EARNINGS AND HUMAN CAPITAL:

EVIDENCE FOR FINLAND

by

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1 INTRODUCTION

This paper reviews existing empirical evidence on the rewarding of individual human capital in general and formal education in particular in the Finnish labour market. As will become evident, the literature of this research field is still rather sparse in Finland. Most of the available evidence has, in effect, been produced during the past decade. Apart from a fairly limited number of studies, any generalisations of results will also suffer from the fact that the comparability of reported results is impaired by the use of different data sets, differing definitions of variables as well as crucial differences in the estimated model specifications. Differences in the employed estimation techniques seem to play a much smaller role, mainly because of the minor impact of sample selection bias on the estimated coefficients.

The overall impression mediated by the reviewed research is that the average return to education has declined substantially during the past decades. The decline was particularly strong in the 1970s, and continued at a slower pace up to the mid-80s. The average return to education has remained roughly unchanged since the latter half of the 80s with the general trend still pointing downward rather than upward. Moreover, the rewarding of human capital accumulated in working life turns out to be very modest in Finland. This holds for general work experience and, especially, for tenure as measured by the length of the current employment relationship.

2 PURPOSE AND DATA SETS USED

The influence of individual differences in human capital endowments on earnings determination in the Finnish labour market has been examined using mainly three extensive individual-level databases: Population Census Data constructed by Statistics Finland, Labour Force Surveys conducted by Statistics Finland and Wage Data Files gathered by the Confederation of Finnish Industry and Employers (TT). The coverage and richness of these databases differ considerably. Moreover, they have been utilised to a highly varying extent depending on the primary purpose of the study. This diversification weakens profoundly the possibilities to draw general conclusions concerning magnitudes and trends of private returns to human capital in the Finnish labour market.[1]

2.1 Population Census Data

The Population Censuses cover the whole population and are available for every fifth year starting in 1970.[2] The most recent census is for 1995. Based on these quinquennial censuses Statistics Finland has compiled the *Finnish Longitudinal Census Data File*, which contains all individuals (some 6 million people) who lived in Finland during at least one of the census years. The censuses are constructed mainly by merging administrative registers; survey data have been used only occasionally for complementary reasons. The earnings data come from the records of the tax authorities and refer to all taxable wage and salary incomes including most types of compensation such as fringe benefits, overtime and vacation pay, etc. Some crucial disadvantages of the database are also worth mentioning: information on working hours is not available for any of the census years, and the number of months worked is missing for 1970; the income data for the 1970 census is actually from 1971 while all the other information refers to 1970; part-timers cannot be distinguished from full-timers for 1970, 1990 or 1995; high income earners (the top percentile) have persistently been top-coded and instead of their actual income, these individuals have been given the average earnings above the top-code cut-offs.

Brunila (1990) uses two representative cross-sections from the 1975 and 1985 Population Censuses to investigate earnings differentials across genders. The one per cent sample drawn from the employed population in respective year is for data-

[1] Lilja and Vartia (1980) and Nygård (1989) have used Household Survey data to estimate the impact of the education of the head of the household on observed differences in household incomes.

[2] Recently Statistics Finland has made available a restricted sample covering the year 1950 (see Statistics Finland, 1998). So far no estimations of the return to human capital have been reported based on that data set.

related reasons restricted to full-year, full-time employees, exclusive of those engaged in agriculture, forestry and mining. When further excluding employees classified into agricultural or entrepreneurial occupations as well as those with annual earnings below FIM 25 000, Brunila arrives at an estimating sample including some 11,000 full-year full-timers for both years investigated. The wage concept used is gross annual earnings.

Helo and Uusitalo (1995) address the question whether it is worthwhile for Finnish youths to invest in a university education. Apart from estimating Mincer-type earnings equations, they also calculate and compare internal rates of return for university degrees taken within different educational fields. Their analyses depart from a 10 per cent sample drawn from the Longitudinal Census Data File covering the years 1975, 1980, 1985 and 1990. They further restrict the estimating data to individuals aged 19–64 having either completed a university degree at the MA- or post-graduate level or merely taken the matriculation examination (i.e. completed the Gymnasium). This procedure results in four cross-sections containing between 8,700 (in 1975) and 23,200 (in 1990) individuals. The wage concept is annual taxable income including wage and salary income as well as entrepreneurial and capital income.

Eriksson (1994) and Eriksson and Jäntti (1996,1997) analyse the distribution and determination of earnings using a random sample containing some 10 per cent of the population included in the Longitudinal Census Data File covering the years 1970, 1975, 1980, 1985 and 1990. Eriksson (1994) restricts the estimating data to wage and salary earners between 16 and 65 years of age, giving a sample size that grows from about 111,000 individuals for 1970 to over 202,000 for 1990. In Eriksson and Jäntti (1996,1997) the sample is further restricted to those over 25 year old earning more than 100 FIM in 1990 prices, which reduces the sample size to some 71,000 individuals for 1970 and about 180,000 for 1990. Two different wage concepts are used: before-tax monthly and annual earnings.[3] The analysis is restricted to all employees in Eriksson (1994) and Eriksson and Jäntti (1996) but is separated also by gender in Eriksson and Jäntti (1997).

Uusitalo (1999) explores the influence of ability bias and schooling choice on estimated returns to education using two random samples of young men who performed their military service in, respectively, 1970 and 1982. The first sample departs from 2,000 recruits having performed the Finnish Defence Forces Basic Ability Test in 1970. The Longitudinal Census Data File for 1970–90 is used to add information on the sample individuals as well as on their parents. Due to missing data some 1,500 men were retained in the final sample. Further reductions in sample size were caused by restrictions to full-time employees and missing information on family background. The wage concept used is gross annual earnings.

The second sample used by Uusitalo (1999) covers 37,000 young men who performed their military service in 1982. Again labour market information on the sample men and their parents was obtained from the Longitudinal Census Data File for 1970–90. In addition, administrative labour market records were used to add information for 1994 on earnings and completed formal education. When further restricting the sample to men in full-time employment earning FIM 2 000 or more per month (in 1994) and with information on family background available, the effective sample dropped to 22,572 male employees. The wage concept used is gross monthly earnings calculated from annual taxable income and an estimated number of months worked.

2.2 The Labour Force Survey

The Labour Force Survey (LFS) is a biannual survey conducted by Statistics Finland. It covers a random sample of some 9,000 individuals, representing the entire

[3] The reported results are affected only marginally when excluding those who are younger than 25 and when using annual instead of monthly earnings (Eriksson and Jäntti, 1996).

population aged 15–64 years as stratified according to sex, age and region. Apart from these three characteristics, only a few additional variables, such as the acquired formal schooling, are taken from registers; most of the information provided in the LFS is self-reported. The LFS has been conducted for several years, but only a limited number of the surveys have been supplemented with income data from the tax registers. So far Statistics Finland has made income-extended surveys available for 1987, 1989, 1991 and 1993, and recently also for 1995. Compared to the Population Census Data the LFS has the advantage of comprising a rich set of background characteristics concerning the individual and his/her job. A less satisfactory feature of the data is that it lacks the panel property, i.e. the survey sample varies from year to year.

Ingberg (1987) was the first to report empirical evidence on the effects of schooling and experience on earnings in Finland. He used an *ad hoc* data set created by Statistics Finland through merging the 1980 Labour Force Survey and income and labour force status variables from the registers of the 1980 Housing and Population Census. The data comprise some 10,000 individuals of which close to 6,200 are recorded to be labour force participants. The wage concept refers to annual taxable earnings, comprising wages and salaries, income from farming, and entrepreneurial income (with capital income, pensions and other unearned income excluded).

