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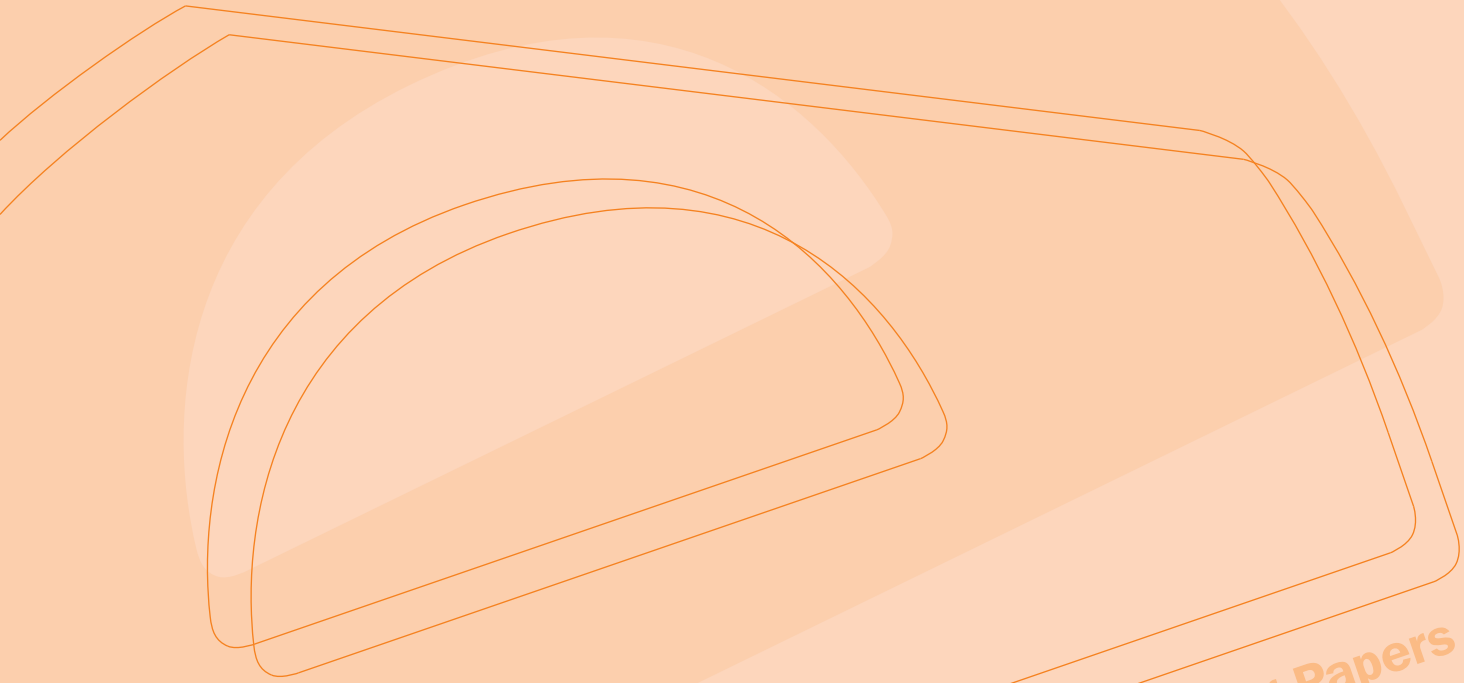

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**Danijel Nestić**
Research Associate
The Institute of Economics, Zagreb
Trg J. F. Kennedyja 7
10000 Zagreb, Croatia
T. 385 1 2362 200
F. 385 1 2335 165
E. dnestic@eizg.hr

www.eizg.hr

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**IZDAVAČ / PUBLISHER:**
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Trg J. F. Kennedyja 7
10000 Zagreb
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T. 385 1 2362 200
F. 385 1 2335 165
E. eizagreb@eizg.hr
www.eizg.hr

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# Contents

## Differing Characteristics or Differing Rewards: What is Behind the Gender Wage Gap in Croatia?

**Abstract:**
This paper aims at estimating the size of, changes in, and main factors contributing to gender-based wage differentials in Croatia. It utilises microdata from the Labour Force Survey in 1998 and 2005, and applies both OLS and quantile regression techniques to assess the gender wage gap across the wage distribution. The gender wage gap is found to be relatively mild at the lower part of the wage distribution and is getting larger as one moves towards the top of the distribution. The paper argues that employed women in Croatia possess higher-quality labour market characteristics, especially levels of education, but receive much lower rewards for these characteristics. Some evidence of a glass-ceiling effect and occupational segregation are found. The impact of having children on the wage prospects of women is also considered. The paper finds that at the top of the wage distribution in the private sector mothers earn lower wages than women without children.

**Keywords:** gender wage gap, glass ceiling, maternity leave, quantile regression
**JEL classification:** J16, J31, J71

## Jaz u plaćama između žena i muškaraca u Hrvatskoj

**Sažetak:**
U radu se razmatra veličina i čimbenici razlike u plaćama između žena i muškaraca u Hrvatskoj. Koriste se individualni podaci iz Ankete radne snage 1998. i 2005. godine, te se uz pomoć OLS i kvantilnih regresija ocjenjuje jaz na različitim dijelovima distribucije plaća. Jaz u plaćama između žena i muškaraca relativno je mali na donjem kraju distribucije i postupno se povećava prema njenom gornjem kraju. Pokazuje se da zaposlene žene u Hrvatskoj općenito posjeduju bolje radne karakteristike od muškaraca, posebice višu razinu obrazovanja, ali da su njihove karakteristike manje cijenjene, odnosno manje plaćene od usporedivih karakteristika muškaraca, što dovodi do opaženog jaza u plaćama. U radu se nalaze određeni argumenti u prilog postojanja «staklenog stropa» (jaz u plaćama najveći je kod najbolje plaćenih radnih mjesta) i rodne segregacije po zanimanjima. Rad razmatra i utjecaj roditeljstva na plaće. Pokazuje se da u privatnom sektoru, u slučaju relativno dobro plaćenih poslova, majke zarađuju manje od žena bez djece.

