ETLA
ELINKEINOELÄMÄN TUTKIMUSLAITOS
THE RESEARCH INSTITUTE OF THE FINNISH ECONOMY
Lönnrotinkatu 4 B 00120 Helsinki Finland Tel. 358-9-609 900
Telefax 358-9-601 753 World Wide Web: http://www.etla.fi/

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Sami Napari

GENDER DIFFERENCES IN EARLY-CAREER WAGE GROWTH

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ABSTRACT: In Finnish manufacturing, the gender wage gap more than doubles during the first ten years in the labor market. This paper studies the factors contributing to the gender gap in early-career wage growth. The analysis shows that the size of the gender gap in wage growth varies with mobility status the gap being much higher when changing employers compared to within-firm wage growth. Several explanations for the gender gap in wage growth based on human capital theory and theory of compensating wage differentials are considered. However, most of the gap in wage growth remains unexplained. Further analysis documents that the female penalty in wage growth increases significantly as we move along the conditional wage growth distribution with a sharp acceleration in the gap at the top of the distribution.

Keywords: Gender Wage Gap, Wage Growth, Mobility

JEL Classification: J24, J31, J6, J7

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TIIVISTELMÄ: Sukupuolten välinen palkkaero yli kaksinkertaistuu teollisuuden toimihenkilöiden keskuudessa ensimmäisten kymmenen vuoden aikana työmarkkinoille siirtymisen jälkeen. Tässä tutkimuksessa analysoidaan tekijöitä havaitun palkkakasvueron taustalla. Tarkempi tarkastelu osoittaa, että miesten ja naisten välisen palkkakasvueron suuruus on yhteydessä toimihenkilöiden työmarkkinaliikkuvuuteen: palkkakasvussa, joka liittyy työnantajan vaihdoksiin, on selkeästi suurempi ero sukupuolten välillä verrattuna palkkakasvuun yritysten sisällä. Tutkimuksessa analysoidaan useita inhimillisin pääoman teorian ja kompensoivien palkkaerojen teorian tarjoamia selityksiä sukupuolten välisille palkkakasvuerolle. Huomattava osa erosta jää kuitenkin selittämättä. Tutkimuksessa selvitetään lisäksi sukupuolten palkkakasvueroa palkkakasvujakauman eri osissa. Tulokset osoittavat, että miesten ja naisten välinen ero palkkakasvussa suurenee liikuttaessa ehdollisella palkkakasvujakaumalla ylöspäin.

Asiasanat: Sukupuolten palkkaero, palkkakasvu, liikkuvuus

JEL-koodit: J24, J31, J6, J7

1. Introduction

Although the existing literature on the gender wage gap is enormous, researchers have only relatively recently started paying more attention to how the size of the male-female wage difference varies with the stage of a career. A typical finding from these studies has been that the gender wage gap is fairly small on entry to the labor market, but after a few years a considerable gender wage gap emerges. This gender gap in early-career wage growth accounts for most of the life-time increase in the sex-based wage differentials. Therefore, in order to achieve a better understanding of the overall gender wage gap, it seems to be of crucial importance to understand the factors contributing to the gender differential in early-career wage growth.

This paper analyzes gender differences in wage growth during the first ten years after labor market entry among white-collar workers in the Finnish manufacturing sector. The data show that women earn less than men already on entry to the labor market, but ten years later the entry-level gender wage gap has more than doubled. It is this increase in the wage gap between male and female white-collars that this paper aims to explain.

Only a few papers have examined *early-career* gender wage differentials. Using data from the National Longitudinal Survey of Youth (NLSY), Light and Ureta (1995) investigated how much of the early-career male-female gap in wage levels is due to differences in the work experience of men and women. Kunze (2002) and Napari (2007) used an approach similar to Light and Ureta in exploring early-career gender wage gaps in Germany and Finland, respectively. Manning and Swaffield (2005) on the other hand investigated gender differences in early-career *wage growth* using the British Household Panel Survey. They found that at the time of labor market entry, men's and women's wages are very similar but ten years later women lag behind men in wages about 25 percent. Half of this increase in the gender wage gap is due to gender differences in labor market experience, on-the job training and educational choices. However, a substantial unexplained gap in the wage growth remains. Also Loprest (1992) found a notable gender gap in wage growth during the first years in the labor market using a sample from NLSY. Furthermore, she showed that much of this gap can be attributed to gender differences in wage growth with employer changes. Loprest looked at differences in working hours and occupations between men and women and tested whether these differences could account for the gap in wage growth with employer changes. She found, however, that hours and occupation differences contribute fairly little to the gap in men's and women's wage growth when changing employers. Using the same data as Loprest, Keith and

McWilliams (1997, 1999) documented that men and women tend to differ in reasons behind mobility. Women quit more often than men because of family related reasons whereas men's mobility is more likely to be motivated by money. These gender differences in motives for mobility proved to be important in explaining the gender wage gap in returns to mobility.

The novelty of my paper is that I decompose the male-female gap in early-career wage growth into two parts: one that is due to gender differences in wage growth with firm changes, and another that is accounting for the gender gap in within-firm wage growth. This decomposition is interesting for at least two reasons. First, there is plenty of evidence that mobility between firms is an important determinant of wage growth, especially among young workers (e.g. Topel and Ward 1992). Second, several studies document gender differences in both mobility behavior and in returns to mobility (e.g. Loprest 1992; Sicherman 1996; Keith and McWilliams 1997, 1999; Light and Ureta 1992). My approach is similar to that of Loprest (1992). Loprest, however, excluded the within-firm part from her analysis as she found it to be unimportant with respect to the overall gender gap in wage growth. This is not the case in my data. By analyzing in detail both between-firm and within-firm wage growth I hope to add to our present understanding of the gender differences in early-career wage growth.

Other aspects of my paper that make it different from the earlier studies on this topic are data related. First of all, as mentioned above, I use data from the Finnish labor market. Most of the previous papers on this topic have focused on the US and the UK. There are, however, differences in the institutional set-ups between the Finnish labor market and those of the Anglo-Saxon countries. For example, in Finland, like in other Nordic countries, wage-setting is much more centralized and employment protection tighter compared to the US and the UK. These institutional differences may not only affect the size of the overall gender gap between the Anglo-Saxon countries and continental Europe (Blau and Kahn 1996), but they may have effects on the relative importance of factors contributing to the sex-based wage gap as well (Albrecht et al. 2003). Teulings and Hartog (1998) have also shown that centralized wage-setting is typically correlated with lesser job mobility. For these kinds of reasons, one should exercise some caution in applying the US and the UK evidence to the Nordic countries as well as to other European countries with co-ordinated wage bargaining.

Secondly, most of the existing studies of the gender gap in early-career wage growth use data that dates back to the 1980s. My data, on the other hand, cover the period 1995-2004. This paper thus provides somewhat fresher evidence on the topic. Finally, my data come directly from the administrative records of firms. Therefore the information in the data can be considered as highly reliable. This is a clear advantage over many earlier studies using survey data.

The main findings of the paper are: female white-collars experience significantly lower wage growth than their male colleagues during the first ten years after labor market entry. This gender difference in early-career wage growth accounts for most of the life-time growth in gender-based wage differentials among white-collars in Finnish manufacturing. The size of the gender gap in wage growth varies considerably with mobility status the gap being much higher in cases of employer changes compared to within-firm wage growth. The observed gender differences in between-firm and within-firm wage growth are not easily explained by men's and women's different educational choices or by the characteristics of the jobs they hold. Neither does time-invariant unobserved individual heterogeneity account for the gender gap in early-career wage growth. Interestingly, the female penalty seems to increase throughout the conditional wage growth distribution with a sharp acceleration in the upper tail of the wage growth distribution. This applies to both between-firm and within-firm wage growth.

The plan of the paper is as follows. In the next section, I present the data and give evidence of gender differences in early-career wage growth in the Finnish manufacturing sector. Section 3 starts with a discussion of potential factors contributing to the gender gap in wage growth associated with employer changes. Then I proceed with presenting an empirical model of the determinants of wage growth with firm changes after which the estimation results are shown. Section 4 follows the structure of Section 3, but focuses on within-firm wage growth instead. Section 5 gives a summary of the paper and discusses the main conclusions.

2. The Data and Gender Differences in Wage Growth

2.1 The Data

This paper uses data from the records of the Confederation of Finnish Industries (EK). The Finnish labor market is highly unionized with comprehensive collective wage agreements and EK is the main organization of employers. There are member firms from construction, transportation, services, forest and energy industry, but the most important sector represented in the data is manufacturing. The firms affiliated with EK account for over two thirds of the value added of the Finnish manufacturing sector and a clear majority of the workers in manufacturing are employed in the member firms of EK. The sector studied forms thus an important part of the Finnish economy. It should, however, be kept in mind that the results presented in this paper may not be generalisable to the whole Finnish economy.

The information on wages and working hours in the EK data can be considered as highly reliable as it comes directly from the administrative records of the member firms. Also, since it is compulsory for the firms affiliated with the EK to provide the required information, the non-response bias is practically non-existing in the data. The EK data contain a fairly rich set of variables typically applied in wage equations like gender, the level and field of education, age, occupation, field of industry and firm size. The data have also information on firm identifiers on which the mobility variable used in the paper is based. Perhaps the most disturbing aspect of the data with respect to the focus of this paper is the lack of information on marital status and dependent children. This implies that I cannot control for the potential impact of maternity leave spells on wage growth.

Most of the variables used in the analysis are conventionally defined and therefore, they do not demand much discussion. A short description of the variables used in the regression analysis is provided in Appendix A. Some words concerning the definitions of the wage measure and the mobility variable may, however, be worthwhile here. The wage variable is the log of gross real hourly wages. Hourly wages are calculated by scaling the basic monthly salary by the normal weekly working time.[1] The wage measure thus excludes earnings from other components such as overtime, shift work, bonuses, and so forth. The main reason for this is that the data do not provide information on all of these other components for all years, and in order to get a consistent wage measure for the whole investigation period I decided to base the wage measure on the basic monthly salary. Although the other components of pay may be an important part of the total compensation for some individuals, the basic monthly salary is by far the most important component of total pay forming nearly 95 % of the earned labor income in my data. This holds for both genders. It is, however, an interesting question how the relative importance of the different components of total pay varies across genders and how this is related to their labor market behavior. I leave this topic to future research.