Asplund (1993a) utilises the 1987 Labour Force Survey, i.e. the first LFS that was supplemented with income data from the tax records, to explore the relationship between individual earnings and human capital in the Finnish labour market.[4] When the sample was restricted to employed wage and salary earners aged 16–64 and sorted out with respect to missing or incomplete information on crucial variables, the actual estimating sample dropped to close to 4,000 individuals. The wage concept used is the average (before-tax) hourly wage calculated as annual taxable earnings divided by annual working hours estimated from the self-reported number of months worked and

[4] Apart from extensively specified wage equations estimated for all employees and separately by gender, Asplund (1993a) also analyses occupational choice and earnings, sectoral choice and earnings, and inter-industry wage differentials with the emphasis on the human capital aspect.

normal weekly working hours. The same data set is used in several comprehensive comparisons of wages and human capital in the Nordic countries (Albaek et al., 1996a; Asplund et al., 1996a,b).

Asplund (1998a) extends the analysis of gender-specific wage formation in the private and public sectors to the years 1989, 1991 and 1993. All four survey years were also utilised in a recent study exploring the potential impact of computer skills on the average return to schooling (Asplund, 1998b). The estimating data comprise more than 4,000 individuals in 1989 and 1991, but only some 2,500 employees for 1993, which reflects the dramatically worsened employment situation in Finland since 1991.

2.3 The TT Wage Data

The Confederation of Finnish Industry and Employers (TT) collects detailed individual-level information from member firms once a year for non-manual workers and four times a year for manual workers. The wage as well as all other information provided is taken directly from the employers' registers and should, accordingly, be highly reliable. The member firms cover approximately 75 per cent of Finnish manufacturing but only a minor share of the services sectors.

Asplund (1996, 1998c) and Asplund and Vuori (1996) utilise a representative sample of full-time non-manual workers drawn from this broad TT database in such a way that the estimating data has both cross-section and panel properties. The sample covers the years 1980 to 1994 and comprises some 135,000 individual time observations. Of these, part concerns non-manual workers observed during just one year, whereas the rest concerns non-manual workers observed during at least two consecutive years and at most during all 15 years investigated. Asplund (1996) analyses all non-manual workers and three non-manual subcategories, i.e. upper-level, technical and clerical non-manual workers. Asplund (1998c) extends the analysis to a comparison of male and female non-manual workers. Asplund and

Vuori (1996), finally, divide the non-manual workers into two groups – those engaged in high-tech and other growth industries and those in slowly growing industries – and compare the labour market and wage performance of the two groups, with a further distinction made between different-sized establishments. The wage concept used in all three studies is the average (before-tax) hourly wage calculated as gross monthly earnings divided by monthly working hours estimated from normal weekly working hours.

Similar analyses have not been undertaken for manual workers because the TT database does not comprise information on the manual workers' formal schooling nor on their working experience. The only human capital-related information concerns the manual worker's qualification category[5] and age.

3 ESTIMATION METHODS

Most cross-section studies of the effect of human capital on wage determination in the Finnish labour market have used ordinary least squares (OLS) techniques.[6] In other words, individual wages have been regressed on a varying number of personal and job-related characteristics that are assumed to contribute to explaining the observed variation in wage outcomes. This method overlooks at least two main issues: the potential presence of a non-negligible sample selection bias and the fact that one or more of the explanatory variables might be endogenously determined.

A sample selectivity bias problem may arise if the sample individuals recorded as being employed are not randomly selected from the entire population. Asplund (1993a) and Asplund et al. (1996b) adjust for this by estimating the earnings equation

[5] The qualification categories, which rank workers according to their skills and tenure, differ across industry branches and are settled in branch-level wage negotiations.

[6] OLS techniques have been used by Ingberg (1987), Brunila (1990), Eriksson (1994), Eriksson and Jäntti (1996,1997), Asplund (1996, 1998b, 1998c), Asplund and Vuori (1996) and Asplund et al. (1996a). Helo and Uusitalo (1995) use a Tobit procedure in order to account for that fact that their income variable is censored in both ends.

in combination with a selection function of the probit type explaining the probability of the i^{th} sample individual being employed. The two equations are estimated first using an ordinary Heckman two-stage procedure and are then re-estimated jointly using the full-information maximum likelihood estimator (FIML), whereby the final values from the Heckman two-stage procedure are used as starting values. Neither for men nor for women did the estimation results (for 1987) point to a significant sample selection bias affecting the estimation results for Finland. This finding indicates that estimation of the earnings equation using OLS techniques produces consistent parameter estimates. The finding of no serious sample selection bias may, however, also be due – at least in part – to the usually high correlation between the exogenous variables in the selection equation and the earnings equation making even the FIML estimator very unrobust (see e.g. Puhani, 1997; Asplund, 1998b).

Several of the individual background variables commonly included in earnings equations can be expected to be the outcome of a selection process rather than a random drawing. These variables include not least education, occupational status and sectoral affiliation (employment in the private or the public sector). Few attempts have, however, been made in Finland to approach the obvious endogeneity of these variables.

Uusitalo (1996,1999) addresses the question of endogeneity of education, i.e. the possibility of non-negligible self-selectivity into different levels of education. This is done by specifying and estimating various models of individual schooling choice and by using more or less standard instruments, such as family background indicators (see further Section 4.1.3 below).

Asplund (1993a) makes an attempt to explore whether the omission of any factors influencing the individual's choice or access to a given occupation might give rise to problems of selectivity bias in the estimations. In order to correct for the potential presence of selectivity bias arising from occupational choice, occupation-specific earnings equations are estimated in combination with occupational attainment equations using the multinomial logit-OLS two-stage estimator. More exactly, the multinomial probability function capturing occupational choice is estimated by maximum likelihood and the obtained information is used to compute occupation-specific lambdas, i.e. the terms controlling for the potential effects of selectivity bias. The occupation-specific earnings equations are then estimated using OLS techniques. The results obtained from 1987 Labour Force Survey data provide evidence on some degree of non-randomness in the allocation of employees across occupational categories. Among female employees there seems to be a strong (negative) selectivity into manual works outside manufacturing, which may be the outcome of relatively low starting wages in typical female jobs in the distribution and services sectors. This, in turn, points to some kind of crowding-in effect, implying that the category comprises proportionally more jobs to which access is relatively easy especially for less-skilled women. For male employees, in contrast, the results reveal a strong (positive) selectivity into manufacturing jobs, which seems reasonable in view of the fact that manufacturing comprises many export-led, male-dominated, relatively high-paid sectors.

In analysing earnings determination in the private and public sectors in Finland, attempts have been made to account for the fact that the individuals may exercise some choice over their sectoral status (Asplund, 1993a, 1998a). In other words, the observed allocation is thought to be the outcome of a non-random distribution of individuals on sectors, reflecting different preferences over, *inter alia*, working conditions. In addition to treating the individual's sectoral status as endogenously determined account is also taken for the potential presence of a sample selectivity bias. This is done by estimating sector-specific earnings equations in combination with a sequential selection model of the bivariate probit type explaining the probability of the i^{th} sample individual being employed and, moreover, in the given sector. In other words, there are two criterion functions: the selection of being employed, and the selection of private versus public status. More formally, the applied estimation method allows the two decisions underlying employment in a given sector to be correlated, and accounts for sample selection both in the bivariate probit model and in the earnings model. The statistical significance of the estimated correlation and correction terms varies strongly with the employee category (men/women in private/public-sector employment) and the year investigated (1987, 1989, 1991, 1993). Although the variation in results seems to largely reflect the different way in which the four employee categories were affected by the dramatic changes in the activity level of the Finnish economy in these years, the sample selectivity and endogeneity problems do not stand out as serious.