**Ključne riječi:** jaz u plaćama između žena i muškaraca, «stakleni strop», rodiljni dopust, kvantilne regresije
**JEL klasifikacija:** J16, J31, J71

# 1 Introduction*

One of the most challenging fields for attaining equal treatment of women and men is the labour market. In practically every country, women earn less than men. To explain this disparity, labour economists have usually looked at differences in human capital characteristics, such as education or experience. Since women, in many countries, have poorer education and less labour market experience than men do, productivity gains due to these attributes could explain a part of the gender wage gap. The role of job- and firm-specific factors has also been studied. However, the gap remains even after accounting for differences in observed characteristics. The unexplained part of the gender differential in wages is sometimes termed discrimination, although it may also include effects of unobserved productive characteristics.

In transition countries, gender equality was a highly proclaimed policy goal during the socialist era and evidence shows that the difference in wages between women and men was rather low at that time (Brainerd, 2000). An egalitarian wage structure was a feature not only of centrally planned systems, but also of the worker's self-management system in the former Yugoslavia (Orazem and Vodopivec, 1995). In the transition period, huge changes in the structure of the overall economy have induced changes in the wage structure. Wage setting mechanism has been liberalised, which has mostly produced higher wage inequality. However, it seems that these changes have not contributed to a widening of the gender wage gap in the Central and Eastern European countries in the first phase of transition (Brainerd, 2000; Newell and Reilly, 2001). In the later stages of transition, the gender wage gap has become visible, although rather modest by international standards (Rutkowski, 2001).

The relatively low observed gender pay gap in most of the former socialist countries of Central and Eastern Europe (CEE) may be misleading in judging the status of women in the labour market in at least three aspects. The first is their relatively low employment rate; the second is the pronounced educational advantage of female employees over their male counterparts; and the third is women's role in terms of family responsibilities.[1] A low employment rate points to certain barriers for women to enter the job market and find a job. Educational attainment of women which is higher than that of men means that the gender wage gap for comparable educational levels is larger than the average

* This research was supported by a grant from the CERGE-EI Foundation under a program of the Global Development Network. All opinions expressed are those of the author and have not been endorsed by CERGE-EI or the GDN.

[1] For 2005, Eurostat reports (http://epp.eurostat.cec.eu.int) on unadjusted gender pay gap in Slovenia of 8 percent, Poland 10 percent, Hungary 11 percent, Romania 13 percent, and Bulgaria 16 percent. The average for "old" EU members (EU15) was 15 percent, while the Baltic States, Czech Republic, and Slovakia experienced somewhat higher gap. Educational advantage of women in CEE countries can be illustrated by the Eurostat data on the share of employees with tertiary education. For 10 former socialist countries and current EU member states, there was 28 percent of female workers with tertiary education, as compared to 19 percent among male workers in 2005 (unweighted average). In "old" EU15 countries the female educational advantage was lower than in the CEE countries, with 31 percent of highly educated female workers versus 26 percent among male workers (unweighted average). The evidence that many of CEE countries have relatively generous maternity and parental leaves can be found, for instance, on the web pages of the European Industrial Relations Observatory (http://www.eurofound.europa.eu/eiro).

unadjusted gap. Further, this suggests that the productive characteristics of women may be much less appreciated than that of men. Lengthy absence from work due to child bearing may preclude women from earning more.

This paper examines the effects of various labour market characteristics, including the effects of having children, on the gender wag gap in a transition economy – Croatia. The female/male wage ratio in Croatia for 2005 was estimated at 0.88, showing the raw gender wage gap of 12 percent. This is one of the lowest unadjusted gaps in Europe. However, after taking into account differences in education, experience and workplace-related factors, Nestić (2005) found the gender wage gap to be somewhat wider, around 15 percent in 2003. Bisogno (2000) reported on a gap of 20 percent in 1998. The current study goes further in exploring the gender wage gap by using quantile regression technique in order to estimate the conditional wage gap at various points of the distribution, for example for low-paid workers at the $10^{th}$ percentile or for high-paid workers at the $90^{th}$ percentile. Machado-Mata (2005) decomposition analysis is employed to extract the part of the gap that is due to differing rewards to observed productive factors for women and men.

This paper also explores the possible impact of relatively generous entitlements for maternity leave and child-related sick leave on the wage prospects of women in Croatia. The effect of children and family obligations on the relative wages of women has been carefully studied for Nordic countries and major industrial countries, such as the US or the UK (see, for instance, Datta Gupta et. al., 2006 for an overview), but there is little evidence from transition countries. Relatively generous maternity and paternal leave entitlement has been introduced in many transition countries in a completely different environment from the Nordic countries. Croatia, for example, has a comparable length of leave, but dissimilarly low compensation rate, low labour mobility, weak job creation, a poor child care system, and a relatively strong role of a traditional lifestyle. Although the significant effect of children on the relative wages of women in Nordic countries is not found (see for example, Rosholm and Smith, 1996; Datta Gupta and Smith, 2002), a transition country case may prove the opposite.