Employer changes are identified by comparing firm identifiers attached to white-collars between consecutive years.[2] Because EK collects information from the member firms only once in a year, this means that I can observe at most one employer change per white-

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[1] Monthly salary is converted into 2000 money using the cost-of-living index of Statistics Finland.

[2] There are some (rare) cases in the data where firm codes change even though workers do not actually change employers. This is due to business reorganizations like mergers. To distinguish a real firm change from a false one, I set a further condition for an employer change: a white-collar is defined to switch employer if the firm code associated with a white-collar differs between years t and t-1, and if no more than 50 % of his/her fellow workers from year t-1 follow him/her to the new employer. This definition does not seem to be sensitive to the used percentage limit as other limits (e.g. 40) produced very similar results. Also some other robustness checks with alternative definitions of the firm change variable were made without any effects on conclusions. I thank Pekka Vanhala for constructing the mobility variable.

collar each year. My mobility variable is thus likely to understate true mobility to the extent that white-collars change employers several times during a year. No information is available for Finland in this respect. I focus on white-collars observed in the data between 1995 and 2004. The data set contains 1 481 065 observations on 282 807 white-collars in total. 62 % of them are men.

2.2 Gender Differences in Wage Growth

As discussed in the introduction, there is some empirical evidence showing that women's wage growth in the years immediately after labor market entry is significantly lower compared to that of men, and that this gap in early-career wage growth accounts for much of the life-time increase in the gender wage gap. However, this evidence comes mainly from the U.S. and the U.K.. Taking into account the differences in the institutional set-ups between Finland and the Anglo-Saxon countries, one should not automatically apply the U.S. or the U.K. evidence to the Finnish labor market. Therefore, I start my analysis by investigating whether the early career is such an important stage of a career with respect to the gender wage gap also in Finnish manufacturing.

Figure 1 shows the wage-experience profiles for male and female white-collars together with the gender wage gap. Wages are normalized so that the average log real hourly wages for men are zero at the time of labor market entry. At least two interesting issues emerge from the figure. First, a considerable entry gender wage gap exists in Finnish manufacturing: women lag behind men in average hourly wages by 10 log points immediately after entry on the labor market. Secondly, the gender wage gap more than doubles during the first ten years in the labor market, exactly the same pattern that has been found for the U.S. and the U.K. It is true that cohort effects may account for some of the observed widening of the gender-based wage gap with experience. However, Figure 2, which presents the gender wage gap profiles for two different birth cohorts, suggests that cohort effects are not the explanation for the pattern presented in Figure 1.

To provide more evidence on the gender differences in early-career wage growth, I estimate a simple wage growth model of the following form:

$$\Delta w_{it} = \alpha_0 + \alpha_1 x_{it} + \alpha_2 x_{it}^2 + \alpha_3 x_{it}^3 + \alpha_4 x_{it}^4 + \varepsilon_{it} , \qquad (1)$$

where $\Delta w = w_t - w_{t-1}$, w is log real hourly wage, x is years of potential experience and ε is the error term. I estimate this model for those who have at most ten years of potential experience and who have completed their education at age 30 or younger. Furthermore, the model is estimated separately for men and women. Table 1 shows the implied wage growth derived from the results for equation (1). The results in columns 1 and 2 confirm the conclusion made from Figure 1: women experience lower wage growth during the first years in the labor market. For men the average predicted yearly wage growth over the first ten years after labor market entry is 9.8 % whereas the corresponding number for women is 9.0 %. Of course, men and women may differ in some important ways in terms of individual characteristics that give rise this 0.8 percentage point the gender gap in annual wage growth. One way to investigate this possibility is to account for individual fixed effects in the wage growth model. Results for the fixed effects regressions are shown in columns 3 and 4 in Table 1. As can be seen, accounting for individual fixed effects does not affect at all the predicted average gender gap in annual wage growth.

Thus, my results so far confirm the earlier findings from the U.S. and the U.K. labor markets: the size of the gender wage gap more than doubles during the first ten years in the labor market and this gap in early-career wage growth accounts for much of the life-time increase in the gender-based wage differentials. Therefore, the rest of this paper focuses exclusively on the early-career (defined above). After this restriction, the data contain 166 823 male and 82 626 female observations.

2.3 Decomposition of the Early-Career Wage Growth

In Table 2, I present a simple wage decomposition which sheds some light on the factors driving the gender gap in early-career wage growth. I decompose the average annual wage growth rate into two parts: one that is associated with employer changes and another that is related to wage careers within firms. As can be seen from the first row, female white-collars lag behind their male colleagues in average annual wage growth (among those with no more than ten years of potential experience) by 0.74 percentage points. However, the size of the gender gap in wage growth seems to vary significantly with mobility status: the gender gap in average within-firm wage growth is 0.67 percentage points whereas there is a striking 1.9 percentage points difference in wage growth with employer changes between men and women. This result corresponds well with the findings of Loprest (1992). Also similar to Loprest, there are no gender differences in overall rates of mobility.

Table 2 implies that the gap in early-career wage growth between male and female white-collars has not that much to do with gender differences in rates of employer changes but more with the fact that women lag behind men both in between-firm and within-firm wage growth. Therefore, this paper excludes the analysis of factors affecting workers' propensity to switch firms. To retain focus of the paper, I also ignore the important question of what contributes to the entry-level gender wage gap. This issue is to some extent analyzed already in Napari (2006) by use of the same data set as in this paper.[3] In the next chapter, I explore the question of what explains women's lower returns to employer changes whereas in Section 4, I analyze the determinants of gender differences in within-firm wage growth.[4]

3. Gender Differences in Wage Growth from Firm Changes

3.1 Descriptive Analysis of Factors Affecting Wage Returns to Firm Changes

What could explain gender differences in returns to firm changes? Standard models of job mobility (e.g. Burdett 1978; Jovanovic 1979a) are silent about this as they assume that all workers receive wage offers from the same wage distribution and also that men and women are similar in characteristics. It is, however, quite easy to come up with reasons why these assumptions could be violated in practice giving rise to gender differences in rewards to mobility. First of all, men and women may have different job preferences. For example, due to women's greater domestic responsibilities, they may accept lower wage offers in return to flexible working schedules or fewer hours whereas men may put more weight on the pecuniary aspects of jobs. These considerations have received support from studies focusing on the reasons behind job mobility. Several papers have documented that women change jobs more often than men because of family or other non-market related reasons whereas for men the

[3] Napari (2006) focuses only on highly educated white-collars.

[4] Taking into account that the rate of mobility is fairly low in the EK data, one might question the relevance of analyzing factors contributing to the gender differences in returns to firm changes. But closer examination reveals that gender differences in wage growth associated with firm changes are not without significance with respect to the overall gender gap in wage growth. Assuming that the weight of between-firms observations is 0.05 for both men and women, which corresponds roughly to what is observed in the data, the gender gap in wage growth with job changes account for about 14 percent of the overall gender differences in the annual early-career wage growth. Furthermore, it is of some interest by itself to investigate why there exists such a large gap in returns to mobility between men and women, a question that has occupied also many other researchers.

most important motivation to switch firms is typically money (e.g. Sicherman 1996; Keith and McWilliams 1997, 1999; Manning 2003 ch7).[5]

Secondly, it may be too strong an assumption that men and women draw wage offers from the same wage distribution. There is empirical evidence suggesting that women may face entry-barriers to certain high-paying jobs (e.g. Albrecht et al. 2003; Arulampalam et al. 2004). These barriers may be either due to employers' prejudice against women as is assumed in Becker's (1971) theory of employer discrimination, or they may exist because of employers' limited information concerning workers' performance, a basic premise in the literature of statistical discrimination originally developed by Phelps (1972) and Arrow (1973).

It is highly difficult to try empirically to distinguish between these two reasons (i.e. preference differences between men and women vs. discrimination), but they both suggest that we should observe differences in the types of jobs men and women switch to. Therefore, I start my analysis of factors explaining women's lower returns to firm mobility by providing some descriptive evidence of changes in job characteristics in connection with firm changes and whether there are gender differences in this respect. Here I concentrate on such job characteristics as working hours, firm size, industry, occupation, and demand level of the job.

Loprest (1992) investigated gender differences in transitions from full-time work to part-time work with employer changes. She found that 12.7 percent of women's firm changes are associated with a switch from full-time work to part-time work whereas for men the corresponding figure was 7.9 percent. In my data, however, practically all white-collars, both men and women, work full-time and there are only few transitions between full-time and part-time statuses with employer changes.[6] This excludes the possibility that gender differences in trade-offs between wages and fewer working hours would explain the observed gender gap in returns to mobility in the EK data. Besides changes in full-time / part-time statutes with firm changes, I explored gender differences in transitions between shift work and non-shift work as well. Also in this respect there seems to be hardly any differences between men and women.

Table 3 investigates to what extent the men and women who change firms move to different industry, firm size and occupation as well. As can be seen, there are some differences between genders in this respect: men seem to experience a change in industry and occupation more often than women when they switch to a new employer. In terms of changes in firm size, there seems to be only small differences between men and women.

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[5] These results may not only reflect gender differences in preferences but they are also consistent with the fact that women are often forced to choose between career and family.

[6] I used several different definitions for part-time work (weekly working hours less than 20, 30, and 35 hours), but in all cases about 99 % of firm changes for both genders were transitions between full-time jobs.

In table 4, I report changes in log hourly wages by the type of employer switch. There seems to be fairly much variation in the wage gains both between the types of mobility and genders. For example, firm changes associated with a change in industry or occupation are related to a much higher wage growth compared to the case when a worker switches employer without moving to a new industry or occupation as well. It seems also more profitable to switch to a larger firm than to an employer with fewer employees than at the worker's previous firm. Furthermore, it is interesting to note that women's gains from mobility are lower than men's over all mobility types.