Because of the different occupational structure of the private and public sectors there is, however, reason to expect some degree of selectivity also when it comes to the occupational status of the employee. In a second step, therefore, Asplund (1993a) treats both the private/public-sector status and the occupational social status of the employee as endogenously determined through a selection process. This multiple choice approach allows the employees to select across four labour markets: private- and public-sector non-manual/manual jobs. The selection model is identical to the one described above for the estimation of occupational earnings equations. The results, which refer to 1987, point to no serious selectivity bias arising from labour market choice influencing the estimation results. There is one notable exception, though: a strong (negative) selection of women into private-sector manual jobs, a result well in line with the strong (negative) selection of women into non-manufacturing jobs obtained from estimating selectivity-corrected occupational earnings equations (see above).

4 ESTIMATION RESULTS

Common to all the studies reviewed in the previous sections is that they estimate a conventional Mincerian earnings equation with the natural logarithm of the sample individuals' wages regressed on their educational attainment (measured by years or degrees), years of experience (actual, potential or proxied by age), gender and a varying set of other key explanatory variables, including tenure. Apart from estimations for all employees, some studies also run separate earnings regressions for men and women and/or for the private and the public sector. Some analyses are restricted to full-year, full-time employees while other comprise all employed. A few studies, finally, focus on more restricted but nevertheless representative samples, such as non-manual workers in manufacturing or particular male cohorts. Table A1 of the Appendix provides a summary of the data, model specifications and estimation methods used in the studies reviewed.

4.1 Returns to education

The regular education system in Finland is composed of the comprehensive school, the senior secondary school, vocational and professional education institutions, and universities. The comprehensive school provides basic education and is compulsory for the whole age group 7 to 16. The post-comprehensive general education provided by senior secondary schools is classified as an upper level of upper secondary education. Vocational and professional education institutions provide education both at the upper secondary level (vocational schools) and at the tertiary level (vocational colleges, technical institutes). Based on the length of the vocational education provided by vocational schools, upper secondary education is divided into lower-level and upper-level education, whereby the former refers to less than three years of vocational and professional training and the latter to about three years of training.

Tertiary-level or higher education comprises three (previously four) levels of education.[7] Vocational and professional schooling at the lowest level of tertiary education is provided by vocational colleges and technical institutes and takes 4–6 years. The certificates issued at this level are not equivalent to university degrees.

A declining number of persons have completed an undergraduate, i.e. Bachelor-level, university degree. This is partly the result of a degree system reform, whereby several BA-level degrees were raised to Master’s level. Today, all first university degrees are equivalent to a Master’s degree and take, on average, 6–8 years to complete. BA-

[7] Degree reforms in higher education that have come into force in recent years, i.e. in years not covered by the reviewed studies, are overlooked in this context.

level degrees are completed mainly in vocational and professional education institutions. Post-graduate schooling, finally, includes degrees at the licentiate and doctorate levels.

4.1.1 Returns to schooling years

Both the Labour Force Survey and the Population Census Data include register data, compiled by Statistics Finland, on the formal schooling attained by each individual. The registered degree, however, only shows the single highest level of education completed by the individual. A total of eight levels of education are distinguished. The educational classification available in the TT data up to 1994 is very similar, albeit not identical, to that of Statistics Finland. From 1995 onwards also the TT data is supplemented with official educational classification codes.

The registered levels of education can be turned into years of full-time schooling using the Finnish Standard Classification of Education as follows: basic education = 9 years, lower level of upper secondary education = 10–11 years, upper level of upper secondary education = 12 years, lowest level of higher education = 13–14 years, BA-level = 15 years, MA-level = 16 years and postgraduate or equivalent education = 18+ years. Unless indicated otherwise, this is the stereotype key used when turning educational degree levels into the years of schooling variable for which estimates are reported in Table 1.

The existing evidence on average returns to schooling is rather limited. Obviously, this is mainly due to the lack of information on actual years spent in schooling. Instead information on schooling years has to be imputed from the available register data on completed educational degrees. Moreover, the use of schooling years has been noted to give a less satisfactory fit compared to adding educational degree variables to the estimated wage model.

Table 1. Average returns to years of schooling, log-%

	Year	All	Men	Women	
Ingberg (1987) [a]	1980	9.1	9.3	–	
Asplund et al. (1996a) [b]	1987	7.0	7.4	6.4	
Asplund (1993a) [c]	1987	8.6	8.8	8.0	
Asplund (unpublished) [d]	1987	8.3	8.4	8.0	
	1989	8.2	8.4	7.8	
	1991	8.8	8.8	8.7	
	1993	8.2	7.8	8.3	
Uusitalo (1999; recruits in 1970)	1975-90 [e]		8.9		
Ability-corrected return			7.4		
Uusitalo (1999; recruits in 1982)	1994		9.1		
Ability-corrected return			7.9		
		Private sector		**Public sector**	
		Men	**Women**	**Men**	**Women**
Asplund et al. (1996a) [f]	1987	7.4	4.9	7.9	7.3
Asplund (unpublished) [g]	1987	8.8	6.6	9.9	8.9
	1989	10.5	5.7	8.7	10.0
	1991	9.3	6.8	8.9	11.0
	1993	7.6	7.4	8.2	9.3

Notes: All estimates are statistically significant at the 1 % level. (a) Only a schooling year variable is included. (b) Explanatory variables are: experience and experience squared, and a gender dummy in the wage equation for all employees. A less detailed key than the stereotype one was used when transforming educational degrees into years of schooling. (c) In addition to human capital variables, the wage equation is supplemented with a broad set of other personal and job-related characteristics. (d) Explanatory variables are: experience, experience squared, dummy for tenure less than one year, tenure and tenure squared, dummy for participation in employer-financed training, and a gender dummy in the wage equation for all employees. (e) The estimations are based on average values for the period 1975–90. (f) Controls are added for experience, experience squared and tenure. (g) Account is made for differences in various personal and job-related characteristics, not occupational or industrial status, though. See Table A1 of the Appendix for more detailed information.

The results obtained by Ingberg (1987) from the estimation of a simple schooling model merely including a variable for the number of completed schooling years, point to an average return on schooling of some 9.5 per cent[8] when restricting the analysis to individuals having been employed the whole year.[9] The corresponding estimate for all participants in the labour market amounts to some 12 per cent.

Table 1 further suggests that the average return to an additional year in schooling has changed only marginally from 1987 to 1993, despite the turbulence in the Finnish economy in these years.[10] The gap between men and women in the average rewarding of formal schooling stands out as small or negligible, but widens in favour of men when more personal and job-related characteristics are added to the estimated wage model (which, in the table, is illustrated for 1987). The difference in the reported estimates for 1987 also reveals how sensitive the estimates are to even small changes in the number of schooling years attached to each educational degree when turning educational degrees into a continuous years of schooling variable.

The returns to schooling years are approximately halved when including controls for the individual's occupational status (e.g. Asplund, 1993a; Asplund et al., 1996a,b). Moreover, this effect has been found to reflect the positive influence that education has on the individual's occupational chances rather than occupational attainment having a tendency of weakening the earnings effects of the acquired formal education (Asplund, 1993a). This is also to be expected for countries like Finland where formal education contains a large amount of occupation-specific skills and the possession of a given educational degree is even a prerequisite for certain occupations. Simultaneously highly varying returns to human capital endowments among

[8] The returns reported in the tables are the estimated coefficients for the variable in question, multiplied by 100. In the text, these log-returns are throughout turned into normal per cent by using the antilog formula $[(e^a - 1)*100]$, where a is the parameter estimate.

[9] Inclusion of the natural logarithm of the number of reported weeks worked during the year changes the size of the estimated returns only marginally.

[10] It may also be noted in this context that the expansion of computer use has had no effect whatsoever on the estimated returns to schooling in Finland. This result contrasts sharply with evidence reported for the US, where some 35–40 per cent of the increase in returns to schooling experienced over the past decades in the US, are to be attributable to rapidly expanding use of computers at the job. (See Asplund, 1998b)

occupational categories indicate that occupation has a marked influence on the sensitivity of the individual's earnings to changes in crucial personal characteristics.[11]

Table 1 also shows that the public sector has persistently rewarded formal education at least as good as the private sector. The estimates for 1993, however, point to a clear narrowing in the average returns to additional years in schooling between both sectors and genders.

