ETLA ELINKEINOELÄMÄN TUTKIMUSLAITOS
THE RESEARCH INSTITUTE OF THE FINNISH ECONOMY
Lönnrotinkatu 4 B 00120 Helsinki Finland Tel. 609 900 Telefax 601 753

Keskusteluaiheita - Discussion papers

No. 525

Rita Asplund

WAGE DIFFERENTIALS, WAGE MOBILITY AND SKILLS IN FINNISH INDUSTRY

An empirical analysis of the period 1980-1992

ISSN 0781-6847

28.11.1994

Asplund, Rita, **WAGE DIFFERENTIALS, WAGE MOBILITY AND SKILLS IN FINNISH INDUSTRY**. Helsinki: ETLA, Elinkeinoelämän Tutkimuslaitos, The Research Institute of the Finnish Economy, 1994, 67 p. (Keskusteluaiheita, Discussion Papers, ISSN 0781-6847; no. 525).

ABSTRACT: The study analysis three closely related topics: trends in wage dispersion, in wage mobility and in rates of return on human capital in Finnish industry over the years 1980 to 1992. The analysis is done separately for non-manual and manual industrial workers and occasionally also for various key subgroups. Trends in industry wages are highlighted from several points of view: trends in nominal and real wages, in relative wages between the various worker categories under study, and in the dispersion of wages within these same worker categories. Wage mobility is analysed over three 4-year-periods which represent different phases of the business cycle. Trends in the return on human capital, finally, are analysed by estimating extended earnings equations.

The results indicate that despite the radical changes in the Finnish economy during the early 1990s, the wage structure in Finnish industry seems to have undergone only minor changes. The mobility within the wage distribution of non-manual and manual industrial workers has not changed much over the past 13 years, either. A noteworthy finding though is a clear weakening of the relative earnings position of less educated, older and more experienced workers. Moreover, this tendency has strengtened markedly over the investigated time period. This trend turns up also in the estimations of wage eaquations in the form of declining returns to all traditional measures of individual human capital endowments (formal education, age, work experience and seniority).

KEY WORDS: human capital, industry, wage dispersion, wage mobility

Asplund, Rita, **PALKKAEROT, PALKKALIIKKUVUUS JA OSAAMINEN SUOMEN TEOLLISUUDESSA.** Helsinki: ETLA, Elinkeinoelämän Tutkimuslaitos, The Research Institute of the Finnish Economy, 1994, 67 s. (Keskusteluaiheita, Discussion Papers, ISSN 0781-6847; no. 525).

TIIVISTELMÄ: Tutkimuksessa tarkastellaan kolme kiinteästi toisiinsa liittyvää ilmiötä: palkkaeroissa, palkkaliikkuvuudessa sekä inhimillisen pääoman tuottoasteessa tapahtuneita muutoksia Suomen teollisuudessa vuosina 1980-92. Tarkastelun kohteena ovat ensisijaisesti teollisuuden kaikki toimihenkilöt ja työntekijät, mutta osittain myös toimihenkilöiden ja työntekijöiden keskeiset alaryhmät. Teollisuuden palkkojen kehitystä tutkitaan useasta näkökulmasta: nimellisten palkkojen ja reaalipalkkojen kehitystä, eri palkansaajaryhmien välisten palkkaerojen kehitystä sekä eri palkansaajaryhmien sisällä esiintyvien palkkaerojen kehitystä. Palkansaajien liikkumista palkkajakaumassa tarkastellaan kolmen ajanjakson osalta. Valitut aikaperiodit edustavat varsin hyvin suhdannesyklin eri vaiheita. Koulussa ja työelämässä hankittujen tietojen ja taitojen tuottoasteissa tapahtuneita muutoksia tutkitaan muodostamalla laajoja inhimillisen pääoman teoriaan perustuvia palkkamalleja.

Tulokset osoittavat, että Suomen teollisuuden palkkarakenne on säilynyt lähes ennallaan vuosina 1980-92. Tätä voidaan pitää sikäli yllättävänä tuloksena, että taloudellinen kasvu ja työllisyystilanne muuttuivat Suomessa olennaisesti tarkasteluperiodin loppuvuosina. Teollisuuden palkansaajien liikkuminen palkkajakaumassa on niin ikään muuttunut vain vähän tarkasteltuna periodina. Varteenotettava tulos kuitenkin on, että vähän koulutettujen, vanhempien, enemmän kokeneiden teollisuuspalkansaajien suhteellinen asema palkkajakaumassa on selvästi heikentynyt tarkasteluperiodin aikana. Tämä heijastuu myös palkkamallien antamissa tuloksissa, jotka osoittavat, että muodollisen koulutuksen, iän, työkokemuksen sekä työsuhteen keston tuottoaste palkassa mitattuna on pienentynyt huomattavasti 1980-luvulla.

AVAINSANAT: inhimillinen pääoma, palkkaerot, palkkaliikkuvuus, teollisuus

CONTENTS

SUMMARY[1]

The development of earnings dispersion in general and earnings differentials in particular during the past few decades has in recent years given rise to a lively debate and a growing body of international research reports on trends in earnings inequality. There is, however, so far very little information on trends in earnings dispersion in the Finnish labour market. In fact, individual data representing the whole labour market are available from two sources only - Population Censuses and Labour Force Surveys - both of which merely cover selected years.

In view of this, the earnings data collected by the Confederation of Finnish Industry and Employers (TT) open a multitude of possibilities to investigate trends in earnings levels and earnings differentials as well as wage mobility in the Finnish labour market. There is, though, one notable qualification related to this database: the data set is only representative of private-sector manufacturing since it merely covers employees working in TT member companies.

The trend in the wage structure of Finnish industry over the years 1980-92 is analysed separately for non-manual and manual workers, with a further division of these two employee categories into key subgroups. The length of the investigated time period can be regarded as quite satisfactory when it comes to displaying trends in earnings dispersion. Moreover, the Finnish economy has undergone marked changes over these years, with remarkable drops in aggregate output and dramatic increases in unemployment rates toward the end of the investigated time period. This definitely increases the importance of the time period under study.

The results presented in this study indicate that despite the radical changes in the Finnish economy during the past few years, the earnings structure in Finnish industry seems to have undergone only minor changes. This holds for all non-manual and manual industrial workers as well as for the various worker subgroups investigated.

The question arises whether these extremely small changes in the wage dispersion of both non-manual and manual industrial workers point to a strong tendency of workers especially in the bottom deciles to be locked for several years at the lower tail of the wage distribution. Or do they possibly easily move up into higher deciles while simultaneously being replaced by new low-pay entrants on the labour market? In other words, has the wage dispersion of industrial workers remained roughly unchanged due to a high degree of stability or despite a

---

[1] Preliminary versions of the present study have been presented in a seminar at The Institute for Labour Market and Social Research in Aarhus 21.4.1994, at the summer school "Recent Developments in Labour Microeconomics: Theoretical and Econometric Approaches" in Paris 19-22.9.1994 and at the EALE conference in Warsaw 22-25.9.1994. I would like to thank the seminar participants for valuable comments.

great amount of mobility within the wage distribution? This is an important aspect not least in discussions of the need for and relevance of minimum wages.

The results obtained from analysing and comparing stability and mobility patterns over three 4-year-periods (1980-84, 1984-88, 1988-92) suggest that the amount of mobility is much greater among manual than among non-manual workers. This also holds for mobility at the extremes. These findings are, however, not surprising in view of the much more compressed wage distribution observed among manual workers. The results further indicate that non-manual and manual workers also differ with respect to the development of stability over time; the degree of stability seems to have decreased slightly among non-manual workers and increased among manual workers.

On the whole, there seems to be quite much movement within the wage distribution of both non-manual and manual industrial workers, but generally it is not very great in either direction. Furthermore, the overall pattern of stability and mobility in the wage distribution has changed only marginally over time. In other words, the recession years in the early 1990s do not seem to have affected to any notable extent the wage development of those non-manual and manual industrial workers who have succeeded in retaining their job.

The analysis further displays that personal and job-related characteristics affect substantially the relative wage position as well as the movement within the wage distribution of both non-manual and manual industrial workers. In particular, the upward movers are, on average, well-educated young people with comparatively short work experience and seniority. The downward movers, on the other hand, have to most part less formal education and much longer work experience and seniority than their counterparts among stayers and upward movers. These trends with respect to human capital endowments have clearly strengthened over time.

These same trends are also reflected in the results obtained from estimating large earnings equations for non-manual and manual industrial workers. In particular, the estimation results suggest that the rate of return to formal education, age, work experience and the length of the current employment relationship (seniority) has weakened considerably over the time period under study. In other words, the wage differentials between industrial workers differing in completed formal education and accumulated work experience and seniority have declined markedly in Finnish industry in the 1980s.

A growing body of international evidence indicates that the trends in overall earnings differentials largely reflect changes in earnings differences across education and age groups. The findings of the present study pointing to declining returns to human capital despite of roughly unchanged earnings differentials both between and within the employee categories under study thus contrasts sharply with results obtained in other industrialized countries.

YHTEENVETO

Palkkarakenteen kehitys on aivan viime vuosina joutunut varsin kiivaan keskustelun ja laajenevan kansainvälisen tutkimuksen kohteeksi. Sen sijaan Suomen työmarkkinoilla tapahtuneesta palkkarakenteen ja palkkaerojen kehityksestä on toistaiseksi vain hajanaisia tutkimustuloksia. Tämä johtuu ennen kaikkea siitä, että tämäntyyppisessä kysymyksenasettelussa tarvittavaa henkilötason aineistoa löytyy Suomessa ainakin toistaiseksi hyvin niukasti. Suomen työmarkkinoita edustavia henkilöaineistoja on ollut saatavissa ainoastaan kahdesta lähteestä - Tilastokeskuksen väestörekisteriaineistosta ja työvoimatutkimuksista. Varteenotettava rajoite kuitenkin on, että molemmat tilastoaineistot kattavat vain tiettyjä vuosia.

Tätä taustaa vasten Teollisuuden ja Työnantajain Keskusliiton (TT) jäsenyrityksiltään keräämä laaja palkka-aineisto avaa huomattavia mahdollisuuksia tutkia, ei pelkästään palkkatasoissa ja palkkaeroissa vaan myös palkkaliikkuvuudessa tapahtuneita muutoksia Suomen työmarkkinoilla. Tämän palkka-aineiston heikkous on kuitenkin siinä, että aineisto käsittää ainoastaan TT:n jäsenyritykset eli sen edustavuus rajoittuu yksityisen sektorin tehdasteollisuuteen.

Tutkimuksessa tarkastellaan aiempaa yksityiskohtaisemmin Suomen teollisuuden toimihenkilöiden ja työntekijöiden sekä näiden kahden palkansaajaryhmän keskeisten alaryhmien palkkatason ja palkkaerojen kehitystä ajanjaksolla 1980-92. Ajanjakson pituus on varsin hyvä luotettavien palkkatrendien tunnistamiseksi. Lisäksi Suomen talous ja teollisuus on näinä vuosina kokenut sekä voimakkaita nousu- että laskusuhdanteita. Teollisuuden palkkarakenteen kehitys vuosina 1980-92 muuttuu tästä syystä entistäkin kiinnostavammaksi tarkastelukohteeksi.

Teollisuuden toimihenkilöitä ja työntekijöitä koskevat tulokset osoittavat, että työmarkkinoiden palkkarakenteessa on tapahtunut vain pieniä muutoksia tarkasteltavana periodina. Samaan päädytään toimihenkilöiden ja työntekijöiden keskeisimpien alaryhmien osalta. Tätä voidaan pitää sikäli yllättävänä tuloksena, että taloudellinen tilanne ja työllisyys muuttuivat ratkaisevalla tavalla tarkasteluperiodin loppuvuosina.

Voidaan kysyä, johtuvatko nämä hyvin pienet muutokset teollisuuden palkkarakenteessa vuosina 1980-92 ainakin osittain siitä, että matalapalkkaiset toimihenkilöt ja työntekijät yleensä lukkiutuvat useaksi vuodeksi palkkajakauman alapäähän? Vai onko mahdollisesti niin, että he liikkuvat palkkajakaumassa nopeasti ylöspäin samalla, kun heidän tilalleen tulee uusia työmarkkinoille vastikään siirtyneitä matalapalkkaisia henkilöitä? Toisin sanoen, onko teollisuuden palkkarakenne säilynyt suurin piirtein muuttumattomana, koska palkkajakauman sisällä on tapahtunut hyvin vähän siirtymisiä, vai onko näin käynyt huomattavasta palkkaliikkuvuudesta huolimatta? Tämä on tärkeä näkökohta etenkin minimipalkkojen tarvetta ja tarkoituksenmukaisuutta koskevassa keskustelussa.

Tutkimuksessa tarkastellaan ja vertaillaan erikseen toimihenkilöiden ja työntekijöiden paikallaan pysyvyyttä ja liikkuvuutta palkkajakaumassa kolmella ajanjaksolla (1980-84, 1984-88 sekä 1988-92). Tutkimustulokset viittaavat siihen, että toimihenkilöiden palkka-liikkuvuus on selvästi suurempi kuin työntekijöiden. Tämä koskee myös palkkajakauman ääripäistä tapahtuvaa liikkuvuutta. Nämä tulokset eivät ole kuitenkaan sinänsä yllättäviä ottaen huomioon, että työntekijöiden välillä esiintyy huomattavasti pienempiä palkkaeroja kuin toimihenkilöiden välillä. Lisäksi tulokset osoittavat, että toimihenkilöiden ja työntekijöiden palkkapysyvyys ja -liikkuvuus on kehittynyt varsin eri tavalla yli vuosien. Toimihenkilöiden palkkapysyvyys näyttää hieman pienentyneen ja työntekijöiden kasvaneen.

Yleisesti ottaen sekä toimihenkilöiden että työntekijöiden palkkajakaumassa näyttää esiintyvän varsin paljon siirtymisiä sekä matalampiin että korkeampiin palkkaluokkiin. Tätä liikkuvuutta ei kuitenkaan esiinny paljon kumpaakaan suuntaan. Lisäksi pysyvyydessä ja liikkuvuudessa palkkajakauman sisällä on tapahtunut vain pieniä muutoksia tarkasteluperiodin aikana. Toisin sanoen 1990-luvun alkuvuosien syvä lama ei näytä vaikuttaneen merkittävästi niiden toimihenkilöiden ja työntekijöiden pakkojen kehitykseen, jotka ovat onnistuneet säilyttämään työpaikkansa.

Tutkimustulokset osoittavat niinikään, että henkilökohtaiset ja työhön liittyvät ominaisuudet vaikuttavat suuresti sekä yksittäisen toimihenkilön että työntekijän suhteelliseen palkka-asemaan ja liikkuvuuteen palkkajakauman sisällä. Palkkajakaumassa ylöspäin eli korkeimpiin palkkaluokkiin siirtyvät ovat keskimäärin hyvin koulutettuja nuoria henkilöitä, joilla on suhteellisen lyhyt työkokemus ja senioriteetti eli nykyisen työsuhteen kesto. Palkkajakaumassa alaspäin eli matalampiin palkkaluokkiin siirtyvillä on sen sijaan yleensä suhteellisen heikko peruskoulutus, ja varsin pitkä työkokemus ja senioriteetti. Edellä mainitut inhimilliseen pääomaan (koulutukseen, työkokemukseen, senioriteettiin) liittyvät vaikutukset teollisuuden toimihenkilöiden ja työntekijöiden liikkuvuuteen palkka-jakaumassa ovat selvästi voimistuneet tarkasteluperiodin aikana.

Samat kehityssuunnat näkyvät teollisuuden toimihenkilöille ja työntekijöille muodostettujen laajojen palkkamallien antamista tuloksista. Nämä tulokset osoittavat, että koulutuksen, iän, työkokemuksen sekä senioriteetin vaikutus palkkaan on pienentynyt olennaisesti tarkasteluperiodin aikana. Toisin sanoen eripituisen koulutuksen ja työkokemuksen hankkineiden väliset palkkaerot ovat kaventuneet huomattavasti Suomen teollisuudessa.

Kansainvälisten tutkimustulosten mukaan palkkaerojen yleinen kehitys heijastaa voimakkaasti eri koulutusryhmien ja ikäluokkien välisten palkkaerojen kehitystä. Tässä tutkimuksessa esitettyjen tulosten perusteella näyttää siltä, että näin ei ole tapahtunut Suomen teollisuudessa: inhimillisen pääoman tuottoaste palkannousuna mitattuna on pienentynyt, vaikka sekä toimihenkilöiden ja työntekijöiden välillä että sisällä esiintyvät palkkaerot ovat samaan aikaan säilyneet lähestulkoon ennallaan.

1. INTRODUCTION

The development of earnings dispersion in general and earnings differentials in particular during the past few decades has in recent years given rise to a lively debate and a growing body of international research reports on trends in earnings inequality. As is made evident in the *OECD Employment Outlook for 1993*, trends in the distribution of earnings in the 1980s differed markedly from those of the 1970s. In particular, the 1970s generally saw decreasing or stable earnings dispersion. In the 1980s, however, there were clear increases in the earnings dispersion in twelve of the seventeen member countries investigated.

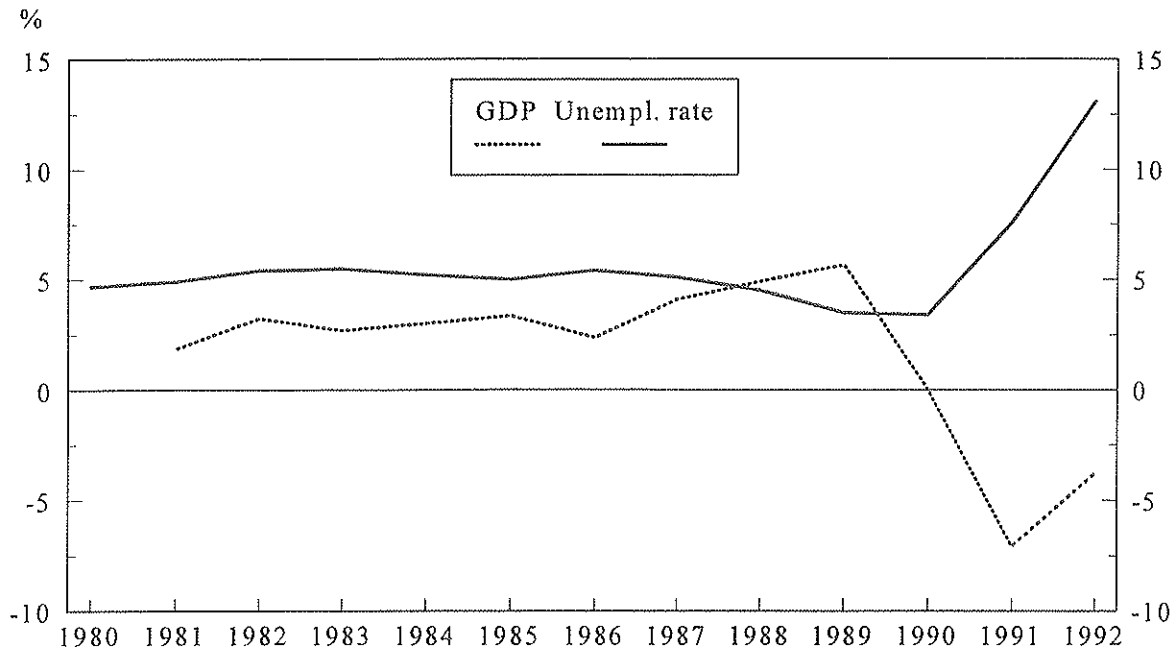
In the remaining five countries, the earnings dispersion was found to have been roughly stable in the 1980s, albeit preceded by declining earnings differentials in the 1970s. Among these five countries are Finland, Denmark and Norway. In Sweden, on the other hand, the earnings differentials in the labour market have been increasing since the mid-1980s.

There is, however, so far very little information on trends in earnings dispersion in the Finnish labour market. In fact, individual data representing the whole labour market are available from two sources only: the Population Censuses and the Labour Force Surveys, both conducted by Statistics Finland. The main shortcoming of these databases is that they merely cover selected years. The Population Censuses are conducted only every fifth year, while the Labour Force Surveys, which are undertaken more frequently, have been supplemented with income data from the taxrolls for two years only (1987 and 1989).

In view of this, the earnings data collected by the Confederation of Finnish Industry and Employers (TT) open a multitude of possibilities to investigate trends in the earnings structure of the Finnish labour market. There is, though, one notable qualification related to this database: it merely covers those employees that are employed in the TT member companies. This means that the data set is representative of the manufacturing sector only. A large majority (some 75 per cent) of private-sector manufacturing companies are members of the confederation, but only a minor part of the private companies engaged in construction and services.

Nevertheless, the private manufacturing sector is a most important part of the Finnish economy and the Finnish labour market. It is, therefore, of great interest to examine in more detail trends in wage levels and wage differentials in this sector using the TT data. This is done separately for non-manual and manual workers, with a further division of these two employee categories into key subgroups. More precisely, the non-manual worker category is divided into technical, clerical and upper-level non-manual workers, while the manual worker category is divided according to branch into textile, clothing, wood, paper, and metal workers. In the early 1980s, these five manual worker subgroups represented the largest branches in Finnish industry. The far-reaching structural changes that Finnish manufacturing

Figure 1. Unemployment rate and annual average change in GDP in Finland 1980-92



Source: Statistics Finland

has undergone during the 1980s have, however, diminished the importance of the textile and clothing industries in particular. [1]

The data used cover the years 1980-92. The length of the investigated time period can be regarded as quite satisfactory when it comes to displaying trends in earnings dispersion. Moreover, the Finnish economy has undergone marked changes over these years, with remarkable drops in aggregate output and dramatic increases in unemployment rates toward the end of the investigated time period *(Figure 1)*. This definitely increases the importance of the time period under study.

On the whole, despite the radical changes in the Finnish economy during the past few years, the wage structure in Finnish industry seems to have undergone only minor changes. This holds for all non-manual and manual workers as well as for the various worker subgroups investigated. Some trends may be distinguished, though, the most important of which are briefly outlined in this paper. Attempts are also made to compare these results with similar

[1] Detailed results concerning these subgroups are not presented in this paper but can be found in Asplund (1993,1994a,1994b). Of these subgroups, three are highly female dominated: clerical non-manual workers with a female share of some 80 per cent, textile industry (over 70 per cent), and clothing industry (over 95 per cent). In contrast, the share of females is very low among upper-level and technical non-manual workers (less than 20 per cent in both groups) as well as in manufacturing of wood, paper and metal products (about 20-30 per cent).

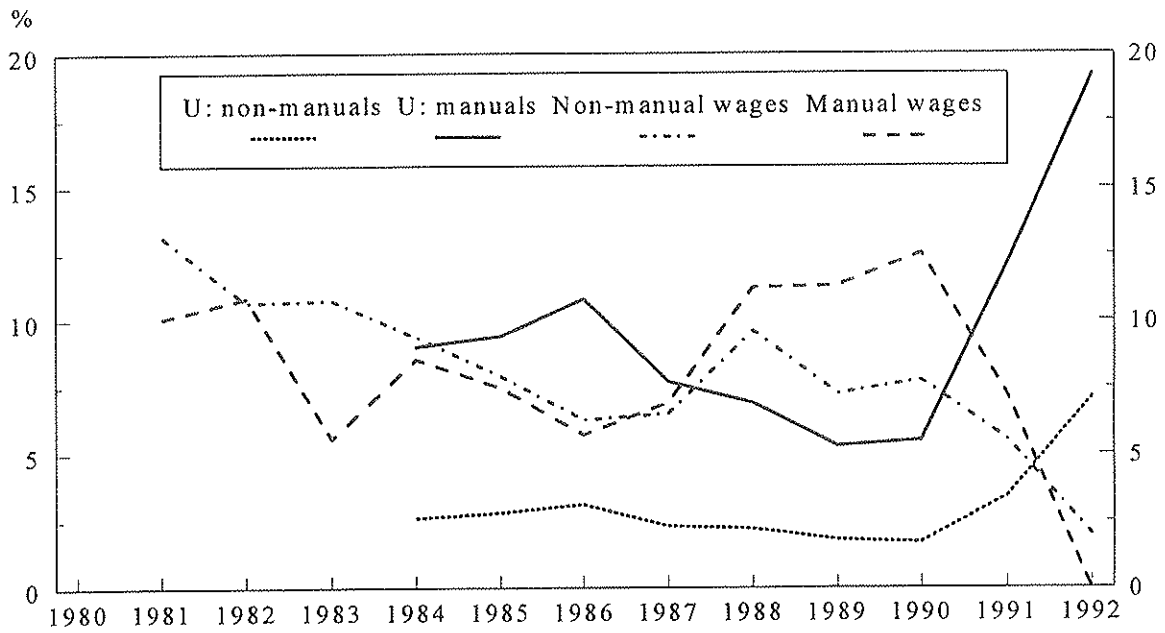
results obtained for the other Nordic countries. Unfortunately, though, comparable results exist to some extent for Sweden only.

The rest of the paper is organized as follows. The next section reports trends in nominal and real wages of the sample non-manual and manual workers. Section 3 presents results on the development of relative wages between the employee categories under study, whereas Section 4 focuses on trends in the dispersion of earnings within the various employee categories. In Section 5 some preliminary results on wage mobility within the broad categories of non-manual and manual workers are given. Section 6 summarizes some of the main results from estimating traditional human capital wage equations for the various employee categories considered. Section 7 gives concluding remarks.

2. TRENDS IN NOMINAL AND REAL WAGES

As shown in *Table A1* in the Appendix, the growth in nominal hourly wages was extremely rapid during the boom years in the 1980s. Compared to this, the average annual growth in hourly wages has be considerably slower during the recession years at the end of the investigated time period (1990-92). The annual average change in hourly earnings of the sample non-manual and manual workers over the years 1980-92 is pictured in *Figure 2*. The figure also displays the trend in the unemployment rate of these two worker categories.

Figure 2. Unemployment rates (U) for all non-manual and manual workers 1984-92 and average change in sample non-manual and manual wages 1980-92



Source: Statistics Finland (unemployment rates)

It is noteworthy that wage growth over the past 13 years is very similar irrespective of the wage concept used, i.e. irrespective of whether wages refer to normal hourly wages or to hourly wages inclusive of various compensations such as overtime pay, bonuses and fringe benefits. The analysis in the present section as well as in Sections 3-4 is entirely based on the latter, more broadly defined wage concept.

Of the three non-manual worker subgroups investigated - technical, clerical and upper-level - non-manual workers in clerical jobs have experienced the fastest growth in nominal wages over the years 1980-92 (some 8 per cent a year compared to about 7 per cent a year for the other two non-manual worker categories). Of the five manual worker categories - textile, clothing, wood, paper and metal - the fastest growth in nominal wages is observed among workers in the textile and paper industries (over 8 per cent a year compared to roughly 7½ per cent in the other three manual worker categories). For further details, see *Tables A2-A3* in the Appendix.

Real hourly wages when deflated by the consumer price index have generally grown continuously during the investigated time period. The most conspicuous exception to this is the year 1992 when hourly earnings declined markedly also in real terms; more among manual than among non-manual workers *(Figures 3 and 4)*. Positive growth in real hourly wages also in 1992 is observed among textile manual workers only.

As can be seen from the figures, overall growth in real hourly wages has been fairly rapid in the paper industry. In contrast, a very slow growth in real hourly wages is observed for manual workers in the clothing industry. The trend in real wages of manual workers in the metal industry, in turn, was relatively unfavourable in the early and mid-80s. Since then, however, metal manual workers have experienced very strong increases in real hourly wages.

Among non-manual workers, the category of upper-level non-manual workers has experienced a very slow growth in real hourly wages over the investigated time period when compared with the real wage increases of technical and clerical non-manual workers as well as of the various manual worker categories.

It may finally be noted that the growth rate in nominal industry wages has not been exceptionally high over the time period under study relative to that of other employee categories in the Finnish labour market. On the contrary, when deflated by the employees' general earnings index, the earnings level in Finnish industry is found mostly to have increased at a slower rate than the earnings in the rest of the economy.