In the EK data, occupations are classified into four demand levels. Although the classification system is very broad and therefore it undoubtedly hides much variation in complexity between occupations, it is, however, of some interest to investigate movements across the demand levels. If women faced entry-barriers to certain high-paying jobs in Finnish manufacturing, I would expect to observe fewer movements to higher demand levels with firm changes among women than among men.[7] Table 5 provides information on this. The upper part of the table does not pay any attention to initial job assignment. Men, however, tend to start their careers in more demanding jobs than women, which naturally should be taken into account in the analysis. Therefore, in the lower part of the table, I focus exclusively on white-collars who are initially observed at the lowest demand level. As expected, controlling for the initial job assignment is important. Without controls for the initial job assignment, there are practically no differences in the types of occupation changes between men and women. But when I restrict myself to workers who are initially at the lowest demand level, clear gender differences emerge: nearly 90 % of men's employer changes that are also associated with a change in occupation are movements to a higher demand level whereas for women the corresponding number is only 70 %. Taking into account that movements to a more demanding occupation with firm changes are associated with large wage increases (an average 19.2 log points for men and 17.6 log points for women), women's tendency to experience fewer 'promotions' may contribute to the observed gender gap in returns to firm-to-firm mobility.

I have shown that there are some differences in the characteristics of jobs men and women switch to. In the next section, I investigate how important these differences in job characteristics are with respect to the gender gap in wage growth with firm changes.

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7 Of course, if women are observed to switch less often to higher demand levels than men, it does not follow that women faced entry-barriers to certain jobs. One plausible explanation for gender differences in upward movements on the demand ladder could be gender differences in productivity (although for example the paper by Pekkarinen and Vartiainen 2006 does not support this view).

3.2 An Empirical Model of the Determinants of Wage Growth with Firm Changes

In order to investigate the importance of job characteristics in accounting for the gender gap in wage growth with firm changes, I estimate the following wage growth regression using the pooled sample of male and female white-collars:

$$\Delta w_{it} = \alpha_0 + \alpha_1 F_i + X_{it}\beta_1 + Z_{it}\beta_2 + Y_{it}\beta_3 + \varepsilon_{it} \qquad (2)$$

where $\Delta w_{it} = w_{it} - w_{it-1}$ is the difference in log real hourly wages between year t and t-1, F_i is the female dummy, and X_{it} is a set of worker characteristics, Z_{it} is a vector of firm/job characteristics, and Y_{it} comprises year dummies. Equation (2) is estimated for the sample of white-collars who change employer between years t and t-1. The first-differencing eliminates the correlation of error terms across observations that is due to the unobserved time-constant individual characteristics. However, a shock at one time period may still cause the error terms to be correlated because a shock in some period t is part of two successive observations ((w_{it}-w_{it-1}) and (w_{it+1}-w_{it})). Therefore, to get robust standard errors I use clustering on the individual.

I estimate four different specifications of the wage growth model. In specification 1, X contains (potential) experience together with dummies for the level and field of education[8] whereas Z includes six regional dummies for periods t and t-1.[9] Female dummy and year indicators are included in all specifications. Specification 1 shows whether there are gender differences in wage growth after basic human capital and labor market characteristics are controlled for. Specification 2 adds dummies for changes in industry and firm size with employer changes. To capture the effects of movements between occupations with firm changes, specification 3 includes four indicators for firm-to-firm mobility: i) a firm change without a change in occupation, ii) a firm change with a change in occupation but no change in the demand level, iii) a firm change with an upwards move in the demand ladder, and iv) a firm change with a downwards move in the demand ladder. In specification 4, I try to take labor market segregation by gender into account by including a set of dummies for the industry, firm size, and occupation in period t-1. In the EK data, male and female white-collars are highly segregated into different types of jobs which may have effects on the returns to mobility.

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[8] I use four dummies for the level of education and nine dummies for the field of education.

[9] I decided not to include the regional variables in a difference form but use levels instead. This is because the region variable is in practice fairly time-invariant. Whether to use difference or level specification is not important with respect to my conclusions.

In 2002, a new occupational classification system was introduced in the EK data which makes it practically impossible to get reliable information on actual occupational changes around the break year. Therefore, I decided not to use wage growth observations between 2001 and 2002 in the regressions. This does not have any effects on my conclusions, but it facilitates comparison between specifications as the underlying population is the same in all cases.

I experimented with several other wage growth specifications as well. First of all, I included interaction terms between the female-dummy and the variables describing changes in job characteristics to allow the wage effects of different types of mobility to differ between men and women. The interaction terms proved, however, to be insignificant at the conventional significance levels.

Secondly, I investigated the effects of cumulative mobility on wage growth, but also this had no impact on my conclusions reflecting the fact that there is only a small number of white-collars in the data who change firms frequently. Thirdly, I explored the possibility that previous breaks in the panel may be related to the wage gains from mobility. This was motivated by the perception that individuals who have intermittent employment may differ in their mobility behavior from workers who are more strongly attached to the labor market. However, I did not observe any significant effects of previous breaks on the results.[10]

Fourth, although my data set does not contain information on the reasons behind employer changes, I tried to separate between voluntary and involuntary movements by constructing a dummy-variable which equals one if the firm disappears from the data between t-1 and t or if the number of white-collars at the firm decreases by more than 15 percent during the corresponding time period. This variable, however, was found to have insignificant effects on the wage growth with employer changes.

Fifth, one obvious explanation for men's higher returns to mobility observed in the data is related to firm-specific human capital. Due to men's stronger attachment to the labor market, the completed tenure at the previous employer may be higher for men than for women. This together with the fact that a worker who switches employer suffers a loss in firm-specific human capital for which he/she must be compensated in order to induce him/her to move to a new job (a reasonable assumption for voluntary job changes) might explain at least some of the gender gap in returns to mobility. I investigated this possibility by construct-

[10] It should be mentioned that the EK data do not provide any information on the reason of a career break (i.e. I do not know whether the break is due to unemployment, parental leave, switch to a firm not affiliated with EK etc.).

ing firm tenure based on a variable that indicates the starting year of the current employment contract. Replacing potential experience with firm tenure produced, however, very similar results. Furthermore, there were no statistically significant gender differences in tenure at the previous employer among the employer changers. It should be mentioned that there are certain problems associated with the variable indicating the starting year of the current employment. First of all, in some cases this variable produces tenure values that are suspiciously large in order to be correct measures of the length of the current employment relationship. Secondly, sometimes white-collars are employed by using repeated contracts. Therefore, the time since the starting of the current contract does not in all cases reflect the true firm tenure. Moreover, this practice of repeated contracts became more common during my investigation period increasing this source of potential bias in the tenure variable (Kangasniemi 2003). Because of these problems together with the fact that my results are not particularly sensitive to whether I apply the experience or the tenure variable (or both), I decided to use experience instead of firm tenure in the wage growth equations.

Finally, I checked whether the effects of time spent in the labor market on the wage returns to mobility were adequately taken into account by a linear experience term by including higher terms of experience in the wage growth equation. It turned out that the linear specification is sufficient.

I estimate equation (2) using a pooled sample of men and women. Although a test of whether the wage growth equation for men and women differed only by a constant was typically rejected, the conclusions derived from the analysis based on separate wage equations were similar to those of the pooled regressions. I prefer the pooled specification mainly for expositional reasons. One might also be concerned about my decision to define wage growth as a difference in wages between two consecutive years. This approach has the potential disadvantage that it may under-sample women as they typically have more intermittent employment compared to men. This, however, seems not to be of particular concern in my case: the share of female observations is 34.0 percent before I restrict the data to those who have wage observations from consecutive years compared to 33.1 percent after the restriction.

3.3 The Results

Table 6 shows the OLS estimation results for the wage growth model (2). The first column presents the results for specification 1. As can be seen, the female indicator gets a highly significant value even after basic human capital and labor market characteristics are controlled for. Taking into account that men and women differ significantly in their educational choices together with the fact that education is typically considered to have an important effect on occupational determination and career paths, the high value for the female-dummy after education has been controlled for is somewhat surprising. Column 2 shows the results of the specification where I have added controls for changes in industry and firm size. This decreases the negative value for the female-dummy fairly little, from -0.024 to -0.023. The third column documents the results for the specification which includes indicators for changes in occupation, but also this has only minor effects on the female dummy. Finally, adding controls for job characteristics in period t-1 decreases the coefficient on the female-dummy further leaving it still, however, highly significant as can be seen from column 4. I made also some sensitivity analysis to make sure that my conclusions are not driven by some extreme wage growth observations, and the results proved to be robust in this respect.

The results in Table 6 suggest that gender differences in wage growth with firm changes cannot be easily explained by differences in characteristics of the jobs men and women switch to. Even though several relevant job characteristics are controlled for, women seem to benefit less from mobility than men. In this respect my results are similar to those of Loprest (1992). She concluded that "differences in job characteristics play only a limited role" and that "the source of much of the substantial difference between men's and women's wage growth with job changes still remains to be explained".[11]

It is of some interest to investigate the effects of mobility also in a fixed effects (FE) framework. Using the FE method, I can deal with the potential endogeneity problem associated with mobility by assuming that endogeneity is only due to time-invariant individual heterogeneity. Obviously, in the FE case, I cannot estimate exactly the same wage growth model as above because the time-invariant variables (most notably the female-dummy) drop out.[12] I tried to estimate wage growth equations for employer changes separately for men and women, but the FE estimation resulted in highly inaccurate parameter estimates. This is

[11] The difficulty to explain the gender gap in rewards to mobility by worker and job characteristics implies that much of the gap is due to gender differences in returns to characteristics. To highlight this, I estimated specification 4 separately for men and women, and calculated women's predicted wage growth with firm changes using women's averages of the explanatory variables, but men's estimated coefficients. In this case, women's wages would have increased by 15.7 percent with employer change compared to an actual rate of 12.7 percent. Alternatively, men's rate of return to employer changes would have been 13.3 percent compared to an actual rate of 14.7 percent had they faced women's price structure.

[12] Level and field of education are practically time-invariant in the data. Therefore also they drop out from the fixed effects model. And since potential experience is used as one of the explanatory variables, year dummies cannot be simultaneously included in the model. Change in log of aggregate index of earnings is used to control for general market factors.

hardly surprising because in order to get FE estimates for this population I need observations of individuals who have changed employer at least twice. There is, however, a fairly small number of white-collars in my data with more than one employer change. Therefore, I decided to investigate the role of unobserved time-invariant individual heterogeneity by estimating the fixed effects model for a pooled sample containing both between-firms and within-firms wage growth observations. To get information on gender differences in returns to firm changes, I include a firm change –dummy and its interaction with the female indicator in the model.

Table 7 shows the fixed effects estimates. Looking at the results it is fairly clear that time-invariant individual heterogeneity is unlikely to explain the observed female-penalty associated with between-firms wage growth. The coefficient on the interaction term between the female indicator and the firm change –dummy is negative and significant at the 1 % level after (potential) experience and labor market characteristics are controlled for, as can be seen from the first column in Table 7. Although adding job characteristics to the model decreases the gender gap in wage growth somewhat, they are, however, unable to account for the differences in returns to employer changes between men and women.