A longer-term trend in the average returns to schooling years is obtained from the TT wage data but for non-manual workers in manufacturing only. Figure 1 displays estimated returns for all non-manual workers and separately by gender and non-manual worker category. Figure 2 compares non-manual workers in high-tech and other fast growing industries with those in slowly growing industries. For the former category a further distinction is made between different-sized establishments. Too few observations in some of the establishment-size categories prevented reasonable estimates to be obtained for the slowly growing industry category and are, therefore, not shown here.

The average effect of an additional year in schooling has remained approximately unchanged over the investigated 15-year period when looking at all non-manual workers. Separate analyses for men and women also point to roughly unchanged average returns – around 6 per cent for men and about one percentage point less for women, but only in the 1980s.[12] In the early 1990s the average return to an additional year in schooling dropped permanently to around 4 per cent per annum among female non-manual workers, while it remained some 6 per cent for their male counterparts, thus widening the gender gap in this respect to nearly two percentage points. Similar

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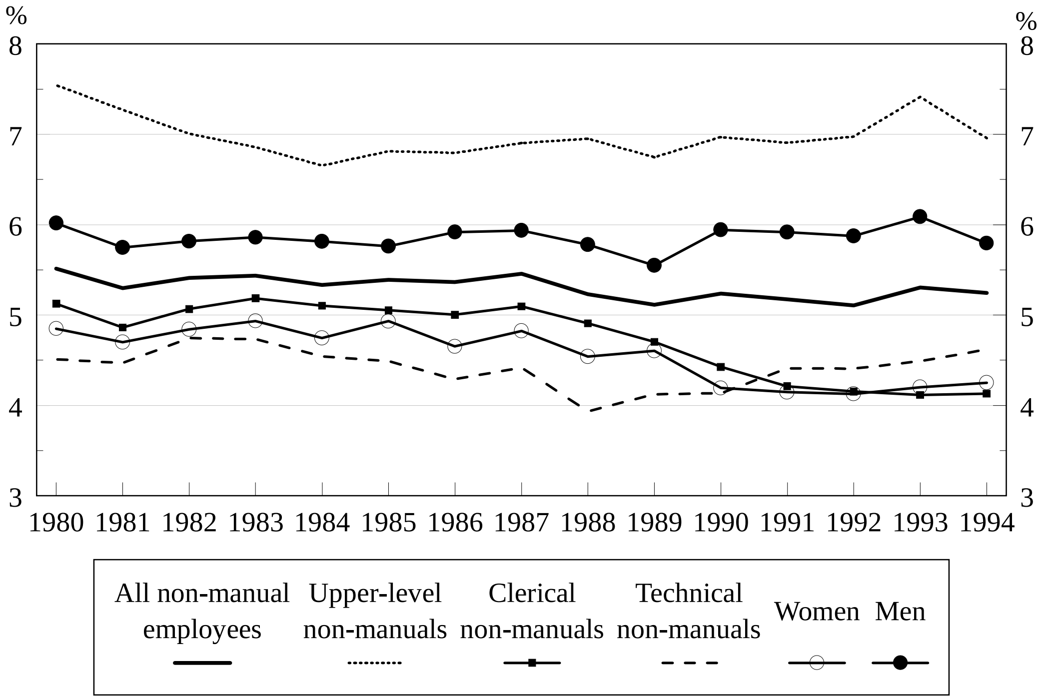
[11] Asplund (1993a) estimates the average return to years of schooling to be significantly higher for non-manual workers than for manual workers in 1987: for men(women) in upper-level non-manual jobs the average return is estimated at 7.4(6.6) per cent, for those in lower-level non-manual jobs at 6.5(4.6) per cent and for male manufacturing workers at 4.0 per cent. The corresponding estimate for women is insignificantly different from zero, as are the estimates for both men and women in non-manufacturing manual jobs.

[12] Asplund (1993a) also reports a significantly lower average return to additional years in schooling for women in private-sector non-manual jobs. In the public sector, in contrast, the difference in educational returns is insignificant between men and women in non-manual jobs.

trends are discernible for the male-dominated categories of upper-level and technical non-manual workers and the female-dominated category of clerical non-manual workers.

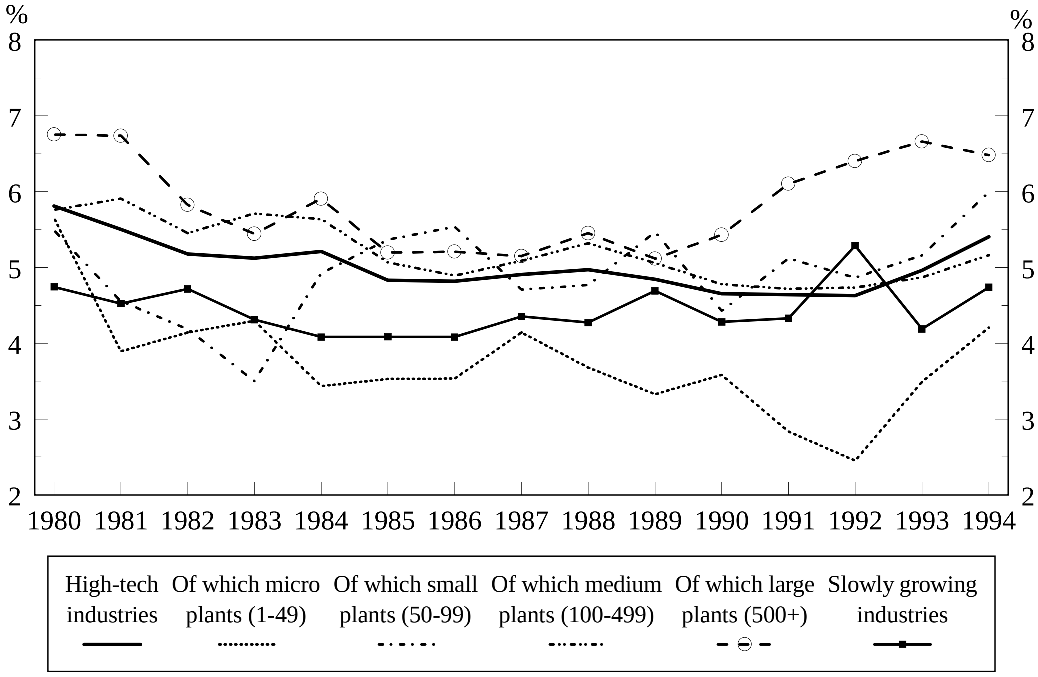
Figure 1. Average returns to schooling years estimated for non-manual workers in manufacturing, 1980–94, log-%



Source: Asplund (1996, 1998c)

Figure 2, in turn, reveals that the average returns to educational endowments have not differed significantly between fast and slowly growing industries over the period 1980–94, not even in the deep recession years in the early 1990s. Substantial variation in educational returns is rather found *within* industrial categories, not least between different-sized establishments, but only in the early 1990s; the differences in returns to education across different-sized establishments estimated for the 1980s are statistically insignificant, implying that prior to the 1990s non-manual workers have, on average, been equally rewarded for their educational endowments irrespective of the size of the establishment in which they are working.[13]

Figure 2. Average returns to schooling years estimated for non-manual workers in high-tech and other fast growing industries (also differentiated according to establishment size) and for non-manual workers in slowly growing industries, 1980–94, log-%



Source: Asplund and Vuori (1996)

The average returns to extra years in schooling reported by Uusitalo (1999) for two male cohorts having performed their military service in, respectively, 1970 and 1982, are slightly higher than those obtained in other studies for the whole male population. Most likely the (fairly minor) difference in estimated returns is a combination of differences in the underlying population, the definition of variables and the model

[13] This is in line with the finding of no significant differences in educational returns across different-sized plants reported in Albæk et al. (1996b).

specification used.[14] More interestingly, when adding ability measures[15] to the wage equation, Uusitalo obtains significantly lower returns to education, the drop being 1.5 percentage points for the 1970 sample and slightly less (1.2 percentage points) for the 1982 sample. Hence, part of the estimated educational returns seems, indeed, to capture individual differences in innate ability. This ability bias, however, turns out to be relatively small, leaving the average return to additional schooling years at a comparatively generous level.