Figure 3. Trends in real hourly wages of non-manual industrial workers 1980-92
(nominal hourly wage deflated by the consumer price index, 1980=100)

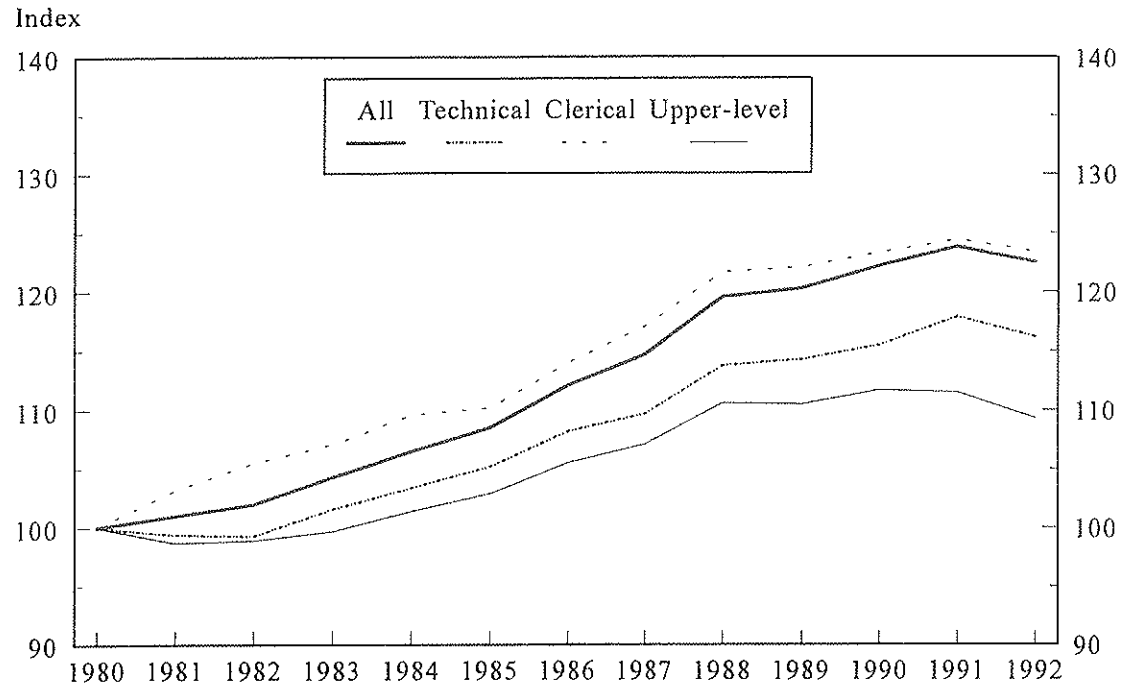
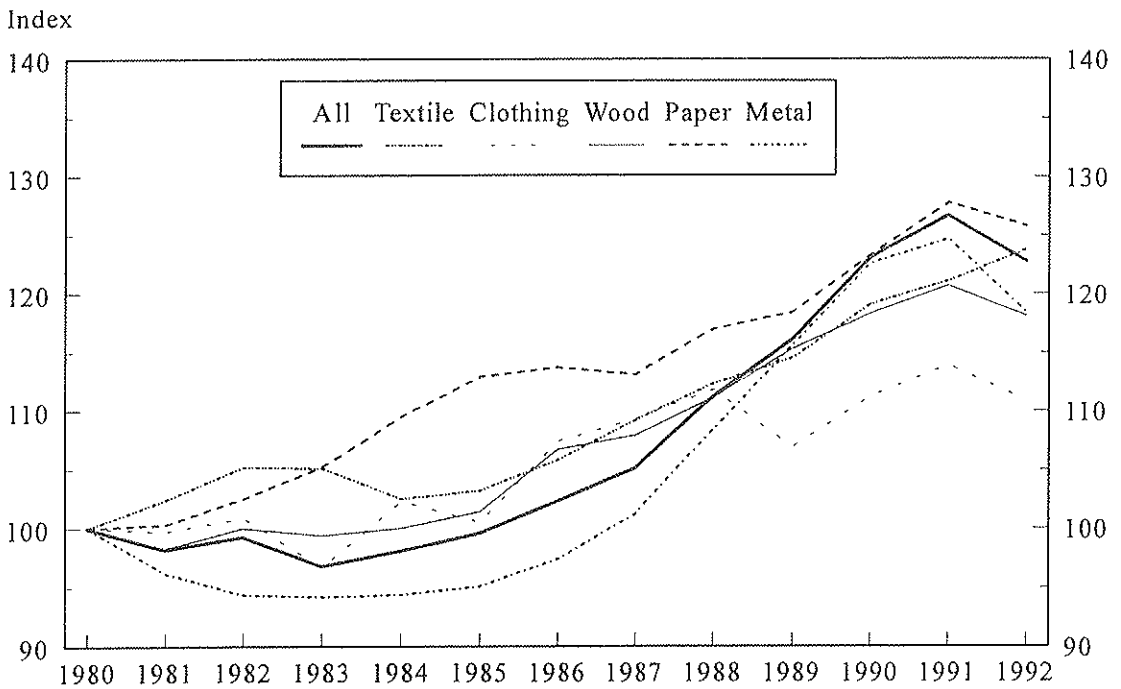


Figure 4. Trends in real hourly wages of manual industrial workers 1980-92
(nominal hourly wage deflated by the consumer price index, 1980=100)



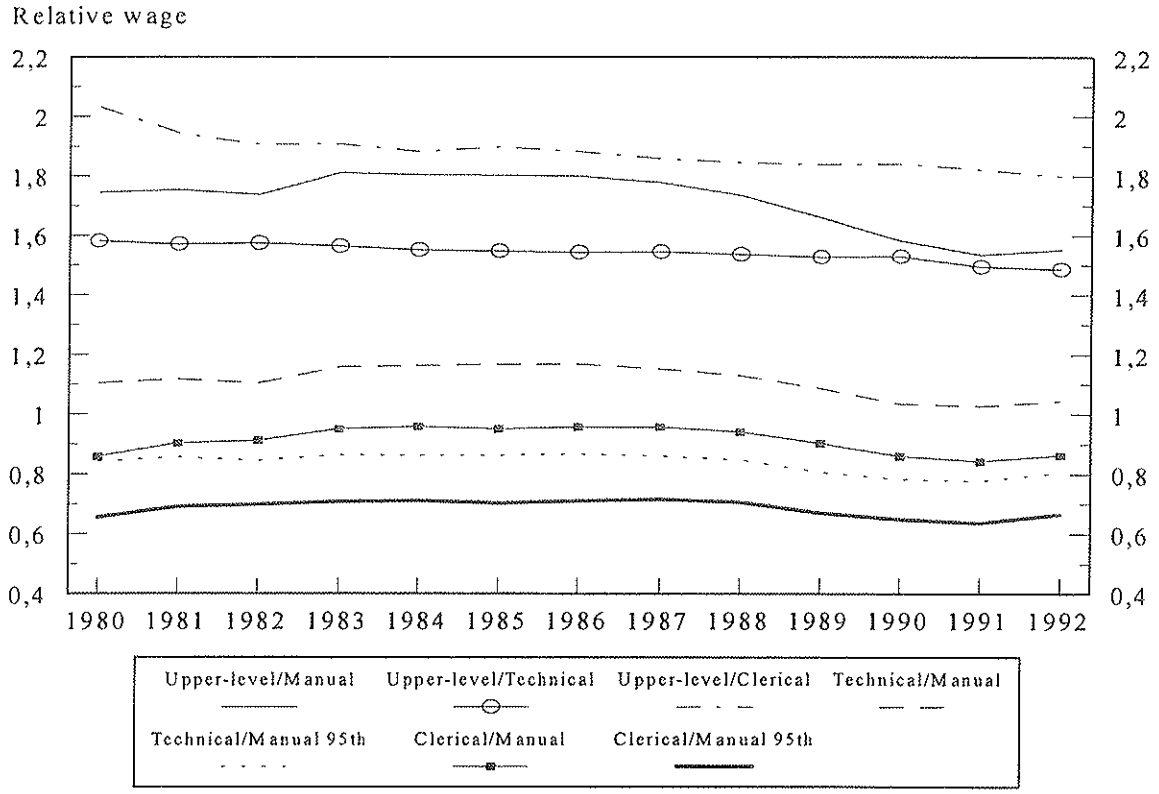
3. THE DEVELOPMENT OF RELATIVE WAGES

It could be expected that the occasionally quite large variations in the growth of nominal hourly wages over the years 1980-92 both across and within the employee categories concerned would have influenced their relative earnings positions. The results presented in this paper do not support this assessment, however. Instead relative wages turn out to have remained surprisingly stable despite the dramatic changes in the labour market situation in Finland displayed in Figures 1 and 2 above.

As can be seen from *Figure 5,* the only more notable change is a slight weakening of the earnings position of all three categories of non-manual workers relative to that of manual workers. For example, the wage relatives between upper-level non-manual workers and manual workers declined from 1.81 in 1983 to 1.55 in 1992. There also seems to have been a slight weakening of the earnings position of upper-level non-manual industry workers relative to non-manual workers in technical and clerical jobs.

The figure further shows that the earnings position of technical and clerical non-manual workers is in general fairly weak relative to that of manual workers and, especially, when compared to the average wage level of high-pay manual workers (manual 95th in the figure). In 1992 the average wage level of high-pay manual workers exceeded the average

Figure 5. Trends in relative wages of non-manual and manual workers in Finnish



wage level of technical non-manual workers by some 20 per cent and that of clerical non-manual workers by some 34 per cent.

It may be noted in this context that results for Sweden reported by Hibbs (1990) point to a clearly stronger earnings position of lower-level non-manual workers relative to manual workers in Swedish manufacturing. In particular, despite a strong compression of the wage structure in Swedish industry over the past few decades, the average earnings level of lower-level non-manual workers still exceeds also that of high-pay manual workers.

4. TRENDS IN THE DISPERSION OF WAGES

The dispersion of hourly wages within the different employee categories under study has also remained remarkedly unchanged. The small changes in overall dispersion as measured with the standard deviation of log hourly wages point to a slight decrease in earnings dispersion in the early 1980s, a slight increase up to the turn of the decade, and a new decline at the end of the investigated time period *(Figures 6 and 7)*. Of the five manual worker categories considered, the textile industry displays the most interesting pattern in overall dispersion, viz. a clear increase in the dispersion of wages toward the end of the investigated time period.

The relative position of selected percentiles of the wage distribution has not changed much, either. The results indicate that the minor changes that can be observed in overall dispersion generally originate in gains by the top decile of the distribution relative to the median usually accompanied by losses by the bottom decile, and vice versa. However, as will become apparent later on (see *Figures 11* and *12* below) these changes in the two tails of the earnings distribution have throughout been very small, almost negligible.

An alternative way of highlighting the changes in the two tailes of the earnings distribution is to look at the overall changes in the P90/P10 distribution, where P90 and P10 refer to the wage level of the 90th and 10th percentiles, respectively. This is done for all sample non-manual and manual workers in *Figure 8*. Roughly comparable data for manual workers in Swedish manufacturing are also included. The curves plotted in the figure show that the wage dispersion among manual industrial workers is notably larger in Finland than in Sweden. Unfortunately, comparable figures for non-manual workers in Swedish manufacturing have, to my knowledge, not been published.

Figures 9 and 10 display the P90/P10 distribution for the three non-manual and the five manual worker subcategories. Again the most conspicuous trend is observed for the textile industry. In line with Figure 7, also Figure 10 points to a notable widening in the wage dispersion among manual workers in the textile industry since the end of the 1980s.

Figure 6. Trends in wage dispersion for non-manual workers 1980-92, measured by the standard deviation of log hourly wages (1980=100)

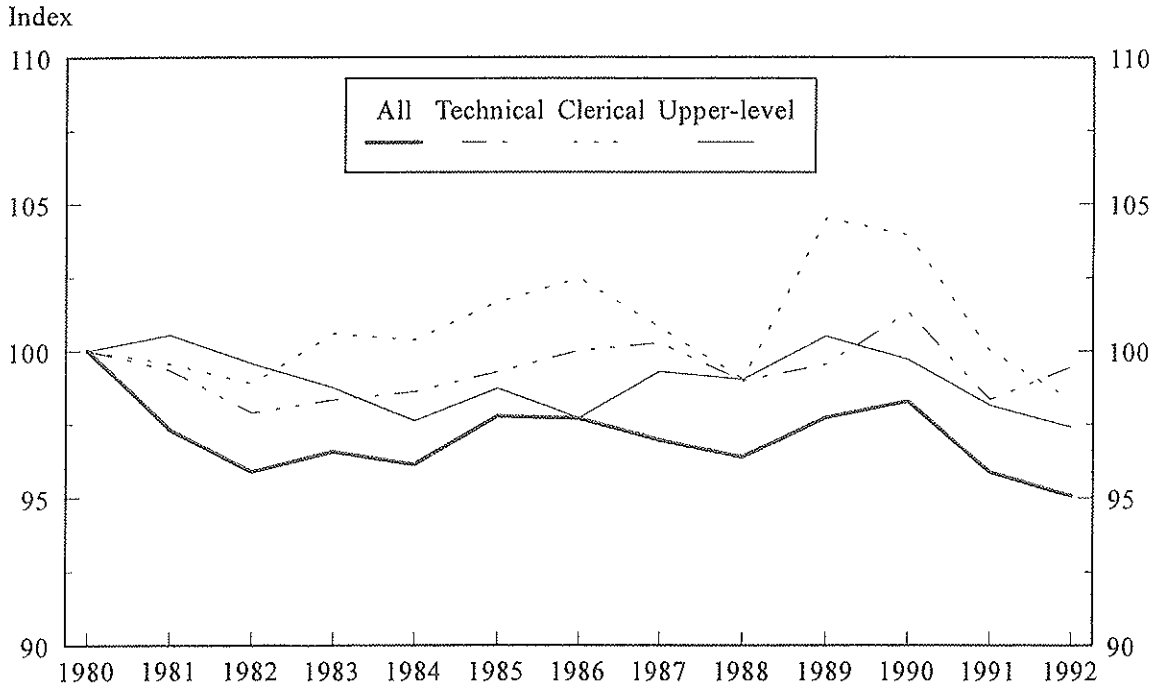


Figure 7. Trends in wage dispersion for manual workers 1980-92, measured by the standard deviation of log hourly wages (1980=100)

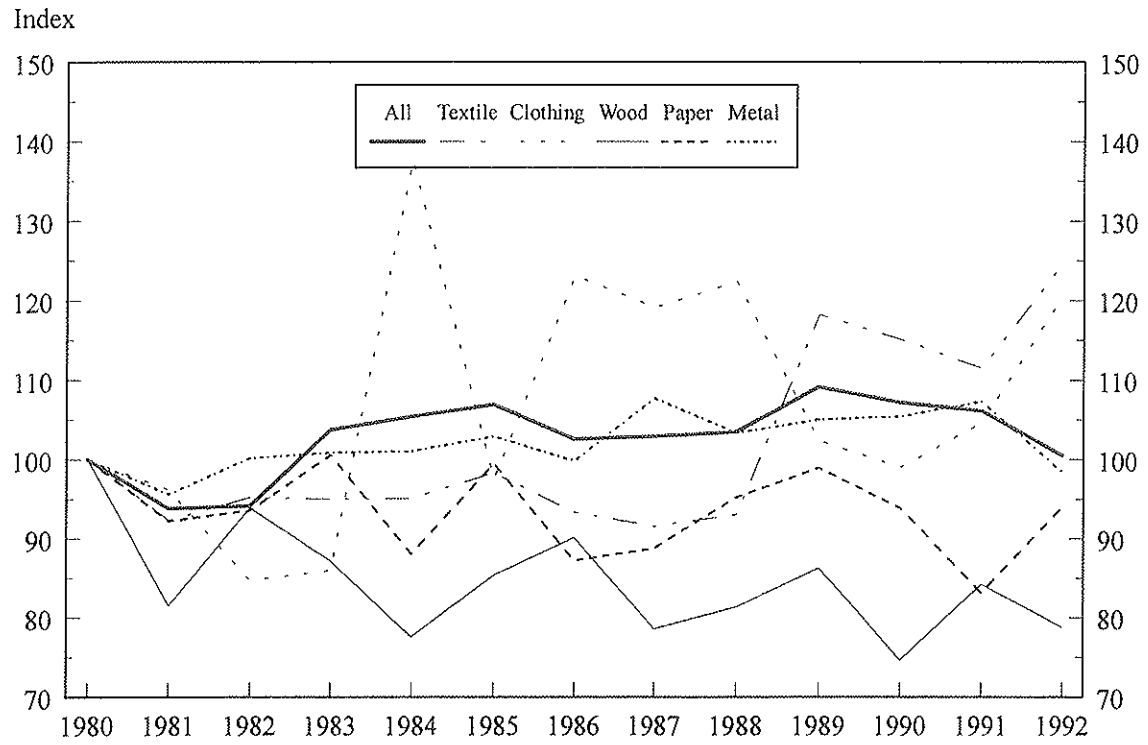
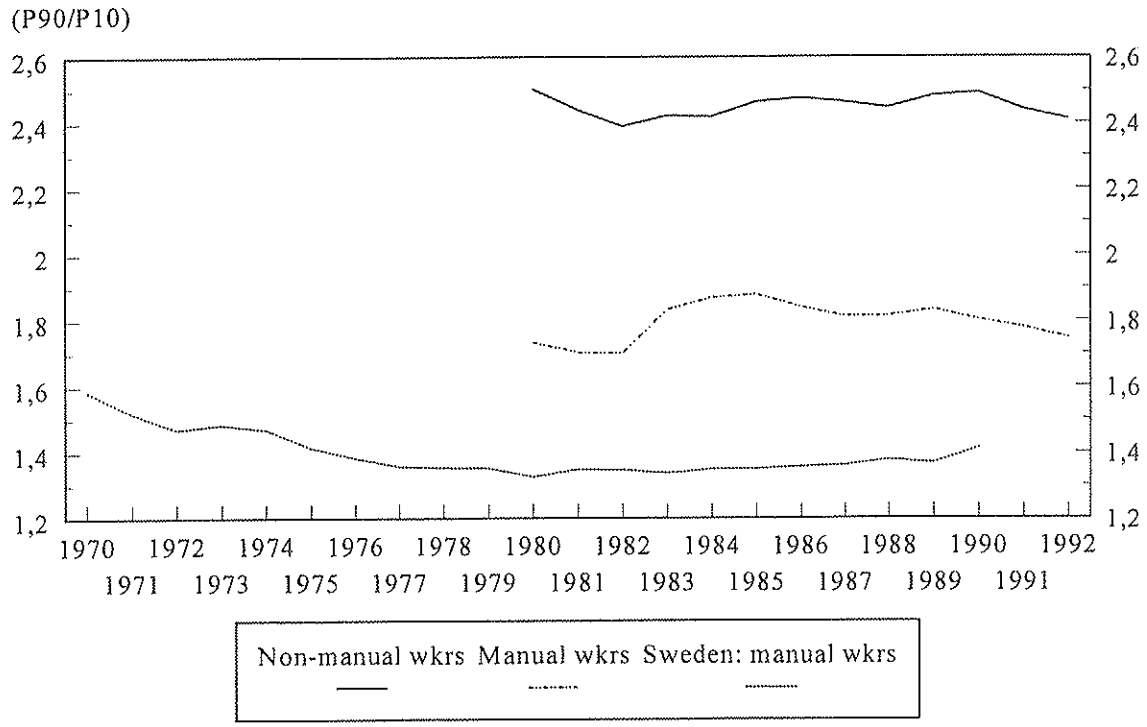


Figure 8. Trends in the P90/P10 distribution of non-manual and manual industry wages in Finland 1980-92 and manual industry wages in Sweden 1970-90



Note: Swedish results are from Edin & Holmlund (1992).

The overall impression of roughly unchanged wage distributions for non-manual and manual workers in Finnish industry over the years 1980-92 is further strengthened when the analysis is extended to cover selected percentiles between the top and bottom wage levels. *Figures 11 and 12* display the earnings position of selected percentiles relative to the median for the two broad categories of non-manual and manual industrial workers. A picture of roughly unchanged wage distributions emerges also for the various subcategories investigated.

Compared to Sweden, the dispersion of manual wages in Finnish industry has been very stable during the 1980s. As shown in *Figure 13*, the dispersion in manual wages shrinked substantially in Swedish industry in the 1970s. This phenomenon has occasionally been called the LO relative wage "cone". As can be seen from the figure, however, the dispersion in Swedish manual industry wages has increased slightly since the mid-1980s.[2]

---

[2] The use of the average wage level as the means of standardization in Figure 13 and the median wage level in Figure 12 does not weaken the comparability of the two figures. The median and average wage levels are namely very close for manual workers in Finnish industry.

Figure 9. Trends in the P90/P10 distribution of non-manual industry wages 1980-92 for three non-manual worker subcategories

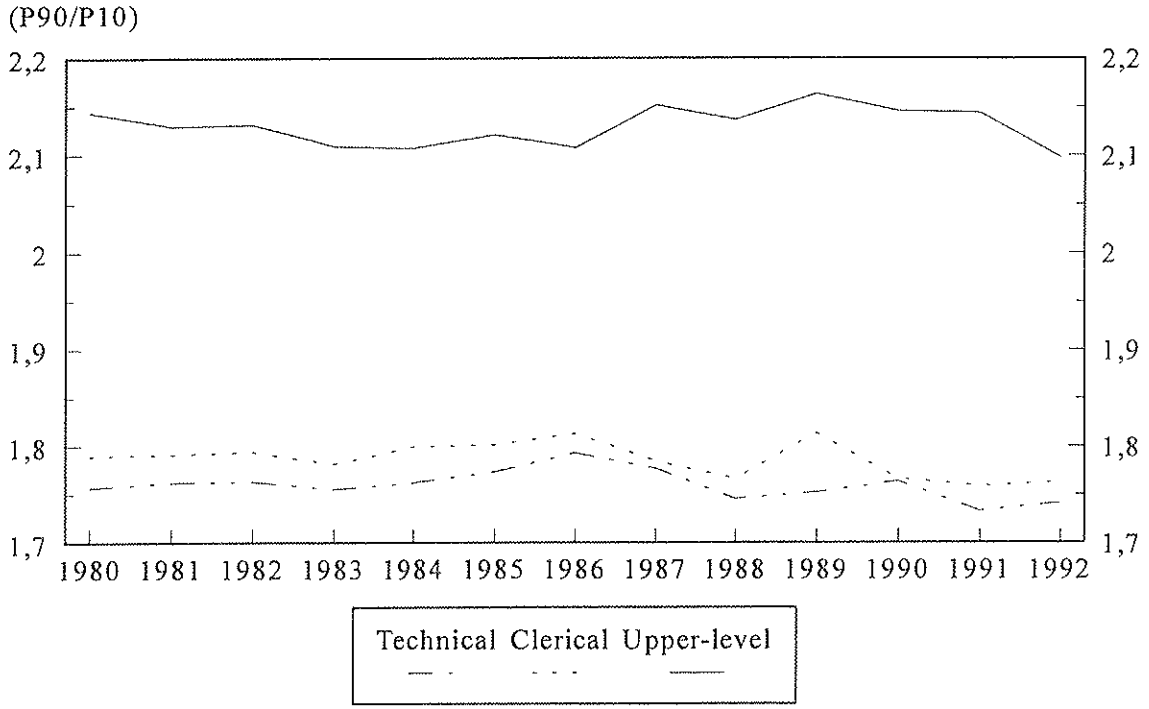


Figure 10. Trends in the P90/P10 distribution of manual industry wages 1980-92 for five manual worker subcategories

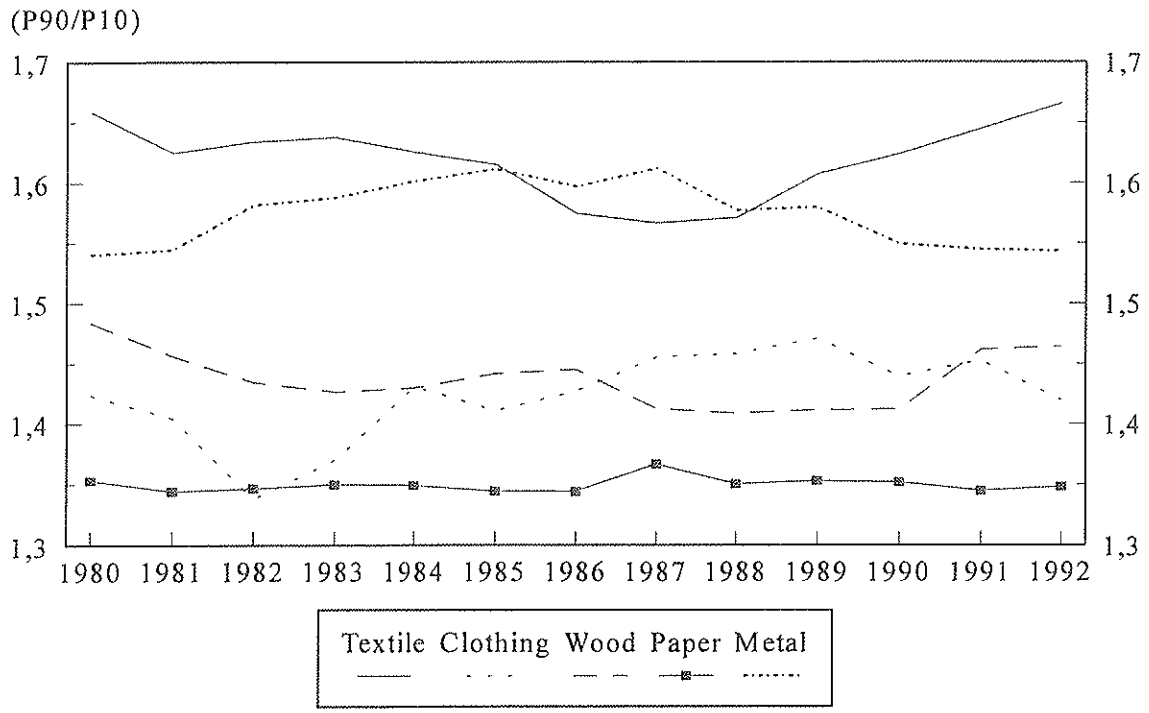


Figure 11. Relative non-manual industry wages 1980-92

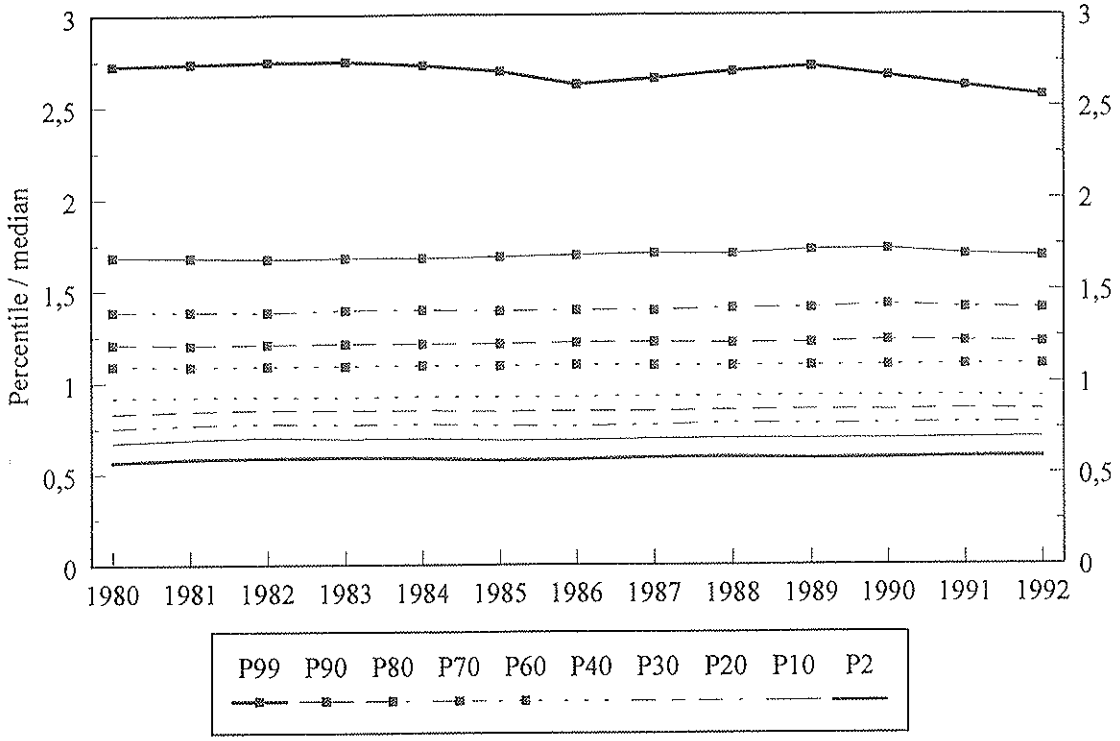


Figure 12. Relative manual industry wages 1980-92

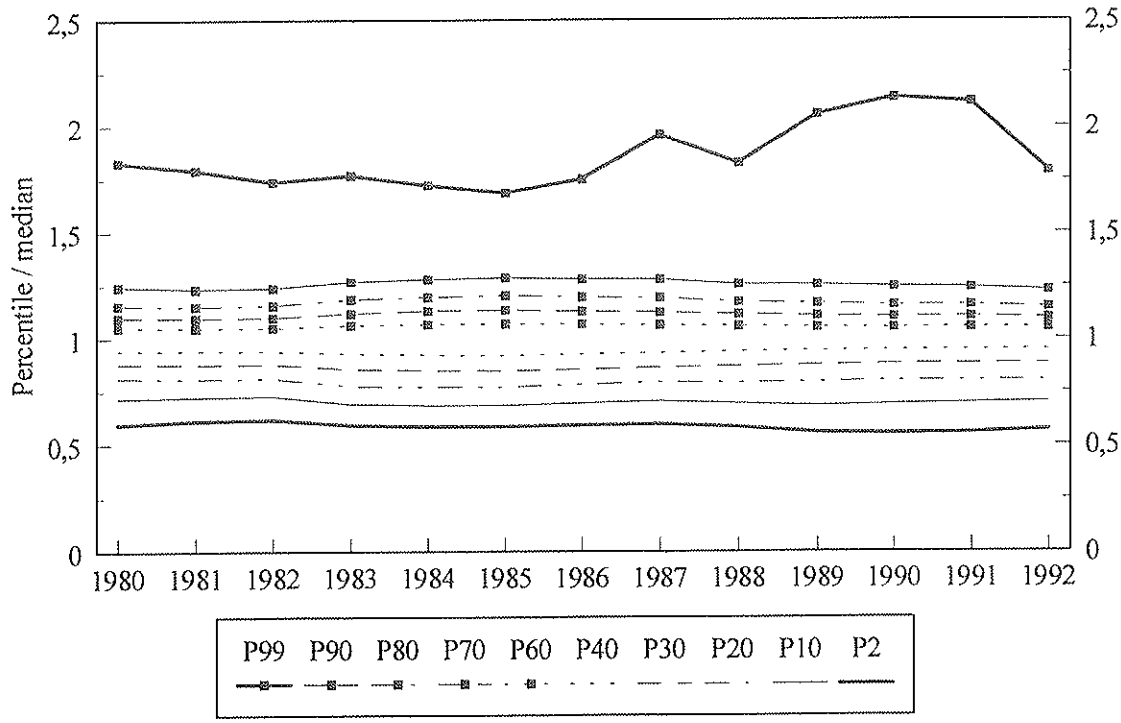
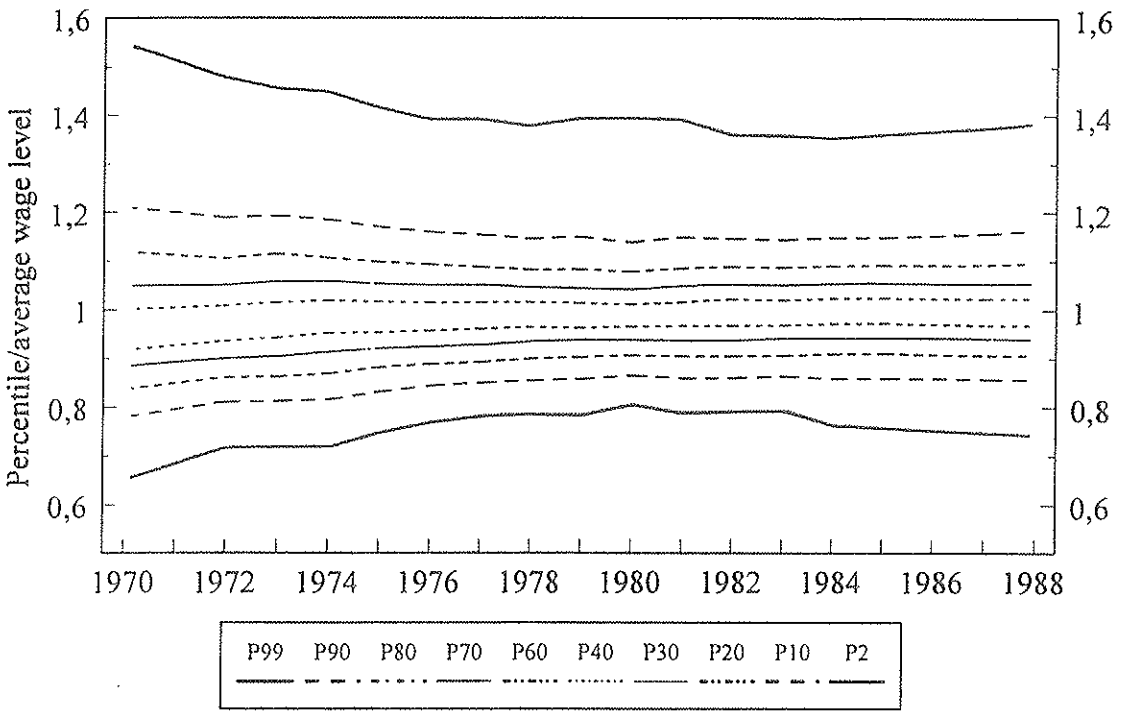


Figure 13. Relative manual industry wages (the LO "cone") in Sweden 1970-88



Source: Hibbs (1990)

To further illustrate the extreme stability of the non-manual and manual wage structures in Finnish industry over the past 13 years, *Figures 14 and 15* picture total nominal hourly wage growth between 1980 and 1992 for selected percentiles of the wage distribution. More precisely, the figures give the percentage increase in the average nominal wage level for each percentile in 1992 relative to the average nominal wage level in the same percentile in 1980.

