the share of overtime is by definition a censored variable bounded by [0, 1], it is convenient to estimate a Tobit specification following the recent empirical studies by Bauer and Zimmermann (1999), Bell and Hart (1999) as follows[32]:

(1) $\text{OVERTIME}_i = \beta' \mathbf{X}_i + \varepsilon_i$ if $\beta' \mathbf{X}_i + \varepsilon_i > 0$

          0 if $\beta' X_i + \varepsilon_i \leq 0,$

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.

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TABLE 2. The results from Tobit regressions (dependent variable: OVERTIME)

	Model 1		Model 2	
	Coefficients	t-statistics	Coefficients	t-statistics
AGE	.0011793	2.333	.0012056	2.409
AGE^2	−.0208697	−3.347	−.0202752	−3.283
WAGE	.6935911	6.960	.3855061	3.893
$WAGE^2$	−2.882085	−4.896	−.9860306	−1.684
TIME	.0002701	11.651	.0002718	11.786
$TIME^2$	−.0038625	−5.124	−.0038829	−5.193
GENDER	−.0070666	−6.975	−.0062141	−6.072
NEWCOMER	.0170021	12.735	.016204	12.340
LEAVER	−.0036845	−3.005	−.0035256	−2.913
EXPERIENCE	−.0011369	−10.910	−.001217	−11.413
METROPOLITAN	.0000136	0.017	−.0033075	−0.692
SIZE	−.0002506	−23.858	−.0002623	−15.388
WOMEN	−.0001352	−2.205	−.0001119	−1.746
Constant	2.608299	3.012	−.31172	−0.362
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 estimation results are summarized in Table 2. The results indicate that that the hours of overtime divided by the number of total hours decline in age of an employee[33]. In addition, the overtime hours tend to decline at the individual-level as the wage per straight-time hours rises. The estimation results indicate that a rise in the straigth-time hours gives a mild decline in the overtime hours. This negative effect from straight-hours to overtime hours is an indication of the income effect. The observation that a decline in straight-hours would lead (other things being equal) to an increase in overtime hours is not fa-

vourable to the conduct of work-sharing in the Finnish manufacturing industries. Howe-ver, the conclusion regarding the work-sharing is not definite due to the fact that the va-riation in the variable TIME comes, in addition to legislated working time reductions, from part-time work, absence due to the sickness leaves, holidays etc., and from the inclu-sion of the employees that are newcomer or leavers[34]. An important point is also related to the implementation of work-sharing. Ilmakunnas (1994, 550) stresses the view that when working time changes are imposed in the form of more holidays rather than in the form of a shorter daily working time, there should be expected less increase in overtime hours and more scope for positive employment effects. These results are in line with the observations by Bell and Hart (1999) that both wage per straigth-time hours and straight-time weekly hours are negatively related to the incidence of overtime hours in the UK. In contrast, Graversen and Smith (1998) observe the positive association for the Danish workers bet-ween overtime hours and wage per straight-time hours.

Males work more overtime. The reason can be a division of labour within families. Thus, families like to extend the hours of work by males, because males typically have higher wages. Females often have also looser connections to the labour market in Finland too, at least during childbearing years, when they, to a larger extent than males, work part-time or are out of the labour force (for example, due to the maternity leaves[35]). Newcomers tend to work more overtime, but leavers work less overtime[36]. Thus, a decline in overtime hours could serve as a signal that the employee is about to separate from the current match. Thus, the large underlying magnitude of gross worker flows in the economies can perhaps partly be explained by the fact that there are hours restrictions[37]. The estimation results also indicate that more experienced employees tend to work fewer overtime hours in the Finnish manufacturing. An explanation for this feature of the incidence of overtime hours could be that the senior workers tend to work more unpaid overtime, because they occupy higher positions within the establishments. In addition, the variable METROPOLITAN is not a statistically significant factor for explaining the incidence of overtime hours.