The rest of the paper is organised as follows. Section 2 presents the methodology used. Section 3 describes the data and presents preliminary evidence on the wage distribution in Croatia. Discussion of major findings of the gender wage gap estimates made by quantile regressions and decomposition analysis is provided in Section 4. Section 5 explores the gender gap faced by mothers, as compared to other women. Section 6 concludes the paper.

# 2 Methodology

The raw (unadjusted) wage gap, calculated as the difference between the average wage of male and female workers, is the first indication of underlying gender wage inequality. However, the observed wage differential between male and female employees could be caused by differences in the stock of human capital, which further implies differences in productivity levels. Many other possible factors could also determine this differential, some of which could be justifiable from an economic point of view. Regression estimates of the earnings functions are employed to check for the impact of these various factors.

The applied wage functions follow the standard Mincer-type specification (Mincer, 1974), where the log wage rate is regressed to the set of variables representing individual human capital characteristics of workers such as education and experience. Other variables are added to control for the effects of job and employer characteristics. The estimated coefficient on the gender dummy in this setting gives an indication of the gender wage gap.

Apart from the models estimated by the OLS, quantile regressions are run to enable further insights into the wage structure.[2] We also apply the Machado-Mata decomposition analysis to distinguish that part of gap that is due to male/female differences in returns from the part which is due to differences in labour market characteristics.[3]

## 2.1 Quantile Regressions

The quantile regression technique allows us to explore the effect of each explanatory variable across the whole distribution, rather than just the effect upon the mean, as is the case with the least squares estimates. Estimation procedure in the quantile regression model can be viewed as the problem of minimizing a sum of absolute residuals. Basically, the solution at different quantiles is found by the asymmetrical weighting of absolute residuals. For the estimation at lower quantiles, the higher weights are given to the negative residuals, and the opposite is done at upper quantiles.

The quantile regression model is formulated as:

$$\ln W_i = X_i'\beta_\theta + u_{\theta i}, \qquad Quant_\theta(\ln W_i \mid X_i) = X_i'\beta_\theta, \tag{1}$$

where ln $W_i$ denotes the log wage of the worker $i$, $X_i$ is a vector of explanatory variables, $X_{i1} \equiv 1$, and $\beta_\theta$ is a vector of coefficients. Quant $_\theta$ ($\ln W \mid X$) denotes $\theta^{\text{th}}$ conditional

[2] Studies using the quantile regression approach include, for example, Buchinsky (1994, 1998) for the analysis of the US wage structure, Machado and Mata (2001) for the wage structure in Portugal, and Garcia et al. (2001) for Spain. Newell and Reilly (2001) used this technique for studying the gender wage gap in transition countries.

[3] In empirical studies, the Machado-Mata approach was used, for instance, in Albrecht et al. (2003) for Sweden, Arulampalam, et al. (2004) for the EU countries, de la Rica at al. (2005) for Spain, and Kee (2006) for Australia.

quantile of ln$W$, conditional on the regressor vector $X$. Partial derivative of the conditional quantile of ln$W$ with respect to regressor $j$, $\partial \text{Quant}_\theta(\ln W \mid X) / \partial x_j$ could be interpreted as a marginal change in the $\theta$th conditional quantile due to a marginal change in the $j^{\text{th}}$ element of $X$. Each of these derivatives is given just by $\beta_{\theta j}$, measuring the marginal change mentioned above. An interesting case appears if the $\beta_{\theta j}$ coefficients vary systematically across $\theta$'s, indicating that the marginal effect of a particular explanatory variable is not uniform across different quantiles of the conditional distribution of ln$W$.

With respect to varying coefficients indicating the gender gap, the quantile regression approach enables us to explore two potentially important phenomena – the *glass ceiling* and the *sticky floor*. Glass ceiling is the term used to describe an unacknowledged barrier that prevents women from advancing to positions of power and responsibility, or more generally to better-paid jobs. In contrast, the sticky floor can be viewed as a situation where women workers are kept in low-level positions without adequate wages. If one could find evidence of a widening gap at the upper end of the wage distribution, that could signal the presence of a glass ceiling, and if the gap is wider at the bottom end of the distribution, a sticky floor could be in place.

## 2.2 Decomposition of the Gender Wage Gap

Wage regressions that include the gender dummy (without interactive variables) assume equal returns to observable characteristics for women and men, which may not hold in reality. Coefficients from wage regressions estimated separately for women and men, if substantially different, point to the unequal rewards to labour market characteristics. This situation allows us to go a step further in depicting the gender wage gap by isolating a part of the wage gap that could be explained by the difference in observable productive characteristics between women and men, for example, education and experience, from the part which is due to the difference in returns to these characteristics between women and men.

The different returns cannot be easily explained in a competitive setting. They are supposedly due to the labour market discrimination or some unobserved characteristics of employees or jobs.

In order to decompose the gap into these two parts, we employ the methodology proposed by Machado and Mata (2005), which extends the Oaxaca-Blinder wage decomposition method to quantile regressions. The general idea is to generate the female wage distribution that would emerge if women were given men's labour market characteristics, but remained to receive returns to those characteristics like women. Such a counterfactual distribution is compared with the estimated male wage distribution.[4] The

[4] Note that the decomposition could also be made with the counterfactual distribution calculated for women if they retain their own labour market characteristics, but supposedly are paid like men.

gap between identical men and women in terms of their characteristics could then be attributed to an unequal gender treatment.