The results also indicate that although the relative wages of low-pay industrial workers have occasionally weakened over the years 1980-92, their real wages have, nevertheless, mostly increased. In other words, only exceptionally has the weakening in the relative earnings position of low-pay workers been strengthened by a simultaneous decline in their real wages. As shown in *Figures 16 and 17*, the most notable decline in real wages occurred among low-pay manual workers in the mid-1980s. During the rest of the investigated time period the wages of low-pay manual workers have grown also in real terms, albeit more slowly than for medium and high-pay manual workers. Among non-manual workers, on the other hand, the fastest growth in real wages is, in fact, observed among low-pay non-manual workers.

Figure 14. Nominal hourly wage increases among non-manual industrial workers 1980-92 for selected percentiles

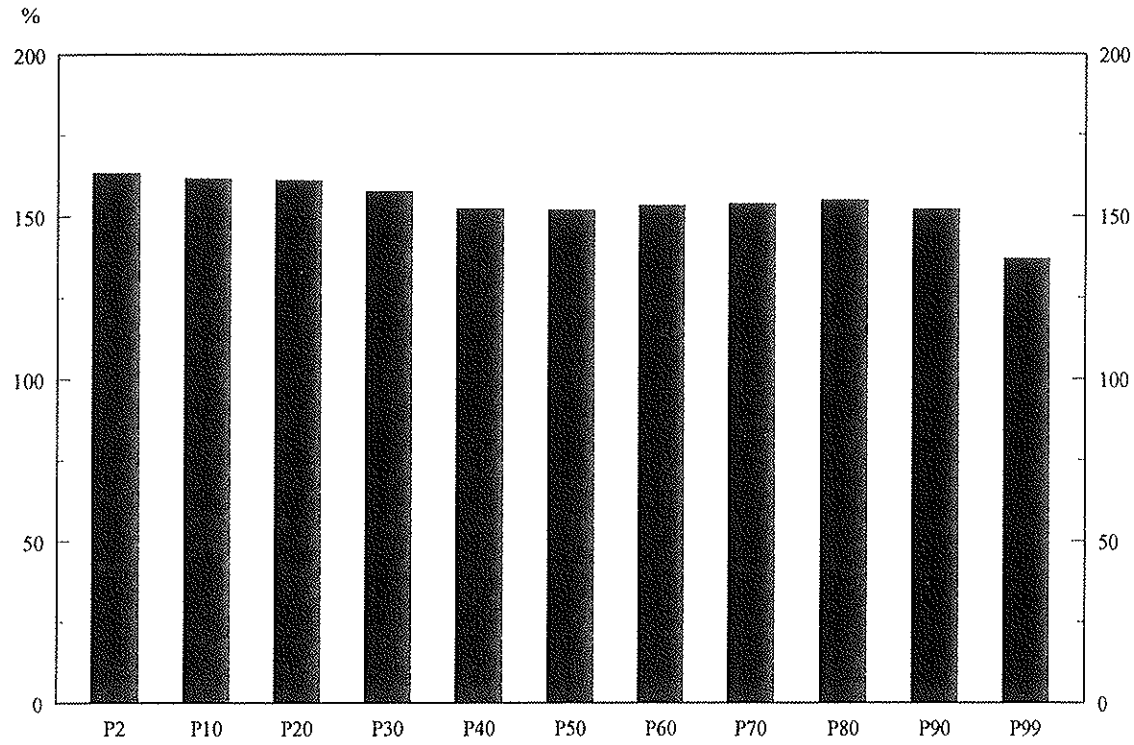


Figure 15. Nominal hourly wage increases among manual industrial workers 1980-92 for selected percentiles

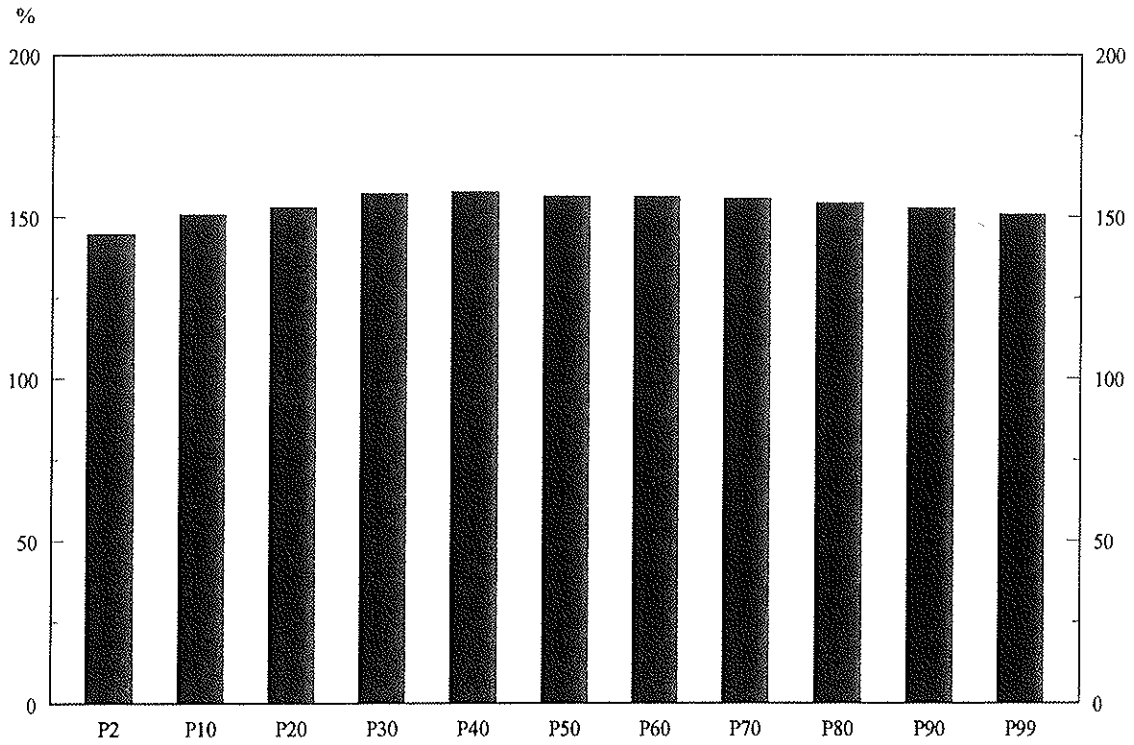


Figure 16. Trends in the 90th, 50th and 10th percentiles of non-manual industry wages deflated by the consumer price index, 1980=100

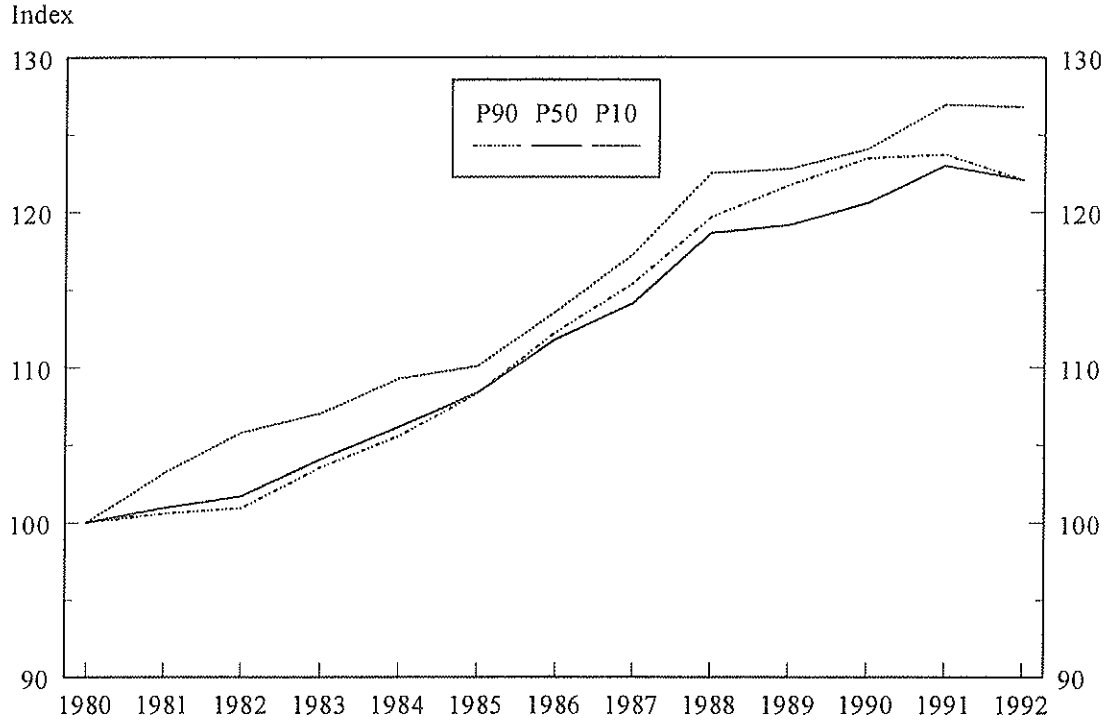
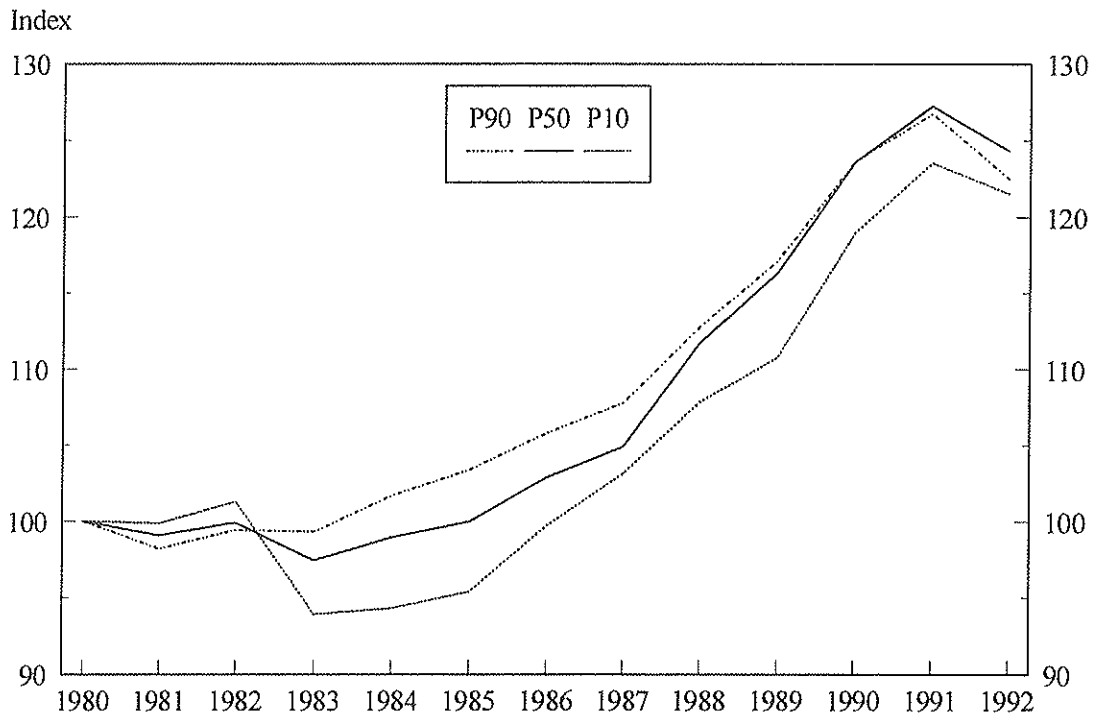


Figure 17. Trends in the 90th, 50th and 10th percentiles of manual industry wages deflated by the consumer price index, 1980=100



5. WAGE MOBILITY

The previous sections analyzing trends in relative wages in the Finnish labour market suggest that there has not been much change in the wage distribution of non-manual and manual workers engaged in manufacturing over the past 13 years. A pattern of roughly unchanged wage distributions emerges also for the three non-manual worker and five manual worker subgroups investigated.

The question then arises whether these extremely small changes in wage dispersion point to a strong tendency of workers in, say, the bottom deciles to be locked for several years at the lower tail of the wage distribution. Or do they easily move up into higher deciles while simultaneously being replaced by new, mostly low-pay entrants on the labour market? In other words, has the wage dispersion of non-manual and manual industrial workers remained roughly unchanged due to a high degree of stability or despite a great amount of wage mobility within the wage distribution?

The data base used in the present study allows more detailed examination of this most interesting question because of its panel data dimension. The datum of the data set is a large sample of non-manual and manual workers drawn for the year 1990. These individuals are then traced backwards to the year 1980 and onwards to the year 1992. Naturally there occur dropouts during this sampling procedure. These dropouts are, however, continuously replaced whereby the replacement mechanism is designed to maintain the sample share relative to the underlying population in each year considered.

5.1. Wage mobility using relative wage thresholds

Mobility within the wage distribution is determined by comparing the individual's earnings decile in the first year with the individual's earnings decile in the second year. For this purpose, the investigated time period is divided into three subperiods: 1980-84, 1984-88 and 1988-92. There are several reasons for analysing wage mobiliy over only a four-year-period. First, the three time periods differ quite markedly when it comes to the economic activity level and the prevailing labour market situation (see Figure 2 above). It could be expected that the changing economic environment has affected also wage mobility.

Second, because of the fairly large amount of dropouts, the number of observations in the panel data shrinks steadily when the investigated time period is extended to cover more years. By restricting the analysis to four-year-periods the wage mobiliy data set will contain a satisfactory number of observations.

Tables 1 and 2 contain transition matrices for non-manual and manual workers in Finnish industry illustrating the degree of wage mobility based on average hourly earnings inclusive

Table 1. Transition matrices for non-manual workers in Finnish industry 1980-84, 1984-88 and 1988-92 based on relative thresholds

Earnings decile in year 1980	Earnings decile in year 1984 (%)										
	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	Sum
D1	**74.0**	21.2	3.0	0.5	0.3	-	-	-	-	0.2	100.0
D2	22.7	**49.2**	19.7	5.0	2.2	0.5	0.2	0.2	0.3	-	100.0
D3	2.0	26.5	**40.2**	17.7	7.8	3.5	1.3	0.7	0.2	-	100.0
D4	0.2	3.0	28.4	**35.7**	16.0	10.0	4.5	1.5	0.7	-	100.0
D5	-	-	6.8	31.6	**34.6**	17.2	6.5	1.7	1.2	0.5	100.0
D6	-	-	1.2	7.5	30.6	**33.7**	17.9	5.8	2.7	0.7	100.0
D7	0.2	-	0.7	1.2	7.3	29.7	**36.7**	17.5	5.3	1.3	100.0
D8	-	-	-	0.7	1.0	4.3	29.5	**42.7**	18.2	3.5	100.0
D9	0.2	-	-	0.2	0.2	1.0	3.2	29.5	**52.2**	13.5	100.0
D10	-	-	-	-	-	-	0.2	0.3	19.2	**80.3**	100.0
Sum	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	

Notes. Number of observations is 5989. Likelihood ratio statistic G^2 = 12197.75. Cramér's V = 0.54. Contingency coefficient P = 0.85. Lambda asymmetric = 0.42. ASE = 0.0071.

Earnings decile in year 1984	Earnings decile in year 1988 (%)										
	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	Sum
D1	**70.1**	20.2	6.3	1.9	1.0	0.2	0.2	0.2	-	-	100.0
D2	27.3	**46.2**	16.5	6.8	1.7	0.5	0.7	0.3	-	-	100.0
D3	2.0	31.2	**39.2**	17.1	5.9	2.5	1.2	0.7	-	-	100.0
D4	0.2	2.0	32.4	**31.5**	20.5	8.5	3.4	0.7	0.7	0.2	100.0
D5	0.3	0.2	4.1	33.8	**31.6**	17.7	6.6	3.9	1.5	0.3	100.0
D6	-	0.2	1.0	7.8	30.4	**33.3**	16.1	8.5	1.9	0.8	100.0
D7	-	-	0.2	1.0	7.5	29.8	**38.8**	15.1	6.4	1.2	100.0
D8	-	-	0.2	0.2	0.8	6.1	30.4	**40.4**	17.7	4.2	100.0
D9	-	-	0.2	-	0.2	1.0	2.7	29.2	**49.2**	17.5	100.0
D10	-	-	-	-	0.3	0.3	-	1.0	22.5	**75.8**	100.0
Sum	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	

Notes. Number of observations is 5893. Likelihood ratio statistic G^2 = 11649.01. Cramér's V = 0.52. Contingency coefficient P = 0.84. Lambda asymmetric = 0.40. ASE = 0.0072.

Earnings decile in year 1988	Earnings decile in year 1992 (%)										
	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	Sum
D1	**71.8**	20.9	5.4	1.0	0.4	0.2	0.4	-	-	-	100.0
D2	26.2	**42.5**	19.5	6.7	2.5	1.7	0.8	-	-	-	100.0
D3	1.3	29.2	**36.3**	17.8	7.9	2.3	2.9	1.0	1.2	0.2	100.0
D4	-	6.1	28.4	**36.2**	14.9	8.6	3.6	1.7	0.4	-	100.0
D5	0.4	0.8	7.1	28.2	**31.9**	18.6	9.2	2.7	1.2	-	100.0
D6	-	0.6	2.1	7.1	33.9	**27.6**	18.6	7.1	2.7	0.4	100.0
D7	-	-	0.4	2.3	5.9	34.9	**33.0**	15.5	6.5	1.5	100.0
D8	0.2	-	0.6	0.8	1.0	5.2	29.2	**39.2**	19.8	4.2	100.0
D9	-	-	0.2	-	1.0	1.0	2.3	29.9	**46.9**	18.8	100.0
D10	-	-	-	-	0.6	-	0.2	2.9	21.5	**74.9**	100.0
Sum	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	

Notes. Number of observations is 5216. Likelihood ratio statistic G^2 = 9808.53. Cramér's V = 0.51. Contingency coefficient P = 0.84. Lambda asymmetric = 0.39. ASE = 0.0076.

Table 2. Transition matrices for manual workers in Finnish industry 1980-84, 1984-88 and 1988-92 based on relative thresholds

Earnings decile in year 1980	Earnings decile in year 1984 (%)										
	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	Sum
D1	**68.5**	20.3	7.3	1.7	0.9	0.2	-	-	-	0.9	100.0
D2	22.8	**43.3**	21.3	6.6	1.5	1.3	0.8	1.1	-	1.3	100.0
D3	5.4	23.7	**27.6**	17.5	10.7	8.5	2.1	1.5	0.6	2.4	100.0
D4	1.3	6.2	21.5	**22.6**	15.4	12.6	10.2	4.7	3.4	2.1	100.0
D5	0.6	2.6	11.5	16.2	**18.8**	18.2	13.7	7.7	6.6	4.1	100.0
D6	0.4	1.9	4.3	15.6	17.3	**15.8**	15.1	14.3	10.4	4.9	100.0
D7	0.2	0.4	3.2	9.0	14.3	16.2	**17.5**	16.4	13.0	10.0	100.0
D8	-	0.8	1.3	5.3	9.2	11.9	16.0	**21.8**	17.3	16.4	100.0
D9	0.4	0.2	0.9	3.2	7.5	10.5	13.7	17.3	**23.1**	23.1	100.0
D10	0.4	0.6	1.1	2.3	4.3	4.7	11.1	15.0	25.8	**34.8**	100.0
Sum	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	

Notes. Number of observations is 5315. Likelihood ratio statistic G^2 = 5341.86. Cramér's V = 0.35. Contingency coefficient P = 0.73. Lambda asymmetric = 0.22. ASE = 0.0069.

Earnings decile in year 1984	Earnings decile in year 1988 (%)										
	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	Sum
D1	**68.4**	21.6	5.7	1.9	0.4	0.7	-	0.3	0.4	0.4	100.0
D2	25.0	**41.6**	16.8	7.6	2.6	1.8	1.3	0.7	0.9	1.6	100.0
D3	4.6	24.7	**35.3**	18.7	7.4	3.5	3.1	0.6	0.6	1.6	100.0
D4	1.2	8.2	24.8	**27.3**	15.0	7.5	6.9	2.6	3.1	3.4	100.0
D5	0.4	2.4	9.7	18.2	**24.3**	19.8	10.3	7.2	4.4	3.2	100.0
D6	0.3	0.6	4.3	10.7	19.3	**24.7**	18.4	10.1	6.3	5.3	100.0
D7	-	0.1	2.1	7.0	16.0	20.1	**19.7**	17.2	10.1	7.6	100.0
D8	-	0.1	0.6	4.8	8.4	11.2	17.1	**23.7**	20.7	13.4	100.0
D9	-	0.3	-	1.5	3.4	7.5	15.9	23.5	**26.6**	21.3	100.0
D10	0.1	0.3	0.7	2.2	3.2	3.1	7.5	14.0	26.7	**42.1**	100.0
Sum	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	

Notes. Number of observations is 6803. Likelihood ratio statistic G^2 = 7923.21. Cramér's V = 0.38. Contingency coefficient P = 0.75. Lambda asymmetric = 0.26. ASE = 0.0063.

Earnings decile in year 1988	Earnings decile in year 1992 (%)										
	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	Sum
D1	**72.1**	17.8	3.9	2.2	1.6	0.7	-	0.6	0.6	0.6	100.0
D2	21.1	**41.6**	19.8	6.4	5.7	1.6	1.3	1.1	0.9	0.4	100.0
D3	3.8	25.7	**29.2**	17.1	8.3	4.6	4.0	2.9	1.3	3.1	100.0
D4	1.6	10.1	24.1	**21.3**	12.3	10.1	6.8	4.6	4.0	5.0	100.0
D5	0.6	1.6	13.9	24.4	**20.0**	14.3	8.4	7.5	5.0	4.2	100.0
D6	0.4	1.1	5.0	12.7	22.0	**18.7**	16.1	11.0	6.2	6.8	100.0
D7	-	0.6	1.8	4.8	12.3	22.4	**20.6**	15.4	12.3	9.7	100.0
D8	-	0.2	0.7	4.4	8.8	13.4	19.3	**22.6**	17.4	13.2	100.0
D9	0.2	0.6	0.9	3.3	5.3	7.2	13.4	20.9	**28.4**	19.8	100.0
D10	0.2	0.7	0.7	3.3	3.7	7.0	9.9	13.4	23.8	**37.2**	100.0
Sum	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	

Notes. Number of observations is 5447. Likelihood ratio statistic G^2 = 5626.66. Cramér's V = 0.37. Contingency coefficient P = 0.74. Lambda asymmetric = 0.25. ASE = 0.0069.

of various types of compensations over the three time periods under study. The rows in the two tables show the earnings decile in the starting year (1980, 1984 and 1988, respectively) while the columns show the earnings decile based on the earnings level in the year of comparison (1984, 1988 and 1992, respectively). Each row and each column in the transition matrices sum to 100 per cent (within rounding error).

The entries in row D5 in the transition matrix for 1980-84 in Table 1, for example, show what happened to the 10 per cent of non-manual industrial workers who were in the 5th earnings decile in 1980. As can be seen, close to 35 per cent (i.e. some 3.5 per cent of all non-manual workers concerned) who were in the 5th decile in 1980 were still there four years later. An almost equally large proportion fell from the 5th to the 4th earnings decile between 1980 and 1984. Another 6.8 per cent fell to the 3rd decile. The other 27 per cent who were in the 5th earnings decile in 1980 had moved up to higher earnings deciles by 1984: over 17 per cent to the 6th decile, 6.5 per cent to the 7th decile, and some 3 per cent to even higher deciles.

The results reported in Table 1 indicate that some 48 per cent of the non-manual workers concerned were in their original decile in both 1980 and 1984. The degree of stability declined thereafter slightly: it was close to 46 per cent for the period 1984-88 and 44 per cent for the period 1988-92. Conversely, some 52 per cent of the investigated non-manual workers moved from one decile to another between 1980 and 1984, some 54 per cent between 1984 and 1988, and about 56 per cent between 1988 and 1992. Hence, there seems to have occurred a slight decline in stability over the 13 years under study.

Another general pattern displayed by the transition matrices is that wage stability is much more pronounced at the top and the bottom of the wage distribution. There is, in other words, less movement from the extremes, whereas between the extremes wage mobility into both higher and lower deciles is very common. In view of the fairly compressed wage structure of both non-manual and manual workers in Finnish industry, however, this result is not surprising; because of relatively small wage differentials it is easy to move from one decile into another also within short time periods.

Of the non-manual workers who were in the bottom decile (D1) in 1980 only one fourth had moved up the wage distribution by 1984, and most of them by one decile only. Of the non-manual workers who were in the top decile (D10) in 1980 merely one fifth had moved down the wage distribution by 1984, again mostly by one decile only. On the whole, the amount of wage mobility among non-manual workers turns out to be clearly lower at the top of the wage distribution compared to movement at the bottom and the middle of the wage distribution. This is, however, also to be expected in view of the much larger wage dispersion in the upper half of the wage distribution as shown in Figure 11 above.

Table 3. Selected information on wage mobility among non-manual and manual industrial workers over the years 1980-92

	Non-manual workers			Manual workers		
	1980-84	1984-88	1988-92	1980-84	1984-88	1988-92
%-share in same decile both years	48.0	45.6	44.0	29.4	33.4	31.2
%-share moving up one decile	15.9	15.8	16.4	16.5	16.9	15.0
%-share moving up two deciles	4.7	5.4	5.6	9.4	7.3	7.4
%-share moving down one decile	24.8	26.7	26.1	17.7	19.9	20.4
%-share moving down two deciles	3.4	3.3	3.8	9.3	9.1	9.3
%-share remaining in original decile or moving within one decile	88.7	88.2	86.6	63.5	70.3	66.6
%-share remaining in original decile or moving within two deciles	96.9	96.8	96.0	82.4	86.5	83.2
%-share in deciles 1-3 moving up	28.2	28.0	30.9	36.2	33.5	35.5
%-share in deciles 4-6 moving up	28.9	30.4	29.9	47.8	41.2	40.8
%-share in deciles 7-9 moving up	19.8	20.7	22.1	32.0	30.1	29.3
%-share in deciles 4-6 moving down	36.4	37.4	38.2	33.1	33.4	39.2
%-share in deciles 8-10 moving down	29.8	31.7	32.1	54.5	50.7	57.3

Source: Tables 1 and 2

Of those non-manual workers who moved within the wage distribution between 1980 and 1984, about 16 per cent moved up one decile while close to 25 per cent moved down one decile *(Table 3)*. In other words, about 41 per cent of all investigated non-manual workers moved only within one decile. Another 8 per cent moved within two deciles.