The establishment characteristics included are also important for the underlying incidence of overtime hours in Finland. Thus, overtime hours are more frequent in the population of small establishments in the Finnish manufacturing industries[38]. This particular observation is consistent with one of the well-known stylized features in the industrial organisation

literature (see, for example, Caves, 1998), 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 a firm. The relationship of overtime hours and the size of an establishment was also investigated separately for the year 1991, which constituted the bottom of the great Finnish depression of the early 1990s. The results reveal that the observation that overtime hours decline in the size of an establishment did hold also during the great depression, but the effect of establishments' size on the overtime hours was slightly milder than during the period from 1989 to 1995[39]. Thus, the stylized feature that overtime hours are more common among small establishments does not break during the times of extreme economic slowdown. The establishments that have less than twenty employees were dropped off the data[40], but the result according to which overtime hours are more common among small establishments remained. Thus, the result is not driven by very small plants either. The overtime equation was also estimated separately for the five industries of this study. The estimations reveal that overtime hours are more common among small establishments within metal industries, manufacture of wood and wood and cork products, and manufacture of paper and paper products, but there no relationship between overtime hours and the size of an establishment at all within textile industries. In addition, within apparel industries the hours of overtime are actually more common among bigger establishments. The results also indicate that 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 also statistically significant ones. Thus, there are strong industry effects[41]. In particular, the incidence of overtime hours is 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 the robustness of the above results the overtime equation was estimated from 1980 to 1995 without establishments' characteristics[42]. 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. In addition, the over-

time equation was estimated by including dummies in regions (i.e. counties) of the Finnish economy. These estimation results (reported in Table 2) are the same as the above except the notion that the variables WOMEN and WAGE^2 are not statistically significant in this specification of the overtime equation. Thus, inclusion of dummies in regions 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 investigation used unique individual-level data based on the Finnish manufacturing industries from 1989 to 1995. The results reveal that the hours of overtime divided by the number of total hours decline in age of an employee. The overtime hours also decline in wage per straight-time hours and in straight-time hours. These results are broadly in line with the ones obtained from the empirical studies that use UK data in overtime hours at the individual level. Males and newcomers tend to work more overtime, but leavers work less overtime. In addition, the overtime hours are more frequent in the population small establishments in the Finnish manufacturing industries. The share of women in the establishment has a negative effect on the incidence of overtime hours in the Finnish manufacturing industries. There are also strong industry effects.

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APPENDIX 1. Selected descriptive statistics (from 1989 to 1995)

	MEAN	STD	MIN	MAX
OVERTIME	.028	.051	0	1
AGE	39.5	10.1	15	65
WAGE	8.56	.266	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

[1] Hamermesh (1993) provides a summary of the empirical studies.

[2] Contensou and Vranceanu (2000) provide a detailed discussion of working time issues.

[3] Santamäki-Vuori and Parviainen (1996, 67–69) provide these stylized facts of the regulation of working time in Finland.

[4] Overtime hours are indeed common across industrialized countries. Harvey, Fisher, Gershuny and Akbari (2000) observe that half of the men in the Netherlands and Norway do some work outside regular business hours, and two-thirds of men in Canada and Sweden worked at least partly outside these hours. Green and McIntosh (2001) provide empirical evidence on the intensification of labour effort in Europe.

[5] In fact, this point is tautology in the case of Finland, because the output of the public sector defined as a sum hours. The other reasons for the low share of overtime hours within public sector may include tight labour contracts and tight budget ceilings, which do not enable paid overtime hours. However, it must be stressed that 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. In addition, fluctuations may increase the utilization of overtime hours without increasing the total working time in the case that overtime hours are compensated with time off instead increased earnings. The latter case corresponds to the so-called transitory overtime hours that are used to increase the flexibility of firm's operations.

[6] The consideration of collective agreements on the incidence of overtime hours in the Finnish manufacturing industries is not possible due to the fact that the binding collective agreements cover the whole of the manufacturing industries in Finland.

[7] Green (2001) reports that the dispersion of working hours has increased in the UK. Thus, working hours have been concentrated into fewer households.