4.1.2 Returns to educational degrees

The existing evidence on returns to educational degrees is fairly rich compared to that on returns to schooling years. The set of schooling indicators that can be distinguished based on the available register data, are: basic (compulsory) education, lower level of upper secondary education, upper level of upper secondary education, short non-university education, BA-level, MA-level and postgraduate degrees. The number of schooling indicators actually accounted for in the estimations vary slightly across studies but, nevertheless, allow cautious comparisons to be made. Comparison of results across studies is, in fact, more impaired by differences in the set of other personal and job-related characteristics added to the estimated wage model. Again the inclusion of controls for the individuals' occupational status affects the estimated educational returns and thus the comparability of returns most strongly (see e.g. Asplund, 1993a).

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[14] For instance, the rate of return estimate for the 1982 sample reported by Uusitalo (1999, Table 2, p. 49)) drops from 0.091 to between 0.083 and 0.087 when using calculated work experience (time elapsed since last degree) instead of potential experience, and depending on whether regional variables (describing the residential environment of the sample men in 1980) and the father's and mother's schooling and earnings (in 1980) are included.

[15] The ability measures are constructed from the Finnish Defence Force Basic Ability Test, which is taken by all new recruits at the beginning of their military service (for selection of the rookies that are given officer training). The test consists of three sub-tests measuring verbal ability, analytical reasoning and mathematical reasoning (for more details, see Uusitalo, 1996). The estimations for the 1970 sample are based on 'raw' ability measures while the estimations for the 1982 sample are based on pre-test schooling adjusted ability measures.

Table A2 in the Appendix gives average returns to different educational degrees estimated for all employees and separately by gender. The available evidence indicates that the average return to educational investment declined at all degree levels up to the mid-80s, albeit at a slower pace in the 1980–85 period than in the 1975–80 period.[16] During the latter half of the 1980s, the decline stopped at the lower end of the educational scale, and was even slightly reversed at the very top of the educational scale.[17] The deep recession in the early 1990s seems, however, to have put an end to this stable or even increasing trend – the average returns estimated for 1993 point to a slight weakening in the rewarding of educational investment at practically all educational levels. Moreover, much the same pattern is discernible among both men and women. All in all, the average return to education was at all degree levels significantly lower in the early 1990s than in the early 1970s.

The overall trend in educational returns over the past decades is further highlighted in Figure 3. The figure displays that the difference in returns between those with a university degree and those with a degree at the upper level of upper secondary education.

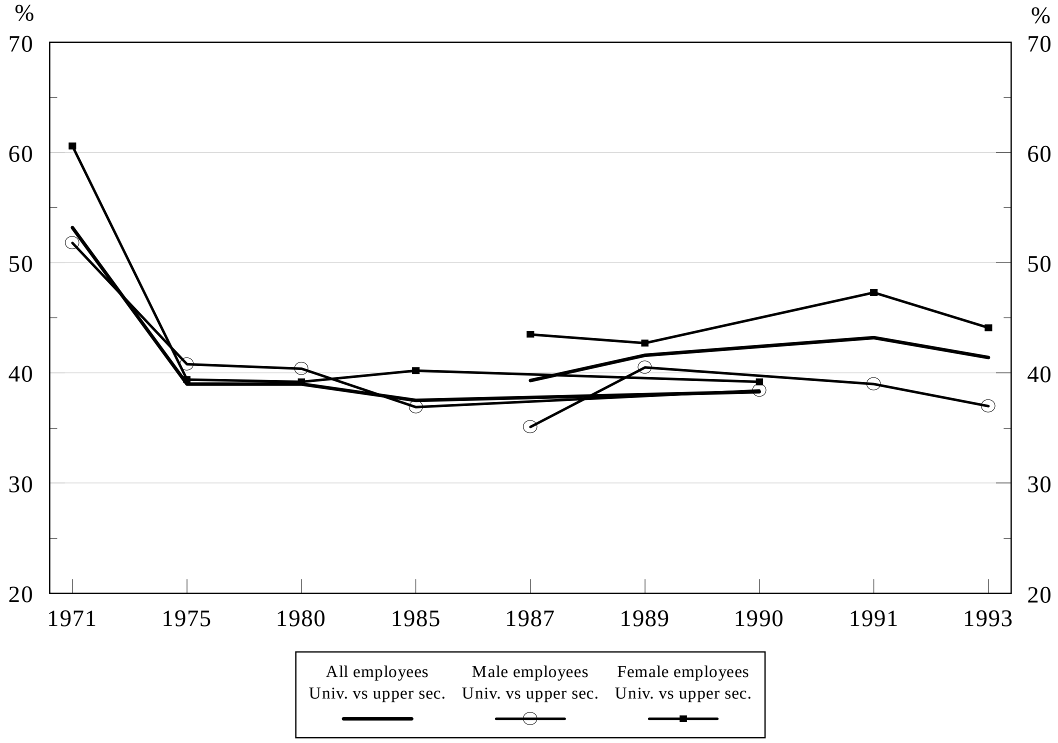
Separate analysis of the private and public sectors, however, points to certain noteworthy sectoral differences in the development of returns to education between 1987 and 1993 (see Table A3 of the Appendix). In particular, while the educational-induced wage differentials among men in private-sector employment declined remarkably during the deep recession in the early 1990s, their female counterparts experienced increasing returns especially to university degrees. In the public sector, in contrast, both men and women have seen a continuous, albeit moderate, decline in educational returns since the late 1980s. By 1993, these different time trends had

[16] A declining trend between 1975 and 1985 is also reported by Brunila (1990), although the decline is smaller in absolute size since she also accounts for differences in occupational status.

[17] Roughly the same trend is reported for the private sector by Vainiomäki and Laaksonen (1995). A similar trend is also displayed by Helo and Uusitalo (1995) when relating the earnings of those with a university degree to the earnings of those having merely taken the matriculation examination. They also show that the size of this university-degree wage premium varies considerably across educational fields. This is evident also from their calculated *internal* rates of return to different university-level educational fields.

resulted in a situation with small, if any, differences in educational returns across sectors and genders (Asplund, 1998a).

Figure 3. Estimated 'university-degree' wage premiums for all employees and separately by gender, log-%



Source: Table A2 of the Appendix

Evidence pointing to narrowing wage differentials between differently educated employees since the early 1980s, has also been obtained from TT wage data for non-manual workers engaged in manufacturing. A declining trend is discernible among both men and women, and also within fast growing industries (Table A4 of the Appendix).

In sum, the average return to education has declined substantially in Finland over the past decades. The decline was particularly strong in the 1970s, and continued at a slower pace up to the mid-80s. This declining trend came to an end during the latter half of the 1980s. Weak signs of increasing returns to university degrees have been reported for the early 1990s, especially among women in private-sector employment.

4.1.3 Special issue: Endogeneity of schooling choice

There is, so far, only one study – that of Uusitalo (1999) – that attempts to adjust the estimated return to education for the possibility of the observed distribution of individuals across educational levels being the outcome of individual choice rather than random selection into schooling of varying length. Uusitalo departs from a random coefficient model of earnings determination which allows schooling choices to vary across individuals because of differences in their returns to education and because of their differing rates of substitution between schooling and future earnings. While the first phenomenon may be due to differences in ability, the latter is related to variation in access to funds and/or tastes for schooling. Broadly speaking, the specified model is estimated using a control function approach, i.e. a two-step selection correction combining the OLS regression of earnings on schooling with a participation decision model. If the participation-in-schooling decision is assumed to be linear (which turns out to be an acceptable approximation in the Finnish case), the two-step selection correction is shown to be equivalent to the IV estimator and the control function merely a less restrictive form of IV.