There was a minor increase in the movement in both directions after 1984. In particular, also between 1984 and 1988 close to 16 per cent of the non-manual workers succeeded in moving up to the next earnings decile. Between 1988 and 1992, the corresponding share was about 16½ per cent. The share of non-manual workers shifting in the opposite direction by one earnings decile was almost 27 per cent over the 4-year-period 1984-88, and some 26 per cent over the 4-year-period 1988-92.

All in all, in all three periods investigated 87-89 per cent of all non-manual workers either remained in their original decile or moved within one decile. When adding the percentages of non-manual workers moving within two deciles, this share amounts to as much as over 96 per cent. Hence, after four years there has not been much change in the pattern of wage

stability and wage mobility in the non-manual labour market of Finnish manufacturing, not even over the period 1988-92 which saw a radical drop in both aggregate output and employment.

The corresponding results for manual industrial workers reported in Tables 2 and 3 above imply that only some 30 per cent of the investigated manual workers were in the same decile in 1980 and 1984. Conversely, some 70 per cent of all manual workers moved from one decile to another between 1980 and 1984. These numbers indicate that the amount of mobility is much greater among manual than among non-manual workers. This is, however, not surprising in view of the much more compressed wage distribution observed among manual workers (cf. Figures 8, 11 and 12).

These two broad occupational categories differ also with respect to the development of stability over time; while the degree of stability has decreased among non-manual workers, it seems to have increased slightly among manual workers. The share of manual workers who remained in their original decile was below 30 per cent for the period 1980-84 but above 30 per cent for the periods 1984-88 and 1988-92.

The results obtained for manual workers further indicate that there is considerable movement also at the extremes, especially from the upper tail of the distribution. In particular, of the manual workers who were in the bottom decile (D1) in 1980 almost one third had moved up the wage distribution by 1984, but a major part of them by just one decile. The situation at the bottom of the wage distribution is thus fairly similar for non-manual and manual workers. Of the manual workers who were in the top decile (D10) in 1980, on the other hand, two of three had moved down the wage distribution by 1984: 26 per cent by one decile and another 15 per cent by two deciles. Despite a slight increase in stability in the top decile among manual workers after 1984, the situation still differs markedly from that of non-manual workers. Hence, the likelihood that a manual worker will remain in the bottom decile is much greater than the likelihood to remain in the top decile.

Of those manual workers who moved within the wage distribution between 1980 and 1984, some 16½ per cent moved up one decile while close to 18 per cent moved down one decile. Thus roughly 34 per cent of all manual workers concerned moved within one decile only. Another 19 per cent moved within two deciles.

There is no clear pattern of change over the three 4-year-periods investigated. The most conspicuous trend is an increase in the share of manual workers either remaining in their original decile or moving down the wage distribution by one decile, especially at the upper tail of the wage distribution. More precisely, close to 40 per cent of all manual workers who were in deciles 4-6 in 1988 had moved to a lower decile by 1992. In the two earlier periods under study, the corresponding share was some 33 per cent. Downward mobility in the wage distribution was equally strong for manual workers in the highest deciles (D8-D10).

These trends are also reflected in the overall share of manual workers who either remained in their original decile or moved within one decile; this share was 63½ per cent for 1980-84, some 70 per cent for 1984-88, and close to 67 per cent for 1988-92. When also accounting for the manual workers who moved within two deciles, these shares vary between 82 and 86 per cent. Thus, as for non-manual workers there appear to have been only marginal changes in wage mobility over the years 1980-92.

Following Hungerford (1993), various measures of the degree of association of an individual's decile rank in two years are given at the bottom of each transition matrix in Tables 1 and 2. The computing formulas for these measures are shown in the *Appendix Measures of association.* For further details, see Bishop et al. (1975).

The likelihood ratio statistic G^2 tests the null hypothesis that all the entries in each transition matrix are the same, i.e., that there is complete independence of the rows and columns in the matrix. It is distributed asymptotically as χ^2 with 81 degrees of freedom. The reported G^2-statistics imply that the null hypothesis of no association of an industrial worker's decile rank over the 4-year-periods investigated can be clearly rejected at any conventional significance levels.

The lambda asymmetric, in turn, indicates the improvement in predicting an individual's decile rank in the second year (the column variable) given information on his or her decile rank in the first year (the row variable). The range of lambda is 0-1. It will be equal to 0 when knowledge of an individual's decile rank in the first year is of no help in predicting his or her decile rank in the second year. Conversely, lambda will be 1 when knowledge of the row variable completely specifies the column variable. When falling between 0 and 1 lambda has a sampling distribution that is asymptotically normal. The means and asymptotic standard errors (ASE) of lambda given in Tables 1 and 2 suggest that knowing an industrial worker's decile rank in the wage distribution in one year is of some use in predicting his or her decile rank four years later.

The two last measures of association reported in Tables 1 and 2 are the contingency coefficient and Cramér's V. The former has a range between 0 and 1, while the latter has a range between -1 and 1. Comparison of these two measures over the three 4-year-periods investigated shows that they are approximately the same. In other words, the degree of association between an industrial worker's decile rank in one year and another has not changed over the three 4-year-periods under study. This holds for both non-manual and manual workers in Finnish manufacturing.

In sum, there seems to be much movement within the wage distribution of both non-manual and manual industrial workers, but generally it is not very great in either direction. In view of the fairly compressed wage structure among manual workers in particular, a greater amount of mobility through the entire wage distribution may have been expected.

Another noteworthy finding is the minor changes in overall mobility over the three 4-year-periods investigated. Some trends are discernible, though. The amount of mobility has increased among non-manual workers but has decreased among manual workers. Among non-manual workers a slightly greater proportion improved their decile rank over the years 1984-88 and 1988-92 compared to 1980-84. An opposite trend of about the same magnitude is observed among manual workers. As shown in the lower half of Table 3, this change has affected all levels in the wage distribution: bottom, middle as well as top deciles.

Also the overall amount of downward mobility among the two industrial worker categories appears to be roughly similar: an almost equal proportion of non-manual and manual workers has moved down to lower deciles. This downward mobility, however, seems to be strongly concentrated to drops by one decile only, especially among non-manual workers. There has also been a slight increase in the movement of both non-manual and manual workers down the wage distribution over the time periods investigated; in both worker categories and among manual workers in particular a greater proportion saw their relative decile position weaken over the period 1988-92 as compared to the periods 1980-84 and 1984-88. Also the probability of moving down has increased throughout the wage distribution over time.

Are these differences between the three 4-year-periods considered significant? One way of answering this question is to perform the Kolmogorov-Smirnov test, which is a distribution-free or nonparametric test.[3] More formally, the null hypothesis that two populations are identical is tested against the alternative that they are not. Applied to the transition matrices in Tables 1 and 2, the rows in the transition matrix can each be interpreted as representing separate distributions. This interpretation can be justified because the workers in each decile in the first year are distributed throughout the wage distribution in subsequent years and because the distributions vary notably from row to row in each transition matrix.

More precisely, the Kolmogorov-Smirnov test tests the hypothesis that the distribution of each row (say, row D1) in one transition matrix is the same as the distribution of the corresponding row in another transition matrix. The test statistics for the Kolmogorov-Smirnov test comparing the three transition matrices in, respectively, Table 1 and Table 2 amount at most to 0.8944. This is far less than the critical value of 1.360 at the 5 per cent significance level and even of 1.230 at the 10 per cent significance level.

Hence, the test statistics for the Kolmogorov-Smirnov test suggest that the null hypothesis of how each first year decile (rows D1 to D10) is distributed in subsequent years was the same in the three 4-year-periods investigated **cannot** be rejected at conventional significance levels. This holds for both non-manual and manual industrial workers.

---

[3] This test is explained in detail in Hollander & Wolfe (1973).

5.2. Wage mobility using fixed wage thresholds

So far, the analysis of mobility has been based on relative wage thresholds. This approach, however, sheds little light on whether or not the worker's wage level has factually changed: the observed shift in a worker's decile rank in the wage distribution may be due to a change in his or her wage level and/or in the decile thresholds.

Following Hungerford (1993), the analysis is therefore next repeated for fixed wage thresholds, where the wage thresholds for the first year are used also for the second year. More precisely, for 1984 (deflated by the CPI with 1980=100) the decile thresholds for 1980 were chosen, for 1988 (deflated by the CPI with 1984=100) the 1984 decile thresholds, and for 1992 (deflated by the CPI with 1988=100) the 1988 decile thresholds. The decile thresholds are listed in the Appendix, *Table A4*.

By using this procedure, any movement of individuals from one wage group to another is the result of a change in their real wage level. The results obtained when using fixed instead of relative wage thresholds are documented for non-manual workers in *Table 4* and for manual workers in *Table 5*. Each row in the transition matrices included in the two tables sums, as before, to 100 per cent. The column totals, on the other hand, need no longer sum to 100 per cent.

As can be seen from Tables 4 and 5, the mobility results obtained from using fixed thresholds are quite different from the results in Tables 1 and 3 obtained from using relative thresholds, which change from one year to another. As displayed in Table A4 of the Appendix, the decile thresholds have throughout increased substantially over the three time periods investigated. Without this notable upward shift in decile thresholds, a large majority of both non-manual and manual workers would already after four years have moved into the upper part of the wage distribution. This trend is, though, clearly weaker over the years 1988-92 than in the two earlier time periods under study due to a much slower growth in wages in the early 1990s as compared to the boom years in the 1980s (cf. Figure 2 above).

Comparison of Tables 4-5 and Tables 1-2 thus indicates that the observed changes in the relative wage position of non-manual and manual workers in Finnish manufacturing over the past 13 years can be explained mainly by a notable increase in decile thresholds. Downward mobility is, in other words, caused primarily by growth rates of individual wages being slower than the average and not by an absolute decline in wage levels.

The test statistics reported below each transition matrix in Tables 4 and 5 as well as the Kolmogorov-Smirnov test statistics are very close to those obtained for Tables 1 and 2. Hence, the same conclusions can drawn for Tables 4 and 5 with respect to the degree of association between a worker's decile rank, on the one hand, and the degree of variation in mobility and stability patterns over time.

Table 4. Transition matrices for non-manual workers in Finnish industry 1980-84, 1984-88 and 1988-92 based on fixed thresholds

Earnings decile in year 1980	1984 earnings ranking (%)										
	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	Sum
D1	**23.1**	52.0	21.2	2.7	0.5	0.3	-	-	-	0.2	100.0
D2	1.3	**21.7**	50.8	18.0	4.8	2.3	0.5	0.2	0.2	0.2	100.0
D3	-	2.0	**29.9**	36.9	17.7	7.8	3.8	1.3	0.3	0.2	100.0
D4	-	0.3	4.2	**27.5**	35.2	16.4	10.4	4.5	1.5	-	100.0
D5	-	-	-	7.3	**30.9**	35.7	17.0	6.5	1.5	1.0	100.0
D6	-	-	0.2	1.0	7.5	**32.9**	34.9	16.9	5.3	1.3	100.0
D7	-	0.2	-	0.7	1.2	8.5	**35.6**	35.1	16.4	2.5	100.0
D8	-	-	-	-	0.7	1.2	5.7	**40.4**	41.1	11.0	100.0
D9	0.2	-	-	-	0.2	0.3	1.0	6.7	**54.8**	36.9	100.0
D10	-	-	-	-	-	-	-	0.2	5.2	**94.7**	100.0
Sum	24.6	76.2	106.2	94.2	98.7	105.5	108.8	111.7	126.2	147.9	

Notes. Number of observations is 5989. Likelihood ratio statistic G^2 = 11936.03. Cramér's V = 0.52. Contingency coefficient P = 0.84. Lambda asymmetric = 0.38. ASE = 0.0078.

Earnings decile in year 1984	1988 earnings ranking (%)										
	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	Sum
D1	**20.4**	35.5	28.0	9.8	3.7	1.5	0.5	0.3	0.2	-	100.0
D2	0.2	**12.0**	42.8	27.0	10.0	5.3	1.4	1.0	0.3	-	100.0
D3	-	0.7	**12.2**	39.2	26.1	13.8	5.1	2.2	0.7	-	100.0
D4	-	-	0.7	**10.7**	32.4	33.4	15.4	5.4	1.2	0.8	100.0
D5	-	0.2	0.2	1.4	**8.0**	44.3	27.8	12.2	4.2	1.7	100.0
D6	-	-	0.2	0.2	1.2	**17.8**	41.9	26.0	10.5	2.2	100.0
D7	-	-	-	0.2	-	2.4	**20.0**	50.0	20.2	7.3	100.0
D8	-	-	-	-	0.2	0.5	2.4	**27.5**	48.7	20.7	100.0
D9	-	-	-	-	0.2	-	0.5	2.2	**35.0**	62.1	100.0
D10	-	-	-	-	-	0.2	0.3	0.2	1.2	**98.1**	100.0
Sum	20.5	48.4	84.0	88.4	81.8	119.1	115.4	127.1	122.2	193.0	

Notes. Number of observations is 5893. Likelihood ratio statistic G^2 = 11324.98. Cramér's V = 0.51. Contingency coefficient P = 0.84. Lambda asymmetric = 0.38. ASE = 0.0077.

Earnings decile in year 1988	1992 earnings ranking (%)										
	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	Sum
D1	**65.6**	24.8	7.1	1.2	0.6	0.4	0.2	0.2	-	-	100.0
D2	18.2	**44.6**	19.3	10.9	3.4	1.5	1.3	0.6	-	-	100.0
D3	0.6	20.7	**33.2**	26.1	10.0	3.4	2.7	1.7	1.0	0.6	100.0
D4	-	3.4	18.2	**36.8**	21.6	10.2	6.5	2.7	0.6	-	100.0
D5	0.2	0.4	2.9	20.5	**30.1**	24.0	13.6	6.0	1.9	0.4	100.0
D6	-	0.2	0.8	5.0	15.9	**36.0**	25.9	11.3	4.2	0.8	100.0
D7	-	-	0.2	1.1	4.0	18.4	**39.1**	25.3	9.4	2.5	100.0
D8	0.2	-	0.4	0.4	1.3	0.6	18.2	**43.0**	29.2	6.7	100.0
D9	-	-	0.2	-	0.4	1.0	1.7	15.9	**51.0**	29.9	100.0
D10	-	-	-	-	0.2	0.4	0.2	1.1	12.6	**85.4**	100.0
Sum	84.8	94.1	82.3	102.0	87.6	95.8	109.4	107.8	109.8	126.3	

Notes. Number of observations is 5216. Likelihood ratio statistic G^2 = 9735.67. Cramér's V = 0.51. Contingency coefficient P = 0.84. Lambda asymmetric = 0.39. ASE = 0.0080.

Table 5. Transition matrices for manual workers in Finnish industry 1980-84, 1984-88 and 1988-92 based on fixed thresholds

Earnings decile in year 1980	1984 earnings ranking (%)										
	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	Sum
D1	**63.1**	22.2	9.0	3.2	0.6	0.8	0.2	-	-	0.9	100.0
D2	14.9	**39.9**	27.5	8.7	3.2	1.3	1.3	0.8	1.1	1.3	100.0
D3	3.6	16.4	**26.9**	16.9	11.1	8.5	6.8	5.3	1.9	2.8	100.0
D4	0.9	3.0	13.4	**19.0**	16.4	11.5	10.4	13.7	7.3	4.3	100.0
D5	0.4	1.9	5.6	10.9	**13.5**	13.3	15.8	18.4	12.2	7.9	100.0
D6	0.4	0.6	3.4	5.3	13.4	**11.9**	13.2	18.5	21.5	12.0	100.0
D7	0.2	0.4	1.1	3.8	9.0	9.2	**13.7**	19.9	23.3	19.4	100.0
D8	-	0.6	0.8	1.7	5.1	6.6	9.2	**17.5**	29.8	28.8	100.0
D9	0.2	0.4	-	2.4	2.4	6.0	6.0	16.7	**27.8**	38.0	100.0
D10	0.4	0.2	0.8	1.1	2.6	2.4	3.6	10.2	25.2	**53.6**	100.0
Sum	84.0	85.5	88.4	73.0	77.3	71.5	80.1	121.0	150.1	169.1	

Notes. Number of observations is 5315. Likelihood ratio statistic G^2 = 5419.68. Cramér's V = 0.36. Contingency coefficient P = 0.73. Lambda asymmetric = 0.20. ASE = 0.0084.

Earnings decile in year 1984	1988 earnings ranking (%)										
	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	Sum
D1	**36.6**	32.5	17.4	6.9	2.9	1.3	0.4	0.4	0.3	1.2	100.0
D2	4.4	**22.4**	28.5	20.1	10.4	4.8	2.4	2.1	1.8	3.1	100.0
D3	0.3	4.6	**12.9**	29.1	22.4	12.8	6.8	4.6	4.0	2.6	100.0
D4	0.3	0.9	4.0	**13.7**	21.3	19.8	14.8	7.3	9.4	8.5	100.0
D5	0.1	0.3	0.9	4.4	**9.6**	14.3	20.7	21.5	14.4	13.8	100.0
D6	-	0.3	0.1	1.3	4.4	**9.0**	15.6	25.3	22.9	21.0	100.0
D7	-	-	-	0.7	2.2	5.4	**11.9**	19.5	26.4	33.8	100.0
D8	-	-	0.1	0.3	1.2	3.7	7.2	**9.7**	22.6	55.1	100.0
D9	-	-	0.3	-	-	1.5	2.2	5.9	**20.7**	69.4	100.0
D10	-	0.1	0.1	0.3	0.7	1.9	2.8	2.2	9.7	**82.1**	100.0
Sum	41.8	61.0	64.4	76.9	75.1	74.5	84.8	98.5	132.3	290.7	

Notes. Number of observations is 6803. Likelihood ratio statistic G^2 = 7932.21. Cramér's V = 0.38. Contingency coefficient P = 0.76. Lambda asymmetric = 0.16. ASE = 0.0072.

Earnings decile in year 1988	1992 earnings ranking (%)										
	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	Sum
D1	**55.9**	24.8	9.4	3.3	1.6	1.1	1.5	0.7	0.6	1.1	100.0
D2	9.9	**30.6**	23.1	13.6	8.6	4.6	4.2	2.0	1.8	1.5	100.0
D3	1.8	9.4	**20.6**	20.0	15.4	10.1	6.6	6.1	5.3	4.8	100.0
D4	0.7	3.5	8.8	**15.6**	16.7	13.4	10.7	10.8	9.2	10.5	100.0
D5	0.2	0.9	1.6	9.2	**12.7**	17.6	18.3	16.1	11.7	11.6	100.0
D6	-	0.6	0.9	2.6	6.8	**10.6**	19.6	20.9	20.4	17.6	100.0
D7	-	-	0.6	1.1	2.8	4.0	**11.0**	24.6	28.5	27.4	100.0
D8	-	-	0.2	0.6	1.1	4.0	8.3	**15.8**	32.7	37.4	100.0
D9	-	0.4	0.4	0.4	1.1	3.1	4.8	7.9	**25.1**	56.9	100.0
D10	-	0.2	0.7	0.6	0.9	2.6	3.5	7.9	16.5	**67.2**	100.0
Sum	68.5	70.3	66.3	66.8	67.7	71.2	88.5	112.9	151.8	235.8	

Notes. Number of observations is 5447. Likelihood ratio statistic G^2 = 5612.38. Cramér's V = 0.37. Contingency coefficient P = 0.74. Lambda asymmetric = 0.15. ASE = 0.0084.

5.3. The distribution of personal and job characteristics across deciles

Before analysing in more detail the stability and mobility patterns displayed in Tables 1 and 2, it might be of interest to look more closely at the overall distribution of individuals across deciles according to personal and job-related characteristics. Most probably the observed distribution of characteristics also affects individual stability and mobility in the wage distribution. This analysis is done using available background information on those non-manual and manual industrial workers who appear in the 1980-84 and 1988-92 subsets underlying the transition matrices in Tables 1 and 2 above.

Generally speaking, non-manual workers situated in the lowest wage decile (D1) in 1980 were to most part women (over 97 per cent), mostly young with a low education, little work experience and short seniority, performing clerical, primarily administrative, working tasks (see *Table A5* in the Appendix). The other extreme (D10) was dominated by men (close to 98 per cent); more precisely by middle-aged, well-educated men in upper-level non-manual positions with 10-29 years of work experience and the present employment relationship having lasted 5-14 years.

Compared to 1980, little had changed in the highest wage decile by 1992 (cf. *Table A6* in the Appendix). The lowest decile, in turn, was also in 1992 occupied mainly by women (close to 93 per cent). A major difference compared to the 1980 situation is, however, that in 1992 relatively more women with a secondary education were situated in the lowest decile. Compared to their counterparts in 1980, these lowest decile women had not only more vocational training but were also older (middle-aged) and had longer work experience and seniority.

Thus, the share of females declines rapidly when moving up the non-manual wage distribution both in 1980 and 1992, albeit a slightly greater share of women can be found in the higher wage deciles in 1992. Not surprisingly the average years of schooling increases steadily with wage decile. The most conspicuous change in the educational structure across deciles is a clear weakening by 1992 of the relative wage position of non-manual workers with a lower secondary education, i.e. with graduation from a vocational school. This trend shows up as an insignificant or even negative rate of return to lower secondary schooling as compared to a basic education in the non-manual wage equation estimations reported in Chapter 6.

Also the relative earnings position of older, more experienced non-manual workers has weakened markedly over the 13 years investigated. This holds for non-manual workers with long seniority, as well. Indeed, in 1980 the average years of work experience and seniority increased when moving up the wage distribution. In 1992 the situation was reversed! Also these trends show up strongly in the estimation results for non-manual workers presented in Chapter 6.

Unfortunately, the available background information is less rich for manual than for non-manual industrial workers. Some interesting patterns and trends may, nevertheless, be observed also among manual workers (see *Tables A7 and A8* in the Appendix). In 1980 over two thirds of the manual workers located in the bottom wage decile (D1) were women, a majority of whom had at most completed only a basic education. Furthermore, these lowest-pay manual workers were mainly middle-aged, had fairly long work experience and were to most part working either in the textile and clothing industry or in manufacturing of wood products. The top decile, in turn, was dominated by men (to over 96 per cent), mainly 30-39 years old with a completed vocational education and working primarily in manufacturing of metal products.

Opposite to their non-manual counterparts, female manual workers do not seem to have been able to improve their relative wage position over the past 13 years. On the contrary, by 1992 there had been a clear shift of female manual workers into deciles in the lower half of the wage distribution. On the whole, though, the overall pattern of a strong concentration of both non-manual and manual male workers into higher wage deciles and of non-manual as well as manual female workers into lower wage deciles has changed only marginally over the years 1980-92.

Furthermore, comparison of the distribution of human capital variables (schooling, age, work experience) across manual wage deciles in 1980 and 1992 displays the by now well documented labour market consequences of the recession years in the early 1990s and the "first in - first out" policy frequently pursued by employers forced to reduce their personnel. More precisely, the rapidly worsening labour market situation starting in mid-1990 affected strongly especially young, vocationally trained people. This is reflected in a remarkably low share of young, less experienced manual workers in all wage deciles in 1992. It is noteworthy that this phenomenon has left the pattern of high-pay and low-pay industry sectors roughly unchanged.

Finally, the relative wage position of manual workers seems to depend largely also on various pay-related factors. As displayed in Tables A7-A8 in the Appendix, upward mobility in the wage distribution seems to require a wage comprising a notable amount of piece-rate pay and/or various bonuses as well as shift work (including sunday work) and compensation for unfavourable working conditions. These prerequisites were even more outstanding in 1992 than in 1980. The only exception is compensation for unfavourable working conditions, the role of which had weakened remarkably by 1992.

Another noteworthy trend is observed for payed overtime. In particular, the share of manual workers working overtime was in all wage deciles clearly lower in 1992 than in 1980. Also the amount of overtime hours was larger in 1980. This finding conflicts sharply with the alleged increase in overtime over the recession years as a means of avoiding new employment. The only dramatic increase is observed for the share of manual workers in

shift work. The question of overtime in Finnish manufacturing definitely requires further analysis.

Above the average personal and job characteristics across deciles in 1980 and 1992 have been briefly analysed and compared. An alternative, more constricted approach is to look for trends in the average decile position of selected personal and job characteristics. This information is found in *Table 6* for the two industrial worker categories under study. More precisely, the table shows the change in the average decile by characteristic over the four-year-periods 1980-84 and 1988-92. Since the analysis is restricted to industrial workers observed both in the starting year (1980, 1988) and the end year (1984, 1992), the table provides a general picture of the importance of different characteristics not only for the workers' relative position but also for their movement in the wage distribution.

The figures reported in Table 6 for non-manual workers indicate that gender, human capital endowments, working tasks, and industry sector affect strongly the relative wage position of an individual non-manual worker. Comparison of the average decile by characteristic in 1980 and 1984 displays few changes. The only conspicuous change is a notable weakening of the relative earnings position of older, more experienced non-manual workers with the current employment relationship having lasted over 10 years. In other words, these characteristics tend to imply relatively slow wage growth.

The trend of rapid upward mobility in the non-manual wage distribution observed among young people with little work experience and short seniority strengthened in the boom years 1984-88. Otherwise the period 1984-88 was very similar to the 1980-84 period both when it comes to the absolute level of the calculated average decile for the various characteristics and with respect to the changes in the average decile level over the next four years.

In view of this, the notable decline by 1988 in the importance of formal education and, especially, of more work experience and a long employment relationship is hardly surprising. An even more interesting finding is, however, that the trends observed in the average decile of the various characteristics over the next four years up to 1992 are roughly identical to those observed over the periods 1980-84 and 1984-88. In other words, it seems that the recession years in the early 1990s have not affected to any notable extent the wage development of those non-manual industrial workers who succeeded in retaining their job. Irrespective of the business cycle, their relative wage position has followed, as it seems, deeply rooted wage policy patterns. Obviously this also explains the remarkably stable relative wages of non-manual workers over the years 1980-92 (cf. Figure 11 above).

The figures reported in Table 6 for manual workers reveal a pattern that differs in several important respects from that observed for non-manual workers. In particular, the average decile levels calculated for manual workers of different age point to strongly concave age-wage profiles, implying that younger and older manual workers are generally found in lower

Table 6. Average decile of selected personal and job characteristics in 1980, 1984, 1988 and 1992 for non-manual and manual industrial workers*

Characteristic	Non-manual workers				Manual workers			
	1980	1984	1988	1992	1980	1984	1988	1992
Males	6.9	6.9	6.7	6.7	6.2	5.9	6.2	6.2
Females	3.0	3.1	3.2	3.2	3.2	4.5	3.2	3.2
Human capital:								
Lower basic, ≤ 7 years	3.8	3.5	3.5	3.3	3.2	4.3	5.5	6.2
Upper basic, 9 years	3.6	3.6	3.5	3.3	4.5	4.9	4.2	6.0
Lower secondary, 11 y.	4.4	4.3	4.0	4.0	5.3	5.4	4.9	5.1
Upper secondary, 12 y.	5.9	5.9	5.4	5.4	7.5	6.3	7.0	5.3
BA level	8.1	8.3	7.5	7.5	-	-	-	-
MA level	9.1	9.2	8.6	8.8	-	-	-	-
Licentiate	9.6	9.6	9.4	9.2	-	-	-	-
Doctor	9.8	9.6	9.6	9.6	-	-	-	-
General education	3.8	3.7	3.7	3.6				
Humanities	6.8	6.7	5.9	5.5				
Economics	8.7	9.0	8.3	8.3				
Law	9.8	10.0	9.4	9.8				
Commerce	4.5	4.8	4.4	4.4				
Agriculture	7.2	7.3	6.4	6.8				
Mathematics	8.4	8.4	8.4	8.4				
Technology	7.1	7.0	6.6	6.6				
Medicin	6.3	6.4	5.7	6.2				
Other programmes	5.4	5.8	5.4	5.8				
Age < 20 years	1.0	-	1.0	-	3.7	5.3	3.6	-
Age 20-24 years	1.9	1.2	2.1	1.6	4.9	4.9	4.4	4.5
Age 25-29 years	4.1	2.8	4.2	3.8	5.5	5.4	5.5	5.3
Age 30-34 years	5.5	4.9	5.2	5.2	6.1	5.7	5.7	5.7
Age 35-39 years	6.2	5.8	5.6	5.5	5.8	5.9	5.8	5.8
Age 40-44 years	6.2	6.1	6.0	5.6	5.6	5.5	5.7	5.8
Age 45-49 years	5.9	5.9	6.2	5.8	5.3	5.5	5.4	5.4
Age 50-54 years	6.1	5.6	5.8	5.7	4.7	5.0	5.2	5.3
Age 55-59 years	6.2	5.8	6.5	5.6	4.8	4.9	4.8	5.0
Age ≥ 60 years	7.1	5.7	5.4	5.8	3.4	5.2	4.4	4.6
Experience < 5 years	4.2	7.6	6.1	7.4	4.8	5.1	4.3	7.1
Experience 5-9 years	4.4	5.8	5.5	6.2	5.4	5.5	4.8	4.9
Experience 10-14 years	5.7	5.2	5.3	5.6	6.0	5.5	5.9	5.6
Experience 15-19 years	6.0	5.3	5.3	5.2	5.9	5.9	5.8	5.8
Experience 20-29 years	6.3	5.5	5.5	5.1	5.6	5.6	5.7	5.5
Experience 30-39 years	6.7	5.2	5.3	4.9	4.7	5.1	5.0	5.3
Experience ≥ 40 years	6.4	5.0	4.7	4.7	3.2	4.7	4.6	5.4
Seniority < 5 years	5.1	6.0	5.2	6.1				
Seniority 5-9 years	5.3	5.3	5.8	5.5				
Seniority 10-14 years	5.8	5.3	5.5	5.8				

Table 6. (cont.)