So far I have concentrated on the gender gap in *average* wage growth with firm changes. It might, however, be interesting to examine also other parts of the wage growth distribution. If, for example, women faced entry-barriers to certain high-paying and demanding jobs, I should observe a sharp acceleration of gender differences in wage growth in the upper tail of the wage growth distribution. To provide information on the variation of the gender differences in wage growth associated with employer changes throughout the conditional wage growth distribution, I utilize the quantile regression framework for the model (2). Table 8 shows the results of this exercise. It reports the estimated coefficients on the female-dummy together with standard errors at various percentiles of the conditional wage growth distribution.[13] Interestingly, there appear to be no gender differences in returns to mobility at the lower tail of the conditional wage growth distribution. However, the female-penalty increases throughout the wage growth distribution with a significant acceleration at the top of the distribution. This holds for all wage growth specifications. Although the expansion of the gender gap in wage growth over the wage growth distribution does not by itself prove the existence of entry-barriers, it is certainly consistent with the entry-barrier story.

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[13] I estimated the quantile regression model by the bootstrap method using the bsqreg-command in Stata 8.1. I have used 500 repetitions, but I also experimented with 999 repetitions without any significant change in results.

4. Gender Differences in Within-Firm Wage Growth

4.1 Determinants of Within-Firm Wage Growth

Theories of wage growth offer several explanations for the observed gender gap in within-firm wage growth documented in Chapter 2. One reason for women's lower wage growth is that they are segregated into fields of industries and occupations where wage profiles are flatter. Segregation by gender may be due to gender differences in preferences as discussed in the previous chapter. Also the human capital theory developed by Becker (1964) and Mincer (1974) provides explanations for why men and women might end up working in different sectors in the labor market. Practically all of these explanations are in one way or the other related to the fact that women spend on average less time in the labor market than men. Because of women's intermittent employment they have incentives to choose jobs that penalize them little for their time out of the labor force. For the same reasons, we might also observe gender differences in human capital investments before the entry on the labor market. Although nowadays there are only small differences in the quantity of education between men and women, their choices concerning the type of education still differ significantly (e.g. Machin and Puhani 2003; Napari 2006).

Men and women may experience different rates of wage growth even if they worked in the same industry and occupation. This happens if they differ in productivity and its growth with experience. For example, due to gender differences in the expected future labor market attachment, we might see men doing more productivity enhancing investments in human capital than women. Unfortunately, the EK data on white-collars do not contain any information on the amount of job-related training a white-collar has received during her/his employment. However, EK collects information also on blue-collars and this data set provides a productivity measure which is based on the supervisors' performance evaluations. Using data on blue-collars Pekkarinen and Vartiainen (2006) find no gender differences in productivity at the time of initial assignment, but interestingly, women seem to become on average more productive than men later on during the employment contract. If men's and women's relative positions in the productivity distribution among the white-collars in the EK data resemble at all the situation among the blue-collars, then gender-based productivity differentials are probably not the whole story behind the observed gender differences in early-career within-firm wage growth.

Discriminatory factors were discussed in connection with gender differences in wage growth with employer changes, but naturally they may contribute to the gender gap in within-firm wage growth as well. Although in most countries employers are prohibited by law from paying women less than men for doing the same work, there is still room for discriminatory forces to play a role for example through the job assignment process. Men may, for instance, find it easier to change jobs (e.g. get promoted) within firms than women. Obviously, by examining gender differences in within-firm mobility we cannot conclude anything about the significance of discriminatory forces as differences in within-firm mobility may be due to many factors, some of which are again related to gender differences in labor market attachment. However, it is by itself of some interest to investigate the role of internal mobility in explaining the gender gap in within-firm wage growth because currently we have little empirical evidence on internal mobility and the resulting wage effects.

Table 9 examines labor market segregation by gender using a sample from those used in the within-firm wage growth estimations (see below). There appears to be fairly small gender differences in the distributions across industries and firm sizes, but in terms of occupations men and women differ substantially. Table 10 on the other hand examines occupational mobility within firms. As can be seen from the upper part of the table, the sample means of occupational changes are virtually identical for men and women. However, when I focus on those who are initially found at the lowest demand level, men show a much higher (raw) probability to move upwards on the demand ladder than women. Table 11 illustrates that internal mobility is typically associated with high wage growth, but more so for men than for women. Finally, I also investigated gender differences in the probability to experience a break in the panel. As expected, women experience more often breaks than men, but the difference is fairly small, about two percentage points. The rest of Chapter 4 examines how much of the observed gender differences in within-firm wage growth can be explained by segregation, within-firm mobility and career breaks once observable individual characteristics are controlled for.

4.2 The Within-Firm Wage Growth Model

The wage growth model to be estimated in this chapter is very similar to equation (2), but instead of explaining wage growth associated with employer changes the focus is on estimating within-firm wage growth. I estimate five different wage growth specifications. In specification 1, changes in log real hourly wages between consecutive years for firm-stayers are explained using otherwise the same set of variables as in the corresponding specification in Chapter 3, but here I exclude regional dummies for period t-1 (because for firm-stayers the region in period t-1 is the same as in period t). Specification 2 adds a variable measuring cumulative breaks in the panel together with its interaction with the female-dummy. Reasons for including a break variable were discussed above. In specification 3, I also control for industry and firm size. To capture the effects of within-firm mobility on wage growth, specification 4 adds four indicators for internal mobility: i) a change in occupation without a change in the demand level, ii) movement into a more demanding occupation, iii) movement into a less demanding occupation, iv) no change in occupation. Finally, in specification 5, I include dummies controlling for the occupation in period t-1. Wage profiles may differ between occupations, and considering the significant gender differences in occupational distributions found in Chapter 4.1, occupation is potentially an important factor behind the gender gap in within-firm wage growth.

As a robustness check, I analyzed several other wage growth specifications. First, I estimated models with controls for changes in firms' white-collar personnel. This was motivated by the well-known empirical fact that the rates of internal mobility are correlated with the rates of firm growth (e.g. Rosenbaum 1979). Therefore, firm growth may have effects on workers' wage growth as well. And indeed, I found a positive relation between firm growth and workers' wage growth, but since controlling for firm growth did not have any effects on my conclusions concerning the size of the female-penalty in within-firm wage growth, I decided to exclude it from the analysis.

Secondly, the wage growth specifications presented above assume that within-firm wage growth is not related in any way to worker's mobility history. However, this is not what standard models of job matching would suggest (e.g. Jovanovic 1979b). These models highlight the importance of mobility in the sorting process of workers into jobs where their productivity is relatively high. Therefore, how good a worker-employer match one succeeds to find may well affect his/her wage career in the current employment. Against this background, and yet, considering the empirical evidence of gender differences in the mobility behavior discussed in Chapter 3, one may call into question the plausibility of ignoring mobility history in the within-firm wage growth regressions. But in my case, I found that controlling for previous firm-to-firm mobility did not play any role in explaining the gender gap in wage careers within firms.

Thirdly, human capital theory suggests that controlling for past career breaks may not be enough in accounting for the effects of career interruptions on wage growth, but that one should take future career interruptions into account as well. This is because expectations about future career interruptions may well play a role when decisions concerning the current investments in human capital are made. To investigate whether future career breaks could explain the gender gap in within-firm wage growth I added a dummy variable to the wage growth model that takes a value of one if a worker experiences a break in the panel in any of the years t+1, t+2 and t+3 and zero otherwise. As expected, the coefficient on this variable is negative, and it is statistically significant at the 5 % level. Controlling for future breaks in the panel does not, however, have any effect on my main conclusions. In particular, the coefficient on the female-dummy is unaffected by the dummy for the future career interruptions. Therefore, I decided not to report the results for the specification that includes controls for future breaks in the panel.

Fourthly, similarly to Chapter 3, I estimated within-firm wage growth regressions using firm tenure instead of experience, but these two approaches produced very similar results. Reasons for why I prefer experience were already discussed in the previous chapter. Finally, I also analyzed gender differences in within-firm wage growth using estimation results from separate regressions for men and women. However, this did not change my main conclusions derived from the pooled sample regressions.

Similar to Chapter 3, to assure comparability of results between specifications I exclude wage growth observations between 2001 and 2002 (because of the break in the occupational classification system).

4.3 The Results

The OLS results of the within-firm wage growth regressions are presented in Table 12. The first column documents that women lag behind men in within-firm wage growth also after gender differences in educational background are controlled for. Column 2 shows the results for the specification which includes controls for breaks in the panel. Breaks appear to be related with lower within-firm wage growth although for women they seem to be less harmful with respect to wage growth than for men. Adding break variables to the model increases the female-penalty slightly, from -0.011 to -0.012. Column 3 indicates that there are some differences in within-firm wage growth between industries. Wage growth seems to vary with firm size as well: wage growth appears to be relatively stronger in larger firms. One obvious reason for this is related to the fact that the number of different job titles and hierarchy levels typically increases with firm size. Therefore, workers employed in larger firms can be expected to have on average better chances to receive job offers from higher wage ranks or to get promoted at their current employer than employees working in small firms. Although industry and firm size are of some importance in accounting for the variation in within-firm wage growth, they are unable to explain any of the female-penalty in wage growth. Column 4 presents results for the specification which controls for occupational mobility within firms. As expected, this decreases the effects of firm size on wage growth even though the gap in within-firm wage growth between large and small firms remains statistically significant after occupational changes are controlled for. Adding occupational mobility variables does not, however, affect the size of the gender gap in within-firm wage growth. The final column documents the results for a wage growth model which accounts for the occupational distribution in period t-1. Although this decreases women's disadvantage in within-firm wage growth from -0.012 to -0.010, the female-penalty is still strongly significant. As in the previous chapter, much of the gender gap in wage growth remains unexplained.[14]

I proceed by showing the results for the fixed effects regressions. There are some differences in the specifications between the fixed effects and the OLS wage growth model due to the fact that time-invariant variables drop out in the fixed effects model.[15] In order to receive information on gender differences in within-firm wage growth in the fixed effects framework, I estimate the wage growth equation separately for men and women.[16]

Tables 13 and 14 show the fixed effects results for men and women, respectively. There appears to be some gender differences in the price structure also after individual unob-

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[14] Similar to Chapter 3, also here the gender gap in wage growth appears to be due to the gender differences in rewards to characteristics. I calculated the predicted wage growth using parameter estimates from the within-firm wage growth specification 5 estimated separately for men and women. Using women's averages of the explanatory variables, but men's estimated coefficients, the predicted within-firm wage growth for women is 9.5 percent compared to an actual rate of 8.3 percent. On the other hand, if men were rewarded according to women's price structure, their predicted within-firm wage growth would be 8.4 percent in contrast to an observed rate of 9.1 percent.

