CENTRE for ECONOMIC PERFORMANCE

CEP Discussion Paper No 738

August 2006

The Early Career Gender Wage Gap

Sami Napari

Abstract
In Finland the gender wage gap increases significantly during the first 10 years after labor market entry accounting most of the life-time increase in the gender wage gap. This paper focuses on the early career gender wage differences among university graduates and considers several explanations for the gender wage gap based on the human capital theory, job mobility and labor market segregation. Gender differences in the accumulation of experience and in the type of education explain about 16 percent of the average gender wage gap that emerges during the first 11 years after labor market entry among university graduates. Differences in employer characteristics between male and female graduates account about 10 percent for the average early career gender wage gap. In all gender differences in background characteristics explain about 27 percent of the average early career wage differences between male and female university graduates. The most important single factor contributing to the gender wage gap is the family type. Women seem to suffer considerable larger wage losses due to marriage and children than men.

Keywords: gender wage gap, early career
JEL Classification: J24, J31, J7

This paper was produced as part of the Centre's Labour Markets Programme. The Centre for Economic Performance is financed by the Economic and Social Research Council.

Acknowledgements
I thank Alan Manning, Pekka Ilmakunnas and Rita Asplund for helpful comments. I also thank Centre for Economic Performance for hospitality during my stay in 2005-2006. I thank Academy of Finland, FDPE, Helsinki School of Economics, and Yrjö Jahnsson Foundation for financial support. I thank Statistics Finland for the data.

Sami Napari is a Visitor with the Labour Markets Research Programme at the Centre for Economic Performance, London School of Economics. He is also a member of the Department of Economics, Helsinki School of Economics, FDPE and HECER. Email: s.r.napari@lse.ac.uk

Published by
Centre for Economic Performance
London School of Economics and Political Science
Houghton Street
London WC2A 2AE

ISBN 0 7530 2035 1

1. Introduction

Despite the fact that the gender wage differences have decreased over the last decades in almost all countries, women's wages are still on average substantially lower than men's. There exists a huge literature that attempts to explain the existence of this wage gap (see surveys by Altonji & Blank 1999; Kunze 2000). Although no one has been able to provide an exhaustive explanation for the gender wage differences, research on the gender wage gap has documented several factors contributing to the gap. First of all, there exist gender differences in the acquisition of human capital. For example, men and women tend to differ in educational choices. Although in terms of the quantity of education men and women are rather similar nowadays, choices concerning the type of education still differ between genders. Taking into account the close relationship between the type of education and individual's occupation, it's not surprising that many studies have found that gender differences in educational choices are important with respect to the gender wage gap (e.g. Brown & Corcoran 1997; Loury 1997; Machin & Puhani 2003). Previous papers have also explored gender differences in the accumulation of work experience. Various papers have shown that women's tendency to experience more career interruptions than men explains some of the gender wage gap (e.g. O'Neill & Polachek 1993; Light & Ureta 1995). There has also been a lot of research concerning gender differences in the labor marker mobility behavior. Men and women have been found to differ not only in terms of the probability of mobility (e.g. Light & Ureta 1992) but also with respect to the underlying reasons behind job changes (e.g. Sicherman 1996; Keith & McWilliams 1997, 1999; Manning 2003, ch7). These kinds of differences in mobility behaviour have also proved to be useful in explaining the gender wage gap (e.g. Loprest 1992).

Taking into account the wideness of literature focusing on the gender wage gap, a short discussion about the reasons for why it is worthwhile to write yet another research on this topic is perhaps in order here. One important distinguishing feature of my paper compared to the most of the earlier studies of the gender wage gap is that I restrict myself exclusively on the early career. The reason why the early part of the working career is of particular interest can be seen from Figure 1. It shows the development of the gender wage gap with experience in the Finnish labor market separately for different education groups. As can be seen, the gender wage gap increases rapidly during the first years after labor market entry. In fact, pretty much all of the lifetime increase in the gender wage

gap takes place during the first 15 years of the working career. This holds for every education group. One might suspect that at least part of the observed profile of the gender wage gap is due to cohort effects. Figure 2, which shows the gender wage gap profiles for different cohorts, suggests that cohort effects are not, however, the explanation behind the observed pattern of the gender wage gap. It thus seems that the early years after labor market entry are of great importance with respect to the gender wage differences, and it is that stage of the career I focus on in this paper.

Career interruptions tend to be a prominent feature of the early career and my data set, which comes from Statistics Finland covering years 1990-2002, does not form an exception with this respect. Intermittent employment patterns pose problems to any empirical study of wages that uses the standard measure of potential experience as a proxy for general human capital. However, the problems caused by inadequate control for experience are likely to be much more severe in papers analyzing the gender wage gap due to women's greater tendency to spend time in non-work activities compared to men. In order to provide as detailed characterization of a worker's employment history as possible, I focus on those individuals whom I observe to make a transition from school to work. I follow these individuals through the first years of their careers and count the months they spend in the labor market during each year. Furthermore, instead of using cumulative actual experience and its square as proxies for job-related skills, I apply the wage model presented by Light & Ureta (1995). Their model, so called work history model, includes an array of experience variables that measure the fraction of time worked during each year of the career. This allows me not only to control more fully for the heterogeneity in accumulation of experience than what is the case in specifications that use either potential or actual experience, but the work history model also relaxes the restrictions imposed by the typically used quadratic functional form.

I restrict my analysis on university graduates from years 1990-1991. I am able to follow these individuals over the first 10 years after labor market entry, thus covering the period of the career during which most of the life-time gender wage gap emerges. Figure 3 shows the development of the gender wage gap with experience for this group of university graduates. Unsurprisingly, also among them the gender wage gap grows fast during the early career. By focusing on university graduates I mitigate the problems caused by the most disturbing shortcoming of my data, namely the lack of information on working hours and part-time status. In Finland, the gender gap in part-

time status is considerable smaller among highly educated workers compared to lower educated individuals. According to Working Conditions Study 1997 and 2003, about 8.3 percent of female and 4.3 percent of male university graduates work in part-time jobs in Finland. The corresponding figures for women and men with no university degree are 18.5 and 7.5. One might be concerned that although the gender gap in part-time status is small among university graduates in general, the gap might be much larger among young workers. However, this does not seem to be the case. In age group 20-34, which is the relevant age group with respect to this paper, only about 7.6 percent of female and 2.7 percent of male university graduates work in part-time jobs. Also by taking into account that university graduates typically work in expertise jobs which pay monthly salary, not according to hours, the lack of information on the working hours is not so disturbing. One might, however, be somewhat concerned that for example the recession the Finnish economy went through in the beginning of the 1990s, or some other anomaly associated with this particular group of university graduates, drives my results. Therefore I made the analysis also for those who got a university degree after the recession, in 1994-1995. There were no differences in conclusions between the graduate cohorts.

Although university graduates are not representative of the total economy, they represent the increasingly important group of high-skilled workers which makes them an interesting group of workers to investigate. Furthermore, many typical problems associated with the gender wage gap research, like researchers' inability to fully control for gender differences in unobservable factors (motivation, ambition etc.), are likely to be smaller in my paper: if a woman goes to trouble to acquire a university degree it is hard to believe why she wouldn't be motivated enough to try to succeed also in the labor market.

Only a few earlier papers have examined factors behind the early career gender wage differences. Loprest (1992) investigates gender differences in wage growth during the first four years of full-time work using a sample from NLSY. She finds a notable gender gap in real wage growth: four years after labor market entry, men's real wages have grown 35.6 % whereas for women the respective number is 29.1. Loprest also tests whether these differences in the wage growth could be explained by gender differences in mobility behavior. Although she observes some differences in the characteristics of jobs men and women change to, differences in mobility behavior account only

for some part of the gap in the wage growth. Light & Ureta (1995) on the other hand focus on the gender differences in the accumulation of actual work experience and its importance with respect to the early-career gender wage gap. A distinguishing feature of their paper is the finding which highlights the importance of timing of work experience.[1] Light & Ureta report that differences in timing could explain as much as 12 % of the early-career male-female wage gap.

Manning & Swaffield (2005) investigate gender differences in the early-career wage growth using the British Household Panel Survey. They find that the wage gap between young men and women is rather small at time of labor market entry but after 10 years of (potential) experience a sizeable wage gap has emerged. Manning & Swaffield seek explanation for this from three different kinds of models: human capital model, models of job mobility, and models which focus on psychological differences in men's and women's labor market behavior. They find that the human capital model explains about half of the observed gender differences in the wage growth. Models of job mobility and psychological differences between men and women explain only little, about 8 % when taking together, of the gap in the wage growth. Thus, a large portion of the gender wage gap remains unexplained.

I consider several hypotheses concerning the factors behind the early career gender wage gap. Starting from explanations based on human capital theory, I examine issues like gender differences in the accumulation process of work experience and in the type of education. Also the effects of family type on the gender wage gap are investigated. Besides gender differences in the characteristics related to workers, I also examine whether men and women differ in terms of employer characteristics and how much labor market segregation by gender accounts for the wage gap between men and women. Finally, I investigate the potential of gender differences in job mobility to explain the early career gender wage gap. More about the research questions and theoretical framework of the paper can be read from Section 2.

When my paper is compared to earlier studies of this particular topic, it must be stressed that the data set I use is of very high quality and that it has several advantages over many of the other data

[1] By timing Light & Ureta mean the patterns by which work experience is accumulated i.e. frequency, duration, and placement of non-work activities.

sets used in the previous research. First of all, information in my data can be considered as highly reliable as it comes from administrative registers. Typical problems of non-response and incorrect information are likely to be smaller than what is the case with the surveys directed to employees. Secondly, my data contain not only a wide variety of human capital related variables but also a large set of information on employer characteristics. This may be of some importance as several papers have documented that even after controlling for many worker characteristics wages seem to be correlated with certain characteristics of employers. The richness of the data set together with its panel structure makes this paper less likely to suffer from omitted variable bias.

The gender wage gap has traditionally been small in Finland and in other Scandinavian countries compared to the United States or to the United Kingdom. The results of Blau & Kahn (1996) suggest that differences in labor market institutions between the Scandinavian countries and the U.S. play an important role in explaining the differences in the size of the gender wage gap between the countries. According to Blau & Kahn, centralized wage-setting tend to compress the wage distributions in the Scandinavian countries which indirectly decreases the gender wage gap by reducing wage penalties associated with lower positions in the wage distributions. Against this background, the results of Albrecht et al. (2003) which suggest that the gender wage gap is larger in Sweden than in the U.S. when the top of the wage distribution is considered, is rather interesting. The explanation that Albrecht et al. offer for their finding concerns the institutions influencing the interactions between work and family. Sweden, together with the other Scandinavian countries, has set up various arrangements to support women's labor market participation. Albrecht et al. argue that although these arrangements may provide incentives for women to participate in the labor force the generous parental benefits may, however, cause the degree of the intensity of career commitment to be low. Therefore Swedish women may choose less demanding jobs and as a result we may see them to succeed well compared to men at the bottom and middle of the wage distribution but fall behind men at the upper part of the distribution.

The above discussion illustrates that we may improve our understanding concerning the mechanisms behind the gender wage gap by investigating wage differences between men and women in different institutional setups. With this respect there is a gap in the existing literature as most of the studies of the (early career) gender wage differentials focus exclusively on the US and

the UK labor markets. This paper contributes to the filling of the gap by exploring gender wage differences in Finland. Finland is very similar to Sweden and to other Scandinavian countries in terms of the institutions governing labor market. My paper can thus be regarded as a detailed study of the gender wage gap in a labor market where the average gender wage differences are rather small, wage-setting process is highly centralized and where women's labor market participation is supported by many institutional arrangements. These characteristics of the Finnish labor market make Finland, and the Scandinavian countries in general, rather different from the US and the UK, but at the same time, these very differences between the countries make this paper interesting.

To preview some of my findings: gender differences in the amount and timing of experience and in the type of education explain about 16 percent of the average gender wage gap that emerges during the first 11 years after labor market entry among university graduates. Gender differences in employer characteristics account about 10 percent for the average early career gender wage gap. In all gender differences in background characteristics explain about 27 percent of the average early career gender wage gap among university graduates. The most important single factor contributing to the gender wage gap is the family type. Women seem to suffer considerable larger wage losses due to marriage and children than men.

The rest of the paper is structured as follows. In the next section, I discuss about the theoretical background of the paper and the questions I am going to focus on. Section 3 describes the data and discusses about the estimation issues. Section 4 shows the results. In the final section I give a summary of the paper and present the main conclusions.

2. Theoretical Background and Research Questions

2.1 Theoretical explanations for the gender wage differentials

There are several theories of wage determination offering variety of explanations for the existence of the gender wage gap. In this paper, two main theories to be considered are the human capital theory and models of job mobility. Human capital theory developed by Becker (1964) and Mincer (1974) is the most heavily applied theoretical framework in the gender wage gap literature. According to the human capital model, women earn less than men because they accumulate less human capital. Since human capital itself is composed of various elements, the model gives us many explanations for the gender wage gap. First of all, some of the wage differentials might be due to gender differences in the pre-labor market human capital investments, i.e. gender differences in educational choices. Although gender differences in terms of the quantity of education are minor nowadays, choices of subjects and fields of education differ greatly between men and women. For example in the case of Finland, more than 50 percent of men with a university level degree in 2002 had obtained their degree in technology. For women the corresponding figure is about 8 percent. Gender differences in the type of education have proved to be important with respect to the gender wage gap (e.g. Machin & Puhani 2003). Secondly, women experience on average more career breaks than men. This may affect women's wages in many ways. First of all, because of career interruptions women accumulate less work experience than men. Career breaks may also affect women's job choices: if jobs which require investments in job-related training offer lower starting salaries but steeper wage-experience profiles, women may have incentives to choose jobs with less job-training. Women may also suffer from depreciation of human capital during career breaks if job-related skills are forgotten or become obsolete.