Characteristic	Non-manual workers				Manual workers			
	1980	1984	1988	1992	1980	1984	1988	1992
Seniority 15-19 years	5.9	5.8	5.6	5.2				
Seniority 20-29 years	6.0	5.7	5.7	5.4				
Seniority 30-39 years	5.7	5.4	5.4	5.1				
Seniority ≥ 40 years	5.8	5.4	4.7	4.9				
Occupational status:								
Technical jobs	5.7	5.5	5.3	5.2				
Clerical jobs	3.2	3.2	3.2	3.0				
Upper-level non-manual	8.8	8.8	8.3	8.2				
Working task:								
R&D	6.4	6.4	6.1	6.2				
Production	6.5	6.3	6.3	6.2				
Procurement	4.8	4.8	4.6	4.5				
Sales	6.4	6.6	6.4	6.3				
Customer relations	3.2	3.8	4.6	4.8				
Administration	3.7	3.8	3.7	3.7				
Industry sector:								
Textile	4.3	4.0	4.6	4.2	1.8	3.7	1.8	1.8
Clothing	3.5	3.4	2.9	3.3	1.3	5.0	1.2	1.2
Manuf. of wood prod.	4.8	4.6	4.5	4.4	2.5	3.5	2.4	2.2
Manuf. of paper prod.	6.0	6.1	6.2	5.8	6.4	6.8	7.0	6.8
Manuf. of metal prod.	5.7	5.7	5.5	5.5	6.4	5.5	5.9	6.0
Other manufacturing	5.6	5.6	5.6	5.6	-	-	-	-
Head offices	5.0	5.5	6.0	5.0	-	-		-
Construction	5.4	5.5	5.8	6.0	-	-		-
Other sectors	5.1	5.1	4.9	5.1	-	-		-
Pay-related variables:								
Shift pay	6.4	6.4	6.4	6.5	5.7	5.9	6.0	5.9
Bonus pay	6.5	6.6	6.5	6.1				
Fringe benefits	7.0	7.3	7.5	7.7				
Hourly (= basic) wage only					5.2	5.4	5.2	5.2
Piece-rate pay only					4.6	4.7	4.4	4.1
Mix of pay schemes					6.0	5.8	5.5	5.8
Sunday work					6.1	6.1	6.2	6.6
Compensation for bad working conditions					6.7	6.2	6.6	6.2
Overtime work					5.5	5.5	5.5	5.6
Regional location:								
High cost-of- living areas	5.7	5.7	5.7	5.8	5.8	5.4	5.7	5.7
Low cost-of- living areas	5.4	5.3	5.3	5.2	5.4	5.5	5.4	5.4
No. of observations	5989	5989	5893	5893	5315	5315	5447	5447

* The table gives the average decile by characteristic for the starting year and the end year of two periods, 1980-84 and 1988-92, for workers observed at both points in time. In other words, the individuals are identical to those in the transition matrices in Tables 1 and 2 above.

wage deciles than middle-aged manual workers. Not surprisingly the same pattern is observed for work experience since the information on experience refers to potential work experience as derived from the individuals' age and years of schooling. The strong impact of industry sector and various pay-related factors on the relative wage position of an individual manual worker is highly evident also in Table 6.

Comparison of 1980 and 1984 indicates that the wages of younger, less educated and less experienced manual workers grew, on average, much faster than the wages of vocationally trained, older and more experienced manual workers. This is also to be expected in view of the wage agreements in force at that time, emphasizing minimum wages and extra wage lifts for low-pay manual workers. The notable improvement in the relative wage position of women over the years 1980-84 is most likely mainly explained by the relatively rapid wage growth in the female-dominated textile and clothing industries.

Comparison of the 1980-84 period with the two latter periods reveals no clearcut trends in the average decile levels of the various characteristics available for manual workers. The observed changes seem to be more or less random, continuously adjusting the relative wage position of manual workers differing in personal and job characteristics back to some "preferred" wage distribution. This is a potential explanation for the minor difference in the average decile of the various characteristics between 1980 and 1988 as well as for the negligible changes in relative manual wages over the years 1980-92 (cf. Figure 12 above). These "random adjustments" seem, though, to have been larger in the periods 1980-84 and 1984-88 as compared to the period 1988-92, which is characterized by a minimum of variation.

In conclusion, personal and job-related characteristics affect substantially the relative wage position of both non-manual and manual industrial workers. Also their movement within the wage distribution is highly influenced by these same characteristics. Accordingly, attempts have often been made to explain the individuals' position and movement in the wage distribution in terms of various background characteristics. This is, however, straightforward to do only if it can be assumed that there is no selectivity problem present in the analysis, i.e., that there is no selection of individuals into the samples used in explaining the observed patterns. The next subsection deals briefly with this mostly neglected problem in studies of wage/income stability and mobility.

5.4. The possibility of a selection problem

When examining wage mobility between two years, the individuals have to be in the sample in both years. This definitely introduces into the analysis the possibility of a selectivity problem. Specifically, those appearing in the sample in both years may represent more able or successful workers with a larger probability of moving up the wage distribution, while

those workers not observed in the second year may have a larger probability of remaining in the bottom deciles or becoming unemployed. Hence, the potential presence of a selectivity problem may in part explain the small changes in the pattern of mobility observed even for the period 1988-92 despite of rapidly growing unemployment rates.

A simple way of investigating the potential presence of a selectivity problem of the type described above is to look at the distribution across deciles of those individuals who are no longer observed four years later, i.e. in the second year (1984, 1988 resp. 1992). A first intuitive reason for not being observed in the second year is that the person has retired either due to age or by utilising the strongly expanded early retirement arrangements. Another reason is, of course, that the person has become unemployed.

A third major reason originating in the limited coverage of the data set used in the present study is that the person has moved to work with an employer that is not a member of the Confederation of Finnish Industry and Employers; that is, the person has moved from manufacturing to work in the private or the public service sector. Obviously this latter explanation played a more outstanding role in the periods 1980-84 and 1984-88 than in the period 1988-92. Although there is no possibility of distinguishing between the reasons behind a person's "dropout", the figures in *Table 7* seem to support this contention.

The table shows that among both non-manual and manual industrial workers one fourth of all dropouts have occurred in the two lowest deciles (D1-D2). Moreover, the proportion of all persons in each decile having dropped out over the next four years has increased substantially in all wage deciles among both non-manual and manual workers over the three 4-year-periods investigated. Among non-manual workers, for instance, close to 40 per cent of all persons loacted in the lowest decile in 1988 had dropped out by 1992. The corresponding share for the lowest-pay manual workers was some 44 per cent.

5.5. Characteristics of movers, stayers and leavers

The above analysis of the occurrence of dropouts in the three 4-year-periods under study clearly points to the presence of a selectivity problem. In particular, the occurrence of dropouts varies considerably across deciles and has also developed differently over time. It may, therefore, be of interest to briefly compare the characteristics of movers, stayers and "leavers". The average characteristics of stayers, upward movers, downward movers and leavers are reported in *Appendix Table A9* for non-manual workers and in *Appendix Table A10* for manual workers. For convenience, this information is provided for two years only, 1980 and 1988. Besides, the pattern for 1984 can approximately be described as an average of the patterns observed for 1980 and 1988.

Table 7. The distribution across deciles of non-manual and manual workers not observed in the second year (1984, 1988 resp. 1992)

Decile	Drop-outs in 1980-84		Drop-outs in 1984-88		Drop-outs in 1988-92	
	Share of all drop-outs, %	Share of all persons in the decile, %	Share of all drop-outs, %	Share of all persons in the decile, %-	Share of all drop-outs, %	Share of all persons in the decile, %
Non-manual workers:						
D1	13.7	31.8	13.2	34.0	13.1	39.3
D2	11.2	27.6	11.0	30.0	11.9	36.9
D3	9.7	24.8	9.8	27.6	10.3	33.7
D4	10.3	26.0	9.2	26.2	10.6	34.3
D5	10.5	26.4	10.8	29.6	9.5	31.8
D6	9.5	24.5	9.8	27.6	8.5	29.4
D7	9.1	23.6	8.9	25.8	9.8	32.6
D8	9.2	23.9	9.6	27.3	9.1	31.0
D9	8.0	21.4	8.8	25.6	8.6	29.6
D10	8.8	23.1	8.7	25.3	8.6	29.7
All	*100.0*	*25.4*	*100.0*	*28.0*	*100.0*	*33.0*
Manual workers:						
D1	14.4	38.5	13.0	40.6	14.2	44.3
D2	12.7	35.5	11.9	38.6	11.3	38.7
D3	11.8	33.9	10.4	35.3	10.6	37.2
D4	11.4	33.1	10.4	35.3	10.2	36.3
D5	9.7	29.6	9.9	34.2	10.4	36.8
D6	9.9	30.1	9.6	33.7	10.2	36.3
D7	8.4	26.7	9.8	34.1	9.4	34.5
D8	7.8	25.3	8.9	31.9	8.0	31.0
D9	6.6	22.3	8.4	30.5	7.8	30.3
D10	7.1	23.6	7.7	28.8	7.8	30.3
All	*100.0*	*30.3*	*100.0*	*34.5*	*100.0*	*35.8*

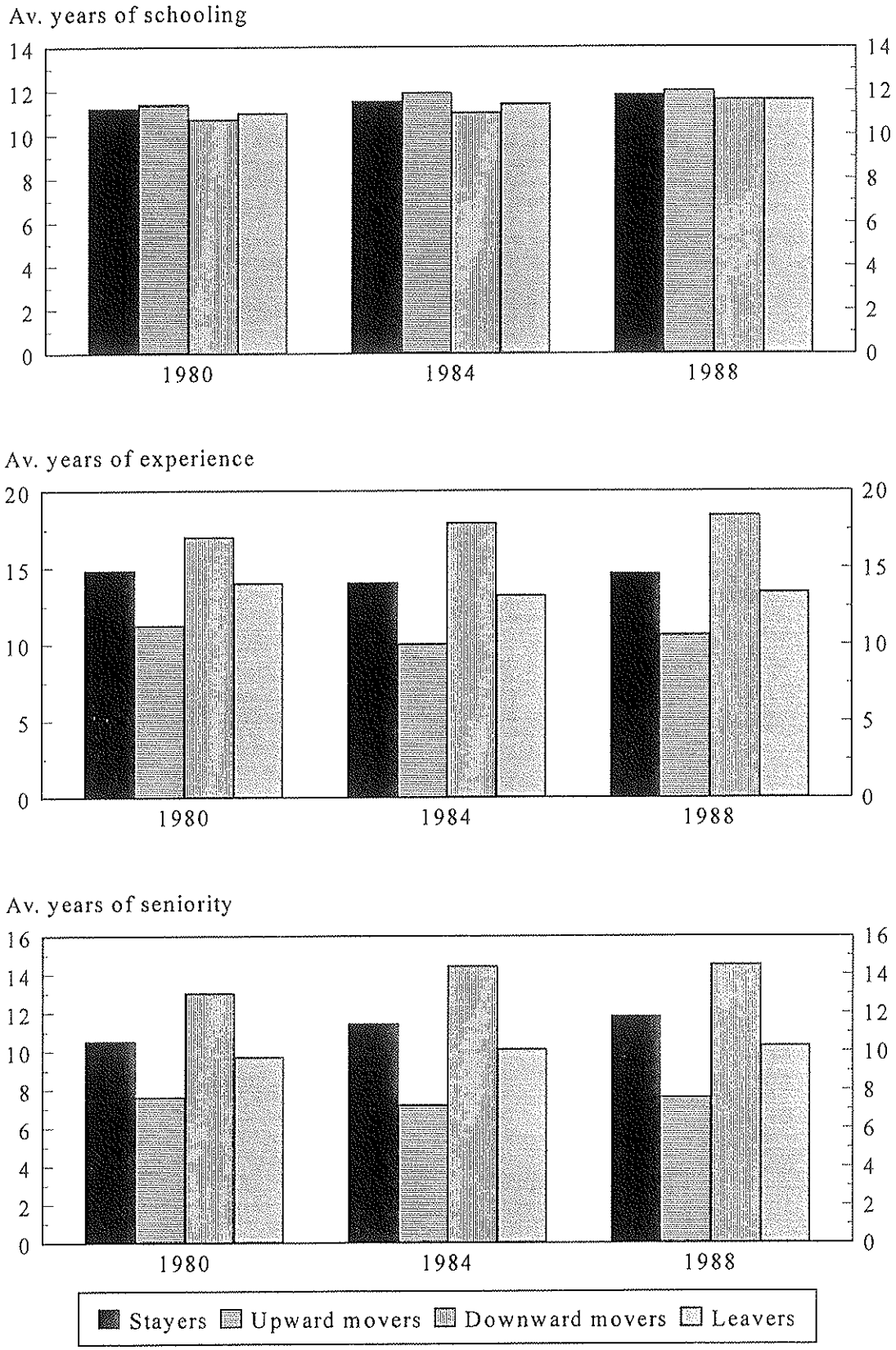
The overall impression mediated by Tables A9 and A10 in the Appendix is that the average personal and job-related characteristics of stayers, upward movers, downward movers and leavers differ notably among both non-manual and manual industrial workers. In particular, the upward movers among non-manual workers are, on average, well-educated young people with comparatively short work experience and seniority. The downward movers, on the other hand, have to most part less formal education and much longer work experience and seniority than their counterparts among stayers, upward movers and leavers. The stayers, in turn, can be argued to represent an average of all non-manual workers in the wage distribution, whereas the leavers fall inbetween the category of stayers and upward movers.

These trends in the average characteristics of stayers, upward movers, downward movers and leavers have clearly strengthened over time. The most conspicuous trend is that the importance of human capital endowments in identifying these four categories has increased remarkably in the 1980s. Indeed, by 1988 the differences in average job-related characteristics across stayers, upward movers, downward movers and leavers had turned almost negligible. Simultaneously the negative impact on a non-manual worker's relative wage position of a low formal eduaction and long work experience and seniority had increased substantially. These trends are displayed in *Figure 18*.

The average characteristics of stayers, upward movers, downward movers and leavers among manual workers and the trends observed in these characteristics are in several respects very similar to those observed for non-manual workers. In particular, a large majority of manual workers moving up the wage distribution over a 4-year-period are young. In contrast, those having experienced a weakening in their relative wage position have, on average, been fairly long in the labour market. As for non-manual workers, these trends have strengthened in the 1980s. At the same time the role of job-related characteristics on the individual's relative wage position has weakened markedly also among manual workers.

The above analysis has clearly shown that the average personal and job-related characteristics of stayers, upward movers, downward movers and leavers differ substantially. In other words, the relative wage position of an individual at some particular point in time is influnced by his/her original (= starting year) position in the wage distribution, his/her mobility in the wage distribution as well as by those leaving. In explaining observed trends in the relative wage position of wage earners one should, as a consequence, account for all these selectivity-related factors. If this selectivity problem is non-negligible, the obtained parameter estimates will otherwise be inconsistent. A study employing this approach to the data used in the present study is under work.

Figure 18. Average years of schooling, work experience and seniority for stayers, upward movers, downward movers and leavers in 1980 and 1988, non-manual workers



6. RETURNS TO EDUCATION AND EXPERIENCE

A growing body of international evidence indicates that the trends in overall earnings differentials largely reflect changes in earnings differences across education and age groups. In other words, the decline in earnings differentials in the 1960s and 1970s seems to be in part the result of declining earnings differentials between education and age groups. In contrast, the increase in earnings differences that has be observed in a majority of OECD countries in the 1980s is seen to be partly explained by increasing earnings differentials across education and age groups *(OECD Employment Outlook 1993)*.

In view of the roughly unchanged wage differentials both between and within crucial worker categories in Finnish industry over the years 1980-92 it could, therefore, be expected that the earnings differentials by eduaction and age have also remained unchanged. This does not, however, seem to be the case.

Results obtained from estimating broadly defined earnings equations of the Mincer type[4] suggest that the average rate of return to formal education has declined in the 1980s in all three non-manual worker categories under study. As can be seen from *Figure 19*, this decline seems, however, to have stopped during the recession years in the early 1990s. Also the return to different levels of education has declined substantially, especially among highly educated non-manual workers *(Figure 20)*.

Another noteworthy result is the extremely weak - and occasionally even negatively influenced - earnings position of non-manual workers with a lower-level secondary education, i.e. with a few years in vocational school beyond compulsory schooling, as compared to non-manual workers with only a basic education. In other words, the incentives to pursue a formal education are weakest at the beginning of the individuals' "educational career".

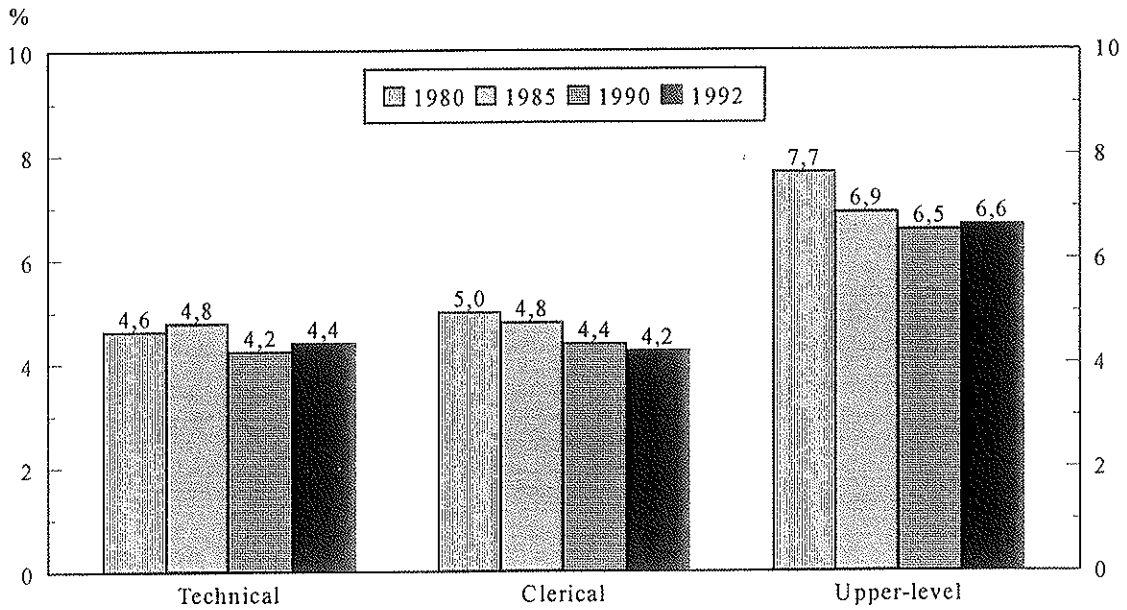
The estimation results suggest that also the earnings effects of work experience have weakened markedly in the 1980s in all three non-manual worker categories *(Table 8)*. This means that the earnings differentials between more and less experienced non-manual workers have narrowed. In other words, the relative earnings position of young people entering the labour market for the first time was much stronger in 1990 than in 1980.

---

[4] Log non-manual normal hourly wages are regressed on a vector of explanatory variables including formal education (degree and field), work experience, seniority, gender, type of working tasks, branch, plant size, region, and various type of pay compensations such as fringe benefits (see further Asplund (1993)).

Log manual normal hourly wages are regressed on a vector of explanatory variables including earnings code (proxy for formal education), age, gender, type of working tasks, various pay variables, plant size, and region (see further Asplund (1994b)).

Figure 19. Average return to an additional year in postcompulsory schooling for three non-manual worker categories, 1980-92



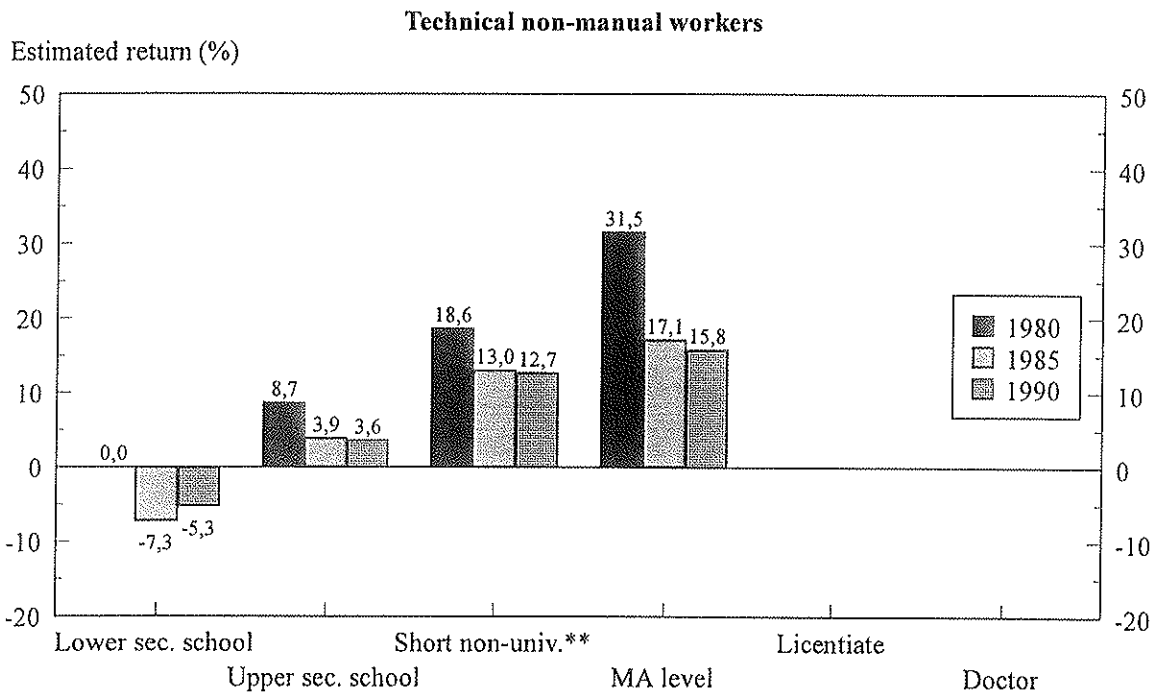
The results further indicate that the length of the present employment relationship (seniority) has a minor impact on the earnings of non-manual workers employed in industry. Indeed, the estimation results imply that by the year 1990 this earnings effect had totally disappeared in all three non-manual worker categories.

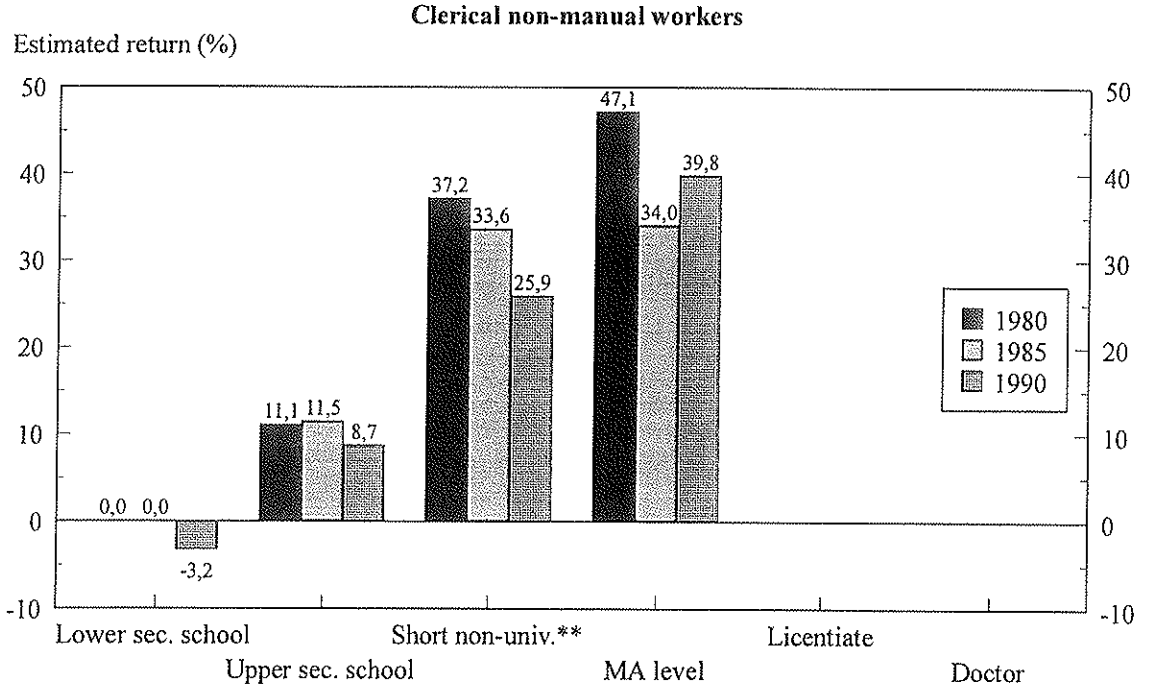
Finally the results show that the acquired human capital can explain only a declining share of the earnings differentials observed among non-manual workers in Finnish industry. More exactly, the earnings level of non-manual workers seems today to reflect less of the knowledge and skills of non-manual workers, as measured by traditional human capital variables, than at the beginning of the 1980s.

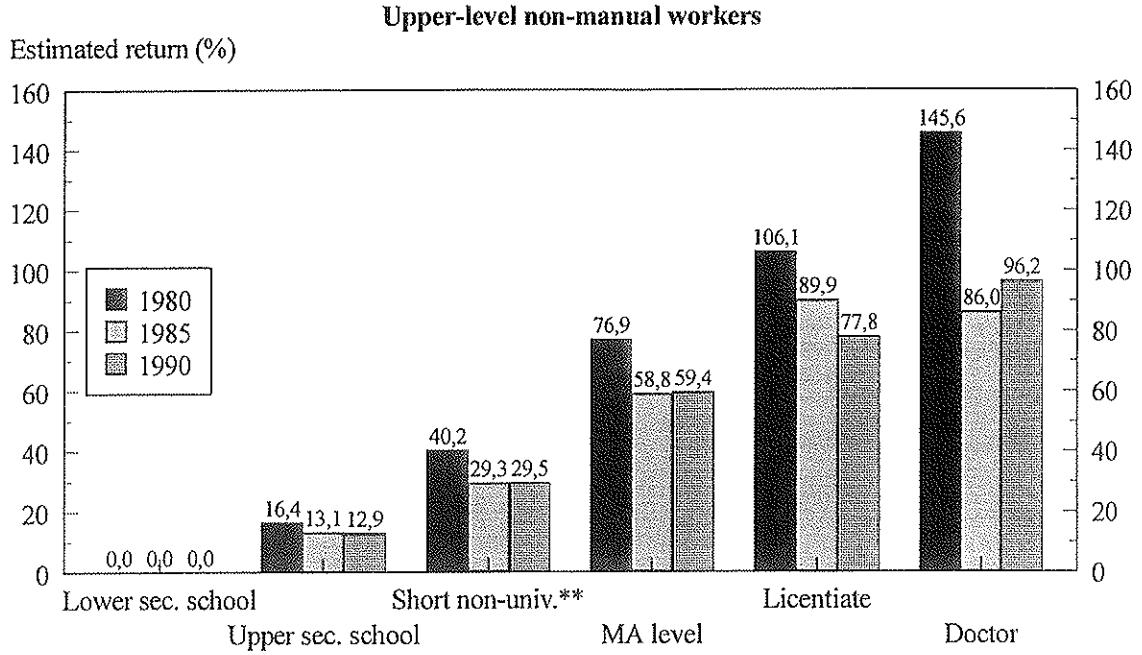
The same overall trends are observed among manual workers in Finnish industry. When measuring the skills of manual workers by means of their earnings code and age, the results obtained clearly indicate that the effects on earnings of both skills proxies have weakened in the 1980s *(Figure 21 and Table 9)*. This means that the earnings differentials between manual workers of different age and belonging to different earnings codes have narrowed.

The only exception to this is the textile industry, where the effects on manual wages of acquired skills seem to have strengthened in the 1980s. In other words, the acquired human capital of textile manual workers (measured by earnings code and age) were more highly rewarded in 1990 than in 1980. In manufacturing of clothing, wood, paper and metal products, manual workers have faced either stable or declining returns to their acquired human capital.