Decomposition of the difference between male and female log wage distributions is given by:

$$X^{m'}\beta_\theta^m - X^{f'}\beta_\theta^f = (X^m - X^f)'\beta_\theta^f + X^{m'}(\beta_\theta^m - \beta_\theta^f), \quad (2)$$

where superscripts *m* and *f* stand for male and female, respectively. The first term on the right-hand side describes a part of the gap due to differing characteristics, while the second term is a part of the gap due to differing returns.

In this study, the Machado-Mata bootstrap technique is applied with certain simplifications, as suggested by Albrecht et al. (2003). The estimation procedure can be summarised as follows:

1) Using the male and female data sets separately, quantile regression coefficient vectors $\beta_\theta^m$ and $\beta_\theta^f$ are estimated for each percentile ($\theta$ = 1, ... 99);
2) From the male data set, a sample of the size $M$=100 is drawn at random with a replacement for each percentile. A total of $M$ x 99 draws is made;
3) For each percentile, characteristics of the sampled males are used to predict wages by using the estimated coefficient vectors $\beta_\theta^m$ and $\beta_\theta^f$. This process generates two sets of 9900 predicted wages covering the whole distribution and enables us to calculate the wage distribution for males from one set together with the counterfactual wage distribution for females if they have had male characteristics from the other set;
4) The counterfactual gap is estimated by taking the difference between the calculated male and female wage distributions.

The procedure has been repeated 200 times in order to estimate standard errors for the calculated distributions.

The gap estimated by the described procedure at various points of the wage distribution is the second part of the decomposed gender wage gap from equation (2). It points to the wage difference which women would face even if they had the same characteristics as men. This wage difference is due to differing rewards to labour market characteristics and is labelled the counterfactual gender wage gap.

For comparison, we calculate *the mean* counterfactual gap by employing the Oaxaca-Blinder technique (Blinder, 1973; Oaxaca, 1973). Accordingly, the mean counterfactual gap is calculated as the difference between the predicted average wages for men and the predicted counterfactual average wage for women. Both predicted wages are calculated as a product of the average male labour market characteristics and the gender specific OLS coefficient estimates.

# 3 Data

## 3.1 Data description

The data employed in this study were obtained from the Croatian Labour Force Survey (LFS) for 1998 and 2005.[5] The Survey was carried out by the Central Bureau of Statistics (CBS) and administered to a random sample of Croatians living throughout the country. The interviewees were asked to provide information on activity status, gender, age, work experience, and education, but also on employer and job characteristics, such as company size, industry sector, ownership status, occupation, and working conditions. More importantly, they reported on monthly wages for their primary job (net of contributions and taxes) and the hours of work performed per week, thus making it possible to calculate the hourly wage rate.

The survey is regularly conducted on a semi-annual basis, but we pooled two adjacent survey data to construct annual observations to increase the precision of estimates. The sampling procedure applied by the CBS allows data pooling. Namely, the LFS sample is chosen for the whole year and then divided into two parts, one for each half of the year.

The 1998 LFS covers 38,533 resident individuals of all ages and employment status, while the 2005 LFS recorded the information on 31,636 individuals. The lower number of surveyed individuals in the latter year is the result of a higher non-response rate. For the purpose of this study, the sample was restricted to employed persons. More precisely, we included only individuals over 15 years of age, who were in paid employment and were not self-employed, because entrepreneurial skills and capital invested in self-employment generate remuneration that cannot be separated from the payment for work. Occasional and family workers, as well as working retirees, were also excluded since their earnings exhibit an unstable link to human capital attributes. A total of 10,066 individuals remained in the 1998 sample, and a total of 9,202 individuals in the 2005 sample.

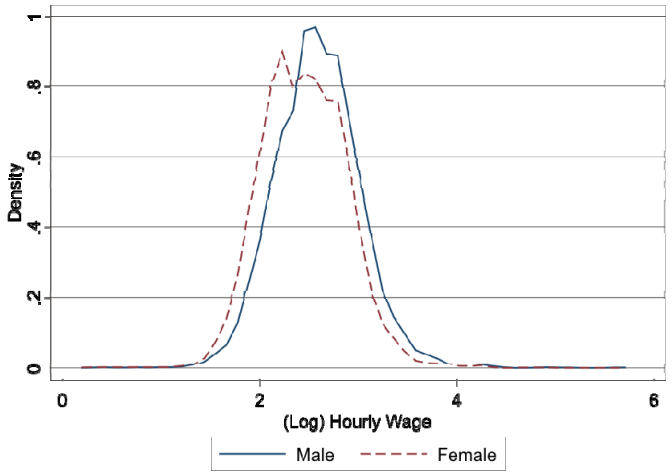
[5] The Labour Force Survey is a relatively new survey instrument in Croatia, established in 1996. In order to examine changes in the structure of wages, we decided to use data for the first and the last year for which comparable and detailed individual information on wages, human capital, job, and employer characteristics were available (i.e. 1998 and 2005).