Another line of theory that may help us to explain gender differences in wages are models of job mobility (e.g. search models of Jovanovic 1979b; Burdett 1978; matching model of Jovanovic 1979a). These models emphasize that there exists heterogeneity in the quality of worker-employer matches and by searching for better matches and jobs a worker can experience wage gains through job mobility. Models of mobility imply that mobility is more profitable if it is voluntary and takes place at the beginning of the working career. Several papers have found that young workers indeed

typically enjoy considerable wage gains from job mobility (e.g. Bartel & Borjas 1981; Topel & Ward 1992), but there is also evidence that these gains are lower for women (e.g. Loprest 1992). Part of the gender differences in the wage gains from mobility can be explained by the fact that reasons behind mobility often differ between men and women. For example, women have been found to quit or change jobs more often than men because of family or non-market related reasons whereas men's job changes are more likely to be motivated by money (e.g. Sicherman 1996; Keith & McWilliams 1997, 1999; Manning 2003, ch7). There is also some evidence that women may be less likely to quit a job than men (e.g. Light & Ureta 1992). These kinds of gender differences in the probability of job changes and returns to mobility provide one potential explanation for the gender wage differences.

It is also well known that there exists heterogeneity in wages firms pay that cannot be easily explained by worker characteristics. After controlling for many worker characteristics, wages have been found to be related to such employer characteristics as firm size (e.g. Brown & Medoff 1989; Winter-Ebmer & Zweimuller 1999), industry (e.g. Gibbons & Katz 1992), profits (e.g. Revenga 1992; Blanchflower et al. 1996), productivity (e.g. Nickell & Wadhwani 1990) and establishment age (e.g. Davis & Haltiwanger 1991; Winter-Ebmer 1994). If men and women work in different types of firms and sectors then job market segregation by gender might also explain part of the differences in wages and wage profiles between men and women. In fact, there is plenty of empirical evidence showing that gender segregation by establishment, firm and sector plays an important role in explaining the gender wage differences (e.g. Groshen 1991; Carrington & Troske 1998; Bayard et al. 2003).

2.2 About the research questions

Based on the discussion above, I consider several explanations for the gender differences in the early career wage development. Starting with those provided by the human capital model, I examine differences between men and women in the accumulation of work experience. I continue by investigating gender differences in the pre-labor market human capital investments. My focus in this respect is on the gender differences in the fields of education. As the last issue related to the human capital model, I analyze the effects of family type on the gender wage gap. Because of

women's traditional role as a main provider of childcare in a household, children have undoubtedly bigger effects on women's earnings potential than on men's wages. There are plenty of reasons why we could expect to see correlation between children and women's wages. For example, children not only cause breaks in women's careers (which affect wages in many ways as was discussed above) but may also lower the effort, or as Becker (1985) put it, the energy women bring to the labor market.

I also examine gender differences in employer characteristics and the importance of labor market segregation by gender with respect to the wage differences between men and women.[2] I study gender differences in employer characteristics by experience level in order to see whether men and women become more similar with respect to employer characteristics or whether they grow further apart as they acquire work experience. Employer characteristics to be considered include the sector of employment, the size of an establishment, the sales/worker –ratio of an establishment and establishment's age, all of which the earlier research has found to be correlated with workers' wages.

Finally, I examine gender differences in mobility behavior. My data allow me to consider only mobility between establishments. It could be of some interest to distinguish within firm mobility from job mobility between firms because these is empirical evidence showing that these mobility events may be qualitatively very different and as result, their wage effects may differ as well (e.g. le Grand & Tåhlin 2002). On contrary to most of the earlier papers on this subject, I focus on cumulative mobility instead of a single mobility event. My intention is to investigate whether there are gender differences in job mobility history patterns and how important possible differences in mobility behaviour are with respect to the early career gender wage gap. Unfortunately, my measure of cumulative mobility is unlikely to capture all job changes that take place because of the way I am able to identify mobility events in my data. Identification of a job change is based on comparisons of establishment codes. These codes are associated with workers who have jobs at the last week in the year. This implies that I can observe at most one job change per worker in a year.

[2] Reasons behind segregation are beyond the scope of this study.

3. Data and Estimation Issues

3.1 Data

My empirical analysis is based on a data set from Statistics Finland that links information on employees, establishments and firms. It covers the period 1990-2002. The data set is a 1/3 random sample of individuals that were 16-69 years old in 1990. These individuals are followed to 2002 and each year every third of the 16 year old persons are added to the sample. Information on individuals comes from the Finnish Longitudinal Employer-Employee Data (FLEED) which consists of data from Employment Statistics. In my sample the number of variables is, however, somewhat limited compared to original FLEED. Also variables for establishments and firms are modified meaning basically that information on employers is in the form of classified variables (e.g. size group), ratios (e.g. productivity), growth rates (e.g. rate of employment change) etc. Information on establishments comes from the Business Register and Manufacture Census. Data on firms are based on Business Register, Financial Statements Statistics and ICT survey. Information on establishments and firms can be linked to individuals using the establishment and firm identifiers associated with workers who hold a job at the last week of the year.

As was mentioned in the introduction of this paper, I focus on university graduates. My data don't include information on part-time status or working hours which is particularly disturbing when the interest is on the gender wage gap. However, in Finland the gender gap in part-time status is very small among highly educated workers. According to Working Conditions Study 1997 and 2003, only about 8.3 percent of female and 4.3 percent of male university graduates work in part-time jobs. One might be concerned that although the gender gap in part-time status is small among university graduates in general, the gap might be much larger among young workers. However, this does not seem to be the case. In age group 20-34 only about 7.6 percent of female and 2.7 percent of male university graduates work in part-time jobs. [3] Also the lack of information on working hours is not such disturbing when the focus is on workers with a university degree as many of them work in jobs that pay monthly salary, not according to the working hours.

[3] I would like to thank Pekka Ilmakunnas for calculating the shares of part-time workers for me.

I restrict my analysis on those who received their university degree between 1990 and 1991. I am able to follow these workers over the first 10 years after graduation, thus covering the period of the career during which most of the lifetime gender wage differences emerge. However, the Finnish economy entered into the recession in the latter part of 1991. One might be concerned that this, or some other anomaly associated with this particular group of graduates, drives my results. Therefore I made the analysis also for those who graduated from university after the recession, in 1994-1995. There were no differences in my conclusions between the graduate cohorts.

The identification of the starting date of the career is always to some extent an arbitrary task because young individuals often work and study simultaneously or move between full-time enrollment and full-time work as they try to figure out a suitable career. In this paper I'm mainly interested in individuals who manage to make a rather clean transition from school to work. In order to exclude workers who have a considerable working career behind them already at time they receive their degree, I impose a restriction which excludes individuals who are over 30 years old at time of graduation.[4] I define a worker's career to begin in the year following the year of graduation. In addition to the restrictions mentioned above, I also exclude entrepreneurs because their labor market behavior is probably very different from other individuals and also because there are difficulties associated with measuring earnings of self-employed individuals. The resulting panel is unbalanced. However, because the number of exists from the data is fairly small and there are practically no gender differences with this respect, I don't pay any particular attention to the workers' exists from the data in the econometric analysis that follows.[5] Summary statistics for the data used in the regressions are shown in table 1.

3.2 Wage model

Results of the studies of the gender wage gap using cross-sectional data and OLS estimation are often met with suspicion because they fail to control for unobserved heterogeneity of individuals. Men and women may differ with respect to many such unobserved characteristics that are

[4] The average age of university graduates varies to some extent depending on the field of education. In my data the average age at time of graduation after I have imposed the age restriction is 26.3 years for men and 25.9 years for women.
[5] The average yearly exit rate from the data is 0.3 percent for both genders.

important determinants of wages, and as a consequence, studies which ignore this correlation between unobservables and wages give biased results concerning the factors behind the gender wage gap. I, however, use panel data in this paper. This allows me to handle the problem of unobserved time-constant heterogeneity and thus increases the reliability of my results.

I use the following estimation framework to analyze the factors behind the early career gender wage gap. Consider a standard human capital wage equation augmented with establishment and mobility related variables

$$\ln W_{it} = \beta_0 + \beta_1 X_{it} + \beta_2 Z_{it} + \beta_3 M_{it} + \alpha_i + \varepsilon_{it}, \quad (1)$$

where lnW is log of average monthly wage, X is a vector of observed worker characteristics, Z is a vector of establishment characteristics, and M includes mobility related variables. Subscripts i and t refer to worker and year respectively. The error component of the model consists of two elements: unobserved time-invariant individual characteristic α_i and a white noise component ε_{it}. Information on wages comes from the tax records which contain information on wages on an annual basis, and thus to get a monthly wage, I have divide annual wage income by months in employment. Furthermore, I convert annual earnings into 2002 money using Cost-of-living index of Statistics Finland. There are some observations with either very low or high monthly wage which is probably due to inaccuracies in my wage data and my inability to observe exact working hours. I 'solve' the outlier problem by requiring the converted monthly wages to be between € 1000 and € 20 000. However, I do not drop out off the sample those workers with a wage outside the acceptable range, but I will not use those wage observations in the estimations. Also my experience measures include experience that is accumulated during those years when wage fall outside the above mentioned range. Furthermore, because wages outside the range € 1000-20 000 are often related to years where an employee has worked only a few months, in estimations I only use those observations which come from the years where the time spent in the labor market is over 6 months.

Estimation of equation (1) depends on what I assume about the correlation between α_i and the other regressors. If I allow unobserved individual characteristics to be arbitrarily correlated with the other explanatory variables then the standard procedure to estimate the parameters of the model is fixed

effects estimation which yields consistent estimates even if the expectation of α_i conditional on the other regressors is nonzero. Although the unobserved individual component would be uncorrelated with the other regressors, OLS will usually be inefficient. Instead, under the assumption that the unobserved individual specific term is random, random effects estimator provides consistent and efficient estimates of the parameters of the model (1).

In this paper, I handle the problem of unobserved heterogeneity by using a fixed effects model because I believe it's too restrictive to assume that the unobserved individual effects are uncorrelated with the other regressors. There is, of course, a Hausman test that can be used to discriminate between fixed and random effects models. When applied to my data, Hausman test reject the null hypothesis that $E(\alpha_i|X_{it}, Z_{it}, M_{it})=0$ which suggests that a fixed effects model should be preferred over a random effects model.

Studies of the gender wage gap have been criticized not only for their failings to control adequately for the possible gender differences in unobserved heterogeneity but also for their inability to control fully for differences in the work histories of men and women. Standard measures of general human capital, potential experience and cumulative actual experience, are often considered to provide inadequate proxies for women's labor market skills because women tend to spend much time in non-work activities. The paper by Light & Ureta (1995) also shows that the conventional quadratic specification of the wage-experience relationship proposed originally by Mincer (1974) may provide a misleading picture of the early career wage growth. They propose an alternative specification, so called work history model, where wages are explained by an array of experience variables that measure the fraction of time spent in working each year from the beginning of the career to the present. Not only does the work history model provide a more detailed description of a worker's career but it also relaxes the restrictions imposed by the typically applied quadratic form. Because I feel that it is important to control as fully as possible for the work history when the interest is in the gender wage gap and because the size of my data makes it possible for me to apply a more flexible specification than the conventional quadratic functional form, I use the work history specification by Light & Ureta in this paper.

As I mentioned above, vector X contains worker characteristics. To be more specific, among the X's is an array of experience variables measuring the fraction of time worked in the last year, 2 years ago, and so forth, back to the beginning of the career. My experience variables can take a value of zero either because the career of the worker was not in progress y years ago or because he/she did not work at all y years ago. To distinguish between the two reasons, I include an array of dummy variables to my wage model which take a value of one if the individual worked zero months y years ago but his/her career was in progress. X also includes dummy variables indicating the fields of education (education science, humanities, social science and business, technology, and other), a dummy variable indicating whether a worker has acquired a lower level university degree, dummy variables indicating whether a worker is currently married, whether a worker has children and whether a worker has children of age 3 or below. There are some observations in my data where the information on the family type is missing. To control for this, I include a dummy which equals one whenever I lack information about the family type. Because the field of education is mostly time-invariant, in order to get coefficient estimates for it in the fixed effects framework I use interactions between cumulated actual experience and the field of education. I also use interactions between family type variables and experience to check whether the returns to experience are affected by marriage or children.

Vector Z in equation (1) comprises a dummy indicating whether a worker is employed in the public sector or not[6], an array of dummies describing the industry of employment (five categories), dummy variables for the size of an establishment (below 10 worker, 10-49 workers, 50-99 workers, over 100 workers), and dummy variables describing the productivity of an establishment (low, medium, high). Establishments are distributed into the different productivity groups based on their position in the sales/worker distribution of all establishments. If the sales per worker ratio of an establishment is less than or equal to the 25^{th} percentile point, the establishment is defined to belong to the low productivity group. If the productivity measure of an establishment falls between the 25^{th} and 75^{th} percentiles, then the productivity of an establishment is considered to be medium,

[6] My data don't contain direct information on whether a worker works at the public sector or not. If a worker is associated with an establishment identifier but there is no information on the establishment characteristics, then there is about 90 % probability that a worker works either at the primary production or at the public sector (I would like to thank Satu Nurmi for providing me this information). I define that a worker works at the public sector if he/she is associated with an establishment identifier but there is no further information on the establishment. When I compare my results about the public sector's employment share to the actual employment statistics of Statistics Finland, I can conclude that my measure of public sector seems to work well.

and finally, if the sales/worker –ratio of an establishment is over 75th percentile point, the establishment is classified as a high productivity establishment. In addition, Z includes dummy variables for the foundation year of the establishment (seven categories). I also use interactions between establishment characteristics and cumulative actual experience to see if there are differences in wage profiles between different types of employers.