Figure 20. Estimated rate of return to different levels of education compared to completed basic education only by non-manual worker category, 1980-90*







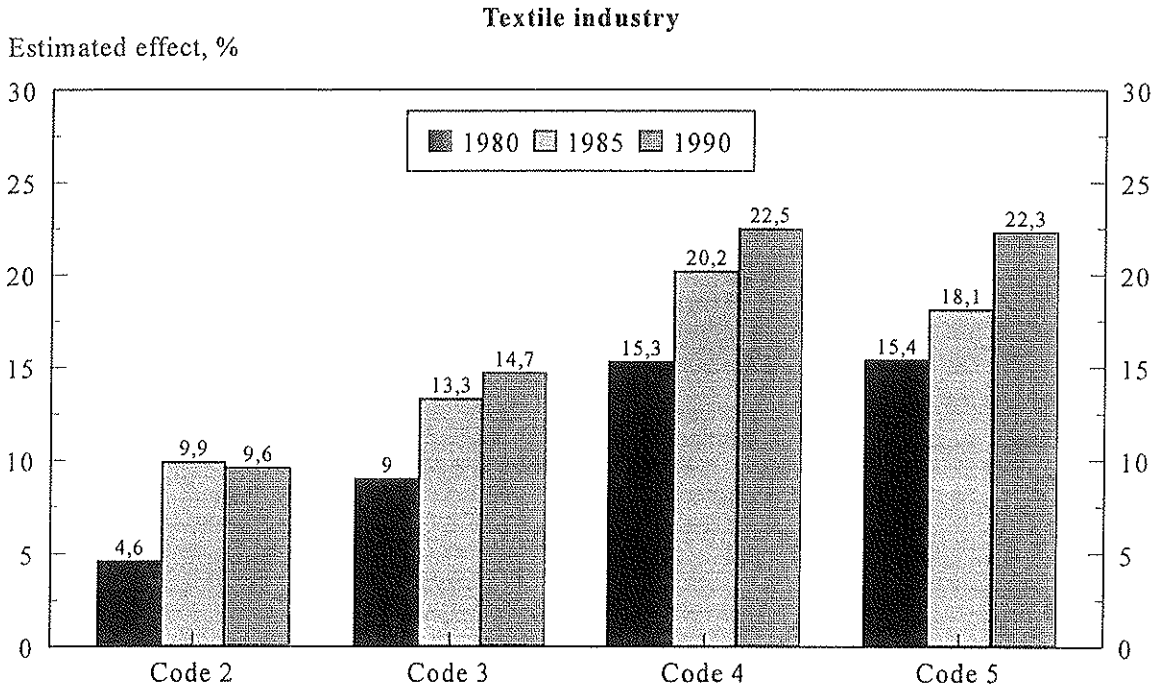
* 0,0 indicates statistically insignificant estimate.
** incl. BA level.

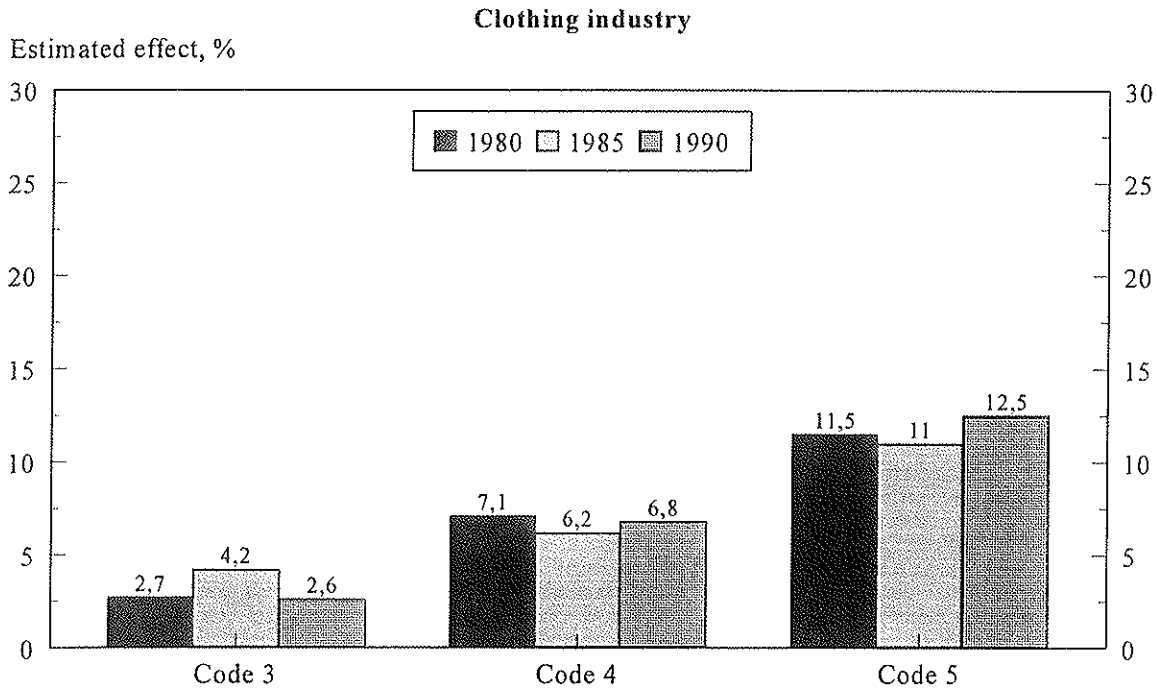
Table 8. Average cumulative growth (%) in non-manual industry wages attributable to different numbers of years of work experience since labour market entrance

Non-manual worker category	Experience, in years							Max of profile, %	Obtained at experience
	5	10	15	20	25	30	35		
Technical:									
1980	10.0	18.9	26.5	32.3	36.2	37.8	37.2	37.9	31
1985	11.1	21.0	29.4	35.6	39.4	40.5	38.9	40.5	30
1990	8.4	15.9	22.2	27.2	30.7	32.4	32.4	32.7	32
Clerical:									
1980	9.5	18.0	25.0	30.2	33.4	34.4	33.2	34.4	30
1985	9.6	18.4	25.9	31.9	36.0	38.2	38.3	38.5	33
1990	6.8	13.1	18.6	23.4	27.2	29.9	31.6	32.0	40
Upper-level:									
1980	26.8	53.7	78.4	98.0	110.2	113.6	107.6	113.6	29
1985	23.6	47.3	69.0	86.9	99.1	104.3	102.0	104.5	31
1990	19.4	38.4	55.7	69.9	80.0	85.0	84.5	85.5	32

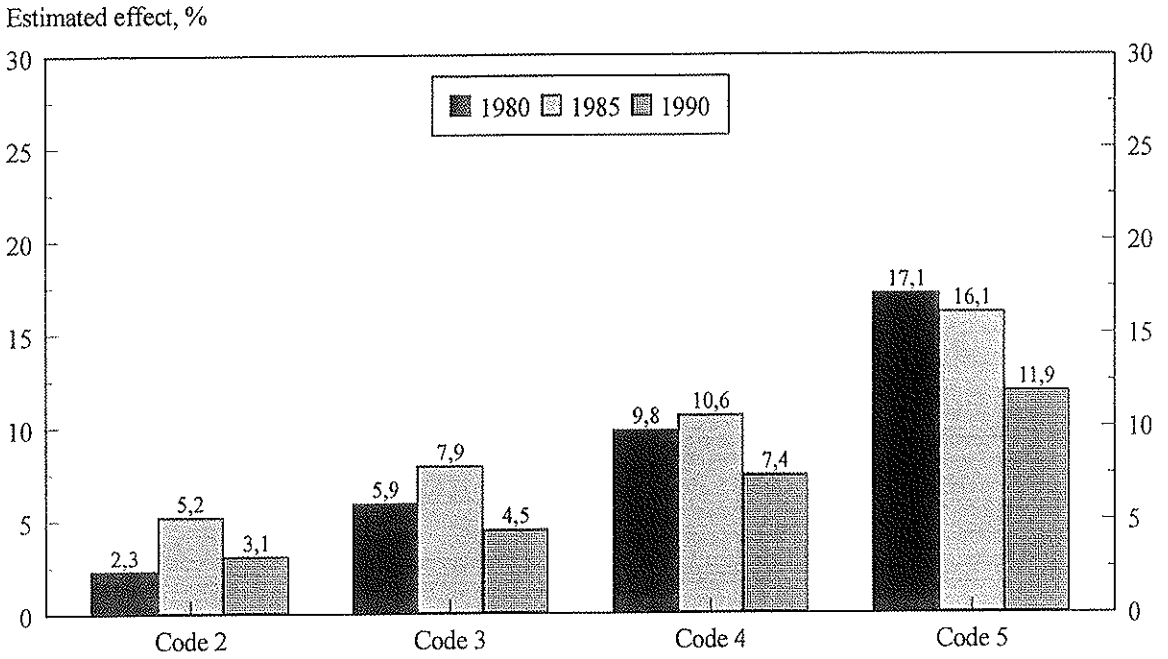
Note. The figures in the last two columns indicate the experience level (in years) where the experience-wage profile reaches its maximum.

Figure 21. Estimated wage differentials across earnings codes for five manual worker categories, 1980-90, the reference group being the lowest earnings code in use in each branch

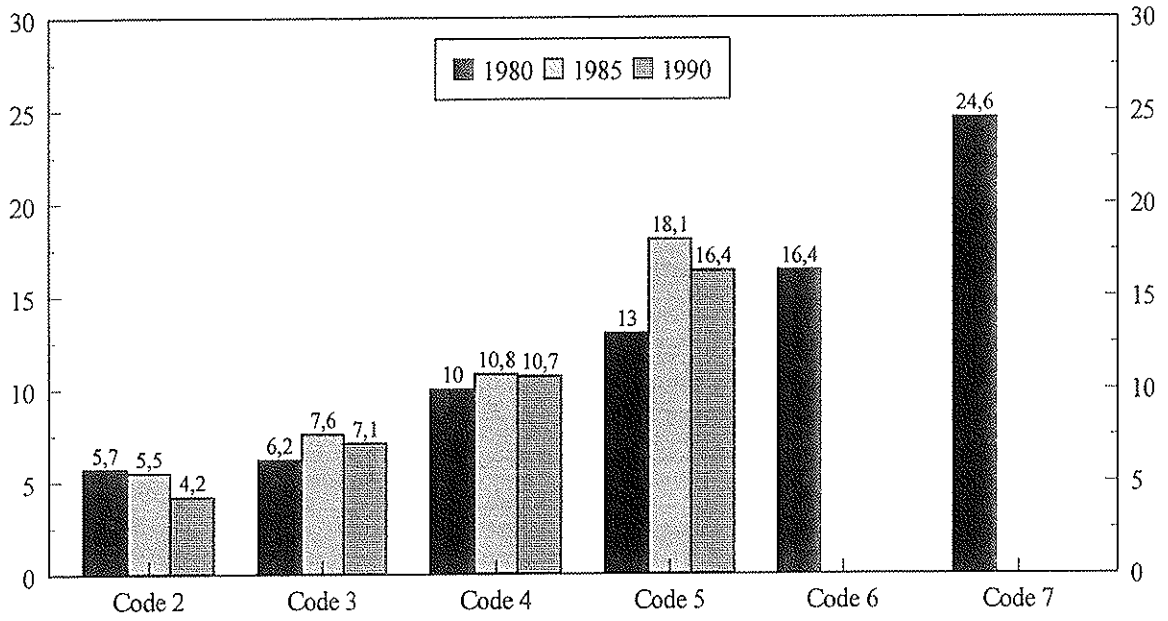




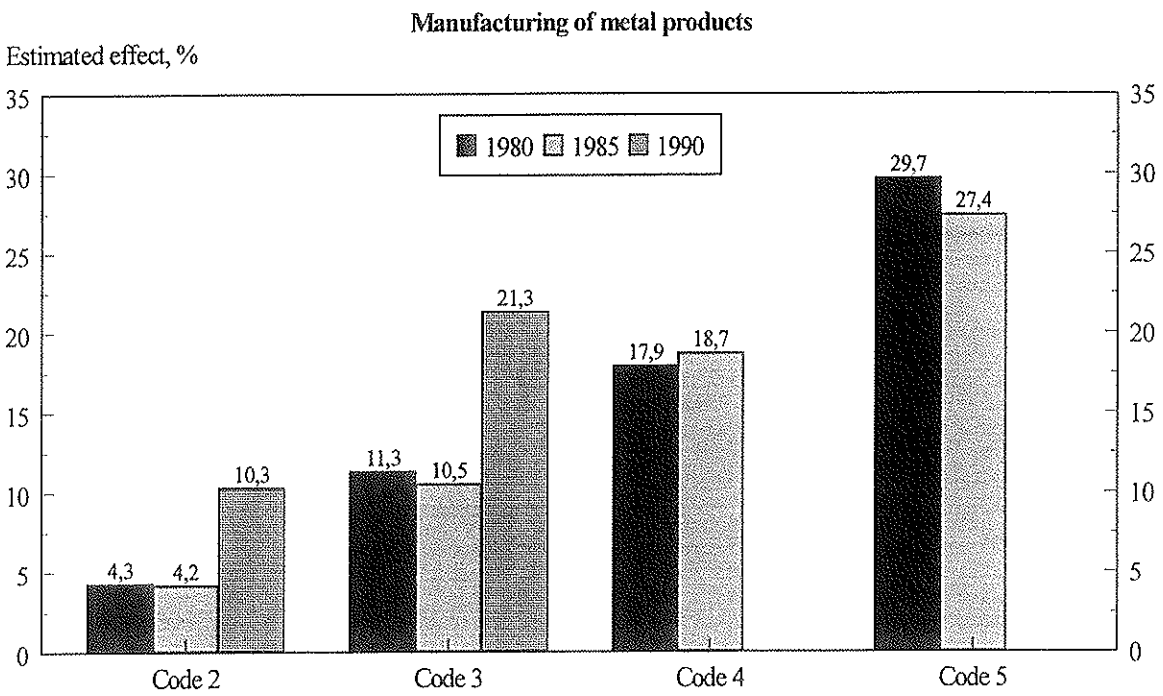
Manufacturing of wood products



Manufacturing of paper products



Note. In 1980 there were 7 earnings codes in use, in 1985 and 1990 only 5.



Note. In 1980 and 1985 there were 5 earnings codes in use, in 1990 only 3.

Table 9. Estimated wage premium for manual workers of different age relative to 18-year-olds for 1980, 1985 and 1990

Branch	Age (reference group is 18-year-olds)					Max of profile, %	Obtained at age
	20	30	40	50	60		
Textile industry							
1980	1.0	4.7	6.4	6.0	3.5	6.5	43
1985	1.9	9.3	13.3	13.4	9.7	13.5	45
1990	2.2	10.7	14.6	13.3	7.0	14.7	43
Clothing industry							
1980	1.6	7.6	9.7	7.7	1.7	9.7	40
1985	1.2	5.9	8.1	7.7	4.7	8.3	43
1990	2.1	10.1	13.4	11.8	5.2	13.5	42
Manufacturing of wood products							
1980	1.0	4.8	6.6	6.3	3.8	6.7	43
1985	1.7	8.1	10.4	8.3	2.2	10.4	40
1990	1.4	6.6	8.6	7.2	2.7	8.6	41
Paper industry							
1980	0.7	3.5	4.8	4.6	2.9	4.9	44
1985	0.7	3.2	4.3	3.9	2.0	4.3	42
1990*	0.2	1.0	1.5	1.6	1.5	1.6	51
Metal industry							
1980	1.4	7.0	9.5	8.6	4.5	9.6	42
1985	1.6	8.1	11.3	11.0	7.2	11.6	44
1990	1.7	8.6	12.5	13.1	10.5	13.3	47

* The coefficients estimated for the age variable and its square are not statistically significant.

All in all, then, except for manual workers in the textile industry acquired human capital seems to succeed in explaining a declining share of the observed earnings variance within the various employee categories investigated. At the same time the growing importance of the competence of the work force in enhancing competitiveness and growth is increasingly emphasized in the general debate as well as in research work.

7. CONCLUDING REMARKS

The results presented in this study indicate that despite the radical changes in the Finnish economy during the past few years, the earnings structure in Finnish industry seems to have undergone only minor changes. This holds for all non-manual and manual industrial workers as well as for the various worker subgroups investigated.

Some trends may be distinguished, though. First, the growth in nominal hourly earnings was extremely rapid during the boom years in the 1980s. Compared to this, average annual growth in hourly earnings has be considerably slower during the recession years at the end of the investigated time period (1990-92). Real hourly earnings when deflated by the consumer price index have generally grown steadily during the investigated time period, except for 1992 when hourly earnings declined also in real terms. When deflated by the employees' general earnings index, however, it turns out that the earnings level in Finnish industry has mostly increased at a slower rate than the earnings in the the rest of the economy.

Second, it would be expected that the occasionally quite large variation in the growth rate of nominal hourly earnings in the years 1980-92 both across and within the employee categories concerned would have influenced their relative earnings positions. The results presented in this study do not support this assessment, however. Instead relative earnings turn out to have remained surprisingly stable despite the dramatic changes in the labour market situation. The only more notable change is a slight weakening of the earnings position of all three categories of non-manual workers relative to that of manual workers.

Finally, the dispersion of hourly earnings within the different employee categories has also remained remarkedly unchanged. The small changes in overall dispersion as measured with the standard deviation of log hourly earnings point to a slight decrease in earnings dispersion in the early 1980s, a slight increase up to the turn of the decade, and a new decline at the end of the investigated time period.

The relative earnings position of selected deciles of the earnings distribution have not changed much, either. The results indicate that the small changes that can be observed in overall dispersion generally originate in gains by the top decile of the distribution relative to

the median usually accompanied by losses by the bottom decile, and vice versa. The results, however, also show that although the relative earnings of low-pay industrial employees have occasionally weakened appreciably, their real earnings have, nevertheless, mostly grown. In other words, only exceptionally has the weakening in the relative earnings position of low-pay employees been strengthened by a simultaneous decline in their real earnings.

The question arises whether these extremely small changes in the wage dispersion of both non-manual and manual industrial workers point to a strong tendency of workers especially in the bottom deciles to be locked for several years at the lower tail of the wage distribution. Or do they possibly easily move up into higher deciles while simultaneously being replaced by new low-pay entrants on the labour market? This is an important aspect not least in discussions of the need for and relevance of minimum wages.

The results obtained from analysing and comparing stability and mobility patterns over three 4-year-periods (1980-84, 1984-88, 1988-92) suggest that the amount of mobility is much greater among manual than among non-manual workers. This also holds for mobility at the extremes. Wage stability is, in other words, much more pronounced at the top and the bottom of the non-manual wage distribution. These findings are, however, not surprising in view of the much more compressed wage distribution observed among manual workers.

On the whole, there seems to be quite much movement within the wage distribution of both non-manual and manual industrial workers, but generally it is not very great in either direction. In particular, in the three periods investigated close to 90 per cent of all non-manual workers either remained in their original decile or moved within one decile. When adding the percentages of non-manual workers moving within two deciles, this share amounts to as much as over 96 per cent. The corresponding shares for manual workers are clearly lower. The share of manual workers who either remained in their original decile or moved within one or two deciles has varied between 82 and 86 per cent.

The results further indicate that non-manual and manual workers also differ with respect to the development of stability over time; the degree of stability seems to have decreased slightly among non-manual workers and increased among manual workers. Test statistics for the Kolmogorov-Smirnov test show, however, that these changes over time in the pattern of wage stability and mobility observed within the two worker categories under study are not significant.

Furthermore, comparison of wage mobility based on, respectively, relative and fixed wage thresholds suggests that the observed changes in the relative earnings position of non-manual and manual workers in Finnish manufacturing over the past 13 years can be explained mainly by a notable increase in decile thresholds. Downward mobility is, in other words, caused primarily by growth rates of individual wages being slower than the average and not by an absolute decline in wage levels.

The overall impression of minor changes in the labour market of Finnish manufacturing over the past 13 years is further strengthened when analysing in more detail the personal and job-related characteristics of stayers, upward movers and downward movers. Put differently, the recession years in the early 1990s do not seem to have affected to any notable extent the wage development of those non-manual and manual industrial workers who have succeeded in retaining their job.

This analysis, however, also displays that personal and job-related characteristics affect substantially the relative wage position as well as the movement within the wage distribution of both non-manual and manual industrial workers. In particular, the upward movers are, on average, well-educated young people with comparatively short work experience and seniority. The downward movers, on the other hand, have to most part less formal education and much longer work experience and seniority than their counterparts among stayers and upward movers. Moreover, these trends with respect to human capital endowments have clearly strengthened over time.

A fourth category of interest in this context is the category of "leavers" or "dropouts", i.e. of workers no longer observed in the second year. In particular, the analysis reveals that the occurrence of dropouts varies considerably across deciles and has also developed differently over time. Also the personal and job-related characteristics of leavers differ in many important respects from those of stayers and movers. Accordingly, the relative wage position of individuals at some particular point in time is influenced not only by their original, i.e. starting year, position and their mobility in the wage distribution but also by the leavers. In explaining observed trends in the relative wage position of wage earners one should, as a consequence, account for all these selectivity-related factors. This approach will be used in a following-up of the present study.

Finally, results obtained from estimating large earnings equations suggest that the rate of return to different levels of education has declined substantially among non-manual workers. This holds for technical, clerical as well as for upper-level non-manual workers. Also the earnings effects of work experience and the length of the current employment relationship (seniority) have weakened considerably over the time period under study. These results indicate that the earnings differentials between non-manual workers differing in completed formal education and accumulated work experience and seniority have declined markedly in Finnish industry in the 1980s.

The same trend is observed among manual industrial workers. When measuring the skills of manual workers by means of their earnings code and age, the results obtained clearly indicate that the effects on earnings of both skills proxies have weakened in the 1980s. This means that the earnings differentials between manual workers of different age and belonging to different earnings codes have narrowed. The only exception to this is the textile industry, where the earnings effects of acquired skills seem to have strengthened.

It would be most important to examine in the future why the earnings structure in Finnish industry has remained roughly unchanged during the past 13 years despite dramatic changes in the economic environment. Is it possibly so, as argued in the *OECD Employment Outlook 1993* (p. 166), that if national institutions have a particularly strong influence on wage setting, as in Finland, they may have outweighed the effects of demographic and economic forces?

Another topic deserving investigation is why the earnings effects of human capital in the form of formal education, training, age, experience, and seniority have declined in the 1980s, and why these skills proxies can explain only a decreasing share of the observed earnings differences. Have the skills captured by formal education and work experience lost some of their importance and possibly been replaced by some other skills characteristics not reflected by these traditional measures of accumulated knowledge?

REFERENCES

Asplund, R. (1993), *Teollisuuden toimihenkilöiden palkat ja inhimillinen pääoma (Human capital and earnings of non-manual industrial workers).* ETLA, Series B89, Helsinki.

Asplund, R. (1994a), *Palkkaerot Suomen teollisuudessa (Earnings differentials in Finnish industry).* ETLA, Series B91, Helsinki.

Asplund, R. (1994b), *Teollisuuden työntekijöiden palkat ja inhimillinen pääoma (Earnings and human capital of manual industrial workers).* ETLA, Discussion papers No. 484, Helsinki.

Bishop, Y.M.M., Fienberg, S.E. & Holland, P.W. (1975), *Discrete Multivariate Analyis: Theory and Practice.* MIT press, Cambridge, MA, and London, England.

Edin, P-A. & Holmlund, B. (1992), *The Swedish Wage Structure: The Rise and Fall of Solidarity Policy?* Uppsala University, Department of Economics, Working Paper 1992:13.

Hibbs, D.A., Jr. (1990), *Wage Compression Under Solidarity Bargaining in Sweden.* Trade Union Institut for Economic Research, Economic Research Report No. 30, Stockholm.

Hollander, M. & Wolfe, D.A. (1973), *Nonparametric Statistical Methods.* John Wiley & Sons.

Hungerford, T.L. (1993), "U.S. Income Mobility in the Seventies and Eighties", *Review of Income and Wealth*, Vol. 39, No. 4, pp. 403-417.

OECD (1993), *Employment Outlook.* Paris.

APPENDIX: *Measures of association*

The ***likelihood ratio statistic*** G^2 is calculated as

(A1) $G^2 = 2 \Sigma o_{ij} \ln(o_{ij}/e_{ij}) \qquad i = 1,...,I \quad j = 1,...,J,$

where o_{ij} is the observed cell count and e_{ij} is the expected frequency, i.e. the ML estimate, in each cell. The ML estimate in the ijth cell is calculated as the row total (o_{i+}) times the column total (o_{+j}) divided by the grand total (o_{++}), i.e.

(A2) $e_{ij} = (o_{i+})(o_{+j}) / o_{++} = \Sigma_j o_{ij} \Sigma_i o_{ij} / \Sigma_{ij} o_{ij}.$

The ***lambda asymptotic*** $\lambda_{C|R}$ and its ***asymptotic standard error*** *ASE* are calculated as

(A3) $\hat{\lambda}_{C|R} = \Sigma_i o_{im} - o_{+m} / o_{++} - o_{+m}$

(A4) $ASE = [\hat{\sigma}^2_{\infty} (\hat{\lambda}_{C|R})]^{\frac{1}{2}} = [(o_{++} - \Sigma o_{im})(\Sigma o_{im} + o_{+m} - 2\Sigma^* o_{im}) / (o_{++} - o_{+m})^3]^{\frac{1}{2}},$

where R corresponds to rows and C to columns. The cell counts o_{im} and o_{+m} are the maxima for the ith row and for the column totals, respectively. $\Sigma^* o_{im}$ is the summation of the maximum frequency in a row, taken only over those rows where o_{im} falls in the same column as o_{+m}.

The computing formula for the ***contingency coefficient*** P is

(A5) $\hat{P} = [\chi^2 / \chi^2 + o_{++}]^{\frac{1}{2}},$

where χ^2 is computed as

(A6) $\chi^2 = \Sigma_{ij} [(o_{ij} - e_{ij})^2 / e_{ij}].$

Cramér's V, finally, is computed as

(A7) $\hat{V} = [\chi^2 / o_{++} \; min\{(I - 1),(J - 1)\}]^{\frac{1}{2}}.$

For further details on the above measures of association, see Bishop et al. (1975).

APPENDIX: *Tables*

Table A1. Nominal wage levels of non-manual and manual workers in Finnish industry in 1980-92

All non-manual workers:

Year	Observations	Normal hourly wage, FIM		Hourly wage incl. comp., FIM	
		Average	Median	Average	Median
1980	8898	26,50	24,00	27,20	24,50
1981	9149	30,00	27,20	30,80	27,70
1982	9254	33,20	30,00	34,00	30,60
1983	9360	36,70	33,30	37,70	33,90
1984	9446	40,20	36,50	41,20	37,00
1985	9585	43,30	39,40	44,50	40,00
1986	9755	46,00	41,80	47,30	42,50
1987	9676	48,90	44,30	50,40	45,10
1988	9693	53,50	48,30	55,20	49,30
1989	9743	56,90	51,70	59,20	52,80
1990	9728	61,20	55,40	63,80	56,70
1991	8975	64,60	58,70	67,30	60,20
1992	8016	65,80	59,80	68,60	61,60
Annual growth (%):					
1980-85		10.3		10.4	
1985-90		7.2		7.5	
1990-92		3.6		3.8	
1980-92		7.9		8.1	

All manual workers:

Year	Observations	Normal hourly wage, FIM		Hourly wage incl. comp., FIM	
		Average	Median	Average	Median
1980	8684	23,00	22,60	23,60	23,20
1981	8650	25,30	25,10	25,90	25,80
1982	9991	28,20	28,00	28,80	28,50
1983	10648	29,80	29,50	30,40	30,10
1984	12230	32,20	32,10	32,90	32,70
1985	11764	34,70	34,40	35,40	35,00
1986	11146	36,70	36,40	37,40	37,10
1987	10854	39,10	38,70	40,00	39,40
1988	10235	43,00	42,80	44,50	44,10
1989	9864	47,90	47,20	49,50	49,00
1990	9407	53,30	52,70	55,70	55,20
1991	8152	57,00	56,40	59,70	59,20
1992	7397	56,90	56,80	59,70	59,60
Annual growth (%):					
1980-85		8.6		8.5	
1985-90		9.0		9.5	
1990-92		3.4		3.6	
1980-92		7.9		8.1	

Table A2. Nominal wage levels of three categories of non-manual workers in Finnish industry in 1980-92

Upper-level non-manual workers:

Year	Observations	Normal hourly wage, FIM		Hourly wage incl. comp., FIM	
		Average	Median	Average	Median
1980	2001	40,03	37,84	41,11	38,54
1981	2155	44,28	41,85	45,48	42,60
1982	2239	48,52	45,77	49,91	46,77
1983	2321	53,31	50,46	54,95	52,00
1984	2427	57,67	55,07	59,39	56,50
1985	2558	61,89	58,67	63,80	60,59
1986	2667	65,41	62,09	67,32	63,65
1987	2714	68,92	65,23	71,11	67,22
1988	2825	74,68	70,77	77,17	72,64
1989	2902	78,77	74,46	82,20	77,42
1990	2988	84,30	80,00	88,17	83,08
1991	2821	87,54	83,30	91,67	86,15
1992	2590	88,59	84,50	92,63	87,40
Annual growth (%):					
1980-85		9.1		9.2	
1985-90		6.4		6.7	
1990-92		2.5		2.5	
1980-92		6.9		7.0	

Technical non-manual workers:

Year	Observations	Normal hourly wage, FIM		Hourly wage incl. comp., FIM	
		Average	Median	Average	Median
1980	3477	25,25	24,78	26,00	25,36
1981	3545	28,14	27,69	28,98	28,20
1982	3530	30,82	30,33	31,72	30,83
1983	3560	34,12	33,51	35,14	34,08
1984	3535	37,23	36,50	38,30	37,10
1985	3530	40,13	39,29	41,26	40,00
1986	3555	42,26	41,43	43,66	42,27
1987	3564	44,53	43,76	46,06	44,61
1988	3524	48,40	47,59	50,24	48,46
1989	3545	51,61	50,46	53,81	51,76
1990	3501	55,19	54,09	57,64	55,38
1991	3251	58,58	57,31	61,31	58,86
1992	2857	59,35	57,99	62,32	59,75
Annual growth (%):					
1980-85		9.7		9.7	
1985-90		6.6		6.9	
1990-92		3.7		4.0	
1980-92		7.4		7.6	

Table A2. (cont.)