| Table 1 **Descriptive Statistics** | | | | |
|---|---|---|---|---|
| | **1998** | | **2005** | |
| | **Male** | **Female** | **Male** | **Female** |
| Observations | 5,354 | 4,712 | 5,062 | 4,140 |
| Mean Log Hourly Wage | 2.59 | 2.45 | 3.08 | 2.95 |
| | (0.43) | (0.43) | (0.44) | (0.43) |
| Quantile | | | | |
| q10 | 2.05 | 1.93 | 2.53 | 2.42 |
| q25 | 2.30 | 2.17 | 2.79 | 2.62 |
| q50 | 2.57 | 2.46 | 3.06 | 2.93 |
| q75 | 2.88 | 2.75 | 3.34 | 3.24 |
| q90 | 3.09 | 2.95 | 3.62 | 3.44 |
| Dispersion | | | | |
| q(90)-q(10) | 1.04 | 1.02 | 1.10 | 1.02 |
| q(75)-q(25) | 0.58 | 0.58 | 0.55 | 0.62 |
| Age | 38.63 | 36.88 | 39.78 | 39.39 |
| | (10.56) | (9.66) | (11.39) | (10.33) |
| Work Experience (years) | 17.23 | 15.07 | 17.89 | 16.68 |
| | (10.41) | (9.47) | (11.29) | (10.51) |
| Tenure (years) | 10.97 | 10.69 | 11.25 | 11.41 |
| | (9.95) | (9.35) | (10.49) | (10.22) |
| Public Sector | 0.63 | 0.60 | 0.41 | 0.44 |
| | (0.48) | (0.49) | (0.49) | (0.50) |
| Years of Schooling | 11.51 | 11.84 | 11.65 | 12.11 |
| | (2.65) | (2.72) | (2.30) | (2.48) |
| Education Attainment | | | | |
| Primary or Less | 0.19 | 0.18 | 0.14 | 0.14 |
| | (0.39) | (0.38) | (0.34) | (0.34) |
| Secondary | 0.64 | 0.61 | 0.70 | 0.62 |
| | (0.48) | (0.49) | (0.46) | (0.49) |
| Tertiary | 0.17 | 0.21 | 0.16 | 0.24 |
| | (0.37) | (0.41) | (0.36) | (0.43) |

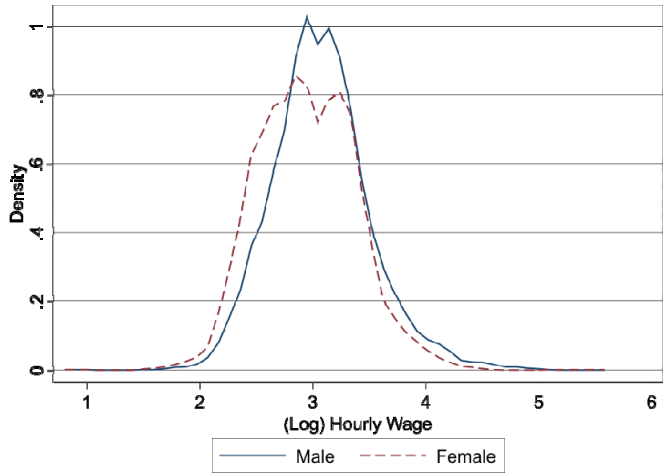
*Note: Standard deviations are in parentheses. Log hourly wages are expressed in the current values of a given year.*
*Source: Author's calculations based on the 1998 and 2005 Labour Force Survey.*

Figure 1 **Kernel Density Estimates of the (Log) Hourly Wage by Gender**

**a) 1998**




**b) 2005**




*Source: Author's estimates based on the 1998 and 2005 Labour Force Survey.*

Table 1 presents the summary statistics of the wage distribution for sampled individuals as well as the means and standard deviations of the main variables used in the study. In 1998, the sample included 46.8 percent of women, while in 2005 this had declined to 45 percent. The difference between the mean log hourly wage for men and women in 1998 was 0.14 (2.59-2.45). This difference is called the raw gender gap and it will later be interpreted in terms of a percentage difference (14 percent). An increase in the average wage from 1998 to 2005 was higher for women than men, resulting in a slight decrease in the raw gender gap. The dispersion of male wages seems higher than that of female wages, if one looks at the tail of the log hourly wage distribution, such as the difference between the $90^{th}$ and the $10^{th}$ quantile (percentile) in both 1998 and 2005. But the opposite can be seen in 2005 in the middle of the distribution through a difference between the $75^{th}$ and the $25^{th}$ quantile, where female wages are more dispersed. Difference in the shape of male and female wage distribution in 1998 and 2005 are shown in Figure 1, where the density of observations is approximated by kernel density estimators.

The characteristics of employed men and women changed somewhat between 1998 and 2005. The average age of female workers increased by 2.5 years and came very close to that for male workers in 2005. This is somewhat surprising since the legal retirement age for women is 5 years lower than that for men. Two explanations could be given here. One relates to the early retirement of disabled persons due to war, prevailing in the male population, and the other is the longer formal education of the female population, which results in a postponement of their labour market participation until a more advanced age. Better educational attainment of employed women is shown in more years of schooling (12.1 as opposed to 11.6 in 2005), or in the higher portion of women with completed tertiary education (24 percent as opposed to 16 percent in 2005). It should be noted that the actual work experience for women is one year lower than that for men (in 2005), which could be considered a very low difference in terms of international comparisons. Tenure (the number of years with the same employer) increased between 1998 and 2005 for both male and female workers, reflecting a consolidation of the Croatian business sector. This also points to relatively weak labour flows. A decreasing share of employment in the public sector is a result of the ongoing process of privatisation of the economy. It should be noted that the public/private sector distinction is based on the ownership status, with the public sector including state-owned companies.