Vector M contains the mobility variables used in the study. M includes a cumulative measure of movements between establishments and a dummy variable which equals one if the establishment disappears from the data between t-1 and t or if the number of employees at the establishment decreases more than 20[7] percent between t-1 and t. Because my data don't contain information on the reason of a job change, the idea of including the dummy in question is to separate between voluntary and involuntary movements. Furthermore, I include a square term of the cumulative mobility variable to check whether I observe diminishing returns to movements between establishments.

Finally, I control for general market factors by including a log of aggregate index of real earnings in the Finnish economy.

[7] I experimented with several other percentage decreases without a change in the results.

4. Results

4.1 Estimation results

Tables 2 and 3 present the estimation results for the fixed effects model estimated separately for men and women.[8] As a benchmark, column 1 shows the estimates for a specification including only experience variables and wage index. By comparing the parameter estimates in column 1 between genders we notice that women's wage profile is much flatter than men's even after unobserved time-invariant individual characteristics are controlled for. There also seem to be some gender differences in the time effects of experience: for men the most recently acquired work experience seem to be more valuable than experience acquired earlier whereas for women the time effects are much weaker. The results in column 1 further suggest that there are some wage penalties resulting from time spent out of work. The wage penalties appear, however, to be rather short in duration. For men the negative effects are statistically significant only if the spell of non-activity has been during the last year. For women the non-work variables get significant negative coefficients for up to 3 years into the past. This difference in the effects of career interruptions between genders may partly reflect the effects of family related variables. If women with children suffer a family penalty then the non-work variables may pick up the negative wage effects of children as I do not have controls for the presence of children in the wage specification 1. In fact, when I add controls for the family type the non-work variables in women's wage equation get all insignificant parameter estimates as can be seen from column 3 in Table 3.

Column 2 in Tables 2 and 3 shows the results for a specification where I add controls for the field of education and for the level of university degree. As can be seen, coefficients for the education variables are typically highly significant. However, even after heterogeneity in the accumulation of experience and the type of education are controlled for the returns to experience remain higher for men than for women.

[8] Because of lack of space, I don't present the results for OLS estimations. They are available from author upon request. There are some differences in the exact magnitudes of the estimated coefficients between the two estimators suggesting that although I restrict myself to a group of individuals which could be expected to be rather homogeneous with respect to unobservables like ability, unobserved individual heterogeneity play nevertheless some role. But at the same time, the importance of unobserved heterogeneity should not be exaggerated: the conclusions drawn from the estimation results are similar for both models.

Much research has been done on the effects of gender differences in the division of labor within a family on the wage gap between men and women. It is often argued that women's domestic and family responsibilities reduce their earnings potential. There are plenty of reasons why we might find negative correlation between the presence of children and women's wages even after actual work experience is controlled for. Women's family responsibilities may for example reduce the level of energy and effort mothers bring to the labor market. Women with children may also face discrimination on the part of the employer. Whatever the exact mechanisms between family status and wages are, it is well-established that family type has asymmetric effects on the wages of men and women. Earlier research has consistently found positive effects of marriage for men but negative or only slightly positive effects for women (e.g. Dolton & Makepeace 1987; Schoeni 1990; Korenman & Neumark 1991, 1992). Furthermore, researchers have typically found a family penalty of 10 to 15 % for women but no penalty for men (e.g. Korenman & Neumark 1992; Jacobsen & Rayack 1996; Loh 1996).

My findings are in line with the conclusions of the earlier research. As can be seen from column 3 in Table 2, I find neither statistically significant negative wage effects of marriage nor family penalty for men. Women's wages on the other hand are negatively correlated with marriage even after I control for the presence of children as the results in column 3 in Table 3 show. Furthermore, mothers suffer a considerable wage penalty: a woman with children earns about 17 % less than a childless woman. In column 4 I add a variable indicating the presence of children of age 3 or below to investigate whether the large family penalty for women is related to the presence of very young children. And this exactly what I observe: the coefficient for children more than halves after I control for the presence of young children. It would be interesting to investigate to what extent the rather large wage penalty of children is due to the fact that women with children are likely to work less. But as was mentioned above, unfortunately my data set does not contain information on working hours or part-time status.

The estimation results discussed so far are based on wage models where I only control for the worker characteristics. There are, however, plenty of studies showing that wages are correlated with some employer characteristics even after many relevant worker characteristics are controlled

for. For example, larger and more productive firms have been found to pay higher wages (e.g. Brown & Medoff 1989; Nickell & Wadhwani 1990). There are also wage differences between industries that cannot be easily explained by worker characteristics. Column 5 in Tables 2 and 3 presents the estimation results for a model where various employer characteristics are added to the wage equation. Starting with the variable indicating the sector of an employment, public sector seems to provide higher starting wages but lower wage growth although for men this effect is not significant at the usual significance levels. There appear to be some differences in the wage profiles between the fields of industries as well. Like many previous studies, also I find some weak evidence of the positive correlation between the establishment size and wages. Furthermore, establishments with high sales per worker -ratio seem to offer initial wage gain although this gain is lost as experience is accumulated. The age of an establishment on the other hand appears to be rather irrelevant with respect to wages.

The final column in Tables 2 and 3 presents the regression results for a full model which includes controls for both the worker and employer characteristics and also for mobility of workers between establishments. According to my results, mobility is positively correlated with wages.[9] This holds for both genders. Furthermore, the square term of cumulative mobility gets a negative parameter estimate although for women it is not statistically significant. The negative coefficient for the square of mobility suggests that there are decreasing returns to mobility. Other explanation for the negative correlation between the number of mobility events and wages is that individuals who are observed to change jobs frequently are individuals who work at temporary jobs. The mobility of these workers is typically not a result of an active scanning for better and better job matches but more like something they cannot avoid. Unfortunately, I do not have information on the type of the contract of employment and therefore I am not able to distinguish between the two explanations.

Although the results presented in Tables 2 and 3 are of some interest as such, it is quite difficult to make any conclusions about the significance of different background variables with respect to the early career gender wage gap from a quick inspection of the parameter estimates in the tables in

[9] Correlation is a right word to be used here. Because mobility is potentially simultaneously determined with wages, I cannot say anything about the causality between mobility and wages. This same point also applies to many other variables (e.g. employer characteristics).

question. To address this issue, I do some Blinder (1973) and Oaxaca (1973) type of analysis in the next sections.

4.2 Gender differences in qualifications

Gender differences in accumulation of experience

Women typically accumulate less actual work experience than men. This is not only because women are more likely than men to work in part-time jobs but also because women experience more career breaks than men. Table 4, which presents the distributions of labor market statuses by potential experience, confirms that also in my data women tend be somewhat less attached to the labor market than men. Men's employment rates are higher than women's and this is mostly due to women's tendency to spend more time outside the labor force compared to men. Table 5 shows statistics for the accumulation of actual work experience. As can be seen, male graduates accumulate more work experience than their female counterparts. Gender differences in accumulated experience are not, however, particularly large. During the first 11 years after graduation the gender gap in the accumulated work experience is only 12.8 months. Besides in the amount of work experience, there are some differences in the timing of experience. During the first 4 years after the labor market entry women are only 1.9 months behind men in experience. Between 5 and 8 years after graduation the gender gap in experience is somewhat larger. During this period women accumulate 6.7 months less experience than men.

The results in Table 5 suggest that gender differences in accumulation of actual experience cannot alone explain the early career gender wage differences among university graduates. Differences in the amount and timing of experience are just not large enough to explain the observed gender wage gap. Table 6 shows the contribution of gender differences in various background variables to the gender wage gap. Sample used in Table 6 consists of those who are included in estimations of the full wage model. Row 1 documents the average gender wage gap over the first 11 years after graduation. Rows 2-6 show the decomposition results. The contribution of gender differences in background variable j is computed as follows: $(\bar{x}_j^M - \bar{x}_j^F)'\hat{\beta}_j^i$ where $\bar{x}_j^M$ is the mean of regressor j for male workers calculated over those who appear in estimations of the full wage model (column 6

in Table 2), $\bar{x}_j^F$ is the corresponding term for females, and finally, $\hat{\beta}_j^i$ is the parameter estimate for regressor j and gender i (shown in column 6 in Tables 2 and 3).

From row 2 in Table 6 we can see that the gender differences in the amount and timing of experience account 1.4 log points of the average early career gender wage gap if men's parameter estimates are applied. When women's estimated returns to experience are used, the corresponding figure is 2 log points. Gender differences in the spells of zero months in work during a year are insignificant when it comes to explain the early career gender wage gap among university graduates as can be seen from row 3.

Gender differences in the fields of education

Women are nowadays as highly (or even more) educated as men. But in terms of the type of education significant gender differences still remain. Table 7 presents the distributions of the fields of education in my data. As can be seen, men are heavily concentrated in the field of technology whereas women choose fields like education science, humanities and art, and business and social science. Previous studies of the gender wage gap have found that gender differences in the subjects or fields of education are important factors behind the wage differences between genders (e.g. Brown & Corcoran 1997). Also I find that the type of education matters. As row 4 in Table 6 presents, gender differences in the fields of education account 3 log points for the average early career gender wage gap when it is assumed that the true wage structure is captured by the estimated coefficients for male workers. When the female parameter estimates are used as a reference group, the corresponding number is 2.1 log points.

Gender differences in the employer characteristics

It is well-known that labor markets are heavily segregated by gender. Women tend to work in different industries, firms and occupations than men. Much of the recent gender wage gap literature has focused on analyzing the importance of labor market segregation with respect to the wage differences between men and women. Several studies have found that segregation accounts for, if

not all, a large portion of the gender wage gap (e.g. Bayard et al. 2003; Groshen 1991; Petersen et al. 1997; Meyersson-Milgrom et al. 2001).

Figures 4-7 and Table 8 provide information on how the sectors of employment and characteristics of employers differ by gender among university graduates. As can be seen from Figure 4, female graduates are clearly more heavily represented at the public sector than male graduates. Furthermore, there seems to be rather small changes with this respect during the early career. Table 8 on the other hand examines gender segregation by the fields of industry among private sector workers by showing the results of the well-known Duncan & Duncan segregation index. The Duncan and Duncan segregation index is defined as $S_t = 0.5\sum_i |m_{it} - f_{it}|$, where m_{it} denotes the share of the male labor force in industry i in year t, and f_{it} is defined similarly for women. In my data set there are 24 different industries. Duncan & Duncan segregation index takes values between 0 and 1 indicating the proportion of women (men) that would have to be redistributed among the industries in order to reach equal industry distributions between genders. In my data, the value of the index is about 0.336 at time of labor market entry, and there seems to be no large changes in the level of segregation with experience.

Figures 5-7 investigate the gender differences in various employer characteristics. Figure 5 examines differences in the distributions of men and women over the size labels of establishments. In Figure 6 on the other hand I present the gender differences in distributions of workers over the sales/worker –labels of establishments, and finally in Figure 7, I examine whether there exist gender differences with respect to the age of establishment men and women work at. As the figures show, there exist some gender differences in employer characteristics. For example, men typically work at larger establishments than women. Women on the other hand are more often than men associated with establishments with high sales/worker –ratio. Women also seem to work at older establishments than men.

Gender differences in employer characteristics explain 10.8 percent of the average early career wage gap between male and female university graduates when the wage structure is described using men's parameter estimates. The corresponding figure is somewhat lower, 9.4 percent, if estimated parameters for women are used as a reference structure.

Gender differences in the mobility behavior

Several studies have shown that the early part of the working career is typically a period of frequent job changes and rapid wage growth (e.g. Bartel & Borjas 1981; Topel & Ward 1992). In Figure 8 I show the statistics for mobility between establishments among university graduates. The upper figure contains all movements between establishments whereas the lower figure restricts on movements which are not associated with a disappearance of an establishment from the data or a large decrease in employment of an establishment (i.e. movements without contraction). As was discussed in Section 3, the idea with distinguishing between the two mobility types is that the last-mentioned is though to describe voluntary movements. As can be seen from the figures, university graduates are rather mobile during the first years after graduation. About 75 percent of graduates change establishment at least once during the observation period. Men appear to be somewhat more mobile than women, but gender differences in the number of movements between establishments are in general very small. Therefore, and as row 6 in Table 6 illustrates, the early career gender wage differences cannot be explained by gender differences in mobility between establishments.

The final row in Table 6 shows how much gender differences in characteristics alone contribute to the average gender wage gap. If men's parameter estimates are used as a reference structure, gender differences in characteristics account about 27.7 % for the average gender wage gap that results during the first 11 years after graduation. The contribution of characteristics is somewhat smaller, 24.5 %, when the calculations are based on women's coefficient estimates.

4.3 The effects of the family type

The previous analysis shows that only a fairly small part of the early career wage differences between male and female university graduates can be explained by gender differences in characteristics. Most of the wage gap is thus due to gender differences in the returns to background variables. In the following I focus on the role played by the family type in contributing to the early career gender wage gap. As was pointed out earlier, marriage and children have very asymmetric effects on men's and women's wages. Women seem to suffer a large family penalty whereas for men the wage effects of marriage and children are statistically insignificant. The importance of

gender differences in the effects of family type with respect to the early career gender wage gap is addressed in Table 9. It shows the predicted wages for men and women based on the results of the full wage model documented in column 6 in Tables 2 and 3. Each gender's predicted wage is calculated by multiplying the estimated coefficients for his or her gender by the mean of the explanatory variables calculated over the pooled sample of both men and women (who are appear in the full wage model). The upper table in Table 9 presents the predicted wages for unmarried workers without children. The lower table on the other hand shows the predicted wages for married workers with children who are over 3 years old. As can be seen, men's wages are very similar between the both tables whereas wages of married women with children are significantly lower compared to wages of unmarried and childless women. The average predicted gender wage over the first 11 years after labor market entry is 12.5 log points for unmarried individuals without children and 23.7 log points for married workers with children. This suggests that the asymmetric effects of family type on men's and women's wages "explain" 11.2 log points of the average gender wage gap emerging during the first 11 years after graduation.