Clerical non-manual workers:					
Year	Observations	Normal hourly wage, FIM		Hourly wage incl. comp., FIM	
		Average	Median	Average	Median
1980	3420	19,89	18,77	20,23	19,06
1981	3449	22,95	21,77	23,40	21,99
1982	3485	25,66	24,37	26,20	24,62
1983	3479	28,26	26,88	28,82	27,20
1984	3484	30,95	29,08	31,56	29,57
1985	3497	32,96	31,38	33,63	31,73
1986	3533	35,12	33,22	35,79	33,62
1987	3398	37,45	35,53	38,27	35,72
1988	3344	40,83	39,00	41,82	39,26
1989	3296	43,32	41,35	44,70	41,85
1990	3239	46,51	44,31	47,90	44,67
1991	2903	48,93	46,52	50,32	47,32
1992	2569	50,01	47,69	51,48	48,49
Annual growth (%):					
1980-85		10.7		10.8	
1985-90		7.1		7.3	
1990-92		3.7		3.6	
1980-92		8.0		8.2	

Table A3. Nominal wage levels of five categories of manual workers in Finnish industry in 1980-92

Manual workers in textile industry:

Year	Observations	Normal hourly wage, FIM		Hourly wage incl. comp., FIM	
		Average	Median	Average	Median
1980	513	16,12	15,17	16,62	15,79
1981	536	18,42	17,44	19,08	18,25
1982	471	20,80	19,96	21,47	20,61
1983	527	22,54	21,61	23,23	21,99
1984	813	23,58	22,58	24,26	23,22
1985	734	25,14	23,96	25,86	24,62
1986	635	26,59	25,50	27,30	26,08
1987	661	28,60	27,51	29,30	28,15
1988	609	30,76	29,80	31,70	30,51
1989	550	33,40	31,23	34,44	31,85
1990	463	36,81	34,66	38,02	35,86
1991	406	39,20	36,88	40,25	37,64
1992	314	41,10	38,00	42,44	38,77
Annual growth (%):					
1980-85		9.4		9.3	
1985-90		8.0		8.0	
1990-92		5.6		5.6	
1980-92		8.2		8.2	

Manual workers in clothing industry:

Year	Observations	Normal hourly wage, FIM		Hourly wage incl. comp., FIM	
		Average	Median	Average	Median
1980	188	16,10	15,74	16,10	15,76
1981	207	17,99	17,78	17,97	17,78
1982	234	20,05	19,79	19,95	19,88
1983	1115	20,76	20,57	20,71	20,56
1984	1164	23,51	22,35	23,46	22,30
1985	1094	24,42	23,94	24,39	23,92
1986	1020	26,91	25,84	26,84	25,78
1987	876	28,48	27,58	28,42	27,48
1988	701	30,59	29,47	30,55	29,39
1989	663	31,20	30,53	31,16	30,41
1990	508	34,42	33,95	34,37	33,88
1991	341	36,68	35,93	36,69	35,76
1992	273	36,79	35,66	36,82	35,66
Annual growth (%):					
1980-85		8.7		9.5	
1985-90		7.1		7.1	
1990-92		3.4		3.6	
1980-92		7.2		7.5	

Table A3. (cont.)

Manual workers in manufacturing of wood products:

Year	Observations	Normal hourly wage, FIM		Hourly wage incl. comp., FIM	
		Average	Median	Average	Median
1980	1677	18,40	17,87	19,04	18,57
1981	1623	20,23	19,84	20,98	20,66
1982	1450	22,65	22,00	23,38	22,80
1983	1423	24,33	23,76	25,16	24,63
1984	1406	26,23	25,96	27,12	26,92
1985	1319	28,23	27,63	29,10	28,48
1986	1304	30,45	29,73	31,52	30,81
1987	1231	31,98	31,51	33,19	32,79
1988	1225	34,58	33,89	35,92	35,46
1989	1204	37,85	37,00	39,72	39,12
1990	1122	40,72	40,29	43,26	42,63
1991	946	43,21	42,22	45,98	44,61
1992	865	43,67	42,71	46,38	45,20
Annual growth (%):					
1980-85		8.9		8.9	
1985-90		7.6		8.3	
1990-92		3.6		3.6	
1980-92		7.5		7.7	

Manual workers in manufacturing in paper products:

Year	Observations	Normal hourly wage, FIM		Hourly wage incl. comp., FIM	
		Average	Median	Average	Median
1980	2762	24,74	23,79	25,57	24,71
1981	2672	27,73	26,86	28,75	27,91
1982	2539	31,25	30,31	32,18	31,25
1983	2447	34,71	33,24	35,77	34,39
1984	2500	38,73	37,60	39,87	38,75
1985	2402	42,39	40,76	43,53	41,97
1986	2322	43,93	42,73	45,12	44,05
1987	2284	45,28	44,16	46,70	45,71
1988	2233	49,30	47,62	50,80	49,37
1989	2225	53,23	51,17	54,82	52,95
1990	2146	58,69	56,51	60,52	58,70
1991	1956	63,50	62,03	65,36	64,13
1992	1848	64,15	62,13	66,33	64,48
Annual growth (%):					
1980-85		11.4		11.2	
1985-90		6.8		6.8	
1990-92		4.6		4.8	
1980-92		8.3		8.3	

Table A3. (cont.)

Manual workers in manufacturing of metal products:					
Year	Observations	Normal hourly wage, FIM		Hourly wage incl. comp., FIM	
		Average	Median	Average	Median
1980	3544	25,26	24,33	25,55	24,70
1981	3612	27,20	26,43	27,56	26,77
1982	5297	29,30	28,72	29,62	29,01
1983	5136	31,71	31,08	32,02	31,34
1984	6347	33,73	33,28	34,34	33,72
1985	6215	36,05	35,45	36,66	36,01
1986	5865	37,97	37,34	38,61	38,00
1987	5802	41,04	39,73	41,77	40,53
1988	5467	45,33	44,04	47,05	45,73
1989	5222	51,64	49,39	53,45	51,39
1990	5168	57,19	54,80	60,12	57,79
1991	4503	60,18	57,49	63,70	60,74
1992	4097	59,04	57,58	62,37	61,00
Annual growth (%):					
1980-85		7.4		7.5	
1985-90		9.7		10.4	
1990-92		1.6		2.0	
1980-92		7.4		7.8	

Table A4. Decile wage breaks in constant FIM

Non-manual industrial workers:

Break	1980	1984 (1980=100)	1984	1988 (1984=100)	1988	1992 (1988=100)
D1/D2	16,76	18,77	26,26	30,13	35,71	36,48
D2/D3	18,81	20,84	29,00	33,51	40,00	40,70
D3/D4	21,04	22,91	32,04	36,71	43,32	44,77
D4/D5	22,94	24,93	36,23	39,86	47,05	48,62
D5/D6	24,92	26,96	37,55	43,06	50,68	53,00
D6/D7	27,06	29,58	41,09	47,10	55,22	57,76
D7/D8	29,99	32,96	45,23	52,69	61,42	64,72
D8/D9	34,23	38,00	51,64	60,83	70,54	73,96
D9/D10	41,15	45,38	61,63	72,76	83,36	88,04

Manual industrial workers:

Break	1980	1984 (1980=100)	1984	1988 (1984=100)	1988	1992 (1988=100)
D1/D2	17,87	18,27	23,87	26,91	33,33	35,70
D2/D3	19,88	20,47	27,02	30,90	37,84	41,10
D3/D4	21,54	22,36	29,76	33,96	41,31	45,01
D4/D5	22,85	23,79	32,41	36,48	43,90	47,99
D5/D6	23,89	25,08	34,43	38,45	46,19	50,42
D6/D7	24,84	26,23	36,32	40,21	48,24	52,48
D7/D8	25,82	27,31	38,11	42,07	50,42	54,55
D8/D9	27,09	28,52	39,87	44,09	52,75	57,01
D9/D10	28,92	30,14	42,26	46,73	55,95	60,43

Note. The decile wage breaks are deflated by the consumer price index.

Table A5. The distribution of personal and job characteristics across deciles, non-manual workers in 1980

Characteristic	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10
Normal hourly wage, FIM	15,28	17,71	19,72	21,74	23,60	25,61	27,70	31,02	35,68	49,40
Total hourly wage, FIM	15,33	17,82	19,87	21,95	23,88	25,97	28,41	32,00	37,30	51,64
Weekly hours worked	37,8	37,8	38,0	38,4	38,6	38,6	38,4	38,1	37,9	37,6
Males	0.025	0.135	0.322	0.581	0.750	0.882	0.858	0.932	0.945	0.977
Females	0.975	0.865	0.678	0.419	0.250	0.118	0.142	0.068	0.055	0.023
Human capital:										
Years of schooling	9,1	9,6	10,0	10,3	10,6	11,0	11,5	12,2	12,6	14,1
Lower basic, ≤ 7 years	0.380	0.272	0.244	0.240	0.239	0.165	0.110	0.058	0.058	0.020
Upper basic, 9 years	0.256	0.255	0.220	0.132	0.082	0.063	0.062	0.052	0.035	0.035
Lower secondary, 11 y.	0.191	0.207	0.184	0.194	0.199	0.204	0.144	0.090	0.067	0.018
Upper secondary, 12 y.	0.164	0.255	0.314	0.377	0.374	0.466	0.518	0.502	0.416	0.175
BA level	-	0.002	0.028	0.048	0.083	0.080	0.122	0.202	0.299	0.379
MA level	-	-	-	0.002	0.017	0.013	0.037	0.078	0.117	0.336
Licentiate	-	-	-	-	-	-	-	0.003	0.005	0.025
Doctor	-	-	-	-	-	-	-	-	0.002	0.005
Educ. degree unknown	0.010	0.008	0.007	0.007	0.007	0.008	0.008	0.013	0.002	0.007
General education	0.667	0.561	0.511	0.422	0.354	0.257	0.199	0.139	0.107	0.065
Humanities	-	-	0.002	0.003	0.010	0.003	0.005	0.012	0.005	0.003
Economics	-	0.002	-	0.002	0.003	0.002	0.003	0.002	0.003	0.032
Law	-	-	-	-	-	-	-	0.002	-	0.012
Commerce	0.268	0.359	0.290	0.240	0.180	0.145	0.130	0.118	0.120	0.150
Agriculture	0.003	0.002	0.003	0.003	0.007	0.005	0.008	0.013	0.012	0.015
Mathematics	-	-	0.005	-	0.003	0.008	0.006	0.008	0.030	0.034
Technology	0.052	0.060	0.170	0.292	0.407	0.551	0.626	0.684	0.712	0.662
Medicine	-	0.005	0.005	0.010	0.015	0.012	0.010	0.003	0.007	0.015
Other programmes	-	0.003	0.006	0.020	0.013	0.008	0.003	0.005	0.003	0.005
Educ. field unknown	0.010	0.008	0.007	0.007	0.007	0.008	0.008	0.013	0.002	0.007
Age, years	31,6	35,0	36,6	37,4	37,4	37,9	38,8	38,9	39,7	41,5
Age < 20 years	0.030	-	-	-	-	-	-	-	-	-
Age 20-24 years	0.236	0.075	0.042	0.025	0.015	0.007	0.003	-	0.002	-
Age 25-29 years	0.244	0.235	0.215	0.179	0.175	0.129	0.105	0.108	0.058	0.008
Age 30-34 years	0.197	0.255	0.224	0.229	0.272	0.306	0.255	0.272	0.244	0.187
Age 35-39 years	0.094	0.154	0.177	0.204	0.172	0.192	0.202	0.207	0.272	0.274
Age 40-44 years	0.070	0.104	0.125	0.144	0.130	0.134	0.192	0.155	0.160	0.219
Age 45-49 years	0.067	0.092	0.112	0.105	0.120	0.122	0.120	0.128	0.125	0.134
Age 50-54 years	0.042	0.065	0.070	0.075	0.082	0.070	0.093	0.080	0.095	0.115
Age 55-59 years	0.018	0.018	0.033	0.038	0.032	0.040	0.025	0.043	0.033	0.057
Age ≥ 60 years	0.002	0.002	0.002	0.003	0.002	0.002	0.003	0.005	0.010	0.007
Experience, years	9,7	12,3	13,9	13,8	14,0	14,2	15,9	15,9	17,4	19,0
Exp. < 5 years	0.179	0.095	0.110	0.145	0.114	0.092	0.062	0.072	0.033	0.010
Exp. 5-9 years	0.446	0.324	0.245	0.204	0.257	0.239	0.165	0.187	0.117	0.083

Table A5. (cont.)

Characteristic	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10
Exp. 10-14 years	0.181	0.279	0.202	0.220	0.209	0.257	0.245	0.267	0.265	0.240
Exp. 15-19 years	0.105	0.129	0.219	0.189	0.179	0.192	0.232	0.172	0.232	0.242
Exp. 20-29 years	0.067	0.145	0.172	0.189	0.169	0.159	0.222	0.207	0.259	0.297
Exp. 30-39 years	0.020	0.028	0.048	0.053	0.067	0.058	0.070	0.092	0.088	0.124
Exp. ≥ 40 years	0.002	-	0.003	-	0.007	0.003	0.003	0.003	0.005	0.003
Seniority, years	7,7	9,0	10,5	11,2	11,0	11,1	11,5	10,7	11,2	11,5
Sen < 5 years	0.301	0.237	0.240	0.232	0.252	0.234	0.229	0.209	0.175	0.157
Sen. 5-9 years	0.450	0.414	0.299	0.275	0.295	0.297	0.272	0.330	0.326	0.324
Sen. 10-14 years	0.119	0.164	0.177	0.170	0.144	0.177	0.164	0.179	0.194	0.217
Sen. 15-19 years	0.058	0.087	0.145	0.155	0.142	0.125	0.160	0.130	0.152	0.144
Sen. 20-29 years	0.054	0.082	0.112	0.127	0.130	0.129	0.135	0.122	0.129	0.134
Sen. 30-39 years	0.018	0.017	0.025	0.040	0.033	0.035	0.040	0.030	0.025	0.023
Sen. ≥ 40 years	-	-	0.002	-	0.003	0.003	-	-	-	0.002
Occupational status:										
Technical jobs	0.124	0.157	0.342	0.528	0.636	0.730	0.668	0.511	0.324	0.047
Clerical jobs	0.876	0.838	0.638	0.446	0.300	0.199	0.167	0.118	0.055	0.032
Upper-level non-manual	-	0.005	0.020	0.027	0.063	0.072	0.165	0.371	0.621	0.922
Working task:										
R&D	0.088	0.108	0.170	0.167	0.185	0.227	0.247	0.289	0.284	0.284
Production	0.048	0.055	0.172	0.334	0.442	0.491	0.472	0.432	0.402	0.310
Procurement	0.043	0.090	0.095	0.107	0.083	0.082	0.053	0.037	0.040	0.027
Sales	0.050	0.085	0.097	0.100	0.083	0.077	0.083	0.139	0.162	0.189
Customer relations	0.142	0.093	0.057	0.020	0.020	0.015	0.022	0.012	0.018	0.017
Administration	0.627	0.568	0.409	0.272	0.185	0.108	0.122	0.092	0.093	0.174
Industry sector:										
Textile	0.037	0.035	0.025	0.020	0.030	0.022	0.015	0.010	0.013	0.008
Clothing	0.058	0.043	0.023	0.018	0.003	0.005	0.003	0.002	0.012	0.017
Manuf. of wood prod.	0.055	0.038	0.050	0.057	0.063	0.035	0.032	0.025	0.025	0.032
Manuf. of paper prod.	0.095	0.107	0.087	0.050	0.057	0.088	0.125	0.118	0.149	0.137
Manuf. of metal prod.	0.236	0.165	0.187	0.199	0.274	0.265	0.260	0.234	0.229	0.232
Other manufacturing	0.366	0.437	0.464	0.461	0.434	0.459	0.434	0.471	0.447	0.439
Head offices	0.018	0.028	0.025	0.027	0.007	0.007	0.017	0.002	0.010	0.030
Construction	0.048	0.072	0.050	0.070	0.060	0.053	0.060	0.082	0.050	0.038
Other sectors	0.085	0.073	0.088	0.098	0.072	0.065	0.053	0.057	0.065	0.067
Other variables:										
Region: high cost-of-living (class I)	0.319	0.410	0.459	0.446	0.406	0.437	0.409	0.434	0.424	0.484
Region: low cost-of-living (class II)	0.681	0.590	0.541	0.554	0.594	0.563	0.591	0.566	0.576	0.516
Share with shift pay	0.017	0.022	0.048	0.055	0.070	0.087	0.120	0.098	0.110	0.032
Share with bonus pay	0.017	0.028	0.028	0.032	0.035	0.030	0.043	0.045	0.048	0.068
Share with fringes	0.028	0.080	0.070	0.068	0.087	0.117	0.127	0.139	0.204	0.275
No. of observations	598	599	599	599	599	599	599	599	599	599

Table A6. The distribution of personal and job characteristics across deciles, non-manual workers in 1992

Characteristic	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10
Normal hourly wage, FIM	40,35	46,62	51,32	55,58	60,27	65,34	71,24	80,29	90,32	118,79
Total hourly wage, FIM	40,57	47,01	51,96	56,58	61,54	67,16	74,17	84,19	97,62	129,62
Weekly hours worked	38,5	38,3	38,6	38,7	38,7	38,7	38,5	38,3	37,9	38,1
Males	0.073	0.209	0.418	0.636	0.764	0.839	0.856	0.875	0.898	0.950
Females	0.927	0.791	0.582	0.364	0.236	0.161	0.144	0.125	0.102	0.050
Human capital:										
Years of schooling	9,8	10,3	10,6	11,2	11,6	11,9	12,3	13,0	13,5	14,3
Lower basic, ≤ 7 years	0.259	0.195	0.157	0.119	0.071	0.069	0.050	0.027	0.013	0.013
Upper basic, 9 years	0.217	0.172	0.152	0.081	0.056	0.036	0.042	0.027	0.032	0.012
Lower secondary, 11 y.	0.250	0.238	0.223	0.210	0.202	0.123	0.090	0.077	0.048	0.019
Upper secondary, 12 y.	0.253	0.372	0.432	0.477	0.495	0.540	0.483	0.416	0.331	0.208
BA level	0.007	0.010	0.031	0.102	0.159	0.192	0.258	0.271	0.322	0.338
MA level	0.002	0.004	0.004	0.010	0.013	0.033	0.075	0.167	0.239	0.365
Licentiate	-	0.002	-	-	-	-	-	0.008	0.006	0.033
Doctor	-	-	-	-	-	-	-	0.002	0.004	0.012
Educ. degree unknown	0.013	0.008	0.002	0.002	0.004	0.008	0.004	0.006	0.004	-
General education	0.516	0.441	0.355	0.253	0.163	0.142	0.111	0.091	0.071	0.050
Humanities	0.002	0.008	0.012	0.010	0.006	0.014	0.006	0.012	0.012	-
Economics	-	0.002	0.002	0.002	-	0.004	0.006	0.004	0.012	0.023
Law	-	-	-	-	-	-	-	0.002	-	0.015
Commerce	0.392	0.379	0.282	0.218	0.161	0.123	0.119	0.121	0.136	0.175
Agriculture	0.002	0.004	0.002	0.008	0.004	0.004	0.006	0.008	0.010	0.012
Mathematics	-	-	-	0.002	0.006	0.008	0.019	0.035	0.050	0.035
Technology	0.074	0.155	0.336	0.485	0.626	0.690	0.718	0.704	0.692	0.679
Medicine	0.002	0.002	0.006	0.017	0.025	0.010	0.008	0.017	0.010	0.012
Other programmes	-	0.002	0.004	0.002	0.006	0.008	0.002	0.002	0.006	-
Educ. field unknown	0.013	0.008	0.002	0.002	0.004	-	0.004	0.006	0.004	-
Age, years	40,6	42,4	43,4	43,0	42,8	43,2	43,2	43,4	43,3	45,4
Age < 20 years	-	-	-	-	-	-	-	-	-	-
Age 20-24 years	0.017	0.006	0.002	-	0.002	-	-	-	-	-
Age 25-29 years	0.092	0.069	0.048	0.033	0.046	0.036	0.031	0.029	0.008	0.002
Age 30-34 years	0.169	0.117	0.134	0.170	0.146	0.132	0.165	0.132	0.119	0.073
Age 35-39 years	0.192	0.180	0.150	0.151	0.171	0.178	0.176	0.180	0.190	0.142
Age 40-44 years	0.190	0.228	0.221	0.193	0.207	0.216	0.199	0.196	0.274	0.238
Age 45-49 years	0.157	0.193	0.175	0.222	0.194	0.199	0.170	0.219	0.190	0.272
Age 50-54 years	0.113	0.111	0.163	0.142	0.144	0.132	0.144	0.154	0.149	0.155
Age 55-59 years	0.057	0.073	0.094	0.071	0.067	0.078	0.094	0.079	0.052	0.086
Age ≥ 60 years	0.015	0.023	0.013	0.017	0.023	0.027	0.021	0.012	0.019	0.033
Experience, years	19,4	20,7	21,0	19,6	19,5	18,5	17,6	16,4	14,5	14,6
Exp. < 5 years	0.017	0.019	0.021	0.027	0.052	0.088	0.117	0.127	0.155	0.140
Exp. 5-9 years	0.125	0.088	0.109	0.115	0.125	0.146	0.142	0.202	0.209	0.207

Table A6. (cont.)

Characteristic	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10
Exp. 10-14 years	0.159	0.157	0.127	0.161	0.144	0.109	0.142	0.132	0.163	0.184
Exp. 15-19 years	0.225	0.182	0.175	0.193	0.177	0.182	0.136	0.144	0.182	0.159
Exp. 20-29 years	0.349	0.374	0.384	0.358	0.349	0.337	0.337	0.276	0.222	0.245
Exp. 30-39 years	0.113	0.167	0.157	0.142	0.132	0.117	0.117	0.107	0.069	0.059
Exp. ≥ 40 years	0.012	0.013	0.027	0.004	0.021	0.021	0.010	0.012	-	0.006
Seniority, years	15,4	16,0	16,3	15,5	15,5	14,6	14,1	14,3	13,2	14,2
Sen < 5 years	0.090	0.078	0.104	0.103	0.127	0.141	0.155	0.150	0.174	0.142
Sen. 5-9 years	0.236	0.234	0.202	0.238	0.226	0.236	0.249	0.242	0.245	0.216
Sen. 10-14 years	0.130	0.140	0.125	0.144	0.132	0.149	0.153	0.132	0.161	0.190
Sen. 15-19 years	0.248	0.215	0.202	0.185	0.182	0.167	0.149	0.186	0.180	0.161
Sen. 20-29 years	0.228	0.255	0.274	0.239	0.236	0.230	0.226	0.230	0.193	0.238
Sen. 30-39 years	0.060	0.077	0.084	0.090	0.081	0.069	0.061	0.056	0.046	0.050
Sen. ≥ 40 years	0.008	0.002	0.010	-	0.015	0.010	0.006	0.004	-	0.004
Occupational status:										
Technical jobs	0.152	0.296	0.468	0.577	0.651	0.602	0.502	0.301	0.192	0.065
Clerical jobs	0.843	0.697	0.516	0.341	0.190	0.142	0.080	0.086	0.054	0.025
Upper-level non-manual	0.006	0.006	0.015	0.082	0.159	0.257	0.418	0.612	0.755	0.910
Working task:										
R&D	0.102	0.170	0.203	0.184	0.255	0.297	0.320	0.351	0.297	0.272
Production	0.063	0.103	0.225	0.377	0.438	0.423	0.423	0.342	0.318	0.301
Procurement	0.079	0.088	0.098	0.078	0.056	0.048	0.038	0.034	0.044	0.033
Sales	0.094	0.119	0.111	0.100	0.086	0.088	0.094	0.134	0.220	0.230
Customer relations	0.077	0.042	0.046	0.033	0.017	0.034	0.029	0.034	0.033	0.033
Administration	0.585	0.477	0.317	0.228	0.148	0.109	0.096	0.104	0.088	0.132
Industry sector:										
Textile	0.029	0.021	0.015	0.011	0.017	0.006	0.011	0.006	0.013	0.004
Clothing	0.034	0.013	0.006	0.008	-	0.008	0.004	0.002	0.002	0.006
Manuf. of wood prod.	0.082	0.054	0.060	0.031	0.027	0.027	0.017	0.029	0.015	0.038
Manuf. of paper prod.	0.121	0.084	0.094	0.057	0.075	0.128	0.067	0.129	0.132	0.126
Manuf. of metal prod.	0.282	0.310	0.347	0.435	0.451	0.333	0.358	0.347	0.347	0.330
Other manufacturing	0.267	0.351	0.315	0.282	0.259	0.253	0.310	0.311	0.356	0.347
Head offices	0.008	0.008	-	0.010	0.010	0.006	0.004	0.004	-	0.008
Construction	0.044	0.048	0.061	0.048	0.061	0.098	0.119	0.079	0.059	0.078
Other sectors	0.132	0.111	0.102	0.119	0.100	0.142	0.109	0.094	0.075	0.063
Other variables:										
Region: high cost-of-living (class I)	0.357	0.492	0.491	0.498	0.511	0.488	0.603	0.551	0.565	0.600
Region: low cost-of-living (class II)	0.643	0.508	0.509	0.502	0.489	0.512	0.397	0.449	0.435	0.400
Share with shift pay	0.021	0.015	0.050	0.061	0.058	0.090	0.121	0.098	0.130	0.040
Share with bonus pay	0.071	0.123	0.163	0.216	0.238	0.213	0.230	0.211	0.234	0.228
Share with fringes	0.029	0.069	0.063	0.109	0.084	0.148	0.178	0.226	0.345	0.563
No. of observations	521	522	521	522	521	522	522	521	522	522

Table A7. The distribution of personal and job characteristics across deciles, manual workers in 1980

Characteristic	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10
Normal hourly wage, FIM	15,41	18,60	20,30	21,67	22,78	23,72	24,62	25,66	27,21	31,80
Total hourly wage, FIM	15,81	18,98	20,73	22,20	23,37	24,38	25,31	26,41	27,92	32,45
Males	0.303	0.525	0.620	0.748	0.816	0.846	0.897	0.927	0.959	0.964
Females	0.697	0.475	0.380	0.252	0.184	0.154	0.103	0.073	0.041	0.036
Human capital:*										
Years of schooling	9,4	9,6	9,8	10,2	10,3	10,6	10,9	11,0	11,3	11,4
Lower basic, ≤ 7 years	0.256	0.237	0.194	0.109	0.085	0.047	0.032	0.040	0.017	0.019
Upper basic, 9 years	0.331	0.273	0.276	0.252	0.271	0.249	0.180	0.105	0.092	0.102
Lower secondary, 11 y.	0.375	0.407	0.425	0.525	0.425	0.450	0.430	0.452	0.372	0.227
Upper secondary, 12 y.	0.038	0.083	0.105	0.113	0.220	0.254	0.357	0.403	0.519	0.652
Higher education	-	-	-	-	-	-	-	-	-	-
Educ. degree unknown	-	-	-	-	-	-	-	-	-	-
Age, years	37,4	36,6	36,6	34,5	35,0	35,5	36,1	36,6	35,5	36,3
Age < 20 years	0.023	0.023	0.015	0.013	0.004	0.004	0.009	0.006	0.002	0.004
Age 20-24 years	0.117	0.115	0.135	0.162	0.133	0.105	0.077	0.060	0.085	0.066
Age 25-29 years	0.151	0.156	0.135	0.175	0.218	0.198	0.165	0.171	0.169	0.133
Age 30-34 years	0.130	0.179	0.177	0.186	0.194	0.194	0.224	0.247	0.274	0.259
Age 35-39 years	0.115	0.128	0.141	0.160	0.135	0.162	0.160	0.137	0.148	0.197
Age 40-44 years	0.154	0.143	0.113	0.130	0.103	0.156	0.175	0.157	0.137	0.143
Age 45-49 years	0.173	0.132	0.150	0.090	0.122	0.100	0.128	0.109	0.116	0.148
Age 50-54 years	0.102	0.087	0.107	0.070	0.064	0.055	0.047	0.068	0.054	0.039
Age 55-59 years	0.034	0.034	0.023	0.013	0.026	0.024	0.013	0.034	0.013	0.009
Age ≥ 60 years	0.002	0.004	0.004	-	-	0.002	0.002	-	-	-
Experience, years	21,1	20,0	19,8	17,3	17,6	18,0	18,2	18,6	17,2	17,9
Exp. < 5 years	0.047	0.055	0.062	0.066	0.036	0.034	0.032	0.023	0.036	0.033
Exp. 5-9 years	0.139	0.147	0.158	0.196	0.220	0.171	0.133	0.145	0.158	0.115
Exp. 10-14 years	0.150	0.162	0.141	0.173	0.190	0.211	0.211	0.228	0.254	0.237
Exp. 15-19 years	0.111	0.141	0.158	0.177	0.179	0.169	0.199	0.168	0.192	0.216
Exp. 20-29 years	0.269	0.277	0.248	0.249	0.224	0.284	0.308	0.302	0.256	0.301
Exp. 30-39 years	0.252	0.181	0.211	0.132	0.143	0.126	0.107	0.134	0.102	0.096
Exp. ≥ 40 years	0.030	0.038	0.023	0.008	0.009	0.004	0.009	0.002	0.004	0.002
Industry sector:										
Textile	0.335	0.068	0.032	0.024	0.015	0.017	0.002	0.002	0.002	0.002
Clothing	0.075	0.024	0.004	-	-	-	-	-	-	-
Manuf. of wood prod.	0.537	0.450	0.280	0.122	0.067	0.053	0.019	0.015	0.019	0.004
Manuf. of paper prod.	0.004	0.107	0.278	0.444	0.517	0.544	0.558	0.573	0.440	0.318
Manuf. of metal prod.	0.049	0.350	0.406	0.409	0.400	0.386	0.421	0.411	0.539	0.677
Pay-related variables:										
Hourly wage only	0.382	0.495	0.496	0.552	0.553	0.512	0.558	0.467	0.344	0.175
Piece-rate pay only	0.139	0.166	0.156	0.085	0.068	0.055	0.032	0.026	0.073	0.120
Bounus pay only	-	-	-	-	-	-	-	-	-	-

Table A7. (cont.)