[15] In my case, the field and level of education, region, industry, and firm size are left out from the fixed effects model. It should be noticed, however, that region, industry and firm size are not necessarily time-invariant for white-collars who have changed employer during the investigation period. But the number of individuals from which I have within-firm wage growth observations around such an employer change which is associated with a change in region, industry or firm size is too low to get sensible parameter estimates for these variables. Furthermore, since change in potential experience is constant across time, in the fixed effects framework I cannot simultaneously use year dummies as well. Therefore general market factors are controlled for by using changes in log of aggregate index of earnings instead of year indicators.

[16] In contrast to Chapter 3, separate wage growth estimations for men and women are possible here as the data contain plenty of observations for individuals with at least two within-firm wage growth observations.

served heterogeneity has been controlled for. This can be seen more clearly when investigating the predicted within-firm wage growth. Women's predicted within-firm wage growth using women's averages of the explanatory variables and men's estimated coefficients is about 9.2 percent irrespective of the specification. This is much higher than the actual wage growth of 8.3 percent. Men, on the other hand, would have experienced a within-firm wage growth of 8.2 percent had they faced women's price structure. This is about one percentage point less than men's actual within-firm wage growth rate. These predictions based on the fixed effects results are similar to those made from the OLS results (see footnote 14) implying that gender differences in within-firm wage growth are not driven by unobserved time-invariant individual heterogeneity.

To provide information on how the female-penalty in within-firm wage growth possibly varies throughout the conditional wage growth distribution, Table 15 presents estimates for the female-dummy for different percentiles. The quantile regression model is estimated for the five specifications presented in Section 4.2. Similar to Chapter 3, I have estimated the quantile model by bootstrapping using 500 repetitions. However, due to the large number of within-firm wage growth observations the estimation of the quantile regression model by bootstrapping becomes fairly burdensome and time-consuming. Therefore, I took a 5 percent random sample from the within-firm wage growth observations used in the previous estimations resulting in 9948 observations. According to Table 15, there seems to be no gender-based differences in within-firm wage growth at the bottom of the within-firm wage growth distribution. However, when the top of the conditional wage growth distribution is investigated, women fall substantially behind men. Consider for example specification 1. At the median, the estimate for the female-dummy is -1.1. After the 75th percentile there is a clear acceleration in the female-penalty and at the 95th percentile the value for the female-dummy is found to be as high as -3.3. Although the disparity in the gender gap in wage growth between the lower and upper tails of the within-firm wage growth distribution decreases as I add explanatory variables to the model, the finding of an increasing female-penalty throughout the conditional wage growth distribution with a considerable acceleration at the top applies to all specifications. This could be interpreted as evidence of the existence of glass ceilings.

5. Conclusions

This paper started with an illustration of the gender differences in early-career wage growth among white-collars employed in Finnish manufacturing. Using data from the Confederation of Finnish Industries covering the years 1995-2004 I showed that there are significant disparities in wage careers between genders during the first ten years in the labor market. Female white-collars lag behind their male colleagues in average hourly wages by ten log points immediately at entry on the labor market. After ten years the size of the gender wage gap has more than doubled accounting for most of the life-time increase in the gender wage gap among white-collars employed in the Finnish manufacturing sector. The rest of the paper focused on explaining this gap in early-career wage growth between male and female white-collars.

I presented a wage growth decomposition in which the early-career wage growth was divided into two parts: one that is associated with employer changes and another that is due to wage growth within firms. This decomposition revealed that the size of the gender gap in early-career wage growth varies significantly with the mobility status. Women's disadvantage in annual within-firm wage growth relative to men is 0.67 percentage points whereas they have on average 1.9 percentage points lower wage growth with employer changes compared to men. I found it difficult to explain the observed gender gap in between-firm and within-firm wage growth by women's and men's different educational choices or by the characteristics of the jobs they hold. Furthermore, OLS and fixed effects estimations both yielded similar conclusions suggesting that time-invariant unobserved individual heterogeneity does not account for the difference between men's and women's wage growth. The investigation of the gender gap in wage growth at different points of the conditional wage growth distribution provided some interesting results. There seems to be no female-penalty in wage growth at the bottom of the wage growth distribution, but as we move along the distribution the gender gap increases significantly. In particular, there is a sharp acceleration in the gap right at the top of the distribution. This is consistent with the existence of glass ceilings. These findings apply to both between-firm and within-firm wage growth.

My results are in line with the existing literature. Of the earlier studies, perhaps the most relevant research with respect to my paper is the study by Loprest (1992). Also Loprest analyzes gender differences in early-career wage growth by distinguishing between the wage growth associated with employer changes and the within-firm wage growth. Using data on the US labor market from the period 1979-1983, she documents significant gender differences in the wage growth when changing firms. Furthermore, most of this gap remains unexplained, a finding that corresponds to my results. The similarity in conclusions between the two papers is fairly interesting not only because I use a much more recent data than Loprest, but also because of the differences in the institutional set-ups between the US and Finland.

What would be productive directions for further research in this particular topic? One potentially interesting line of research is to investigate gender differences in wage careers within firms. Given the evidence of gender differences in the distributions of workers across firms (e.g. Carrington and Troske 1998) and that firms differ for instance in terms of training practices, work processes, and rewarding systems, it may be important to look inside firms and to investigate whether observed and unobserved firm-specific effects could account for the differences in men's and women's wage growth. Another line of research that might be of use in explaining the large unexplained part of the gender gap in early-career wage growth found in this paper is the so-called family gap literature (e.g. Waldfogel 1998a, 1998b). Most of the existing studies in this literature have focused on examining factors behind the gap in wage *levels* between mothers and childless women. It would be interesting to get more information on the effects of children on mothers' wages relative to men and how these child-related career breaks possibly contribute to the gender gap in wage growth. How important these considerations are in improving our knowledge of the mechanisms behind the gender gap in wage careers remains to be seen.

References

Albrecht, James, Anders Björklund, and Susan Vroman (2003): "Is There a Glass Ceiling in Sweden?", *Journal of Labor Economics*, Vol. 21(1), pp. 145-77

Arrow, Kenneth J. (1973): "The Theory of Discrimination", in O. Ashenfelter and A. Rees (eds), *Discrimination in Labor Markets*, Princeton

Arulampalam, Wiji, Alison L. Booth, and Mark L. Bryan (2004): "Is There a Glass Ceiling over Europe? Exploring the Gender Pay Gap across the Wages Distribution" IZA Discussion Paper No. 1373

Becker, Gary S. (1964): "Human Capital – A Theoretical and Empirical Analysis with Special Reference to Education", Chicago: Chicago University Press, 3rd edition

Becker, Gary S. (1971): "The Economics of Discrimination", Chicago: Chicago University Press

Blau, Francine, and Lawrence Kahn (1996): "Wage Structure and Gender Earnings Differentials: An International Comparison", *Economica*, Vol. 63(250), pp. S29-S62

Burdett, Kenneth (1978): "A Theory of Employee Job Search and Quit Rates", *American Economic Review*, Vol. 68(1), pp. 212-20

Carrington, W.J, and Kenneth R. Troske (1998): "Sex Segregation in U.S. Manufacturing", *Industrial and Labor Relations Review*, Vol. 51(3), pp. 445-64

Jovanovic, Boyan (1979a): "Job Matching and the Theory of Turnover", *The Journal of Political Economy*, Vol. 87(5), pp. 972-90

Jovanovic, Boyan (1979b): "Firm-Specific Capital and Turnover", *Journal of Political Economy*, Vol. 87(6), pp. 1246-59

Kangasniemi, Mari (2003): "Essays on Job Tenure, Worker Mobility and Occupation in Finnish Manufacturing: Do Institution Matter?", PhD Thesis, University of Essex

Keith, Kirsten, and Abigail McWilliams (1997): "Job Mobility and Gender-Based Wage Growth Differentials", *Economic Inquiry*, Vol. 35(2), pp. 320-33

Keith, Kirsten, and Abigail McWilliams (1999): "The Returns to Mobility and Job Search by Gender", *Industrial and Labor Relations Review*, Vol. 52(3), pp. 460-77

Kunze, Astrid (2002): "Gender Differences in Entry Wages and Early Career Wages", IZA Discussion Paper No. 626

Light, Audrey, and Manuelita Ureta (1992): "Panel Estimates of Male and Female Job Turnover Behavior: Can Female Nonquitters Be Identified?", *Journal of Labor Economics*, Vol. 10(2), pp. 156-81

Light, Audrey, and Manuelita Ureta (1995): "Early-Career Work Experience and Gender Wage Differentials", *Journal of Labor Economics*, Vol. 13(1), pp. 121-54

Loprest, Pamela J. (1992): "Gender Differences in Wage Growth and Job Mobility", *American Economic Review*, Vol. 82(2), pp. 526-32

Machin, Stephen, and Patrick A. Puhani (2003): "Subject of Degree and the Gender Wage Differential, Evidence from the UK and Germany", *Economics Letters*, Vol. 73, pp. 393-400

Manning, Alan (2003): "Monopsony in Motion: Imperfect Competition in Labor Markets", Princeton: Princeton University Press

Manning, Alan, and Joanna Swaffield (2005): "The Gender Gap in Early-Career Wage Growth", CEP Discussion Paper No. 700

Mincer, Jacob (1974): "Schooling, Experience and Earnings", New York: National Bureau of Economic Research

Napari, Sami (2007): "The Early Career Gender Wage Gap among the University Graduates in the Finnish Private Sector", mimeo

Napari, Sami (2006): "Type of Education and the Gender Wage Gap", HECER Discussion Paper No. 128

Phelps, Edmund S. (1972): "The Statistical Theory of Racism and Sexism", *American Economic Review*, Vol. 62(4), pp. 659-61