In order to provide some information on the mechanisms behind the family penalty I analyze next the relationship between the 'timing of children' and the gender wage gap. Following Gubta & Smith (2001), I select men and women in the sample who had no children at time they entered labor market but who were observed to have children later on during the investigation period. These individuals are followed to the end of my observation period and for each year I calculate three different experience variables: experience accumulated before the first childbirth, experience accumulated after the last born child observed in the data is at least 3 years old, and finally, experience accumulated between the two periods. These experience variables together with their square terms are then used as explanatory variables in estimating the wage equation for this selected population. If the observed family penalty is only due to the fact that women with young children are likely to work less then I might expect to see a large increase in the gender wage gap following the years immediately after the childbirth but the wage gap should recover as children get older and mothers' need for part-time work and fewer working hours decreases. On the other hand, if the family penalty is due to the differences in the career development of men and women with children then I might expect to see the gender wage gap remaining at high levels, or even increasing, after women return to work following the childbirth.

Because the imposed restrictions cause a significant decrease in the number of observations I estimate a somewhat simpler model for this sample. I exclude variables indicating the foundation year of establishment and interactions between experience variables and employer characteristics. Furthermore, the work history of a worker is described only with the three experience variables mentioned above and their squares.

Table 10 presents the estimation results. As can be seen, there are clear differences in the wage profiles between genders. Men seem to gain much more than women from one year of experience both before and between childbirths. After childbirths, however, women seem to catch up with men in wages. Table 11 further illustrates the effects of children on the gender wage gap by showing the predicted gender wage gaps based on the parameter estimates shown in Table 10. The predicted wages are calculated like in Table 9 except that here I always assume that individuals are married. The results show that the wage gap between genders increases rather slowly before the first child is born. Between childbirths there is a huge increase in the wage gap but after the last childbirth recorded in the data the gender wage gap returns to the level preceding the childbirths or falls even below that. My results thus seem to suggest that the large family penalty for women has perhaps more to do with mothers' tendency to work less during the immediate years after childbirth rather than with the different career development of men and women with children.

5 Conclusions

In this paper I have illustrated that in order to understand the existence of the gender wage gap in Finland, it is important to focus on the early part of the career. Using data from Statistics Finland I showed that the gender wage gap increases significantly during the first 10-15 years men and women spend in labor market after which changes in the magnitude of the gender wage gap are rather small.

The more detailed analysis of the reasons behind the early career gender wage gap focused on university graduates. Several different explanations were considered. For example, I examined gender differences in the accumulation of work experience, in the fields of education, and in the effects of family type on wages. Also the importance of labor market segregation by gender and gender differences in the job mobility behavior were investigated.

Gender differences in the accumulation of work experience and in the type of education explain about 16 percent of the average gender wage gap that emerges during the first 11 years after labor market entry among university graduates. Gender differences in employer characteristics account about 10 percent for the average gender wage gap. In all gender differences in background characteristics account about 27 percent for the average early career gender wage gap among university graduates. The most important single factor contributing to the gender wage gap is the family type. My results suggest that the asymmetric effects of marriage and children on men's and women's wages account as much as 40 percent for the average gender wage gap that emerges during the first 11 years after graduation. A more detailed analysis of the family penalty suggests that mothers' large wage losses are likely to be due to their tendency to work less rather than a consequence of differences in the career development between men and women with children.

Table 1: Summary statistics for data used in the regressions

	Men			Women		
	Obs	**Mean**	**Std. Dev.**	**Obs**	**Mean**	**Std. Dev.**
% of year spent in working:						
last year	17068	0.873	0.306	13128	0.815	0.347
2 years ago	17068	0.779	0.391	13128	0.706	0.420
3 years ago	17068	0.693	0.439	13128	0.619	0.453
4 years ago	17068	0.607	0.468	13128	0.542	0.468
5 years ago	17068	0.518	0.480	13128	0.467	0.471
6 years ago	17068	0.430	0.476	13128	0.392	0.463
7 years ago	17068	0.342	0.457	13128	0.317	0.444
8 years ago	17068	0.259	0.422	13128	0.249	0.414
9 years ago	17068	0.183	0.373	13128	0.183	0.372
10 years ago	17068	0.112	0.305	13128	0.112	0.304
11 years ago	17068	0.041	0.192	13128	0.039	0.187
1 if career in progress but did not work:						
last year	17068	0.015		13128	0.023	
2 years ago	17068	0.029		13128	0.045	
3 years ago	17068	0.037		13128	0.055	
4 years ago	17068	0.042		13128	0.059	
5 years ago	17068	0.042		13128	0.060	
6 years ago	17068	0.042		13128	0.059	
7 years ago	17068	0.040		13128	0.053	
8 years ago	17068	0.035		13128	0.042	
9 years ago	17068	0.026		13128	0.028	
10 years ago	17068	0.015		13128	0.015	
11 years ago	17068	0.003		13128	0.004	
log of real wage index	17068	0.064	0.055	13128	0.063	0.056
social science	17068	0.188		13128	0.334	
Teaching	17068	0.028		13128	0.231	
Humanities	17068	0.037		13128	0.148	
Technology	17068	0.623		13128	0.099	
Other	17068	0.125		13128	0.188	
lower level degree	17068	0.438		13128	0.292	
Married	17068	0.593		13128	0.565	
Children	17068	0.568		13128	0.525	
children of age 3 or below	17068	0.337		13128	0.273	
family type unknown	17068	0.082		13128	0.080	
Public	17068	0.279		13128	0.630	
manufacture of machinery	17068	0.094		13128	0.016	
manufacture of electronic products	17068	0.126		13128	0.026	
Wholesale	17068	0.071		13128	0.042	
R & D	17068	0.127		13128	0.066	
Other	17068	0.304		13128	0.221	

(table 1 continues)

size:						
below 10 workers	17068	0.092		13128	0.060	
10-49 workers	17068	0.159		13128	0.104	
50-99 workers	17068	0.085		13128	0.041	
over 100 workers	17068	0.385		13128	0.165	
productivity:						
Low	17068	0.179		13128	0.091	
Medium	17068	0.242		13128	0.100	
High	17068	0.301		13128	0.179	
Establishment's foundation year:						
Before 1977	17068	0.224		13128	0.162	
1977-1980	17068	0.036		13128	0.017	
1981-1985	17068	0.104		13128	0.054	
1986-1990	17068	0.176		13128	0.059	
1991-1995	17068	0.118		13128	0.051	
1996-1998	17068	0.038		13128	0.015	
after 1998	17068	0.024		13128	0.012	
Cumulative mobility	17068	1.003	1.263	13128	0.984	1.261
Cumulative mobility^2/10	17068	0.260	0.563	13128	0.256	0.540
Contraction	17068	0.152		13128	0.130	

Notes:

1. Sample is those who were included in the estimation of the full wage model.
2. Standard errors are not reported for binary variables.

Table 2: Fixed effects estimates for male graduates

Dependent variable: log of monthly wage						
	(1)	(2)	(3)	(4)	(5)	(6)
Experience:						
% of year spent working:						
last year	0.062	0.075	0.072	0.073	0.072	0.069
	(10.38)**	(11.97)**	(11.48)**	(11.40)**	(8.71)**	(8.36)**
2 years ago	0.041	0.051	0.051	0.051	0.051	0.047
	(7.78)**	(8.74)**	(8.53)**	(8.56)**	(6.38)**	(5.98)**
3 years ago	0.052	0.058	0.057	0.057	0.050	0.048
	(7.44)**	(7.78)**	(7.45)**	(7.48)**	(5.67)**	(5.47)**
4 years ago	0.039	0.042	0.040	0.040	0.035	0.035
	(4.46)**	(4.72)**	(4.37)**	(4.39)**	(3.47)**	(3.43)**
5 years ago	0.030	0.036	0.033	0.034	0.025	0.024
	(4.39)**	(4.93)**	(4.53)**	(4.53)**	(2.83)**	(2.75)**
6 years ago	0.050	0.057	0.055	0.055	0.051	0.049
	(8.44)**	(8.76)**	(8.24)**	(8.23)**	(6.12)**	(6.03)**
7 years ago	0.041	0.047	0.045	0.045	0.040	0.040
	(6.56)**	(7.08)**	(6.60)**	(6.61)**	(4.63)**	(4.62)**
8 years ago	0.043	0.050	0.048	0.048	0.043	0.042
	(6.92)**	(7.56)**	(6.99)**	(6.99)**	(5.15)**	(5.09)**
9 years ago	0.027	0.035	0.033	0.033	0.023	0.022
	(4.16)**	(5.02)**	(4.65)**	(4.66)**	(2.58)*	(2.51)*
10 years ago	0.002	0.008	0.011	0.011	0.013	0.012
	(0.24)	(0.93)	(1.21)	(1.26)	(1.25)	(1.20)
11 years ago	0.010	0.015	0.019	0.021	0.013	0.014
	(1.07)	(1.51)	(1.74)	(1.81)	(1.02)	(1.11)
1 if career in progress but did not work:						
last year	-0.080	-0.078	-0.080	-0.079	-0.072	-0.073
	(3.83)**	(3.74)**	(3.79)**	(3.76)**	(3.26)**	(3.29)**
2 years ago	-0.016	-0.015	-0.016	-0.015	-0.013	-0.014
	(1.07)	(0.99)	(1.02)	(1.01)	(0.77)	(0.80)
3 years ago	-0.026	-0.027	-0.028	-0.028	-0.038	-0.035
	(1.48)	(1.57)	(1.65)	(1.63)	(2.13)*	(1.98)*
4 years ago	-0.014	-0.017	-0.019	-0.019	-0.022	-0.019
	(0.86)	(1.05)	(1.15)	(1.14)	(1.21)	(1.06)
5 years ago	-0.011	-0.013	-0.014	-0.014	-0.024	-0.022
	(0.72)	(0.82)	(0.92)	(0.92)	(1.44)	(1.32)
6 years ago	0.005	0.005	0.004	0.004	0.000	0.001
	(0.29)	(0.32)	(0.22)	(0.22)	(0.00)	(0.07)
7 years ago	0.004	0.006	0.005	0.004	-0.002	-0.001
	(0.22)	(0.38)	(0.28)	(0.28)	(0.12)	(0.06)
8 years ago	0.004	0.008	0.007	0.007	0.001	0.001
	(0.25)	(0.51)	(0.45)	(0.45)	(0.04)	(0.06)
9 years ago	0.009	0.014	0.014	0.013	0.002	0.004
	(0.53)	(0.79)	(0.79)	(0.79)	(0.11)	(0.21)

(table 2 continues)

10 years ago	-0.046	-0.039	-0.034	-0.034	-0.042	-0.039
	(2.31)*	(1.94)	(1.69)	(1.68)	(2.09)*	(1.94)
11 years ago	-0.043	-0.039	-0.034	-0.034	-0.040	-0.040
	(1.40)	(1.30)	(1.14)	(1.13)	(1.47)	(1.50)
Education:						
exp*teaching		-0.041	-0.041	-0.041	-0.029	-0.030
		(8.11)**	(8.15)**	(8.15)**	(5.89)**	(6.05)**
exp*humanities		-0.042	-0.042	-0.042	-0.030	-0.029
		(8.80)**	(8.77)**	(8.77)**	(6.57)**	(6.52)**
exp*technology		-0.005	-0.005	-0.005	-0.010	-0.010
		(1.55)	(1.54)	(1.54)	(3.28)**	(3.25)**
exp*other		-0.019	-0.019	-0.019	-0.016	-0.016
		(5.48)**	(5.49)**	(5.49)**	(4.76)**	(4.78)**
(omitted group: social and business)						
exp*lower level degree		-0.005	-0.005	-0.005	-0.004	-0.004
		(2.41)*	(2.39)*	(2.38)*	(2.11)*	(1.90)
Family type:						
married			-0.001	0.001	-0.009	-0.009
			(0.05)	(0.04)	(0.64)	(0.63)
exp*married			0.001	0.000	0.001	0.001
			(0.26)	(0.19)	(0.50)	(0.51)
children			-0.008	-0.003	0.005	0.002
			(0.61)	(0.22)	(0.35)	(0.15)
exp*children			0.001	0.001	-0.001	-0.001
			(0.47)	(0.26)	(0.42)	(0.34)
children of age 3 or below				-0.007	-0.015	-0.015
				(0.47)	(1.05)	(1.02)
exp*children of age 3 or below				0.001	0.002	0.002
				(0.34)	(0.78)	(0.76)
type unknown			-0.015	-0.017	-0.015	-0.014
			(1.79)	(1.78)	(1.69)	(1.57)
Sector of employment:						
public					0.054	0.067
					(1.47)	(1.86)
exp*public					-0.009	-0.012
					(1.68)	(2.19)*
Field of industry:						
manufacture of electronic products					-0.059	-0.051
					(2.12)*	(1.87)
wholesale					-0.023	-0.011
					(0.74)	(0.36)
R & D					-0.016	-0.008
					(0.56)	(0.27)
other					0.024	0.033
					(1.04)	(1.46)
(omitted group: manufacture of machinery)						
exp* manufacture of electronic products					0.010	0.008
					(2.73)**	(2.07)*