Characteristic	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10
Mix of pay schemes	0.478	0.339	0.348	0.363	0.380	0.433	0.410	0.507	0.583	0.705
Sunday work**	0.194	0.205	0.344	0.412	0.487	0.508	0.506	0.499	0.474	0.406
Sunday work 1-49 hours	0.166	0.160	0.216	0.209	0.207	0.230	0.239	0.226	0.261	0.280
Sunday work 50-99 h.	0.023	0.040	0.116	0.200	0.265	0.271	0.263	0.266	0.207	0.122
Sunday work ≥ 150 h.	0.002	0.006	0.009	0.004	0.013	0.008	0.004	0.006	0.002	0.004
Paid overtime**	0.371	0.463	0.539	0.554	0.532	0.482	0.464	0.533	0.481	0.402
Overtime 1-49 hours	0.331	0.414	0.445	0.475	0.449	0.414	0.387	0.458	0.406	0.333
Overtime 50-99 hours	0.034	0.040	0.075	0.073	0.070	0.060	0.062	0.056	0.062	0.060
Overtime 100-149 hours	0.004	0.009	0.015	0.006	0.009	0.002	0.006	0.019	0.011	0.009
Overtime ≥ 150 hours	0.002	-	0.004	-	0.004	0.006	0.010	-	0.002	-
Share with shift pay	0.512	0.505	0.635	0.686	0.731	0.740	0.726	0.746	0.662	0.607
Share with compensation for unfavourable working conditions	0.087	0.164	0.239	0.328	0.301	0.339	0.408	0.473	0.523	0.519
Regional location:										
Region: high cost-of-living (class I)	0.260	0.194	0.207	0.194	0.197	0.196	0.175	0.213	0.259	0.338
Region: low cost-of-living (class II)	0.740	0.806	0.793	0.806	0.803	0.804	0.825	0.787	0.741	0.662
No. of observations	531	531	532	531	532	531	532	531	532	532

* Educational degrees are derived from information on the manual workers' position in the earnings code schemes in use in each branch. Estimations of wage equations using the workers' earnings code, on the one hand, and the derived educational degrees, on the other, produce almost identical results. The use of educational degrees is preferred to earnings codes because different industry sectors use different earnings code schemes, which unables direct comparisons across industry sectors. The information on years of experience refers to potential work experience calculated as (age - the derived years of schooling - 7).

** The data on manual industrial workers cover the fourth quarter of each year investigated. Thus the individual hourly wage, for example, is calculated as the wage sum over the last three months of the year divided by the corresponding amount of hours worked. In contrast, the information on hours worked on sundays and in overtime refers to the total number of, respectively, sunday and overtime working hours during the fourth quarter of the year.

Table A8. The distribution of personal and job characteristics across deciles, manual workers in 1992

Characteristic	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10
Normal hourly wage, FIM	36,99	44,41	50,12	54,28	57,17	59,50	61,61	63,83	66,92	84,96
Total hourly wage, FIM	37,82	46,66	52,36	56,48	59,70	62,51	64,99	67,60	71,16	89,95
Males	0.290	0.536	0.563	0.733	0.835	0.870	0.900	0.932	0.956	0.934
Females	0.710	0.464	0.437	0.267	0.165	0.130	0.092	0.068	0.044	0.066
Human capital:*										
Years of schooling	10,2	11,0	10,6	10,3	10,2	10,2	10,1	10,0	9,8	9,9
Lower basic, ≤ 7 years	0.099	0.046	0.117	0.131	0.132	0.139	0.165	0.150	0.211	0.196
Upper basic, 9 years	0.289	0.097	0.149	0.184	0.224	0.244	0.211	0.290	0.284	0.283
Lower secondary, 11 y.	0.460	0.492	0.508	0.496	0.479	0.415	0.428	0.363	0.299	0.308
Upper secondary, 12 y.	0.153	0.365	0.226	0.189	0.165	0.202	0.195	0.196	0.206	0.213
Higher education	-	-	-	-	-	-	-	-	-	-
Educ. degree unknown	-	-	-	-	-	-	-	-	-	-
Age, years	43,0	42,5	42,5	42,8	42,2	41,5	41,8	41,0	42,0	42,3
Age < 20 years	-	-	-	-	-	-	-	-	-	-
Age 20-24 years	0.024	0.013	0.022	0.015	0.013	0.016	0.002	0.013	0.006	0.009
Age 25-29 years	0.072	0.081	0.092	0.081	0.084	0.070	0.088	0.073	0.048	0.073
Age 30-34 years	0.108	0.132	0.090	0.101	0.095	0.112	0.127	0.128	0.132	0.125
Age 35-39 years	0.145	0.150	0.152	0.149	0.163	0.204	0.171	0.211	0.204	0.154
Age 40-44 years	0.175	0.193	0.198	0.217	0.218	0.226	0.224	0.233	0.231	0.246
Age 45-49 years	0.222	0.161	0.206	0.191	0.196	0.198	0.191	0.194	0.194	0.167
Age 50-54 years	0.140	0.160	0.152	0.142	0.165	0.121	0.108	0.092	0.127	0.143
Age 55-59 years	0.092	0.097	0.073	0.083	0.055	0.051	0.081	0.050	0.050	0.070
Age ≥ 60 years	0.022	0.013	0.015	0.022	0.009	0.002	0.007	0.006	0.009	0.013
Experience, years	25,8	24,5	24,9	25,0	24,9	23,8	24,1	23,3	24,4	24,2
Exp. < 5 years	0.002	0.002	0.016	0.022	0.007	0.022	0.020	0.024	0.029	0.044
Exp. 5-9 years	0.048	0.068	0.057	0.037	0.053	0.052	0.033	0.044	0.022	0.029
Exp. 10-14 years	0.088	0.112	0.079	0.107	0.079	0.083	0.112	0.097	0.084	0.112
Exp. 15-19 years	0.114	0.127	0.136	0.118	0.139	0.152	0.164	0.158	0.158	0.145
Exp. 20-29 years	0.369	0.372	0.380	0.380	0.398	0.418	0.373	0.415	0.400	0.350
Exp. 30-39 years	0.314	0.283	0.284	0.278	0.277	0.246	0.244	0.233	0.257	0.262
Exp. ≥ 40 years	0.064	0.037	0.048	0.059	0.046	0.028	0.053	0.029	0.050	0.057
Industry sector:										
Textile	0.274	0.081	0.031	0.007	0.009	0.002	0.004	0.004	-	0.011
Clothing	0.274	0.028	0.006	-	0.002	-	-	-	-	0.002
Manuf. of wood prod.	0.380	0.416	0.183	0.077	0.031	0.020	0.011	0.002	0.004	-
Manuf. of paper prod.	-	0.044	0.169	0.285	0.416	0.391	0.423	0.424	0.428	0.391
Manuf. of metal prod.	0.072	0.431	0.611	0.630	0.541	0.587	0.562	0.571	0.569	0.596
Pay-related variables:										
Hourly wage only	0.377	0.415	0.455	0.493	0.525	0.433	0.364	0.339	0.295	0.301
Piece-rate pay only	0.066	0.106	0.083	0.044	0.028	0.016	0.026	0.022	0.020	0.035
Bounus pay only	-	-	-	-	-	-	-	-	-	-

Table A8. (cont.)

Characteristic	D1	D2	D3	D4	D5	D6	D7	D8	D9	D10
Mix of pay schemes	0.557	0.479	0.462	0.463	0.448	0.550	0.610	0.638	0.684	0.664
Sunday work**	0.072	0.200	0.216	0.292	0.407	0.433	0.447	0.501	0.521	0.473
Sunday work 1-49 hours	0.061	0.161	0.176	0.184	0.250	0.248	0.224	0.275	0.270	0.328
Sunday work 50-99 h.	0.011	0.029	0.037	0.105	0.159	0.178	0.221	0.226	0.250	0.145
Sunday work ≥ 100 h.	-	0.010	0.004	0.002	-	0.008	0.002	-	0.002	-
Paid overtime**	0.219	0.457	0.398	0.439	0.466	0.488	0.461	0.422	0.435	0.339
Overtime 1-49 hours	0.188	0.385	0.330	0.368	0.394	0.415	0.403	0.376	0.406	0.317
Overtime 50-99 hours	0.024	0.064	0.057	0.057	0.062	0.064	0.051	0.037	0.028	0.015
Overtime 100-149 hours	0.004	0.006	0.007	0.011	0.007	0.009	0.007	0.009	0.002	0.006
Overtime ≥ 150 hours	0.004	0.002	0.004	0.004	0.002	-	-	-	-	-
Share with shift pay	0.392	0.747	0.829	0.846	0.886	0.916	0.915	0.938	0.947	0.903
Share with compensation for unfavourable working conditions	0.064	0.132	0.143	0.175	0.222	0.272	0.270	0.277	0.244	0.180
Regional location:										
Region: high cost-of-living (class I)	0.252	0.200	0.272	0.265	0.317	0.306	0.268	0.299	0.283	0.314
Region: low cost-of-living (class II)	0.748	0.800	0.728	0.735	0.683	0.694	0.732	0.701	0.717	0.686
No. of observations	544	545	545	544	545	545	544	545	545	545

* Educational degrees are derived from information on the manual workers' position in the earnings code schemes in use in each branch. Estimations of wage equations using the workers' earnings code, on the one hand, and the derived educational degrees, on the other, produce almost identical results. The use of educational degrees is preferred to earnings codes because different industry sectors use different earnings code schemes, which unables direct comparisons across industry sectors. The information on years of experience refers to potential work experience calculated as (age - the derived years of schooling - 7).

** The data on manual industrial workers cover the fourth quarter of each year investigated. Thus the individual hourly wage, for example, is calculated as the wage sum over the last three months of the year divided by the corresponding amount of hours worked. In contrast, the information on hours worked on sundays and in overtime refers to the total number of, respectively, sunday and overtime working hours during the fourth quarter of the year.

Table A9. Average personal and job characteristics for stayers, upward movers, downward movers and leavers in 1980 and 1988, non-manual workers

Characteristic	1980				1988			
	Stayers	Upward movers	Downw. movers	Leavers	Stayers	Upward movers	Downw. movers	Leavers
Normal hourly wage, FIM	28,41	23,52	26,57	26,02	57,45	48,56	54,65	52,37
Total hourly wage, FIM	29,16	23,96	27,03	26,68	59,52	49,74	56,23	54,15
Males	0.611	0.596	0.726	0.594	0.630	0.661	0.676	0.594
Females	0.389	0.404	0.274	0.406	0.370	0.339	0.324	0.406
Human capital:								
Years of schooling	11,2	11,4	10,7	11,0	11,8	12,0	11,6	11,6
Lower basic, ≤ 7 years	0.182	0.126	0.216	0.207	0.111	0.076	0.098	0.132
Upper basic, 9 years	0.121	0.131	0.107	0.129	0.110	0.072	0.082	0.103
Lower secondary, 11 y.	0.141	0.115	0.193	0.132	0.149	0.128	0.150	0.135
Upper secondary, 12 y.	0.315	0.435	0.365	0.336	0.349	0.439	0.457	0.379
BA level	0.137	0.137	0.095	0.112	0.162	0.185	0.163	0.140
MA level	0.086	0.055	0.022	0.007	0.109	0.094	0.046	0.084
Licentiate	0.006	0.001	0.001	0.004	0.009	0.001	0.002	0.006
Doctor	0.001	-	0.001	0.000	0.003	-	0.001	0.002
General education	0.324	0.315	0.348	0.380	0.252	0.220	0.206	0.289
Humanities	0.005	0.005	0.002	0.009	0.006	0.006	0.010	0.011
Economics	0.006	0.004	0.003	0.005	0.006	0.002	0.006	0.004
Law	0.002	0.001	-	0.002	0.003	0.002	-	0.001
Commerce	0.206	0.268	0.138	0.217	0.207	0.189	0.219	0.241
Agriculture	0.009	0.004	0.006	0.007	0.007	0.007	0.004	0.013
Mathematics	0.012	0.007	0.008	0.011	0.017	0.015	0.010	0.014
Technology	0.408	0.379	0.483	0.345	0.483	0.530	0.533	0.396
Medicine	0.009	0.009	0.006	0.007	0.009	0.018	0.008	0.007
Other programmes	0.007	0.007	0.007	0.007	0.001	0.002	0.002	0.006
Age, years	37,4	33,6	40,6	37,9	39,4	34,4	42,3	39,1
Age < 20 years	0.006	0.001	-	0.011	0.001	0.001	-	0.003
Age 20-24 years	0.049	0.058	0.012	0.081	0.024	0.062	0.002	0.053
Age 25-29 years	0.120	0.278	0.083	0.184	0.095	0.247	0.047	0.153
Age 30-34 years	0.248	0.299	0.194	0.222	0.164	0.258	0.097	0.172
Age 35-39 years	0.214	0.160	0.191	0.139	0.233	0.171	0.195	0.163
Age 40-44 years	0.142	0.098	0.181	0.089	0.224	0.142	0.270	0.164
Age 45-49 years	0.107	0.067	0.158	0.062	0.132	0.065	0.219	0.098
Age 50-54 years	0.079	0.030	0.117	0.070	0.009	0.046	0.128	0.085
Age 55-59 years	0.030	0.009	0.055	0.088	0.032	0.008	0.038	0.082
Age ≥ 60 years	0.002	-	0.009	0.053	0.001	-	0.004	0.028
Experience, years	14,8	11,2	17,0	14,0	14,6	10,6	18,4	13,4
Experience < 5 years	0.071	0.184	0.051	0.178	0.154	0.284	0.086	0.250
Experience 5-9 years	0.223	0.309	0.168	0.250	0.161	0.234	0.097	0.192
Experience 10-14 years	0.249	0.214	0.233	0.194	0.190	0.181	0.134	0.146
Experience 15-19 years	0.202	0.158	0.191	0.125	0.214	0.154	0.209	0.146
Experience 20-29 years	0.188	0.114	0.248	0.134	0.229	0.123	0.372	0.176

Table A9. (cont.)

Characteristic	1980				1988			
	Stayers	Upward movers	Downw. movers	Leavers	Stayers	Upward movers	Downw. movers	Leavers
Experience 30-39 years	0.060	0.020	0.102	0.096	0.050	0.022	0.098	0.079
Experience ≥ 40 years	0.002	-	0.008	0.023	0.002	0.002	0.004	0.011
Seniority, years	10,5	7,6	13,0	9,7	11,8	7,6	14,5	10,3
Seniority < 5 years	0.198	0.386	0.148	0.374	0.262	0.484	0.185	0.412
Seniority 5-9 years	0.357	0.313	0.293	0.270	0.183	0.207	0.134	0.173
Seniority 10-14 years	0.182	0.142	0.174	0.119	0.192	0.119	0.185	0.127
Seniority 15-19 years	0.128	0.085	0.169	0.074	0.188	0.109	0.215	0.111
Seniority 20-29 years	0.112	0.069	0.158	0.090	0.145	0.068	0.230	0.121
Seniority 30-39 years	0.024	0.006	0.055	0.063	0.030	0.013	0.048	0.051
Seniority ≥ 40 years	0.003	-	0.003	0.011	0.000	0.001	0.003	0.005
Occupational status:								
Technical jobs	0.339	0.357	0.557	0.358	0.339	0.409	0.445	0.333
Clerical jobs	0.382	0.454	0.271	0.420	0.328	0.315	0.303	0.378
Upper-level non-manual	0.278	0.188	0.172	0.222	0.333	0.276	0.251	0.289
Working task:								
R&D	0.195	0.208	0.219	0.163	0.246	0.284	0.234	0.209
Production	0.291	0.261	0.402	0.293	0.282	0.309	0.336	0.264
Procurement	0.056	0.070	0.078	0.067	0.054	0.051	0.066	0.065
Sales	0.110	0.130	0.083	0.132	0.117	0.113	0.108	0.158
Customer relations	0.048	0.041	0.031	0.042	0.047	0.039	0.034	0.045
Administration	0.300	0.289	0.187	0.302	0.254	0.203	0.221	0.259
Industry sector:								
Textile	0.019	0.014	0.031	0.027	0.012	0.011	0.018	0.022
Clothing	0.019	0.018	0.018	0.035	0.010	0.009	0.006	0.023
Manuf. of wood prod.	0.040	0.030	0.052	0.047	0.034	0.025	0.049	0.028
Manuf. of paper prod.	0.116	0.098	0.079	0.053	0.089	0.053	0.142	0.039
Manuf. of metal prod.	0.226	0.226	0.233	0.212	0.363	0.330	0.352	0.294
Other manufacturing	0.438	0.452	0.438	0.394	0.313	0.330	0.279	0.380
Head offices	0.020	0.019	0.010	0.018	0.015	0.006	0.016	0.014
Construction	0.050	0.075	0.059	0.117	0.061	0.109	0.057	0.099
Other sectors	0.071	0.067	0.080	0.096	0.103	0.126	0.079	0.102
Pay-related variables:								
Shift pay	0.055	0.062	0.087	0.035	0.073	0.062	0.110	0.054
Bonus pay	0.036	0.035	0.042	0.037	0.047	0.043	0.062	0.068
Fringe benefits	0.129	0.099	0.120	0.128	0.183	0.139	0.124	0.199
Regional location:								
High cost-of- living areas	0.409	0.430	0.438	0.473	0.508	0.572	0.478	0.554
Low cost-of- living areas	0.591	0.570	0.562	0.527	0.492	0.428	0.522	0.446
No. of observations	2876	1382	1731	2909	2296	1297	1623	4478

Table A10. Average personal and job characteristics for stayers, upward movers, downward movers and leavers in 1980 and 1988, manual workers

Characteristic	1980				1988			
	Stayers	Upward movers	Downw. movers	Leavers	Stayers	Upward movers	Downw. movers	Leavers
Normal hourly wage, FIM	21,71	22,19	25,34	23,79	41,79	42,52	47,78	42,28
Total hourly wage, FIM	22,26	22,83	25,89	23,96	43,29	43,80	50,07	43,44
Males	0.659	0.768	0.837	0.682	0.644	0.802	0.813	0.640
Females	0.341	0.232	0.163	0.318	0.356	0.198	0.187	0.360
Human capital:*								
Years of schooling	10,2	10,1	10,9	10,0	10,3	10,5	10,6	10,2
Lower basic, ≤ 7 years	0.136	0.125	0.056	0.167	0.124	0.096	0.113	0.121
Upper basic, 9 years	0.237	0.265	0.143	0.245	0.231	0.213	0.164	0.288
Lower secondary, 11 y.	0.394	0.429	0.401	0.389	0.362	0.405	0.358	0.375
Upper secondary, 12 y.	0.234	0.180	0.399	0.198	0.283	0.286	0.365	0.216
BA level	-	-	-	-	-	-	-	-
MA level	-	-	-	-	-	-	-	-
Licentiate	-	-	-	-	-	-	-	-
Doctor	-	-	-	-	-	-	-	-
Age, years	36,9	34,9	36,3	37,8	38,5	36,6	39,2	37,0
Age < 20 years	0.008	0.017	0.005	0.070	0.007	0.014	0.002	0.043
Age 20-24 years	0.093	0.141	0.081	0.164	0.058	0.098	0.044	0.141
Age 25-29 years	0.159	0.181	0.161	0.148	0.100	0.144	0.091	0.136
Age 30-34 years	0.193	0.194	0.230	0.119	0.163	0.159	0.150	0.130
Age 35-39 years	0.148	0.137	0.160	0.077	0.190	0.194	0.205	0.142
Age 40-44 years	0.147	0.133	0.148	0.052	0.220	0.180	0.244	0.123
Age 45-49 years	0.144	0.106	0.133	0.057	0.146	0.113	0.141	0.088
Age 50-54 years	0.080	0.067	0.062	0.143	0.099	0.083	0.102	0.105
Age 55-59 years	0.027	0.024	0.017	0.115	0.017	0.013	0.020	0.077
Age ≥ 60 years	0.002	-	0.002	0.055	-	0.002	0.001	0.014
Experience, years	19,7	17,8	18,4	20,8	21,2	19,1	21,6	19,9
Experience < 5 years	0.031	0.060	0.035	0.119	0.017	0.046	0.015	0.085
Experience 5-9 years	0.138	0.188	0.146	0.176	0.082	0.134	0.062	0.155
Experience 10-14 years	0.192	0.185	0.209	0.146	0.145	0.156	0.139	0.136
Experience 15-19 years	0.164	0.163	0.184	0.097	0.168	0.174	0.175	0.139
Experience 20-29 years	0.280	0.250	0.286	0.117	0.405	0.331	0.420	0.240
Experience 30-39 years	0.174	0.142	0.134	0.223	0.173	0.150	0.180	0.197
Experience ≥ 40 years	0.021	0.012	0.006	0.122	0.010	0.008	0.008	0.048
Industry sector:								
Textile	0.109	0.034	0.017	0.074	0.091	0.025	0.020	0.077
Clothing	0.018	0.014	0.001	0.039	0.087	0.006	0.009	0.109
Manuf. of wood prod.	0.238	0.101	0.144	0.250	0.150	0.087	0.108	0.126
Manuf. of paper prod.	0.293	0.651	0.182	0.223	0.263	0.266	0.346	0.131
Manuf. of metal prod.	0.342	0.199	0.656	0.414	0.409	0.616	0.518	0.556
Other manufacturing	-	-	-	-	-	-	-	-

Table A10. (cont.)

Characteristic	1980				1988			
	Stayers	Upward movers	Downw. movers	Leavers	Stayers	Upward movers	Downw. movers	Leavers
Head offices	-	-	-	-	-	-	-	-
Construction	-	-	-	-	-	-	-	-
Other sectors	-	-	-	-	-	-	-	-
Pay-related variables:								
Hourly (= basic) wage only	0.435	0.540	0.384	0.441	0.387	0.419	0.377	0.409
Piece-rate pay only	0.109	0.055	0.114	0.113	0.058	0.057	0.056	0.075
Mix of pay schemes	0.455	0.404	0.503	0.445	0.555	0.524	0.566	0.516
Shift pay	0.613	0.799	0.550	0.545	0.743	0.824	0.882	0.675
Sunday work**	0.362	0.537	0.308	0.275	0.412	0.524	0.396	0.274
Compensation for bad working conditions	0.277	0.364	0.363	0.258	0.261	0.310	0.392	0.244
Paid overtime**	0.453	0.538	0.451	0.415	0.558	0.653	0.544	0.485
Regional location:								
High cost-of- living areas	0.251	0.206	0.218	0.208	0.249	0.279	0.288	0.274
Low cost-of- living areas	0.749	0.794	0.782	0.792	0.751	0.721	0.712	0.726
No. of observations	1562	1850	1903	3374	1698	1726	2023	4792

* Years of schooling and educational degrees are derived from information on the manual workers' position in the earnings code schemes in use in each branch. Estimations of wage equations using the workers' earnings code, on the one hand, and the derived educational degrees, on the other, produce almost identical results. The use of educational degrees is preferred to earnings codes because different industry sectors use different earnings code schemes, which unables direct comparisons across industry sectors. The information on years of experience refers to potential work experience calculated as (age - the derived years of schooling - 7).

** The data on manual industrial workers cover the fourth quarter of each year investigated. Thus the individual hourly wage, for example, is calculated as the wage sum over the last three months of the year divided by the corresponding amount of hours worked. In contrast, the information on hours worked on sundays and in overtime refers to the total number of, respectively, sunday and overtime working hours during the fourth quarter of the year.

ELINKEINOELÄMÄN TUTKIMUSLAITOS (ETLA)
THE RESEARCH INSTITUTE OF THE FINNISH ECONOMY
LÖNNROTINKATU 4 B, FIN-00120 HELSINKI

Puh./Tel. (90) 609 900 Telefax (90) 601753
Int. 358-0-609 900 Int. 358-0-601 753

KESKUSTELUAIHEITA - DISCUSSION PAPERS ISSN 0781-6847

No 494 ERKKA HOPPONEN, Itsenäisen voimantuotannon rahoitus ja kilpailukyky. 16.05.1994. 75 s.

No 495 JOUNI P. MÄKELÄ, Teleklusterin tutkimus- ja kehitystoiminta sekä koulutus ja konsultointi. 16.05.1994. 67 s.

No 496 JYRKI RUUTU, Tuntipalkkojen ja työmäärän jousto teollisuudessa laman aikana. 18.05.1994. 68 s.

No 497 MIKA MALIRANTA, Suomen työn tuottavuuden kansainvälinen taso ruoan, juomien ja tupakkatuotteiden valmistuksessa. Kahdenvälinen vertailu Ruotsiin ja Yhdysvaltoihin. 24.05.1994. 23 s.

No 498 MAARIT SÄYNEVIRTA - PEKKA YLÄ-ANTTILA, Teknologiaintensiivisten yritysten kansainvälistyminen. 06.06.1994. 54 s.

No 499 PETTERI KAUPPALA, Matkustajalaivaliikenteen kansallinen kilpailukyky. 06.06.1994. 65 s.

No 500 KAAREL KILVITS, Current State of Estonian Industry. The basic material prepared in autumn 1993 for the joint Estonian-Finnish study project on "the Future of Estonian industry". 10.06.1994. 74 p.

No 501 KALLE LAAKSONEN - RAIJA VOLK, Elintarvikeklusterin kilpailukyky - Väliraportti. 20.06.1994. 59 s.

No 502 SYNNÖVE VUORI, Teknologian tutkimuksen nykytila Suomessa. 21.06.1994. 23 s.

No 503 PETRI ROUVINEN, Hyvinvointiklusterin kilpailukyky - Väliraportti. 27.07.1994. 66 s.

No 504 SYNNÖVE VUORI, R&D, Technology Diffusion and Productivity in Finnish Manufacturing. 30.08.1994. 27 p.

No 505 MINNA SALMI, The Rise of Kone Elevators to the top of the world. 05.09.1994. 29 p.

No 506 JARI AALTO, Suomalaisten teräsrakenteiden toimittajien kilpailukyky. 05.09.1994. 31 s.

No 507 PIA KORPINEN, Kilpailuetu kansainvälisessä kaupassa - suomalainen kuntovälineteollisuus. 05.09.1994. 78 s.

No 508 RISTO PENTTINEN, Timanttimallin arvostelu. 05.09.1994. 32 s.

No 509 GUSTAV VON HERTZEN - JULIANNA BORSOS, An Agro-food Industrial Strategy for the Baltic States. 21.09.1994. 75 p.

No 510 JUHA VILJAKAINEN, Euroopan unionin teollisuuspolitiikka ja suomalainen terästeollisuus. Case: Rautaruukki. 26.09.1994. 30 s.

No 511 NINA J. KONTULAINEN, Competitive Advantage of the Finnish Fiber Processing Machinery Industry. 10.10.1994. 60 p.

No 512 HANNA VUORI, Betoniteollisuuden kilpailukyky. 18.10.1994. 39 s.

No 513 PASI KUOPPAMÄKI, Ilmastonmuutos ja Suomen maatalous. 19.10.1994. 36 s.

No 514 ESKO TORSTI, Profit Margins in Finnish Industry - a Panel Data Analysis. 26.10.1994. 24 p.

No 515 JARKKO RANTALA, Suomalaisen rakennusteollisuuden kilpailukyky projektiviennissä, Case: Venäjän sotilaskylät. 26.10.1994. 25 s.

No 516 ESKO TORSTI, The Scandinavian Inflation Model in Finland. 26.10.1994. 19 p.

No 517 JAANA KOOTA, Hirsi- ja puutaloteollisuuden kilpailukyky. 01.11.1994. 19 s.

No 518 MARKO TEIVAS, Talotekniikan kilpailukyky. 01.11.1994. 23 s.

No 519 MARKKU SOININEN, Rakennuspuusepänteollisuuden kilpailukyky. 01.11.1994. 22 s.

No 520 KRISTIINA SOLA, Rakennusalan suunnittelun ja konsultoinnin kilpailukyky. 07.11.1994. 32 s.

No 521 JUHA JUNNONEN, Vesihuoltoon ja vedenkäsittelyyn liittyvän rakentamisen kilpailukyky. 07.11.1994. 30 s.

No 522 JARI PELTOLA, Kojiman suhteellisten etujen hypoteesi suorille sijoituksille - kiista länsimaisen teorian universaalisuudesta. 14.11.1994. 76 s.

No 523 HELENA LAIHOSOLA, Suomalaisen lääketeollisuuden kilpailuetu. 15.11.1994. 60 s.

No 524 VELI-MATTI TÖRMÄLEHTO, Huomioita endogeenisen kasvuteorian ja Michael E. Porterin kilpailuetuteorian yhtäläisyyksistä. 16.11.1994. 33 s.

No 525 RITA ASPLUND, Wage Differentials, Wage Mobility and Skills in Finnish Industry. An empirical analysis of the period 1980-1992. 28.11.1994. 67 p.

Elinkeinoelämän Tutkimuslaitoksen julkaisemat "Keskusteluaiheet" ovat raportteja alustavista tutkimustuloksista ja väliraportteja tekeillä olevista tutkimuksista. Tässä sarjassa julkaistuja monisteita on mahdollista ostaa Taloustieto Oy:stä kopiointi- ja toimituskuluja vastaavaan hintaan.
Papers in this series are reports on preliminary research results and on studies in progress. They are sold by Taloustieto Oy for a nominal fee covering copying and postage costs.

d:\ratapalo\DP-julk.sam/28.11.1994