Pekkarinen, Tuomas, and Juhana Vartiainen (2006): "Gender Differences in Job Assignment and Promotion on a Complexity Ladder of Jobs", *Industrial and Labor Relations Review*, Vol. 59(2), pp. 285-301

Rosenbaum, James E. (1979): "Organizational Career Mobility: Promotion Chances in a Corporation during Periods of Growth and Contraction", *American Journal of Sociology*, Vol. 85(1), pp. 21-48

Sicherman, Nachum (1996): "Gender Differences in Departures from a Large Firm", *Industrial and Labor Relations Review*, Vol. 49(3), pp. 484-505

Teulings, Coen, and Joop Hartog (1998): "Corporatism or Competition? Labour Contracts, Institutions and Wage Structures in International Comparison", Cambridge: Cambridge University Press

Topel, Robert H., and Michael P. Ward (1992): "Job Mobility and the Careers of Young Men", *Quarterly Journal of Economics*, Vol. 107(2), pp. 439-79

Waldfogel, Jane (1998a): "The Family Gap for Young Women in the United States and Britain: Can Maternity Leave Make a Difference?", *Journal of Labor Economics*, Vol. 16(3), pp. 505-45

Waldfogel, Jane (1998b): "Understanding the "Family Gap" in Pay for Women with Children", *Journal of Economic Perspectives*, Vol. 12(1), pp. 137-56

Figure 1: Wage-experience profiles

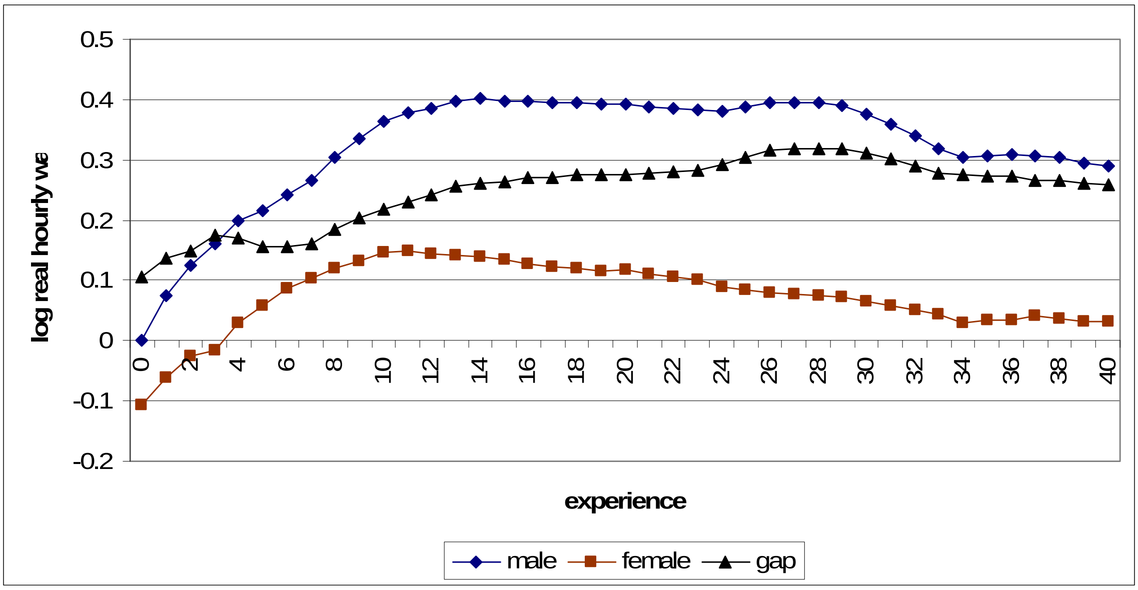

Figure 2: Wage-experience profiles by birth cohorts

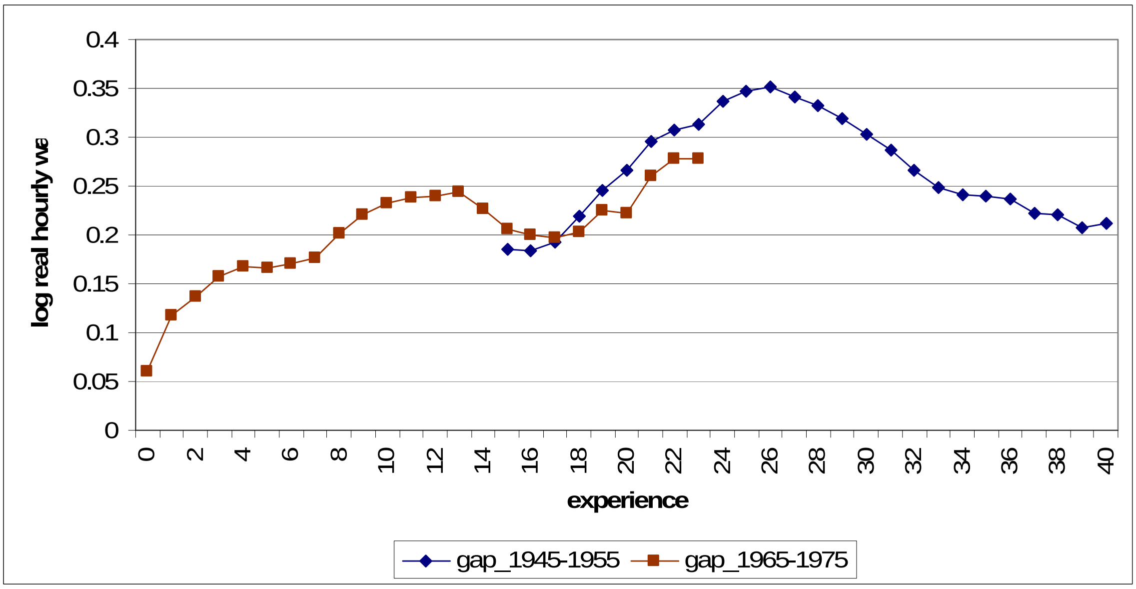

Table 1: Implied early-career wage growth

Experience	Men (1)	Women (2)	Men (3)	Women (4)
	Implied wage growth			
1	0.132	0.120	0.147	0.139
2	0.112	0.104	0.130	0.124
3	0.101	0.095	0.118	0.111
4	0.097	0.091	0.110	0.102
5	0.096	0.089	0.103	0.094
6	0.095	0.087	0.097	0.087
7	0.094	0.084	0.091	0.080
8	0.090	0.080	0.084	0.074
9	0.086	0.077	0.078	0.070
10	0.080	0.075	0.073	0.067
Average	0.098	0.090	0.103	0.095
Fixed effects	No	No	Yes	Yes
No. of obs.	166 823	82 626	166 823	82 626
R^2	0.010	0.010	0.347	0.388

Notes:

1. Sample is those with no more than ten years of potential experience.
2. The implied wage growth is based on the estimated parameters of (1).

Table 2: Decomposition of the early-career wage growth

	Men	Women	Difference
Average annual wage growth (%)	9.20	8.46	0.74**
Number of observations	166 823	82 626	
Average annual wage growth with firm changes	14.23	12.31	1.92**
Number of observations	8 207	3 773	
% of total observations	4.9	4.6	
Average annual within firm wage growth	8.94	8.27	0.67**
Number of observations	158 616	78 853	
% of total observations	95.1	95.4	

Notes:

1. Sample is those with no more than ten years of potential experience.
2. Wage growth is defined similar to Table 1, i.e. as a difference in wages between two consecutive years.
3. **: Difference significant at 1 % level.

Table 3: Gender differences in the type of mobility

Type of mobility	men (%)	women (%)
Change in:		
industry	20.5	17.1
firm size	82.4	83.7
occupation	54.9	50.1

Note:

1. Sample is those used in estimations of wage growth with employer changes.

Table 4: Wage growth by the type of mobility

	Wage growth		
Type of mobility	Men	Women	Difference
same industry	0.137	0.120	0.017**
change in industry	0.162	0.138	0.024**
move to a smaller firm	0.129	0.115	0.014**
move to a larger firm	0.152	0.134	0.017**
no change in firm size	0.163	0.130	0.033**
same occupation	0.116	0.103	0.013*
change in occupation	0.170	0.150	0.019**

Notes:

1. Sample is those used in estimations of wage growth with employer changes.
2. Wage growth refers to the immediate wage growth following mobility, w_t - w_{t-1}, where w_t and w_{t-1} are log hourly wage at the new and previous employer respectively.
3. **: Difference significant at 1 % level.

Table 5: Gender differences in mobility across the demand levels of jobs

Type of occupation change	men (%)	women (%)
No controls for initial Job assignment:		
upward movement	41.9	40.6
no change in demand level	36.0	36.6
downward movement	22.1	22.8
White-collars initially at the lowest demand level:		
upward movement	89.5	69.3

Note:

1. Sample is those used in estimations of wage growth with employer changes restricted further to those who also experience an occupational change.