## 3.2 Preliminary Evidence

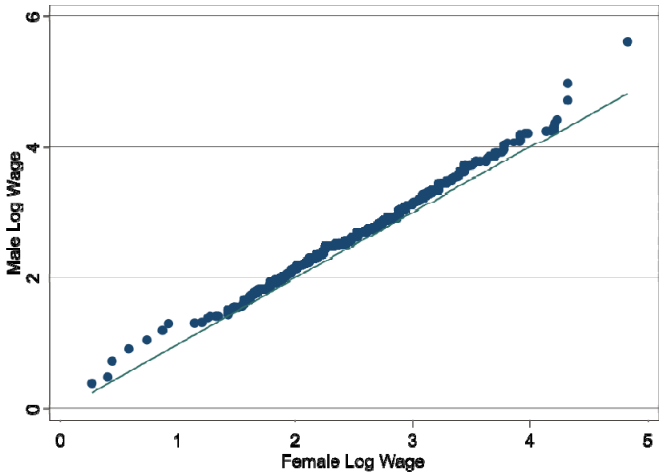
An informative comparison between the wage distributions for men and women is provided by a quantile-quantile plot. This kind of graph relates quantiles of the variable on the vertical axis to quantiles of the variable on the horizontal axis. A point on the symmetry line indicates that a quantile of one distribution has the same value as the corresponding quantile of the other distribution. Figure 2 contains plots of male/female wage distributions for 1998 and 2005. The left panel of Figure 2 shows a quantile-

quantile plot of the male and female log hourly wages in 1998. Most of the observations are slightly above the diagonal line, implying that wages for male workers are slightly higher than wages for female workers for comparable quantiles of the wage distribution. At lower to middle quantiles, the difference is quite small. However, when approaching higher quantiles, the male/female wage gap becomes larger. In other words, there is a larger relative discrepancy between male and female wages among higher-paid than lower-paid workers. An even more pronounced effect is found in 2005. This evidence illustrates the importance of investigating wages at different points of the distribution.

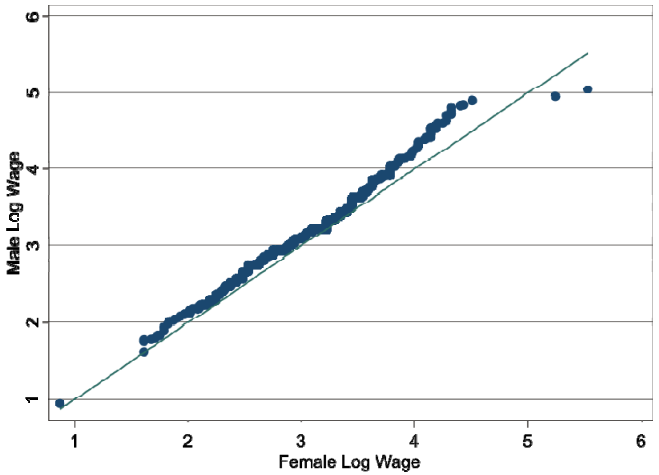
The raw gender wage gap is calculated as the difference in log hourly wages between female and male workers at various points of distribution. Selected results are presented in Table 2. At the mean, the overall gap is a bit lower in 2005 than in 1998, and it is clearly higher in the private sector than in the public sector. The private/public sector discrepancy in the raw gender gap increased from 1998 to 2005, when the gap in the private sector reached 18.6 percent, as opposed to 6.6 percent in the public sector. In the public sector, the mean gap reduced notably by 2005 due to the privatisation process and accordingly stronger influence of the budgetary part of the public sector which usually operates a more equitable wage policy. The mean gender gap is generally lower at higher levels of education. However, the gap for post-secondary education increased between 1998 and 2005. In the 2000s, Croatia has experienced stable economic growth and entered the phase of mature transition after the turbulent 1990s (including the war for independence) that have caused a stretching of the overall transition process. The wage setting mechanism in the 2000s has become more and more market driven, where increased inequality in returns of various productive characteristics could be expected. The proximate stability of the mean raw gender gap is therefore good news in such an environment.

Figure 2 **Quantile-Quantile Plot of the Log Wage Distribution by Gender**

**a) 1998**




**b) 2005**




*Source: Author's calculations based on the 1998 and 2005 Labour Force Survey.*

| Table 2 **The Raw Gender Wage Gap by Sector and Education Level** | | | | | | |
|---|---|---|---|---|---|---|
| | **Mean** | **Quantile** | | | | |
| | | **10th** | **25th** | **50th** | **75th** | **90th** |
| **1998** | | | | | | |
| Total | -0.139 | -0.123 | -0.134 | -0.116 | -0.134 | -0.145 |
| Private Sector | -0.169 | -0.097 | -0.134 | -0.223 | -0.223 | -0.154 |
| Public Sector | -0.114 | -0.203 | -0.182 | -0.093 | -0.089 | -0.092 |
| Unfinished Primary | -0.198 | -0.120 | -0.141 | -0.198 | -0.239 | -0.233 |
| Primary (8-year) | -0.233 | -0.173 | -0.174 | -0.203 | -0.258 | -0.300 |
| Vocational Secondary | -0.281 | -0.182 | -0.239 | -0.304 | -0.329 | -0.357 |
| General Secondary | -0.119 | -0.105 | -0.148 | -0.126 | -0.113 | -0.139 |
| 2-year College | -0.126 | -0.031 | -0.047 | -0.087 | -0.174 | -0.154 |
| College Graduate | -0.147 | -0.195 | -0.105 | -0.105 | -0.174 | -0.183 |
| Postgraduate | -0.082 | 0.000 | -0.065 | -0.082 | -0.043 | -0.268 |
| **2005** | | | | | | |
| Total | -0.125 | -0.105 | -0.167 | -0.134 | -0.094 | -0.182 |
| Private Sector | -0.186 | -0.148 | -0.174 | -0.182 | -0.182 | -0.239 |
| Public Sector | -0.066 | -0.123 | -0.065 | 0.000 | -0.090 | -0.049 |
| Unfinished Primary | -0.152 | -0.105 | -0.152 | -0.128 | -0.159 | -0.182 |
| Primary (8-year) | -0.256 | -0.134 | -0.201 | -0.261 | -0.336 | -0.288 |
| Vocational Secondary | -0.266 | -0.211 | -0.272 | -0.231 | -0.301 | -0.308 |
| General Secondary | -0.138 | -0.095 | -0.134 | -0.145 | -0.118 | -0.144 |
| 2-year College | -0.163 | -0.033 | -0.085 | -0.112 | -0.231 | -0.375 |
| College Graduate | -0.167 | -0.174 | -0.118 | -0.154 | -0.223 | -0.274 |
| Postgraduate | -0.138 | -0.041 | -0.133 | -0.121 | -0.128 | -0.377 |