(table 2 continues)

exp*wholesale	0.012	0.010
	(2.60)**	(2.21)*
exp*R & D	0.001	0.001
	(0.33)	(0.14)
exp*other	-0.001	-0.002
	(0.24)	(0.63)
Establishment size:		
10-49 workers	0.017	0.019
	(0.78)	(0.84)
50-99 workers	0.012	0.015
	(0.46)	(0.57)
over 100 workers	0.015	0.017
	(0.63)	(0.72)
(omitted group: less than 10 workers)		
exp*10-49 workers	0.008	0.007
	(2.07)*	(2.00)*
exp*50-99 workers	0.009	0.009
	(2.24)*	(2.07)*
exp*over 100 workers	0.011	0.010
	(2.78)**	(2.61)**
Sales/worker –ratio:		
medium	0.072	0.067
	(4.56)**	(4.29)**
high	0.040	0.037
	(2.31)*	(2.14)*
(omitted group: low)		
exp*medium	-0.012	-0.011
	(4.74)**	(4.41)**
exp*high	-0.004	-0.003
	(1.51)	(1.31)
Establishment's foundation year:		
1977-1980	-0.059	-0.056
	(1.74)	(1.67)
1981-1985	-0.040	-0.038
	(1.76)	(1.65)
1986-1990	-0.025	-0.022
	(1.23)	(1.05)
1991-1995	-0.018	-0.015
	(0.71)	(0.62)
1996-1998	-0.003	-0.005
	(0.08)	(0.10)
after 1998	0.091	0.069
	(1.08)	(0.83)
(omitted group: before 1977)		
exp*1977-1980	0.007	0.006
	(1.32)	(1.20)
exp*1981-1985	0.005	0.005
	(1.41)	(1.38)

(table 2 continues)

exp*1986-1990					0.004	0.004
					(1.52)	(1.35)
exp*1991-1995					0.004	0.003
					(1.17)	(0.84)
exp*1996-1998					0.007	0.005
					(1.21)	(0.92)
exp*after 1998					-0.002	-0.003
					(0.28)	(0.31)
Mobility:						
cumulative mobility						0.036
						(5.00)**
cumulative mobility^2/10						-0.029
						(2.05)*
contraction						-0.002
						(0.31)
wage index	1.393	1.582	1.636	1.630	1.746	1.629
	(6.34)**	(7.33)**	(7.54)**	(7.50)**	(8.35)**	(7.83)**
constant	7.681	7.691	7.696	7.695	7.664	7.654
	(1163.92)**	(1171.18)**	(896.82)**	(881.87)**	(253.50)**	(253.80)**
Observations	17862	17862	17862	17862	17068	17068
R-squared	0.78	0.78	0.78	0.78	0.80	0.80

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

Notes:

1. About the definitions of variables see Section 3.
2. Exp refers to accumulated actual experience.
3. t statistics are calculated using robust standard errors with clustering on the worker.
4. Wage index is the log of an aggregate index of real earnings.

Table 3: Fixed effects estimates for female graduates

Dependent variable: log of monthly wage						
	(1)	(2)	(3)	(4)	(5)	(6)
Experience:						
% of year spent working:						
last year	0.022	0.036	0.041	0.038	0.075	0.070
	(3.49)**	(5.53)**	(6.35)**	(5.92)**	(5.91)**	(5.49)**
2 years ago	0.003	0.016	0.030	0.026	0.057	0.054
	(0.46)	(2.19)*	(4.35)**	(3.79)**	(4.49)**	(4.19)**
3 years ago	0.019	0.027	0.044	0.055	0.081	0.079
	(2.14)*	(3.03)**	(5.08)**	(6.33)**	(5.92)**	(5.70)**
4 years ago	0.017	0.020	0.033	0.047	0.073	0.071
	(1.65)	(1.91)	(3.25)**	(4.58)**	(4.91)**	(4.75)**
5 years ago	0.030	0.036	0.049	0.055	0.079	0.077
	(3.25)**	(3.82)**	(5.41)**	(6.09)**	(5.74)**	(5.55)**
6 years ago	0.020	0.027	0.036	0.043	0.072	0.069
	(2.23)*	(2.96)**	(3.96)**	(4.75)**	(5.17)**	(4.93)**
7 years ago	0.044	0.050	0.055	0.057	0.084	0.082
	(4.59)**	(5.18)**	(5.82)**	(6.04)**	(5.85)**	(5.67)**
8 years ago	0.028	0.037	0.042	0.042	0.071	0.070
	(3.14)**	(4.04)**	(4.58)**	(4.58)**	(5.08)**	(4.93)**
9 years ago	0.033	0.043	0.046	0.041	0.068	0.066
	(3.53)**	(4.58)**	(4.98)**	(4.45)**	(4.86)**	(4.71)**
10 years ago	0.029	0.035	0.026	0.026	0.054	0.053
	(2.85)**	(3.45)**	(2.50)*	(2.47)*	(3.52)**	(3.44)**
11 years ago	0.045	0.050	0.040	0.049	0.070	0.070
	(3.55)**	(3.97)**	(2.92)**	(3.65)**	(4.10)**	(4.06)**
1 if career in progress but did not work:						
last year	-0.045	-0.047	-0.011	-0.008	-0.008	-0.008
	(3.01)**	(3.11)**	(0.70)	(0.54)	(0.51)	(0.49)
2 years ago	-0.058	-0.057	-0.022	-0.021	-0.020	-0.021
	(4.78)**	(4.76)**	(1.83)	(1.72)	(1.60)	(1.61)
3 years ago	-0.027	-0.028	0.005	0.003	0.007	0.008
	(2.05)*	(2.12)*	(0.37)	(0.20)	(0.55)	(0.58)
4 years ago	-0.020	-0.025	0.004	-0.002	-0.014	-0.013
	(1.40)	(1.79)	(0.24)	(0.11)	(1.00)	(0.93)
5 years ago	-0.007	-0.011	0.012	0.007	0.000	0.001
	(0.55)	(0.80)	(0.92)	(0.52)	(0.03)	(0.06)
6 years ago	-0.012	-0.013	0.006	-0.002	-0.007	-0.008
	(0.88)	(0.93)	(0.44)	(0.13)	(0.50)	(0.56)
7 years ago	-0.007	-0.006	0.008	0.000	-0.004	-0.004
	(0.48)	(0.43)	(0.60)	(0.01)	(0.29)	(0.30)
8 years ago	-0.014	-0.013	-0.008	-0.011	-0.012	-0.012
	(0.89)	(0.83)	(0.50)	(0.68)	(0.75)	(0.77)
9 years ago	0.000	0.000	0.007	0.003	0.003	0.003
	(0.03)	(0.00)	(0.45)	(0.21)	(0.17)	(0.19)

(table 3 continues)

10 years ago	-0.009	-0.005	-0.011	-0.005	-0.011	-0.009
	(0.49)	(0.31)	(0.57)	(0.29)	(0.60)	(0.49)
11 years ago	0.020	0.029	0.019	0.047	0.037	0.039
	(0.79)	(1.12)	(0.68)	(1.66)	(1.25)	(1.32)
Education:						
exp*teaching		-0.024	-0.025	-0.025	-0.014	-0.015
		(7.68)**	(7.95)**	(8.08)**	(4.53)**	(4.71)**
exp*humanities		-0.016	-0.017	-0.018	-0.012	-0.012
		(4.52)**	(5.24)**	(5.39)**	(3.94)**	(3.77)**
exp*technology		0.010	0.008	0.008	0.002	0.003
		(2.46)*	(2.14)*	(2.17)*	(0.59)	(0.81)
exp*other		-0.018	-0.018	-0.018	-0.014	-0.013
		(5.39)**	(5.65)**	(5.61)**	(4.20)**	(4.15)**
(omitted group: social and business)						
exp*lower level degree		-0.008	-0.007	-0.007	-0.007	-0.007
		(3.31)**	(2.90)**	(3.06)**	(3.04)**	(2.78)**
Family type:						
married			-0.065	-0.038	-0.031	-0.032
			(4.55)**	(2.67)**	(2.29)*	(2.32)*
exp*married			0.005	0.003	0.002	0.002
			(2.26)*	(1.10)	(0.87)	(0.90)
children			-0.174	-0.062	-0.072	-0.072
			(11.02)**	(3.57)**	(4.11)**	(4.10)**
exp*children			-0.003	-0.005	-0.004	-0.004
			(1.00)	(1.79)	(1.57)	(1.56)
children of age 3 or below				-0.096	-0.097	-0.097
				(5.28)**	(5.29)**	(5.27)**
exp*children of age 3 or below				-0.005	-0.005	-0.005
				(1.76)	(1.88)	(1.86)
type unknown			0.024	-0.036	-0.037	-0.037
			(2.22)*	(3.17)**	(3.29)**	(3.29)**
Sector of employment:						
public					0.292	0.293
					(3.43)**	(3.41)**
exp*public					-0.044	-0.044
					(4.02)**	(4.01)**
Field of industry:						
manufacture of electronic products					0.164	0.165
					(2.09)*	(2.08)*
wholesale					0.129	0.130
					(1.62)	(1.62)
R & D					0.198	0.198
					(2.77)**	(2.75)**
other					0.192	0.193
					(2.75)**	(2.73)**
(omitted group: manufacture of machinery)						
exp*manufacture of electronic products					-0.016	-0.017
					(1.49)	(1.59)

(table 3 continues)

exp*wholesale	-0.013	-0.013
	(1.19)	(1.17)
exp*R & D	-0.023	-0.023
	(2.40)*	(2.40)*
exp*other	-0.029	-0.029
	(3.08)**	(3.04)**
Establishment size:		
10-49 workers	0.018	0.016
	(0.53)	(0.47)
50-99 workers	-0.052	-0.056
	(1.18)	(1.27)
over 100 workers	0.000	0.001
	(0.00)	(0.02)
(omitted group: less than 10 workers)		
exp*10-49 workers	0.003	0.003
	(0.71)	(0.76)
exp*50-99 workers	0.013	0.014
	(2.06)*	(2.11)*
exp*over 100 workers	0.008	0.007
	(1.63)	(1.53)
Sales/worker –ratio:		
medium	0.043	0.044
	(1.64)	(1.67)
high	0.060	0.057
	(2.12)*	(1.99)*
(omitted group: low)		
exp*medium	-0.011	-0.011
	(2.45)*	(2.46)*
exp*high	-0.009	-0.008
	(2.04)*	(1.90)
Establishment's foundation year:		
1977-1980	0.007	0.011
	(0.14)	(0.21)
1981-1985	0.031	0.029
	(0.85)	(0.79)
1986-1990	0.026	0.029
	(0.78)	(0.87)
1991-1995	0.030	0.028
	(0.76)	(0.71)
1996-1998	0.118	0.119
	(1.16)	(1.17)
after 1998	0.250	0.246
	(1.82)	(1.79)
(omitted group: before 1977)		
exp*1977-1980	-0.001	-0.001
	(0.10)	(0.15)
exp*1981-1985	-0.001	-0.001
	(0.25)	(0.16)

(table 3 continues)

exp*1986-1990					0.001	0.000
					(0.16)	(0.04)
exp*1991-1995					0.004	0.003
					(0.67)	(0.58)
exp*1996-1998					-0.004	-0.005
					(0.32)	(0.42)
exp*after 1998					-0.016	-0.017
					(1.11)	(1.18)
Mobility:						
cumulative mobility						0.022
						(2.77)**
cumulative mobility^2/10						-0.020
						(1.21)
contraction						0.002
						(0.37)
wage index	0.654	0.914	0.987	0.780	1.071	1.016
	(2.77)**	(3.94)**	(4.34)**	(3.48)**	(4.91)**	(4.67)**
constant	7.574	7.587	7.647	7.628	7.394	7.392
	(1170.80)**	(1232.50)**	(965.53)**	(983.41)**	(97.94)**	(97.38)**
Observations	13810	13810	13810	13810	13128	13128
R-squared	0.65	0.66	0.68	0.69	0.71	0.71

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

Notes:

1. About the definitions of variables see Section 3.
2. Exp refers to accumulated actual experience.
3. t statistics are calculated using robust standard errors with clustering on the worker.
4. Wage index is the log of an aggregate index of real earnings.

Table 4: Distributions of workers over the labor market statuses

	Male				Female			
Experience	E	U	O	S	E	U	O	S
1	80.3	13.4	1.7	4.6	86.8	6.0	3.2	4.0
2	80.4	13.1	2.3	4.2	80.8	10.3	5.1	3.8
3	82.4	12.2	1.9	3.5	79.4	9.7	7.4	3.5
4	87.5	6.6	2.1	3.7	80.1	9.5	7.2	3.2
5	89.7	5.4	2.5	2.4	81.6	7.0	8.3	3.0
6	93.1	3.3	1.9	1.7	86.0	5.1	6.5	2.4
7	95.5	2.1	1.4	1.1	87.8	3.4	6.7	2.1
8	96.2	1.5	1.6	0.7	89.0	3.5	5.8	1.7
9	95.4	1.8	1.9	0.9	90.2	3.1	5.2	1.4
10	95.9	2.0	1.7	0.4	91.2	2.3	4.9	1.6
11	96.2	1.5	1.4	0.8	91.4	2.3	4.8	1.4

E = employed
U = unemployed
O = outside the labor force
S = student

Table 5: Accumulation of work experience

Years after graduation	Average months in work		Accumulated gender gap in work months
	Male	Female	
1	9.0	9.1	-0.2
2	9.0	8.8	0.0
3	9.2	8.4	0.8
4	9.4	8.3	1.9
5	9.9	8.3	3.5
6	10.4	8.6	5.4
7	10.7	9.1	7.0
8	11.0	9.4	8.6
9	10.9	9.4	10.1
10	10.9	9.6	11.5
11	11.0	9.7	12.8

Notes:

1. Figures in Tables 4 and 5 are calculated from a population which contains those who appear in estimations of the wage specification 6 in the Tables 2 and 3 *at least once*.
2. The sum over statuses may not add up to one because of military service.
3. Labor market statuses are associated with each individual according to the situation prevailed at the last week in the year.
4. Experience refers to potential experience (age – schooling years – 7).