The instruments used by Uusitalo (1999) are standard. For the 1970 sample Uusitalo experiments with father's schooling and income as instruments. The 1982 sample offers a slightly broader set of possible instruments: father's and mother's schooling and earnings as well as residence in a university city, all information for 1980. These instruments are grouped in four different ways, and returns to schooling are reported for each of them with the earnings equation given four different specifications, each of which is estimated using both the IV(2SLS) and the control function estimator.

This framework results in no less than 28 ability-adjusted[18] return-to-schooling estimates ranging from 0.052 to 0.112 (Uusitalo, 1999, Table 4, p. 54). The corresponding ability-adjusted OLS estimates vary between 0.077 and 0.083 depending on whether work experience refers to potential or calculated years in working life and whether or not the parents' schooling is added to the earnings equation. Thus, some of the IV estimates[19] are clearly higher, some are clearly lower than the OLS estimates.

There seem to be mainly two explanations for this outcome. First, the highest and lowest IV estimates relate to specifications with parents' schooling being used as an instrument (alone or interacted with some other instrument) and/or included as an exogenous variable in the earnings equation. Since the parents' schooling turns out to affect both the son's schooling decision and his future earnings, it is not a valid instrument.[20] This is also the conclusion reached by Uusitalo (1999, p. 53). Second, the university city stands out as a more credible instrument. Here, however, significantly higher IV than OLS estimates are only to be expected as in this case, the IV estimate obviously reflects to a larger extent the average return to a university year than to a schooling year in general.

Faced with this mixed evidence on the variation of educational returns across individuals, Uusitalo (1999) attempts to capture the potential effects of individual selection into schooling of different length by interacting years of schooling with ability and family background measures. In brief the results suggest that educational returns do, on average, increase with ability (especially with math ability). The strong

[18] The estimates are adjusted for ability bias by the inclusion of ability measures both in the earnings equation and in the schooling decision equation.

[19] The conclusions concerning IV estimates hold also for the control function estimates, since the two techniques produce highly similar estimates.

[20] Uusitalo (1999, Table 5, p. 25) faces similar problems with his 1970 sample, where the father's income turns out to affect both the son's schooling decision and his future earnings. The very high rates of return to schooling reported based on this sample (estimates ranging from 0.124 to 0.157 compared to an OLS estimate of 0.081) are therefore to be interpreted not as an average return to schooling for the underlying population but as the *marginal* return that a son from a low income family would have obtained from an additional schooling year, had he decided to continue in school.

effect of ability on the variation in returns to schooling and thus on schooling choice, is noted to be the outcome of the combined effect of lower costs and higher returns for individuals with higher ability (mainly to convert human capital absorbed in school into marketable skills valued at the workplace). The substantial effect of family background, on the other hand, is found to origin solely in its effect on the discount rate. On the whole, though, observable heterogeneity turns out to leave a significant part of the individual variation in returns to schooling unexplained.

Uusitalo (1999) goes deeper into the question of schooling choices and the impact on these of various personal characteristics and family background by estimating a discrete choice schooling model, which is given the specification of an ordered generalised extreme value model. Earnings equations *for different educational levels* are thereafter estimated using a simple selectivity correction model. In particular, Uusitalo (1999) focuses on the selection point by which students are faced after completed general upper secondary education (Gymnasium) giving them the matriculation diploma.[21]

The returns to education are estimated in a setting where individuals have the possibility to choose between several alternative educational levels. The schooling investment decision is assumed to be driven by the different rewarding of skills depending on the job performed. Consequently rational individuals can be expected to choose the educational level that leads to the occupation where their skills are best rewarded. Attempts are made to capture the effects on earnings of both cognitive and non-cognitive skills measured from ability and personality tests administered by the Finnish Army. The data used is the 1982 male sample, now restricted to those close to 6,900 recruits with a recent high school diploma and no further education at the time of entering military service.

In brief the results indicate that cognitive and non-cognitive test scores explain relatively little of the *within* educational level variation in earnings. The effects of test

[21] Of these about one-third are admitted to universities (the same year), while the rest continue their studies in vocational institutions or enter the labour market (for more details, see OECD, 1998).

scores are found to differ only marginally also between different educational levels, which points to minor differences in skill prices across educational levels. The main conclusion to be drawn concerning schooling choice is that neither the (non-)cognitive skills nor family background provide a clear-cut pattern; only a few characteristics stand out as statistically significant and most clearly for the choice of a university education. Put differently, individual skills and family background do not seem to cause clear self-selection into different educational levels.

4.2 Returns to work experience

4.2.1 Earnings effects of age

There is very limited evidence on the impact on earnings of the individual's age. The existing estimates are based on Population Census Data, which in contrast to the Labour Force Survey and the TT wage data do not include information on actual years spent in working life.

Brunila (1990) uses a single age variable and obtains a very modest average effect of increasing age on annual earnings among full-year, full-time employees: 0.6 per cent per annum for 1975 and 0.8 per cent per annum for 1985 among both men and women. Uusitalo (1999) obtains insignificant wage effects for age from his sample of males that performed their military service in 1970.

Eriksson and Jäntti (1997) distinguish between eight age groups in their estimations of earnings equations for all employees and separately for male and female employees for the years 1971, 1975, 1980, 1985 and 1990. Their estimates are reproduced in Table 2 in the form of age premiums calculated as (unweighted) percentage deviations from the overall mean earnings in the labour market.

Two main changes deserve attention. First, the increasing parts of the age-earnings profiles have become steeper while the declining parts have become flatter, except in the last year (1990) studied. Second, the age differentials have widened substantially since the early 1970s. These results change only marginally when including employees younger than 25 years (Eriksson, 1994) or when using monthly earnings instead of annual earnings as in Table 2 (cf. Eriksson and Jäntti, 1996).

Table 2. Age premiums of different age groups for all employees and separately by gender, 1971–90, log-%

All employees					
Age group	1971	1975	1980	1985	1990
25–29	2.3	–8.6	–13.6	–17.0	–15.9
30–34	7.2	2.0	–2.7	–7.4	–5.5
35–39	10.0	4.9	5.1	1.0	2.2
40–44	8.2	6.6	6.7	6.8	7.9
45–49	5.6	3.6	6.3	6.5	10.8
50–54	0.5	2.0	2.5	5.8	7.4
55–59	–9.2	–2.5	1.3	5.8	3.3
60–64	–24.4	–8.1	–5.5	–1.4	–10.0
Male employees					
25–29	3.3	–7.5	–11.6	–14.1	–10.8
30–34	8.1	3.6	–2.0	–6.0	–1.4
35–39	10.7	4.8	4.6	1.6	2.3
40–44	7.8	5.9	6.2	5.8	6.6
45–49	5.6	3.0	4.6	4.7	8.4
50–54	0.5	1.7	1.8	4.4	4.0
55–59	–8.3	–2.0	1.0	4.7	0.8
60–64	–27.5	–9.5	–4.5	–1.0	–9.9
Female employees					
25–29	1.3	–9.8	–16.0	–20.0	–21.0
30–34	5.8	0.1	–3.8	–8.8	–9.8
35–39	9.1	5.0	5.8	0.5	2.3
40–44	8.7	7.5	7.2	8.1	9.7
45–49	5.6	4.1	8.1	8.4	13.5
50–54	0.5	2.5	3.4	7.2	10.6
55–59	–10.1	–3.1	1.7	6.9	5.1
60–64	–20.7	–6.2	–6.6	–2.0	–10.1

Source: Eriksson and Jäntti (1997, Table 5) transformed into unweighted age premiums by the author.