*Note: Raw gender wage gap is calculated as the difference of the log female and log male hourly wage.*
*Source: Author's calculations based on the 1998 and 2005 Labour Force Survey.*

The gender gap varies in different parts of the distribution. In the private sector, the gap is the lowest at the bottom end of the distribution and it increases as we move upward along the wage distribution (as an exception, in 1998 this is not observed at the 90th quantile). In 2005, the gap widens towards the upper tail of the wage distribution in the private sector, suggesting the possible existence of a glass-ceiling effect. This effect needs to be confirmed in the analysis. In the public sector, the opposite tendency is found in 1998. In that respect, the possible presence of sticky floor effects should be further explored. As for the gender wage gap at different levels of education, a larger gap is generally observed at higher quantiles of the wage distribution for all levels of education.

# 4 Estimates of the Gender Wage Gap

Wage regressions account for various factors that may explain the differences in individual wages, including gender. The estimated coefficients for a gender dummy from wage regression captures the extent to which the wage gap between women and men remains unexplained after checking for other individual, job, and company differences. We refer to these as the gender wage gap. In this section, results from a series of quantile regressions on the pooled male and female datasets are presented first. Then, estimations from separate regressions for men and women are shown in order to illustrate gender differences in returns to the labour market characteristics. Finally, results from the counterfactual decompositions are discussed.

## 4.1 Pooled Quantile Regressions

Table 3 presents regression results for the gender wage gap. Quantile regression estimates are shown at five points of the log hourly wage distribution; the $10^{th}$, $25^{th}$, $50^{th}$ (median), $75^{th}$, and $90^{th}$ quantile. In order to take the correlation among various quantile regressions into account, the selected quantiles are estimated simultaneously, thus allowing a formal comparison of the coefficients describing different quantiles. Estimates of standard errors are obtained via bootstrapping, using 50 replications.[6] Ordinary least squares (OLS) regression estimates are presented for comparison.

The first row of Table 3 shows the gender gap in the regression specification without any control variables except gender. The coefficient estimated for the gender dummy is the raw gender gap, which is the same as the total log wage difference from Table 2. However, here we could assign standard errors to the estimated gap. Other results are organised around three models. Model (1) includes basic human capital control variables (education level, experience and experience squared). The extended model (2) aims to include other available variables representing the characteristics that count in the wage determination (employer size, sector, irregular working hours, rural area, and immigrants) but without occupation.[7] The "full" model (3) is the same as the extended one, but includes the set of occupational dummies.[8] Occupation is usually significant in accounting for gender wage differences, but it can be rather strongly linked to educational attainment. The inclusion of occupation variables in the model, together

[6] In quantile regressions, the bootstrap standard errors could be preferable to those calculated analytically, as suggested by Rogers (1992).

[7] There are four dummies for company size, defined with respect to the number of employees. As immigrants, we count persons who have come from abroad to the current place of residence after 1991, when Croatia declared its independence. The dummy variable for non-regular working hours is defined in order to pick up the effect of unfavourable working conditions and takes the value 1 in two cases: (i) if one always works at nights and (ii) if one sometimes works at nights, sometimes on Saturdays, and sometimes on Sundays. The public sector dummy variable refers to individuals working in the state-owned institutions and enterprises.

[8] Occupation is actually represented by a set of dummy variables for each of the ten main occupation categories defined according to the standard (ISCO) classification.

with education variables, introduces a potential problem with the endogenity of explanatory variables. However, the advantage of having two otherwise identical models (one with and the other without occupation) is that this enables us to account for the sole impact of occupational division on the gender wage gap.[9] Estimated coefficients for all the variables included in model (3) are presented in tables A1 and A2 in Appendix, while Table 3 presents coefficient estimates for the gender dummy, i.e. the gender wage gap.

In the model that controls for human capital variables, the mean gender wage gap (OLS estimate) is found to be higher than the raw gender wage gap for both 1998 and 2005. A considerable increase is also found at the 50$^{th}$, 75$^{th}$ and 95$^{th}$ quantiles. This result reflects a much better educational attainment of employed women, especially in higher-paid jobs. In a situation where returns to education are the same for male and female workers (which is imposed by the pooled regression model), the educational advantage of employed women results in a wider estimated gender wage gap as compared to the raw gap. Once we control for education and experience, a comparison of the gender gap in 1998 and 2005 points to its widening at all the observed points of the conditional wage distribution (for instance, from 16.2 percent in 1998 to 18.2 percent in 2005 estimated at the median)[10]. Further improvement in women's relative educational attainment and a narrowing of their experience disadvantage between 1998 and 2005 (see Table 1) did not contribute to any marked improvement in women's relative wages, as measured by the raw gender wage gap.