[8] In the investigation of overtime hours within Finnish manufacturing industries it is not possible to include education as a potential factor that explain the incidence of overtime hours. This is simply due to the fact that the data does not contain an education code at all. However, almost all workers in manufacturing industries in Finland belong to the group in the often applied four-category classification that has had only basic education or possesed some vocational certificates. Thus, it can be argued that education is perhaps not so important in the incidence of overtime hours within the Finnish manufacturing industries.

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

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

[11] Thus, 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.

[12] A study by Böckerman and Kiander (2001) suggests that a reduction in average hours seems to deliver an increase in employment on condition that output does not deteriorate as a result of shorter working time in the Finnish economy. However, the maintenance of output level in the case of shorter average working hours is a challenging exercise. In addition, the conduct of work-sharing as a policy scheme is limited by the celebrated Lucas critique.

[13] 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 2.8 % for the same period (Appendix 1). 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.

[14] An article by Asplund (1995) does not include the tabulation of the estimation results concerning the incidence of overtime hours at the individual level, but the results are said to to be based on various specifications of Tobit and Probit regressions.

[15] Kiander and Vartia (1996) provide a summary of the great slump of the 1990s.

[16] Kauhanen (2000, 14-16) documents this sectoral pattern of temporary employment contracts for the Finnish economy during the 1990s.

[17] Approximately 5 600 companies are members of the Confederation. These companies employ nearly 470 000 persons. In addition, the member companies account for more than 75% of the nation's industrial value added and export income.

[18] Kettunen and Marjanen (1992), Kettunen and Vartiainen (1993), Vartiainen (1993) and Asplund (1994) contain a detailed description of the various aspects of the applied data.

[19] This implies that 94 239 observations are deleted by imposing this restriction.

[20] 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 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 the experimentation. In particular, firms in growing industries should prefer young, high variance workers and be characterized by high worker turnover rates.

[21] In addition, Altonji and Paxson (1988) observe, using the Panel Study of Income Dynamics, that hours changes are indeed more variable across jobs than within jobs. Altonji and Paxson (1992) provide additional empirical evidence on this issue. In particular, Altonji and Paxson (1992) find that in a sample of married women changes in many of the labor supply preference variables produce much larger effects on hours when the job changes.

[22] Vartiainen (1999; 2000) applies the same variable. 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.

[23] 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.

[24] Statistics Finland (1987) provides a detailed description of the classification of occupations.

[25] The occupation dummies are not included in the following estimations due to their poor performance in the overtime equations.

[26] These figures and Appendix 1 contain the outliers that were deleted before estimation of Tobit regressions.

[27] The most interesting stylized patterns from a regression specification that aims to explain overtime compensation divided by overtime hours (OVERCOMP) at the individual-level from 1989 to 1995 with the same explanatory variable as in Table 1 are that the fact that OVERCOMP is higher for the more experienced workers and the notion that OVERCOMP is higher in the smaller establishments in the Finnish manufacturing industries. Bauer and Zimmermann (1999) investigate the

determination of overtime compensation in Germany.

[28] In fact, Hamermesh (1994) argues that the flexibility of overtime hampers efforts to transfer labour market reforms from another countries.

[29] The scatterplots include regression lines.

[30] However, it must be stressed that this impression is biased by the fact that the turnover in terms of entry and exit is much higher among small establishments. Of course, 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 aritmetics, because it is not possible to small establishments to make proportionately small changes in the number of their personnel. However, it must be noted that distinction of paid and unpaid overtime hours complicates this notion.

[31] 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.

[32] Estimations were performed by STATA 6.0.

[33] 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.

[34] Hunt (1997) is able to exploit the cross-industry variation in standard hours in order to study the effects of work-sharing in Germany.

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

[36] About 72% of employees are males in the Finnish manufacturing industries.

[37] Davis and Haltiwanger (1999) provide a detailed survey to the literature on gross job and worker flows.

[38] This 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.

[39] This pattern is consistent with an 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 from 1991 to 1994.

[40] This restriction eliminates 29 722 observations.

[41] Asplund (1995) provides an extensive discussion on this issue.

[42] The period from 1980 to 1995 includes 150 161 observations.