4.2.2 Earnings effects of work experience

The existing evidence on the influence of increasing work experience on individual earnings is so far quite limited, as is evident from Table 3. The reported estimates refer to the individuals' *total* years *actually* (i.e. self-reportedly) spent in working life.[22]

Table 3. Average wage effects of total (actual) work experience, log-%

		Experience			Experience squared		
	Year	**All**	**Men**	**Women**	**All**	**Men**	**Women**
Asplund et al. (1996a) [a)]	1987	1.8	2.6	0.9	–0.024	–0.039	–0.010[i]
Asplund et al. (1996a) [a)]	1987	1.6	2.5	0.8	–0.024	–0.039	–0.009[i]
Asplund (1993a) [b)]	1987	1.5	1.9	1.3	–0.020	–0.029	–0.017
Uusitalo (1999; recruits in 1982)	1994	–	1.4 [d)]	–	–	–	–
PRIVATE SECTOR							
	Year		**Men**	**Women**		**Men**	**Women**
Asplund (1998a) [c)]	1987		2.1	1.4		–0.034	–0.021[i]
	1989		2.4	1.2		–0.037	–0.016[i]
	1991		2.5	1.2		–0.038	–0.012[i]
	1993		2.5	2.9		–0.034	–0.053
PUBLIC SECTOR							
	Year		**Men**	**Women**		**Men**	**Women**
Asplund (1998a) [c)]	1987		2.2	1.1		–0.033	–0.006[i]
	1989		1.3	1.6		–0.018[i]	–0.021
	1991		2.8	1.0		–0.048	–0.008[i]
	1993		2.8	1.7		–0.045	–0.020[i]

Notes: [i] indicates insignificance at the 5 % level. (a) Explanatory variables are: first row, schooling years, second row, four indicators for educational degree levels, and a gender dummy in the wage equation for all employees. (b) In addition to five indicators for educational degree levels, the wage equation is supplemented with a broad set of other personal and job-related characteristics. (c) Account is made for differences in educational degree levels (five indicators) as well as for various other personal and job-related characteristics, not occupational or industrial status, though. (d) Calculated as number of years after graduation. None of the wage equations control for tenure.

[22] Asplund (1993a) shows that the use of potential instead of actual years in working life produces a strongly upward-biased estimate especially for female employees.

The experience acquired in working life turns out to be rather weakly reflected in the wages of Finnish employees. Both the initial wage influence of work experience and the experience-earnings profile are particularly modest for women. The only exception is women employed in the private sector, who seem to be experiencing a boom in the rewarding of their work experience. Among men, the wage advantage arising from increasing work experience has persistently been approximately equally strong irrespective of the sector of employment. Moreover, the experience-induced effect on male wages seems to have strengthened slightly in the early 1990s.

The table also shows that the estimates of work experience are to some extent sensitive to the definition of the schooling variable as well as to the inclusion of other personal and job-related characteristics. As in the case for returns to schooling, the decline in the estimated wage effect of work experience is non-negligible only when supplementing the wage model with controls for the individuals' occupational status (see e.g. Asplund, 1993a; Asplund et al., 1996a).[23]

Experiments with work experience given the form of a linear spline (thereby following Stewart, 1983) instead of the conventionally used concave shape display quite an unexpected, but fairly similar overall pattern across genders and sectors. Instead of rising steeply, the experience profiles tend to decline or remain approximately unchanged for the first five years in working life. The rising trend starts only during the next five years representing 5–9 years of work experience. These years seem to be the most important ones especially for women in private-sector employment and men in public-sector employment. The next ten years give a further push up the wage scale, most strongly for men in private-sector employment. After 20 years of work experience the experience-earnings profile stays flat towards the end of working life. This lack of a declining trend with increasing work

[23] It may also be noted in this context that Uusitalo (1999) attempts to treat (potential) work experience as an endogenous variable by using age and age squared as instruments. This leads not only to a decline in the estimated coefficient for the experience variable; it turns insignificant altogether.

experience is repeated across genders and sectors and emerges irrespective of the activity level of the economy.[24]

From the estimated coefficients of (actual) work experience obtained for non-manual workers in manufacturing using TT wage data, it may be concluded that the rewarding of work experience has weakened substantially over the 15-year period 1980–94 (Asplund, 1996). In other words, the wage position of the inexperienced workers entering a manufacturing job has strengthened relative to their more experienced colleagues. The overall trend has been much the same among upper-level, technical and clerical non-manual workers (Asplund, 1993b). Comparison of male and female non-manual workers, in turn, displays a huge gender gap in the wage impact of work experience, a gap that has expanded further in the early 1990s (Asplund, 1998c). The experience-earnings profiles look completely different also when comparing non-manual workers employed in fast growing and slowly growing industries. In particular, the former category has persistently faced a significantly higher and also more steeply rising wage effect from increasing work experience (Asplund and Vuori, 1996). Common to both categories, however, is that they have seen a steady decline in the estimated wage effect, albeit of a highly different magnitude. The experience-earnings gap between the two industry categories was, as a consequence, notably larger in the early 1990s than in the early 1980s. This trend was further strengthened by a weak recovering in experience-induced wage effects in the fast growing industries in the mid-90s.[25]

Accounting for the individuals' tenure not only adds to the drop in the estimated wage effects of work experience but also changes the interpretation of the estimate of the experience variable. Now the estimated wage effect of work experience reflects the influence of the work experience acquired before entering the current job. The difference between this experience-induced wage effect and the total wage effect reported in Table 3 above thus illustrates the influence on wages of tenure, often

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[24] For more details, see Asplund (1998a).

[25] Asplund and Vuori (1996) also report corresponding results for different-sized establishments.

interpreted as capturing the firm-specific training acquired in working life. Table 4 reproduces some of the estimates from Table 3, now adjusted for the wage impact of tenure. The general impression is that the change in the experience-earnings profiles is minor, which is also to be expected from the small overall wage effect of work experience and the minor overall role of tenure (see next subsection).

Table 4. Average wage effects of (actual) work experience when also controlling for tenure, log-%

		Experience			**Experience squared**		
	Year	**All**	**Men**	**Women**	**All**	**Men**	**Women**
Asplund et al. (1996a) [a)]	1987	1.4	2.3	0.5[i]	–0.022	–0.038	–0.007[i]
Asplund (unpubl.) [b)]	1987	1.5	2.1	1.0	–0.026	–0.034	–0.020
	1989	1.1	1.8	0.3[i]	–0.018	–0.030	–0.004[i]
	1991	1.8	2.3	1.5	–0.032	–0.040	–0.028
	1993	1.7	2.3	1.1	–0.027	–0.036	–0.017[i]

PRIVATE SECTOR

	Year	**Experience: Men**	**Experience: Women**	**Experience squared: Men**	**Experience squared: Women**
Asplund (1998a) [c)]	1987	1.8	0.9[i]	–0.032	–0.016[i]
	1989	2.0	0.6[i]	–0.033	–0.008[i]
	1991	1.9	0.8[i]	–0.031	–0.012[i]
	1993	1.8	3.0	–0.022	–0.062

PUBLIC SECTOR

	Year	**Experience: Men**	**Experience: Women**	**Experience squared: Men**	**Experience squared: Women**
Asplund (1998a) [c)]	1987	1.8	0.6[i]	–0.028[i]	–0.006[i]
	1989	0.5[i]	0.9[i]	–0.005[i]	–0.015[i]
	1991	2.7	0.7[i]	–0.047	–0.010[i]
	1993	1.9	1.6	–0.030[i]	–0.025[i]

Notes [i] indicates insignificance at the 5 % level. (a) Explanatory variables are: schooling years, tenure and a gender dummy in the wage equation for all employees. (b) Explanatory variables are: five indicators for completed educational level, dummy for tenure less than one year, tenure and tenure squared, dummy for participation in employer-financed training and a gender dummy in the wage equation for all employees. (c) Account is made for differences in educational degree levels (five indicators) and tenure (dummy for tenure less than one year, tenure and tenure squared) as well as for various other personal and job-related characteristics, not occupational or industrial status, though.