Table 6: Decomposition of the early career gender wage gap among university graduates

		(1)	(2)
Average gender wage gap over the first 11 years after labor market entry	(1)	0.278	0.278
Contribution of gender differences in the:		men's coefficient used	women's coefficient used
amount and timing of experience	(2)	0.014	0.020
spells of 0 months in work during a year	(3)	0.002	0.001
fields of education	(4)	0.030	0.021
employer characteristics	(5)	0.030	0.026
mobility behavior	(6)	0.001	0.0004
Total contribution of gender differences in background characteristics	(7)	0.077	0.068

Notes:

1. Decomposition is based on the estimates shown column 6 in Tables 2 and 3.
2. The sample used in calculations of the average gender wage gap consists of those who are used in estimations of the full wage model (column 6 in Tables 2 and 3).

Table 7: Distributions of workers over the fields of education

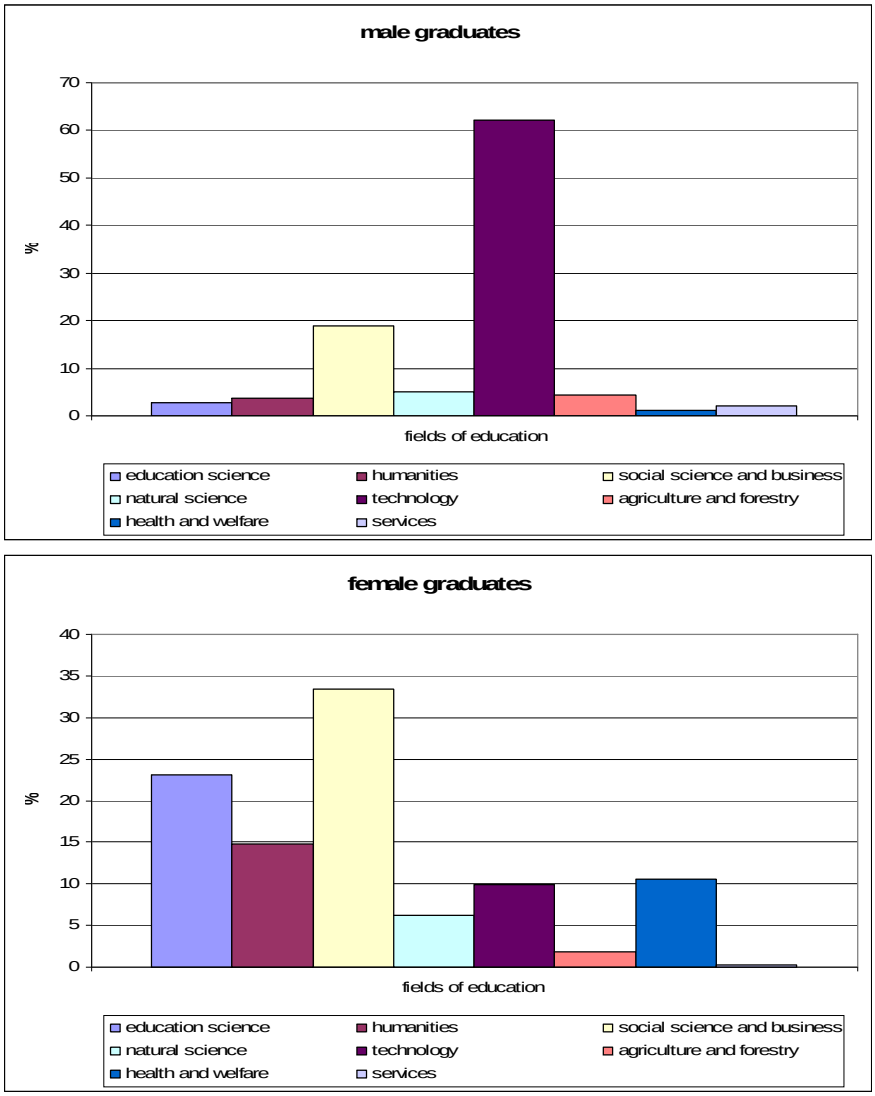


Table 8: Gender segregation by the field of industry: Duncan & Duncan dissimilarity index

Total	0.306
Experience level:	
0	0.336
5	0.333
10	0.300

Notes:

1. Tables 7 and 8 are based on population which contains those who are used in estimations of the wage specification 6 (see Tables 2-3).
2. The number of different fields of industry is 24.
3. Experience refers to potential experience (age - school years – 7)

Table 9: The effects of the family type on the early career gender wage differences

The predicted wages for unmarried individuals without children:

Years after graduation	Men	Women	Gender gap
1	7.824	7.689	0.134
2	7.877	7.721	0.156
3	7.909	7.737	0.172
4	7.942	7.777	0.164
5	7.961	7.810	0.151
6	7.970	7.849	0.121
7	8.004	7.879	0.125
8	8.029	7.923	0.105
9	8.055	7.955	0.101
10	8.062	7.983	0.079
11	8.060	7.997	0.062
Average	7.972	7.847	0.125

The predicted wages for married individuals with children over 3 years old:

Years after graduation	Men	Women	Gender gap
1	7.817	7.583	0.234
2	7.871	7.613	0.258
3	7.903	7.627	0.276
4	7.936	7.665	0.271
5	7.956	7.695	0.261
6	7.965	7.732	0.233
7	7.999	7.760	0.239
8	8.024	7.802	0.222
9	8.051	7.831	0.220
10	8.058	7.857	0.202
11	8.056	7.869	0.187
Average	7.967	7.730	0.237

Notes:

1. The predicted wages base on the parameter estimates shown in column 6 in Tables 2 and 3. Each gender's predicted wage is calculated by multiplying the estimated coefficients for his or her gender by the mean of the explanatory variables calculated over the pooled sample of both men and women.

Table 10: Fixed effects estimates for graduates who had no children at time of labor market entry but who got children during the observation period

Dependent variable: log of monthly wage	**men**	**women**
Experience:		
experience before 1st childbirth	0.061	0.034
	(5.45)**	(3.56)**
experience before 1st childbirth^2/10	-0.021	-0.024
	(1.51)	(1.92)
experience between childbirths	0.035	-0.060
	(4.86)**	(6.05)**
experience between childbirths^2/10	0.007	0.093
	(0.84)	(7.14)**
experience after childbirths	0.019	0.110
	(2.15)*	(11.27)**
experience after childbirths^2/10	0.022	-0.109
	(1.47)	(6.89)**
Family type:		
married	-0.025	-0.041
	(1.75)	(3.37)**
Education:		
exp*teaching	-0.049	-0.023
	(7.36)**	(5.31)**
exp*humanities	-0.048	-0.016
	(6.38)**	(3.05)**
exp*technology	-0.002	0.011
	(0.40)	(2.26)*
exp*other	-0.020	-0.014
	(4.06)**	(3.45)**
(omitted group: social and business)		
exp*lower level degree	-0.006	-0.005
	(1.91)	(1.61)
Sector of employment:		
public	0.001	0.038
	(0.03)	(0.55)
Field of industry:		
manufacture of electronic products	-0.037	0.073
	(1.56)	(1.14)
wholesale	0.020	0.058
	(0.76)	(0.84)
R & D	-0.029	0.057
	(1.16)	(0.97)
other	0.014	0.007
	(0.69)	(0.12)
(omitted group: manufacture of machinery)		

(table 10 continues)

Establishment size:		
10-49 workers	0.038	0.103
	(1.99)*	(3.29)**
50-99 workers	0.061	0.055
	(2.97)**	(1.37)
over 100 workers	0.064	0.078
	(3.24)**	(2.12)*
(omitted group: less than 10 workers)		
Sales/worker –ratio:		
medium	0.004	-0.014
	(0.34)	(0.64)
high	0.028	0.028
	(2.10)*	(1.25)
(omitted group: low)		
Mobility:		
cumulative mobility	0.044	0.030
	(4.06)**	(2.68)**
cumulative mobility^2/10	-0.041	-0.016
	(1.88)	(0.68)
contraction	-0.007	-0.004
	(0.89)	(0.39)
wage index	1.645	1.162
	(7.68)**	(5.38)**
constant	7.631	7.518
	(262.00)**	(113.63)**
Observations	7551	6620
R-squared	0.78	0.63

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

Notes:

1. Individuals included in the sample had no children at time of graduation but got children during the observation period.
2. About the definitions of variables used, see Sections 3 and 4.
3. Exp refers to accumulated actual experience.
4. t statistics are calculated using robust standard errors with clustering on the worker.
5. Wage index is the log of an aggregate index of real earnings.

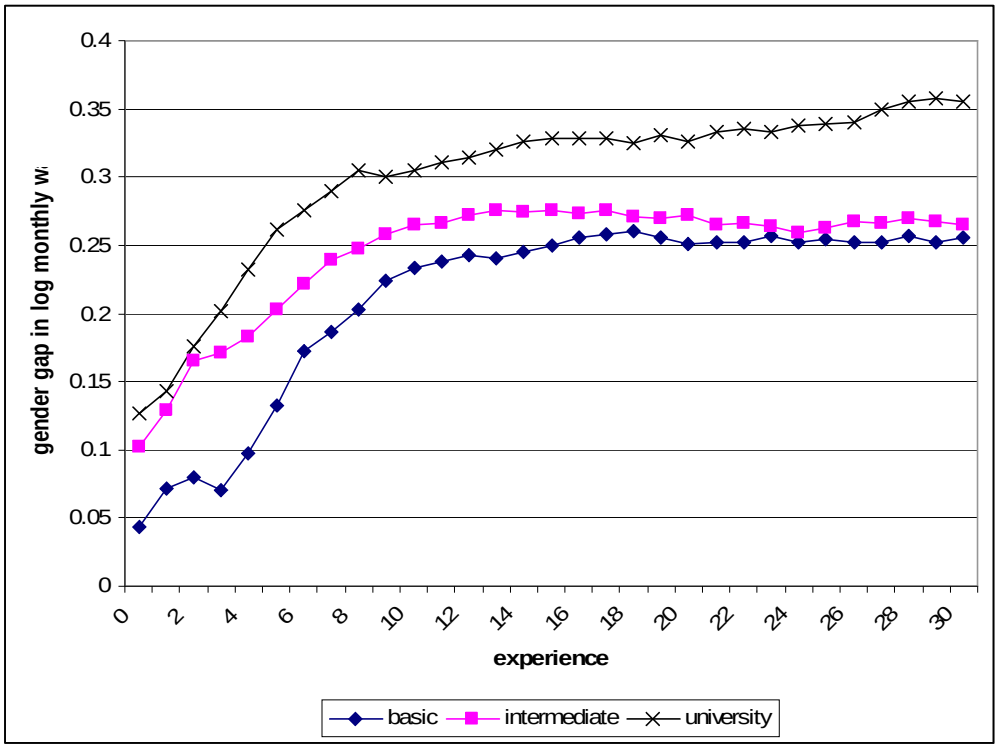
Table 11: The predicted gender wage gaps for individuals who had no children at time of graduation but who got children during the observation period

	Predicted gender wage gap	Change in the gap
experience before Childbirth		
1	0.138	
2	0.154	0.017
3	0.171	0.017
experience between Childbirths		
1	0.225	0.054
2	0.282	0.057
experience after Childbirths		
1	0.148	-0.134
2	0.085	-0.063

Notes:

1. Individuals included in the sample had no children at time of graduation but got children during the observation period.
2. The predicted gender wage gaps are based on the parameter estimates shown in Table 10. Wage gaps are calculated like in Table 9 with the exception that marriage –variable is always assumed to take the value of 1.