Table 6: OLS wage growth regressions with employer change

Dependent variable: w_t - w_{t-1}

	(1)	(2)	(3)	(4)
Female	-0.024	-0.023	-0.022	-0.020
	(7.50)**	(7.09)**	(7.14)**	(5.84)**
Experience	-0.003	-0.003	-0.003	-0.003
	(6.56)**	(6.21)**	(5.96)**	(6.42)**
Level of education:				
Lowest tertiary	-0.000	-0.002	-0.006	-0.008
	(0.06)	(0.26)	(1.03)	(1.38)
Bachelor	0.019	0.017	0.011	0.007
	(3.37)**	(2.99)**	(1.97)*	(1.17)
Master	0.028	0.026	0.018	0.012
	(4.76)**	(4.50)**	(3.19)**	(1.85)
(Omitted group: secondary level)				
Field of education:				
Humanities and Arts	-0.053	-0.050	-0.045	-0.047
	(3.87)**	(3.72)**	(3.45)**	(3.41)**
Social Sciences	-0.044	-0.043	-0.037	-0.038
	(5.31)**	(5.15)**	(4.59)**	(4.59)**
Natural Sciences	-0.066	-0.065	-0.057	-0.055
	(6.84)**	(6.71)**	(6.04)**	(5.73)**
Technology	-0.061	-0.059	-0.055	-0.057
	(7.90)**	(7.71)**	(7.44)**	(7.42)**
Agriculture and Forestry	-0.068	-0.066	-0.056	-0.056
	(5.20)**	(5.06)**	(4.43)**	(3.99)**
Health and Welfare	-0.079	-0.073	-0.060	-0.058
	(5.64)**	(5.19)**	(4.39)**	(3.82)**
Services	-0.058	-0.055	-0.048	-0.050
	(4.43)**	(4.20)**	(3.78)**	(3.79)**
Other	-0.094	-0.088	-0.084	-0.081
	(2.69)**	(2.56)*	(2.46)*	(2.37)*
(Omitted group: General)				
Change in industry		0.018	0.011	0.013
		(5.19)**	(3.01)**	(3.36)**
To a smaller firm		-0.020	-0.011	-0.011
		(5.85)**	(3.16)**	(2.95)**
To a larger firm		-0.005	-0.005	-0.006
		(1.24)	(1.35)	(1.44)
Same occupation			-0.065	-0.066
			(18.66)**	(17.84)**
Change in occupation, same demand level			-0.033	-0.035
			(7.79)**	(8.13)**
Change in occupation, lower demand level			-0.042	-0.048
			(8.57)**	(8.90)**
(Omitted group: change in occupation, higher demand level)				

(Table 6 continues)

Region indicators	Yes	Yes	Yes	Yes
Year indicators	Yes	Yes	Yes	Yes
Industry indicators for period t-1	No	No	No	Yes
Firm size indicators for period t-1	No	No	No	Yes
Occupation indicators for period t-1	No	No	No	Yes
Constant	0.182	0.189	0.230	0.233
	(23.18)**	(22.59)**	(26.86)**	(15.62)**
Observations	10282	10282	10282	10280
R-squared	0.07	0.07	0.11	0.12

Robust t statistics in parentheses
* significant at 5%; ** significant at 1%

Notes:

1. Wage growth model is estimated for those changing employer and having no more than ten years of potential experience.
2. t statistics are in parenthesis, and they are calculated using robust standard errors with clustering on the individual.

Table 7: Fixed effects wage growth regressions

Dependent variable: $w_t - w_{t-1}$	(1)	(2)	(3)	(4)
Firm change	0.058	0.062	0.062	0.064
	(24.61)**	(25.17)**	(12.67)**	(13.13)**
Firm change*female	-0.018	-0.018	-0.015	0.016
	(4.67)**	(4.58)**	(3.90)**	(4.07)**
Experience	-0.007	-0.007	-0.007	-0.006
	(45.50)**	(45.34)**	(46.23)**	(33.57)**
Change in industry		0.003	-0.000	-0.009
		(1.33)	(0.08)	(3.16)**
To a smaller firm		-0.010	-0.007	-0.008
		(6.37)**	(4.60)**	(5.05)**
To a larger firm		-0.004	-0.006	-0.003
		(3.22)**	(4.62)**	(2.33)*
Same occupation			-0.043	-0.040
			(28.61)**	(25.71)**
Change in occupation, same demand level			-0.025	-0.022
			(11.98)**	(10.25)**
Change in occupation, lower demand level			-0.028	-0.021
			(9.66)**	(6.93)**
(Omitted group: change in occupation, higher demand level)				
Same occupation*firm change			-0.025	-0.028
			(4.69)**	(5.26)**
Change in occupation, same demand level*firm change			-0.001	-0.002
			(0.23)	(0.24)
Change in occupation, lower demand level*firm change			-0.006	-0.007
			(0.73)	(0.88)
(Omitted group: change in occupation, higher demand level*firm change)				
Region indicators (periods t-1 and t)	Yes	Yes	Yes	Yes
Change in earnings index	Yes	Yes	Yes	Yes
Industry indicators for period t-1	No	No	No	Yes
Firm size indicators for period t-1	No	No	No	Yes
Occupation indicators for period t-1	No	No	No	Yes
Constant	0.097	0.098	0.133	0.111
	(53.48)**	(53.70)**	(58.88)**	(19.67)**
Observations	208 760	208 760	208 760	208 685
R-squared	0.42	0.42	0.43	0.43

Robust t statistics in parentheses
* significant at 5%; ** significant at 1%

Notes:

1. Wage growth model is estimated for those having no more than ten years of potential experience.
2. t statistics are in parentheses, and they are calculated using robust standard errors with clustering on the individual.
3. Since potential experience is used as one of the explanatory variables, year dummies cannot be simultaneously included in the fixed effects model. Therefore change in log of aggregate index of earnings is used to control for general market factors.

Table 8: Quantile wage growth regressions with employer change

	Specification			
	I	II	III	IV
5th percentile				
Female	0.007	0.004	0.003	0.006
	(0.007)	(0.005)	(0.003)	(0.004)
10th percentile				
Female	-0.000	0.000	-0.000	0.001
	(0.001)	(0.001)	(0.001)	(0.002)
25th percentile				
Female	-0.009	-0.007	-0.006	-0.006
	(0.002)**	(0.002)**	(0.002)**	(0.002)*
median				
Female	-0.020	-0.019	-0.020	-0.019
	(0.003)**	(0.003)**	(0.003)**	(0.003)**
75th percentile				
Female	-0.030	-0.029	-0.026	-0.023
	(0.005)**	(0.005)**	(0.005)**	(0.005)**
90th percentile				
Female	-0.048	-0.049	-0.042	-0.032
	(0.008)**	(0.007)**	(0.007)**	(0.007)**
95th percentile				
Female	-0.060	-0.061	-0.050	-0.037
	(0.010)**	(0.010)**	(0.010)**	(0.010)**

Notes:

1. Wage growth model is estimated for those changing employer and having no more than ten years of potential experience.
2. Standard errors are in parenthesis. The model is estimated by bootstrapping using 500 repetitions.
3. ** indicates that the coefficient on female-dummy is significant at 1 % level. * refers to significance at 5 % level.
4. Specifications I-IV refer to the specifications estimated in Table 6.

Table 9: Distributions across industries, firm sizes and occupation groups

Industry	Men (%)	Women (%)
manufacturing	77.0	75.6
construction	5.0	2.0
transportation	4.9	9.6
Services	10.8	10.3
forest industry	1.6	1.0
energy industry	0.7	1.6

Firm size (number of employees)	Men (%)	Women (%)
50 or less	8.0	8.1
51-100	6.9	8.3
101-200	11.8	11.4
201-500	15.7	16.7
501-1000	12.4	10.4
1001-2000	6.9	5.9
more than 2000	38.3	39.3

Occupation group	Men (%)	Women (%)
product design	42.4	17.1
quality control	2.9	5.3
Research	5.3	6.3
Production, assembly and maintenance management	16.6	3.7
production support	9.1	3.2
material handling and transportation	1.7	1.5
Purchasing	1.7	2.6
Sales	9.5	17.3
Marketing	1.3	3.3
Coordination	0.9	1.2
PR	0.7	3.4
data processing	2.8	2.5
Cashier	0.2	2.5
Accounting	0.5	4.2
pricing and budgeting	1.0	2.7
Secretary	0.1	10.8
office services	0.2	2.8
Other	3.3	9.8

Note:

1. Sample is those used in within-firm wage growth estimations.

Table 10: Gender differences in internal mobility

Internal mobility	Men (%)	Women (%)
No controls for initial job assignment:		
same occupation	88.1	87.8
change in occupation, same demand level	4.1	4.8
change in occupation, higher demand level	6.1	5.4
change in occupation, lower demand level	1.7	2.0
White-collars initially at the lowest demand level:		
change in occupation, higher demand level	16.5	8.4

Note:

1. Sample is those used in within-firm wage growth estimations.

Table 11: Wage growth and internal mobility

	Wage growth		
Internal mobility	**Men**	**Women**	**Difference**
same occupation	0.087	0.079	0.008**
change in occupation, same demand level	0.108	0.099	0.009**
change in occupation, higher demand level	0.137	0.129	0.008**
change in occupation, lower demand level	0.099	0.092	0.007*

Notes:

1. Sample is those used in within-firm wage growth estimations.
2. Wage growth refers to average annual wage growth defined as w_t - w_{t-1}, where w_t and w_{t-1} are log hourly wage observations from the same employer.
3. **: Difference significant at 1 % level.

Table 12: OLS within-firm wage growth regressions

Dependent variable: $w_t - w_{t-1}$

	(1)	(2)	(3)	(4)	(5)
Female	-0.011	-0.012	-0.012	-0.012	-0.010
	(24.41)**	(24.39)**	(25.05)**	(24.99)**	(21.20)**
Experience	-0.003	-0.003	-0.003	-0.003	-0.003
	(43.69)**	(43.05)**	(43.58)**	(43.20)**	(42.88)**
Level of education:					
Lowest tertiary	-0.005	-0.005	-0.005	-0.005	-0.005
	(6.89)**	(6.79)**	(6.35)**	(6.91)**	(6.68)**
Bachelor	0.004	0.005	0.004	0.003	0.001
	(6.46)**	(6.54)**	(5.37)**	(4.17)**	(0.98)
Master	0.006	0.006	0.005	0.004	0.002
	(8.32)**	(8.49)**	(6.68)**	(5.27)**	(2.16)*
(Omitted group: Secondary level)					
Field of education:					
Humanities and Arts	-0.036	-0.036	-0.036	-0.034	-0.029
	(19.61)**	(19.64)**	(19.48)**	(18.60)**	(15.76)**
Social Sciences	-0.025	-0.025	-0.024	-0.023	-0.023
	(19.09)**	(19.06)**	(18.48)**	(17.92)**	(17.75)**
Natural Sciences	-0.034	-0.034	-0.035	-0.033	-0.034
	(23.19)**	(23.17)**	(24.00)**	(23.12)**	(23.70)**
Technology	-0.037	-0.037	-0.036	-0.034	-0.034
	(29.64)**	(29.59)**	(29.09)**	(28.01)**	(27.33)**
Agriculture and Forestry	-0.044	-0.044	-0.039	-0.038	-0.036
	(25.96)**	(26.01)**	(20.31)**	(19.80)**	(18.94)**
Health and Welfare	-0.041	-0.041	-0.042	-0.038	-0.036
	(22.29)**	(22.31)**	(22.40)**	(21.24)**	(18.82)**
Services	-0.028	-0.028	-0.028	-0.026	-0.024
	(12.89)**	(12.87)**	(12.69)**	(12.02)**	(11.36)**
Other	-0.030	-0.030	-0.030	-0.029	-0.027
	(5.26)**	(5.26)**	(5.29)**	(5.14)**	(4.78)**
(Omitted group: General)					
Cumulative breaks		-0.006	-0.005	-0.006	-0.005
		(6.77)**	(6.19)**	(6.77)**	(6.45)**
Cumulative breaks*female		0.004	0.005	0.005	0.004
		(3.41)**	(3.47)**	(3.72)**	(3.45)**
Field of industry:					
Construction			0.001	-0.001	0.003
			(0.75)	(1.01)	(3.41)**
Transportation			-0.002	-0.001	0.001
			(3.00)**	(1.86)	(0.85)
Services			-0.003	-0.003	-0.005
			(4.06)**	(4.78)**	(6.29)**