4.2.3 Earnings effects of tenure

The wage effects reported for work experience give a good hint of the size of the wage growth induced by increasing tenure. The available evidence for the Finnish labour market is reviewed in Table 5, with tenure referring to the length of the individual's employment relationship at the current employer. The overall impression mediated by the table is, indeed, a minor wage influence of tenure. The very small size of the tenure effect is also evident from the fact that the tenure-earnings profile is throughout estimated to be flat or almost flat.

The results obtained for the boom years in the late 1980s indicate that the role of longer tenure for wage growth was much more important among public-sector employees, although the effect was quite strong also among women employed in the private sector. The deep recession in the early 1990s seems, however, to have fundamentally reversed this pattern. More precisely, by 1993 the tenure-induced growth in female wages had disappeared in both sectors at the same time as the rewarding of their general work experience boosted (cf. Table 4 above). Men in private-sector employment, in contrast, faced the opposite change with the length of the current employment relationship exerting an increasing influence on their wage growth.

The tenure-induced wage effects estimated for non-manual workers in manufacturing from TT wage data are equally moderate. Moreover, the wage advantage of a longer employment relationship shows no time trend whatsoever and has varied quite randomly – mostly between negligible and negative values. This overall pattern is repeated for all non-manual categories as well as for all the subgroups investigated.[26]

[26] See Asplund (1996) for results for all non-manual workers and separately for upper-level, clerical and technical non-manual workers, Asplund (1998c) for male and female non-manual workers, and Asplund and Vuori (1996) for non-manual workers employed in, respectively, fast and slowly growing industries.

Table 5. Wage effects of tenure for all employees and separately by gender and sector, log-%

		Tenure			Tenure squared		
	Year	All	Men	Women	All	Men	Women
Asplund et al. (1996a) [a)]	1987	0.6	0.5	0.7	–	–	–
Asplund (1993) [b)]	1987	0.6	0.4[i]	0.7	–0.001[i]	–0.001[i]	0.000[i]

		Tenure < 1 year		Tenure		Tenure squared	
WHOLE ECONOMY		Men	Women	Men	Women	Men	Women
Asplund (unpubl.) [c)]	1987	1.2[i]	14.6	0.4[i]	1.3	–0.002[i]	–0.021
	1989	6.3	13.7	1.0	1.7	–0.012[i]	–0.031
	1991	4.6[i]	11.4	1.1	0.8	–0.017	–0.005[i]
	1993	5.8[i]	14.2	1.1	0.1[i]	–0.018[i]	0.014[i]
PRIVATE SECTOR							
Asplund et al. (1996a) [a)]	1987	–	–	0.5	0.4	–	–
Asplund (1998a) [d)]	1987	2.2[i]	9.0	0.3[i]	1.0	–0.003[i]	–0.016[i]
	1989	3.0[i]	10.8	0.7	1.6	–0.006[i]	–0.030
	1991	5.9[i]	17.2	1.2	1.0	–0.019	–0.009[i]
	1993	6.8[i]	8.3[i]	1.7	0.3[i]	–0.038	0.011[i]
PUBLIC SECTOR							
Asplund et al. (1996a) [a)]	1987	–	–	0.7	0.9	–	–
Asplund (1998a) [d)]	1987	12.6	20.0	1.2	1.9	–0.019[i]	–0.026[i]
	1989	31.1	19.3	1.8	2.0	–0.029[i]	–0.032
	1991	7.3[i]	10.6	0.6[i]	1.1	–0.010[i]	–0.009[I]
	1993	20.0	19.4	1.6	0.5[i]	–0.026[i]	0.009[i]

Notes: [i] indicates insignificance at the 5 % level. (a) Explanatory variables are: schooling years, experience, experience squared and a gender dummy in the wage equation for all employees. (b) Account is made for differences in educational degree levels (five indicators) and work experience as well as for various other personal and job-related characteristics, not for occupational status, though. (c) Explanatory variables are: five indicators for completed educational level, experience, experience squared, dummy for participation in employer-financed training and a gender dummy in the wage equation for all employees. (d) Account is made for differences in educational degree levels (five indicators) and work experience as well as for various other personal and job-related characteristics, not for occupational status or industry affiliation, though.

4.2.4 Earnings effects of job training

The only individual-level database containing information about the individuals' participation in employer-financed job training is the Labour Force Survey. The sample individuals are asked whether they have participated in employer-financed training courses outside the workplace and for how many days in total during the past 12 months. The available empirical evidence based on this information is displayed in Table 6.

The estimates point to a substantially lower rewarding of participation in employer-financed job training among women, which is primarily attributable to the negligible wage advantage of women employed in the public sector of participating in this type of training. It is also of interest to note that the deep recession seems to have strengthened the importance not only of tenure but also of training in explaining observed wage differentials among men employed in the private sector. Again an opposite trend is observable for their female counterparts, i.e., a decline in the wage influence of training as well as tenure.

The estimated differences in wage effects may, of course, be the result of crucial differences both in the length and the content of the training received. Evidence for 1987 indicates, however, that the overall pattern is maintained when accounting for differences in the total number of training days (Asplund, 1993a).

Table 7. Wage effects of participation in employer-financed job training outside the workplace, log-%

		Male employees			Female employees		
		All	**Private sector**	**Public sector**	**All**	**Private sector**	**Public sector**
Asplund (1993a) [a)]	1987	10.1	13.0	8.2	3.1	8.9	−1.0[i]
Asplund [b)]	1987	10.8	11.7	7.2	3.0	9.5	−1.5[i]
	1989	8.6	8.7	8.5	4.1	11.7	−2.8[i]
	1991	8.5	9.6	4.1[i]	5.8	9.6	4.9
	1993	9.9	12.4	6.7	3.8	8.3	1.8[i]

Notes: [i] indicates insignificance at the 5 % level. (a) Account is made for differences in educational degree levels (five indicators), experience (and its square), tenure (and its square) as well as for various other personal and job-related characteristics, not for occupational status or industry affiliation. (b) Account is made for differences in educational degree levels (five indicators), experience (and its square), tenure (tenure < 1 year –dummy, tenure and its square) in the ‘All’ equations (unpublished), while the sectoral equations are, in addition, supplemented with a limited number of other personal and job-related characteristics, not occupational status or industry affiliation, though (Asplund, 1998a).

5. CONCLUSIONS

Most existing evidence for Finland on the earnings effects of human capital endowments refer to a rather short time period, viz. 1987 to 1993. Only occasionally have results been reported for a longer sequence of years and then mostly for a very limited set of human capital proxies or for a specific category of workers.

Moreover, the analysis of the interplay between the individuals’ earnings and their human capital endowments has drawn heavily on the conventional Mincer-type earnings model. Few attempts have been made to account for the fact that the human capital acquired by the individual is not necessarily the outcome of a random process but rather the result of individual choice. More research is needed on the impact of innate ability and family background on returns to schooling and schooling choice. Also totally unexplored areas should be penetrated. For instance, we are totally lacking empirical evidence on the effects of screening/signalling and sheepskin effects as well as on the link between educational returns and unemployment. In fact, compared to many other European countries (see the other country-specific literature reviews) Finland is without doubt lagging far behind when it comes to empirical evidence on the rewarding in the labour market of investment in education and other types of human capital.

Needless to say, the richness of the empirical evidence produced in a country largely reflects the availability of proper data. This is certainly true when it comes to returns to schooling. Enlarging our knowledge on returns to human capital in general and to schooling in particular is thus a challenge not only for the research community but also for the bodies creating and producing statistical databases.

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