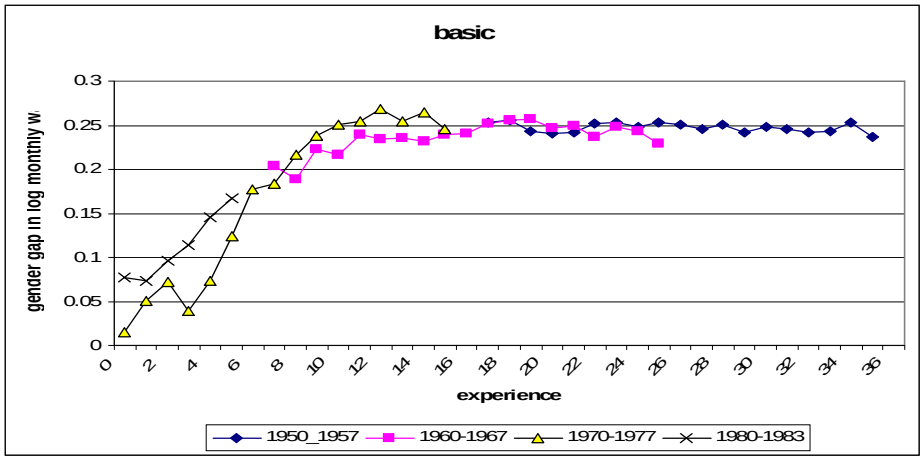
Figure 1: The gender wage gap by education levels

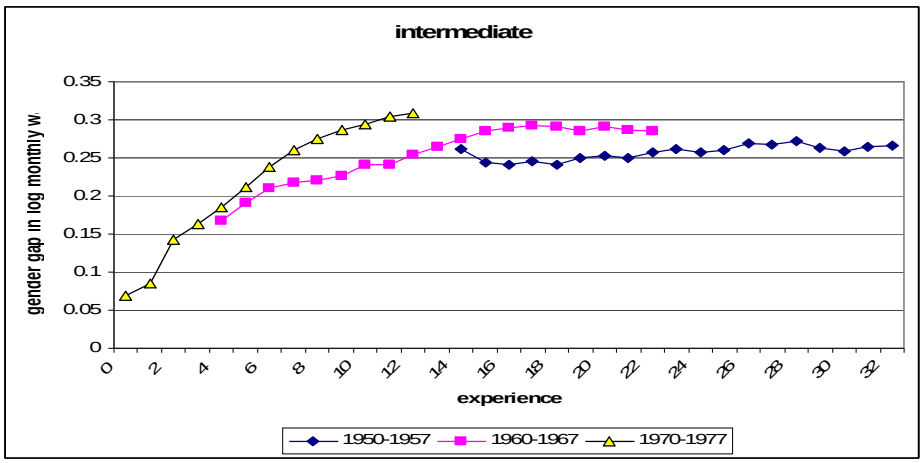


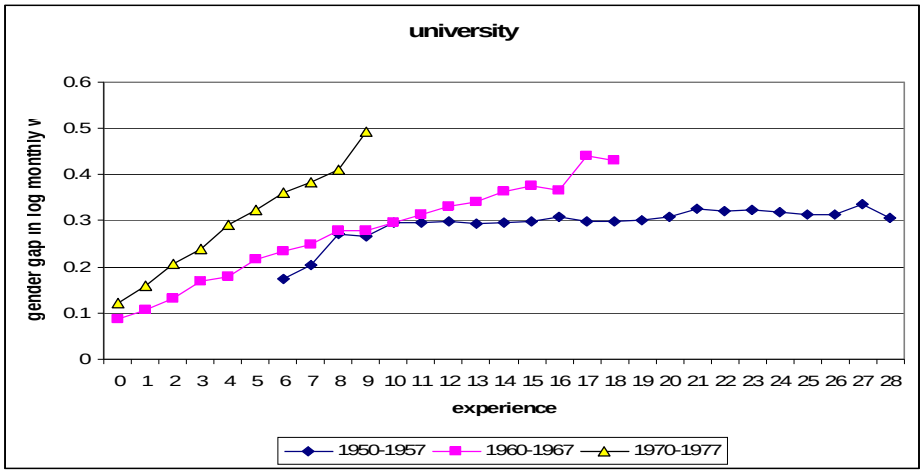
Notes:

1. Data come from Statistics Finland. Wages are converted into 2002 money using Cost-of-living index of Statistics Finland. In order to avoid outliers, wage observations outside the range € 600 - 20 000 are excluded. Sample also excludes entrepreneurs and farmers.
2. Experience refers to potential experience (age - school years – 7)

Figure 2: The gender wage gap by education level for different birth cohorts



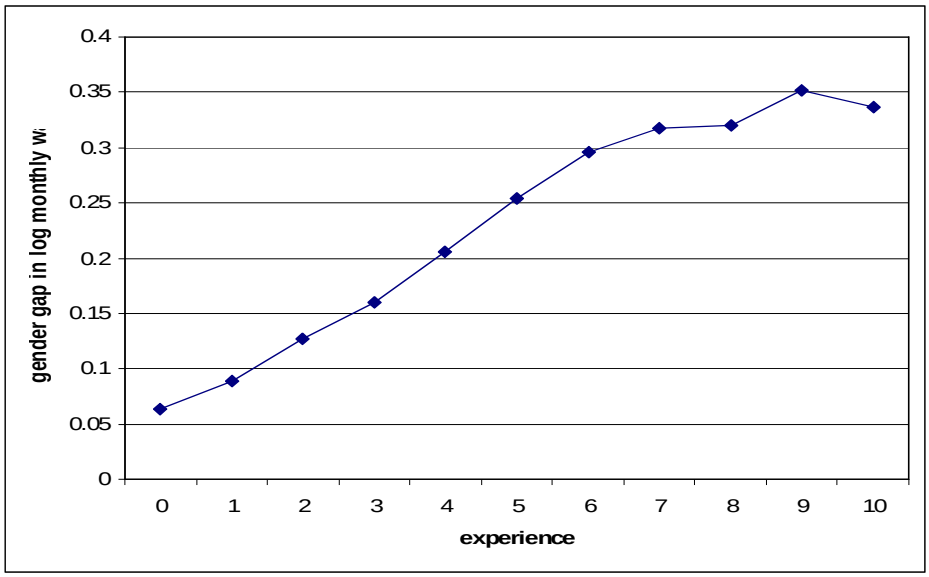




Notes:

1. Data come from Statistics Finland. Wages are converted into 2002 money using Cost-of-living index of Statistics Finland. In order to avoid outliers, wage observations outside the range € 600 - 20 000 are excluded. Sample also excludes entrepreneurs and farmers.
2. Experience refers to potential experience (age - school years – 7)

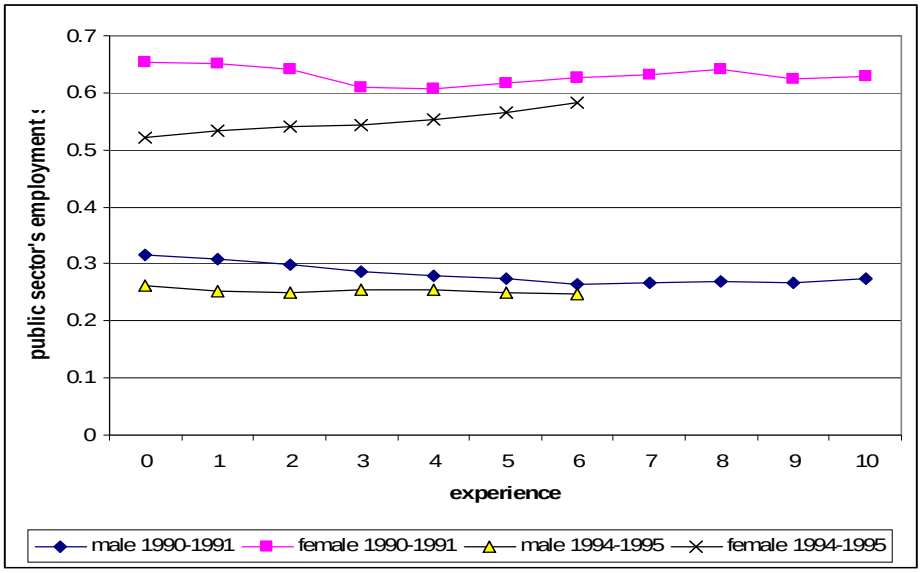
Figure 3: The gender wage gap for university graduates from years 1990-1991



Notes:

1. Wages are converted into 2002 money using Cost-of-living index of Statistics Finland. In order to avoid outliers, wage observations outside the range € 1000 - 20 000 are excluded. Sample also excludes entrepreneurs and farmers.
2. Experience refers to potential experience (age - school years – 7)

Figure 4: The employment share of the public sector



Notes:

1. Figure 4 is based on population which contains those who are used in estimations of the wage specification 6 (see Tables 2-3).
2. Experience refers to potential experience (age - school years – 7)

Figure 5: Gender differences in the distributions of workers over the size labels of establishments

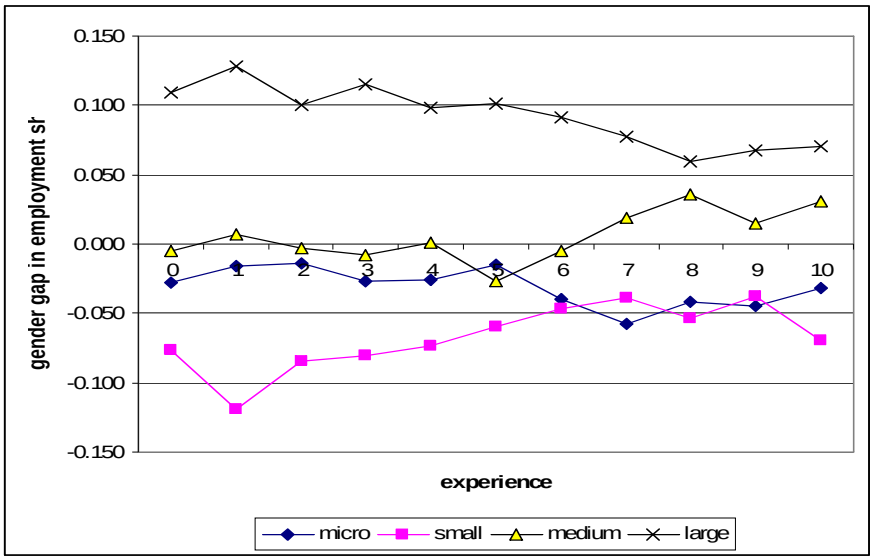
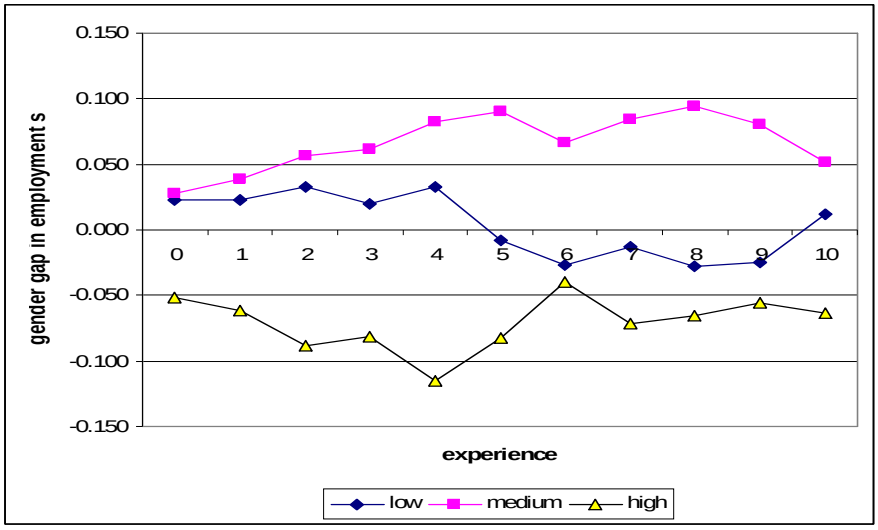


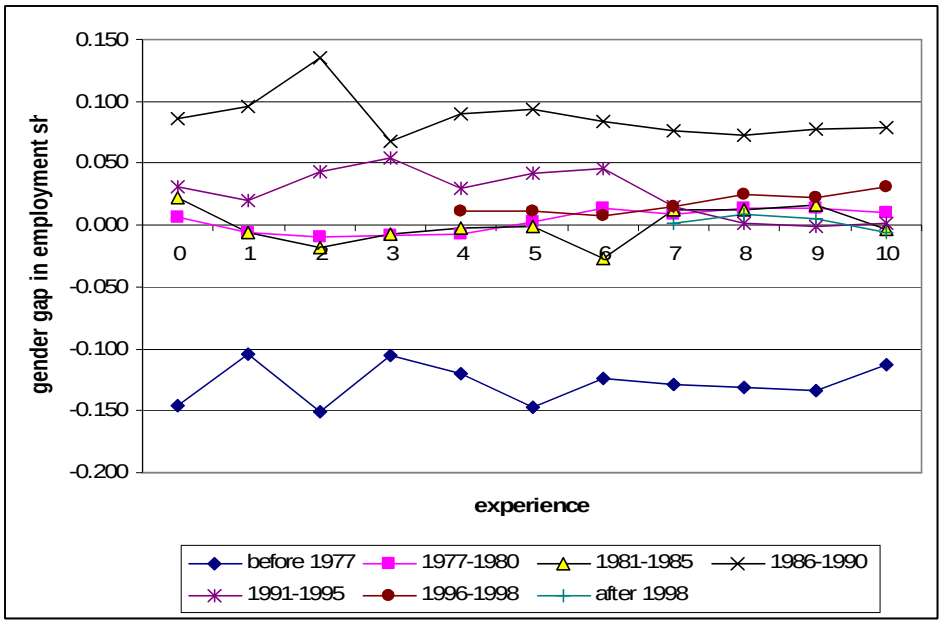
Figure 6: The distributions of workers over sales/worker -labels



Notes:

1. Figures 5 and 6 are based on population which contains those who are used in estimations of the wage specification 6 (see Tables 2-3).
2. Experience refers to potential experience (age - school years – 7)
3. Definitions of the size labels: micro = less than 10 workers, small = 10 to 49 workers, medium = 50 to 99 workers, and large = over 100 workers.
4. Definitions of the sales/worker -label: if sales per worker in an establishment is less than the 25th percentile of corresponding ration calculated over establishments in the total data, medium: if sales per worker is between the 25th and 75th percentiles, high = if sales per worker is more than the 75th percentile of all establishments. Percentiles are calculated in yearly bases.
5. Gender gap in employment share in size / sales per worker label i = m_i /M - f_i /F , where m_i denotes the number of male graduates in size / sales per worker label i and M is the total number of male graduates. F and f_i are similarly defined for women.