(Table 12 continues)

	(1)	(2)	(3)	(4)	(5)
Forestry			-0.007 (4.27)**	-0.007 (4.27)**	-0.004 (2.43)*
Energy			0.003 (1.89)	0.004 (2.34)*	0.008 (4.24)**
(Omitted group: Manufacturing)					
<u>Firm size:</u>					
51-100 white-collars			0.000 (0.33)	0.001 (0.79)	0.001 (1.06)
101-200 white-collars			0.001 (0.70)	0.001 (1.20)	0.001 (1.22)
201-500 white-collars			0.003 (3.77)**	0.003 (4.01)**	0.003 (4.15)**
501-1000 white-collars			0.005 (5.89)**	0.005 (6.08)**	0.006 (6.70)**
1001-2000 white-collars			0.004 (4.22)**	0.003 (3.60)**	0.003 (3.61)**
Over 2000 white-collars			0.013 (17.15)**	0.010 (13.80)**	0.009 (12.76)**
(Omitted group: not more than 50)					
Change in occupation, same demand level				0.022 (22.84)**	0.022 (22.53)**
Change in occupation, higher demand level				0.049 (49.87)**	0.049 (49.26)**
Change in occupation, lower demand level				0.012 (7.43)**	0.013 (7.72)**
(Omitted group: same occupation)					
Region indicators	Yes	Yes	Yes	Yes	Yes
Year indicators	Yes	Yes	Yes	Yes	Yes
Indicators for occupation at year t-1	No	No	No	No	Yes
Constant	0.121 (91.64)**	0.120 (91.23)**	0.115 (78.20)**	0.111 (76.51)**	0.112 (55.71)**
Observations	198 891	198 891	198 891	198 891	198 842
R-squared	0.10	0.10	0.10	0.12	0.13

Robust t statistics in parentheses
significant at 5%; ** significant at 1%

Notes:

1. Wage growth model is estimated using within-firm wage growth observations for those with no more than ten years of potential experience.
2. t statistics are in parentheses, and they are calculated using robust standard errors with clustering on the individual.

Table 13: Fixed effects within-firm wage growth regressions for male white-collars

Dependent variable: first difference in log real hourly wages

	(1)	(2)	(3)	(4)
Experience	-0.007	-0.007	-0.007	-0.007
	(37.50)**	(36.80)**	(37.51)**	(31.07)**
Cumulative breaks		0.008	0.007	0.007
		(2.61)**	(2.38)*	(2.55)*
Change in occupation, same demand level			0.017	0.017
			(8.78)**	(8.50)**
Change in occupation, higher demand level			0.043	0.041
			(23.54)**	(21.57)**
Change in occupation, lower demand level			0.013	0.016
			(3.80)**	(4.32)**
(Omitted group: same occupation)				
Change in earnings index	Yes	Yes	Yes	Yes
Indicators for occupation at year t-1	No	No	No	Yes
Constant	0.102	0.103	0.096	0.094
	(55.05)**	(54.81)**	(51.30)**	(18.44)**
Observations	132 732	132 732	132 732	132 688
R-squared	0.41	0.41	0.42	0.42

Robust t statistics in parentheses
* significant at 5%; ** significant at 1%

Notes:

1. Wage growth model is estimated using within-firm wage growth observations for those male white-collars with no more than ten years of potential experience.
2. t statistics are in parentheses, and they are calculated using robust standard errors with clustering on the individual.
3. Since potential experience is used as one of the explanatory variables, year dummies cannot be simultaneously included in the fixed effects model. Therefore change in log of aggregate index of earnings is used to control for general market factors.

Table 14: Fixed effects within-firm wage growth regressions for female white-collars

Dependent variable: $w_t - w_{t-1}$

	(1)	(2)	(3)	(4)
Experience	-0.007	-0.007	-0.008	-0.006
	(25.08)**	(24.84)**	(25.40)**	(19.26)**
Cumulative breaks		0.009	0.009	0.009
		(2.43)*	(2.32)*	(2.42)*
Change in occupation, same demand level			0.017	0.017
			(6.61)**	(6.55)**
Change in occupation, higher demand level			0.042	0.038
			(15.37)**	(13.76)**
Change in occupation, lower demand level			0.015	0.018
			(4.13)**	(4.87)**
(Omitted group: same occupation)				
Change in earnings index	Yes	Yes	Yes	Yes
Indicators for occupation at year t-1	No	No	No	Yes
Constant	0.080	0.081	0.075	0.054
	(29.39)**	(29.53)**	(27.61)**	(7.15)**
Observations	66 232	66 232	66 232	66 227
R-squared	0.45	0.45	0.46	0.47

Robust t statistics in parentheses
*significant at 5%; ** significant at 1%

Notes:

1. Wage growth model is estimated using within-firm wage growth observations for those female white-collars with no more than ten years of potential experience.
2. t statistics are in parentheses, and they are calculated using robust standard errors with clustering on the individual.
3. Since potential experience is used as one of the explanatory variables, year dummies cannot be simultaneously included in the fixed effects model. Therefore change in log of aggregate index of earnings is used to control for general market factors.

Table 15: Quantile within-firm wage growth regressions

	Specification				
	I	**II**	**III**	**IV**	**V**
5th percentile	-0.000	-0.000	-0.000	-0.000	-0.000
Female	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
10th percentile	0.000	-0.000	-0.000	-0.000	-0.000
Female	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
25th percentile	-0.000	-0.000	-0.000	-0.000	-0.000
Female	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
median	-0.011	-0.012	-0.011	-0.011	-0.010
Female	(0.002)**	(0.002)**	(0.002)**	(0.002)**	(0.002)**
75th percentile	-0.014	-0.013	-0.014	-0.013	-0.011
Female	(0.002)**	(0.003)**	(0.002)**	(0.003)**	(0.003)**
90th percentile	-0.023	-0.021	-0.020	-0.017	-0.018
Female	(0.004)**	(0.005)**	(0.004)**	(0.004)**	(0.004)**
95th percentile	-0.033	-0.032	-0.029	-0.026	-0.020
Female	(0.007)**	(0.007)**	(0.008)**	(0.007)**	(0.007)**

Notes:

1. Standard errors are in parenthesis. The model is estimated by bootstrapping using 500 repetitions.
2. ** indicates that the coefficient on female-dummy is significant at 1 % level. * refers to significance at 5 % level.
3. Specifications I-V refer to the specifications estimated in Table X+1.
4. Model is estimated for a 5 % random sample of within-firm wage growth observations.

Appendix A: Definitions of the variables used in the wage growth regressions

In Sections 3 and 4, I focus on white-collars who have at most ten years of potential experience and who have completed their degree at age 30 or younger. Next I provide a short description of the variables used in the regression analysis in Section 3 and 4.

Log real hourly wage: The EK data do not contain direct information on hourly wages but they can be calculated using data on monthly wages and weekly working hours. The wage measure used in this study is based on the basic monthly salary, which does not include earnings from overtime, shift work, bonuses, and so forth. Wages are converted into 2000 money using the cost-of-living index of Statistics Finland.

Experience: Experience refers to potential experience calculated as age - years of schooling – 7.

Level of education: Four categories: i) basic or secondary level education, ii) lowest level tertiary education, iii) lower-degree level tertiary education, iv) higher-degree level tertiary education or doctorate level education.

Field of education: Nine categories: i) general education, ii) educational science, iii) humanities and arts, iv) social science and business, v) natural science, vi) technology, vii) agriculture and forestry, viii) health and welfare, ix) services.

Region: Five dummies for the location of firm: i) Southern Finland, ii) Western Finland, iii) Eastern Finland, iv) Oulu, v) Lapland.

Industry: Six industry dummies: i) manufacturing, ii) construction, iii) transportation, iv) services, v) forestry, vi) energy.

Firm size: Seven firm size categories: i) no more than 50 employees, ii) 51-100 employees, iii) 101-200 employees, iv) 201-500 employees, v) 501-1000 employees, vi) 1001-2000 employees, vii) over 2000 employees.

Occupation demand level: Occupations are categorized into four demand levels in the EK data: i) management, ii) senior expert, iii) expert, iv) care taker. Information on the demand levels is included in the new occupation variable (see below) as such, but in the case of the old occupation variable, one must apply an occupation key provided by EK.

Occupation: Before 2002, the occupation code is a two-digit number containing 75 different codes. In 2002, a new six-digit occupation code is introduced, and as a result the number of different occupation codes increases substantially. EK provides an occupation key, which makes it possible to translate the new occupation codes into the old codes fairly reliable. This key is applied in constructing indicators for the previous period's occupation.

Dummies for occupational changes are defined by comparing occupational codes between consecutive years. However, because it is impossible to get reliable information on occupational changes around 2002 (because of the change in the occupation code), occupational changes are not defined between 2001 and 2002.

Firm change: Firm changes are identified by comparing firm identifiers attached to white-collars between consecutive years. To avoid some rare cases where the firm code changes even though a white-collar does not actually change firm a further condition for an employer change is introduced: a white-collar is defined to switch firm if the firm code associated with a white-collar differs between years t and t-1, and if no more than 50 % of his/her fellow workers from year t-1 follow him/her to the new employer.

Cumulative breaks: First a dummy variable is calculated which takes a value of one if the gap between two observations for an individual is greater than one, and zero otherwise. Cumulative breaks –variable is then defined as a cumulative sum of the dummy-variable in question.

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THE RESEARCH INSTITUTE OF THE FINNISH ECONOMY
LÖNNROTINKATU 4 B, FIN-00120 HELSINKI

Puh./Tel. (09) 609 900 Telefax (09) 601753
Int. 358-9-609 900 Int. 358-9-601 753
http://www.etla.fi

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