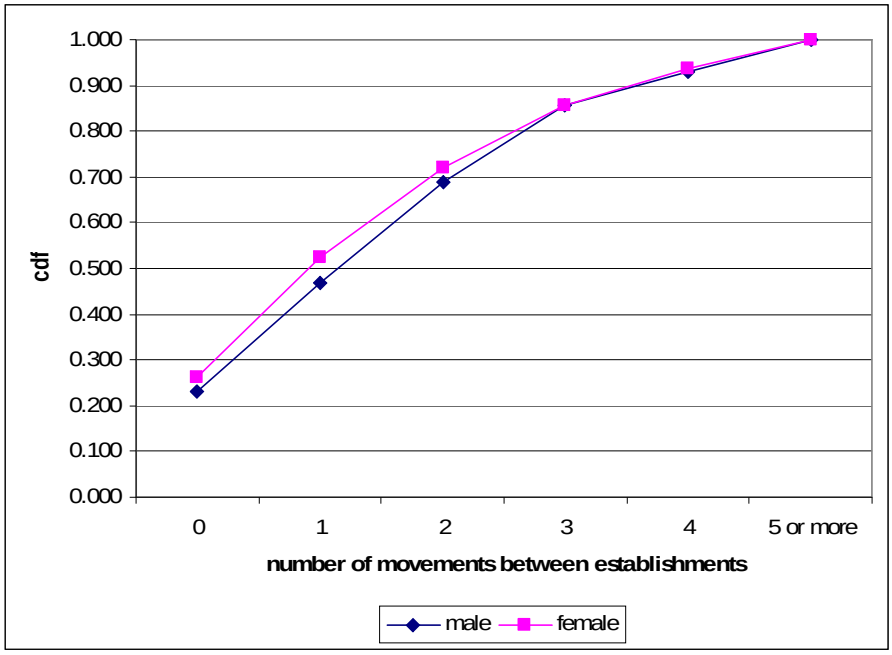
Figure 7: Gender differences in the employer age

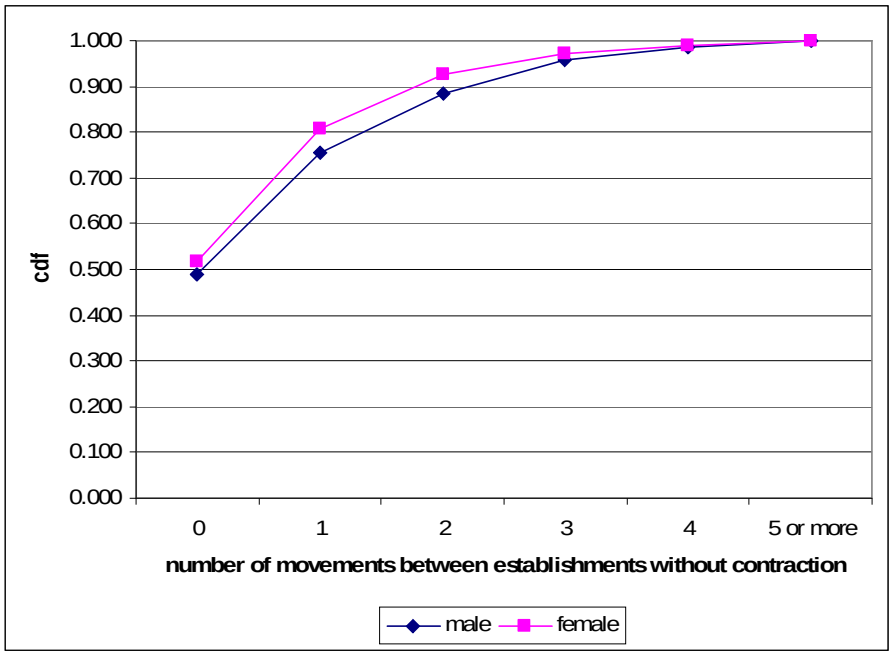


Notes:

1. Figure 7 is based on population which contains those who are used in estimations of the wage specification 6 (see tables 2-3).
2. Experience refers to potential experience (age - school years – 7).
3. Gender gap in employment share in age label i = m_i /M - f_i /F , where m_i denotes the number of male graduates in age label i and M is the total number of male graduates. F and f_i are similarly defined for women.

Figure 8: Mobility between establishments





Notes:

1. Figure 8 is based on population which contains those who are used in estimations of the wage specification 6 (see tables 2-3).
2. Contraction refers to a situation where an establishment disappears from the data or there is over 20 percent decrease in the employment of an establishment between years t-1 and t.

References

Albrecht, James, Anders Björklund, and Susan Vroman (2003), 'Is There a Glass Ceiling in Sweden', Journal of Labor Economics, 21(1), pp. 145-177.

Altonji, Joseph G., and Rebecca M. Blank (1999), 'Race and Gender in the Labor Market', in Orley Ashenfelter and David Card (eds), *Handbook of Labor Economics*, Volume 3C, Amsterdam: North-Holland, pp. 3143-3259.

Bartel, Ann P., and George J. Borjas (1981), 'Wage Growth and Job Turnover: An Empirical Analysis', in Sherwin Rosen (eds), *Studies in Labor Markets*, Chicago: University of Chicago Press.

Bayard, Kimberly, Judith Hellerstein, David Neumark, and Kenneth Troske (2003), 'New Evidence on Sex Segregation and Sex Differences in Wages from Matched Employee-Employer Data', Journal of Labor Economics, 21(4), pp. 887-922.

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

Becker, Gary (1985), 'Human Capital, Effort, and the Sexual Division of Labor', Journal of Labor Economics, 3(1), pp. S53-S58.

Blanchflower, David G., Andrew J. Oswald, and Peter Sanfey (1996), 'Wages, Profits, and Rent-Sharing', Quarterly Journal of Economics, 111(1), pp. 227-251.

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

Blinder, Alan S. (1973), 'Wage Discrimination: Reduced Forms and Structural Estimates', Journal of Human Resources, 8(4), pp. 436-455.

Brown, Charles, and James Medoff (1989), 'The Employer Size-Wage Effect', Journal of Political Economy, 97(5), pp. 1027-1059.

Brown, Charles, and Mary Corcoran (1997), 'Sex-Based Differences in School Content and the Male-Female Wage Gap', Journal of Labor Economics, 15(3), pp. 431-465.

Burdett, Kenneth (1978), 'A Theory of Employee Job Search and Quit Rates', American Economic Review, 68(1), pp. 212-220.

Carrington, W. J., and Kenneth R. Troske (1998), 'Sex segregation in U.S. manufacturing', Industrial and Labor Relations Review, 51(3), pp. 445-464.

Davis, Steven J., and John Haltiwanger (1991), 'Wage Dispersion Between and Within U.S. Manufacturing Plants, 1963-1986', NBER Working Paper, No. 3722.

Dolton, Peter, and Makepeace, Gerald (1987), 'Marital Status, Child Rearing and Earnings Differentials in the Graduate Labour Market', Economic Journal, 97(388), pp. 897-922.

Gibbons, Robert, and Lawrence F. Katz (1992), 'Does Unmeasured Ability Explain Inter-Industry Wage Differentials?', Review of Economic Studies, 59(3), pp. 515-535.

Groshen, Erica L. (1991), 'The Structure of the Female/Male Wage Differentials: Is It Who You Are, What You Do, or Where You Work?', Journal of Human Resources, 26(3), pp. 457-472.

Gubta, Nabanita Datta, and Nina Smith (2001), 'Children and Career Interruptions: The Family Gap in Denmark', IZA Discussion Paper, No. 263.

Jacobsen, Joyce, and Wendy Rayack (1996), 'Do Men Whose Wives Work Really Earn Less?', American Economic Review, 86(2), pp. 268-273.

Jovanovic, Boyan (1979a), 'Job Matching and the Theory of Turnover', Journal of Political Economy, 87(5), pp. 972-990.

Jovanovic, Boyan (1979b), 'Firm-Specific Capital and Turnover', Journal of Political Economy, 87(6), pp. 1246-1259.

Keith, Kirsten, and Abigail McWilliams (1997), 'Job Mobility and Gender-Based Wage Growth Differentials', Economic Inquiry, 35(2), pp. 320-333.

Keith, Kirsten, and Abigail McWilliams (1999), 'The Returns to Mobility and Job Search by Gender', Industrial and Labor Relations Review, 52(3), pp. 460-477.

Korenman, Sanders, and Neumark, David (1991), 'Does Marriage Really Make Men More Productive?', Journal of Human Resources, 26(2), pp 282-307.

Korenman, Sanders, and Neumark, David (1992), 'Marriage, Motherhood, and Wages', Journal of Human Resources, 27(2), pp. 233-255.

Kunze, Astrid (2000), 'The Determination of Wages and the Gender Wage Gap: A Survey', IZA Discussion Paper No. 193.

le Grand, Carl, and Michael Tåhlin (2002), 'Job Mobility and Earnings Growth', European Sociological Review, 18(4), pp. 381-400.

Light, Audrey, and Manuelita Ureta (1992), 'Panel Estimates of Male and Female Job Turnover Behavior: Can Female Nonquitters Be Identified?', Journal of Labor Economics, 10(2), pp. 156-181.

Light, Audrey, and Manuelita Ureta (1995), 'Early-Career Work Experience and Gender Wage Differentials', Journal of Labor Economics, 13(1), pp. 121-154.

Loh, Eng Seng (1996), 'Productivity Differences and the Marriage Wage Premium for White Males', Journal of Human Resources, 31(3), pp. 566-589.

Loprest, Pamela J. (1992), 'Gender Differences in Wage Growth and Job Mobility', American Economic Review, 82(2), pp. 526-532.

Loury, L.D. (1997), 'The Gender Earnings Gap among College-Educated Workers', Industrial and Labor Relations Review, 50(4), pp. 580-593.

Machin, Stephen, and Patrick Puhani (2003), 'Subject of Degree and the Gender Wage Differential: Evidence from the UK and Germany', Economics Letters, 79(3), pp. 393-400.

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

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

Meyersson-Milgrom, E., T. Petersen, and V. Snartland (2001), 'Equal pay for equal work? Evidence from Sweden and a comparison with Norway and the U.S.', Scandinavian Journal of Economics, 103(4), pp. 559-583.

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

Nickell, Steven J., and Sushil B. Wadhwani (1990), 'Insider Forces and Wage Determination', Economic Journal, 100(401), pp. 496-509.

Oaxaca, Ronald (1973), 'Male-Female Wage Differentials in Urban Labor Markets', International Economic Review, 14(3), pp. 693-709.

O'Neill, June, and Solomon Polachek (1993), 'Why the Gender Gap in Wages narrowed in the 1980s', Journal of Labor Economics, 11(1), pp. 205-228.

Petersen, T., V. Snartland, L.-E. Becken, and Olsen K. Modesta (1997), 'Within-job wage discrimination and the gender wage gap: The case of Norway', European Sociological Review, 13(2), pp. 199-213.

Revenga, Ana L. (1992), 'Exporting Jobs? The Impact of Import Competition on Employment and Wages in U.S. Manufacturing', Quarterly Journal of Economics, 107(1), pp. 255-284.

Schoeni, Robert (1990), 'The Earnings Effects of Marital Status: An International Comparison', Luxembourg Income Study Working paper.

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

Topel, Robert H., and Michael P. Ward (1992), 'Job Mobility and the Careers of Young Men', Quarterly Journal of Economics, 107(2), pp. 439-479.

Winter-Ebmer, Rudolf (1994), 'Firm Size, Earnings, and Displacement Risk', Economic Enquiry, 39(3), pp. 474-486.

Winter-Ebmer, Rudolf, and Josef Zweimuller (1999), 'Firm-Size Wage Differentials in Switzerland: Evidence from Job-Changers', American Economic Review, 89(2), pp. 89-93.

CENTRE FOR ECONOMIC PERFORMANCE
Recent Discussion Papers

737	Tobias Kretschmer	Competing Technologies in the Database Management Systems Market
736	Andrew B. Bernard Stephen J. Redding Peter K. Schott	Multi-Product Firms and Product Switching
735	Francesco Caselli James Feyrer	The Marginal Product of Capital
734	Frédéric Robert-Nicoud	Off-Shoring of Business Services and De-Industrialization: Threat or Opportunity – and for Whom?
733	Alex Bryson Michael White	Unions, Within-Workplace Job Cuts and Job Security Guarantees
732	Francesco Caselli Wilbur John Coleman II	On the Theory of Ethnic Conflict
731	Alex Bryson Richard Freeman	What Voice Do British Workers Want?
730	Giulia Faggio Stephen Nickell	Patterns of Work Across the OECD
729	Saul Lach Mark Schankerman	The Impact of Royalty Sharing Incentives or Technology Licensing in Universities
728	Philippe Aghion Robin Burgess Stephen Redding Fabrizio Zilibotti	The Unequal Effects of Liberalization: Evidence from Dismantling the License Raj in India
727	Richard E. Baldwin Fredéric Robert-Nicoud	Trade and Growth with Heterogeneous Firms
726	Gustavo Crespi Chiara Criscuolo Jonathan Haskel	Productivity, Exporting and the Learning-by-Exporting Hypothesis: Direct Evidence from UK Firms

725	Giovanni Olivei Silvana Tenreyro	The Timing of Monetary Policy Shocks
724	Ghazala Yasmeen Azmat	The Incidence of an Earned Income Tax Credit: Evaluating the Impact on Wages in the UK
723	Sharon Belenzon	Basic Research and Sequential Innovation
722	Daron Acemoglu Philippe Aghion Claire Lelarge John Van Reenen Fabrizio Zillibotti	Technology, Information and the Decentralization of the Firm
721	Sharon Belenzon	Knowledge Flow and Sequential Innovation: Implications for Technology Diffusion, R&D and Market Value
720	Rafael Gomez Konstantinos Tzioumis	What Do Unions Do to CEO Compensation?
719	Ralph Ossa	A Gold Rush Theory of Economic Development
718	Nick Bloom	The Impact of Uncertainty Shocks: Firm Level Estimation and a 9/11 Simulation
717	Holger Breinlich	Trade Liberalization and Industrial Restructuring through Mergers and Acquisitions
716	Nick Bloom John Van Reenen	Measuring and Explaining Management Practices Across Firms and Countries
715	Mirko Draca Stephen Machin John Van Reenen	Minimum Wages and Firm Profitability
714	Matteo Bugamelli Francisco Paternò	Do Workers' Remittances Reduce the Probability of Current Account Reversals?

The Centre for Economic Performance Publications Unit
Tel 020 7955 7673 Fax 020 7955 7595 Email info@cep.lse.ac.uk
Web site http://cep.lse.ac.uk