Inclusion of other control variables somewhat reduces the estimated mean gender wage gap in comparison with the model that includes basic controls. However, it appears that variations in other labour characteristics are important in explaining the gender wage gap, although not as much as education and experience. In 2005, inclusion of the broadest set of control variables in model (3) still leaves almost 17 percent of the gender wage differences unexplained on average, as compared to 19.3 percent in model (1) (OLS estimate). Occupation affected a portion of the gap in 2005, as indicated by its notable narrowing between the model (2) and (3) at all the observed parts of the distribution. For example, the gender gap at the 10$^{th}$ quantile reduces from 12.9 percent to 10.4 percent. In spite of only 10 occupation categories being considered, this result suggests that occupational segregation accounts for a part of the gender wage differential in Croatia.

Quantile regression results in Table 3 mostly show an acceleration of the gender wage gap at higher quantiles, almost independent of the set of control variables included. For

[9] Some other control variables could be added too. Variables for industry affiliation are often considered in similar studies. Industry wage differentials might be substantial. However, in Croatia it might be affected by ownership, since there are industries that are clearly dominated by state-ownership, such as utilities, education, health care, and public administration. Since this study is more interested in ownership effects that should be distinguished from industry effects, variables for industry affiliation are not incorporated in the analysis.

[10] A log-linear specification of the wage function allows us to treat the estimated coefficients (if multiplied by 100) as percentage changes in a conditional hourly wage that is due to a marginal change in regressor, i.e. due to the male/female switch.

example, in 1998, at the 10th quantile, employed women earned about 11.6 percent less than men. At the 90th quantile, the gap widens to 20.4 percent in the model with the broadest set of control variables. In other words, in well-paid jobs, women are relatively more disadvantaged than in less-paid jobs. An even higher disproportion between the gap in poorly-paid and well-paid jobs is observed for 2005.

Table 3 **Gender Wage Gap Based on Pooled Quantile Regressions**

| | OLS | Quantile | | | | |
|---|---|---|---|---|---|---|
| | | 10th | 25th | 50th | 75th | 90th |
| **1998** | | | | | | |
| Raw Gender Gap | -0.139<br>(0.009) | -0.123<br>(0.018) | -0.134<br>(0.011) | -0.116<br>(0.021) | -0.134<br>(0.010) | -0.145<br>(0.019) |
| (1) Gap with education and experience as control variables | -0.163<br>(0.007) | -0.120<br>(0.014) | -0.132<br>(0.010) | -0.162<br>(0.008) | -0.180<br>(0.010) | -0.192<br>(0.015) |
| (2) Gap with education, experience, employer size, sector, immigrant, rural, and non-regular working hours as control variables | -0.165<br>(0.007) | -0.121<br>(0.014) | -0.126<br>(0.009) | -0.153<br>(0.008) | -0.186<br>(0.008) | -0.210<br>(0.015) |
| (3) Gap with education, experience, employer size, sector, and other control variables, including occupation | -0.160<br>(0.008) | -0.116<br>(0.016) | -0.130<br>(0.009) | -0.157<br>(0.010) | -0.177<br>(0.011) | -0.204<br>(0.016) |
| **2005** | | | | | | |
| Raw Gender Gap | -0.125<br>(0.009) | -0.105<br>(0.008) | -0.167<br>(0.025) | -0.134<br>(0.017) | -0.094<br>(0.017) | -0.182<br>(0.016) |
| (1) Gap with education and experience as control variables | -0.193<br>(0.007) | -0.146<br>(0.012) | -0.160<br>(0.010) | -0.182<br>(0.009) | -0.211<br>(0.009) | -0.235<br>(0.015) |
| (2) Gap with education, experience, employer size, sector, immigrant, rural, and non-regular working hours as control variables | -0.184<br>(0.007) | -0.129<br>(0.010) | -0.158<br>(0.008) | -0.170<br>(0.008) | -0.206<br>(0.010) | -0.229<br>(0.016) |
| (3) Gap with education, experience, employer size, sector, and other control variables, including occupation | -0.169<br>(0.007) | -0.104<br>(0.011) | -0.140<br>(0.009) | -0.168<br>(0.010) | -0.191<br>(0.011) | -0.217<br>(0.016) |

*Note: Reported figures are the estimated coefficients for the gender dummy, followed by standard errors in parentheses. Statistics are computed using the bootstrap estimator. All the coefficients are statistically significant at the 1 percent level. A complete set of estimated coefficients for the specification (3) in the OLS and quantile regressions is presented in Tables A1 and A2 in Appendix.*
*Source: Author's calculations based on the 1998 and 2005 Labour Force Survey.*

To test if the differences in the estimated gender gap between various quantiles are statistically significant, we have run several interquantile regressions. The results are reported in Table 4. Differences in the gender dummy coefficients between the 90th and 10th quantile, as well as between the 75th and 25th quantile are statistically significant at the 1 percent level for each model. This suggests that quantile regressions, in general, do a good job representing a range of effects along the wage distribution. By relying only on the average gender gap estimated by the OLS, we might have overlooked its important features. The gender wage gap is shown higher at the upper tail of distribution. The estimated difference of around 2.5 percent in 1998 and 2005 between the gap at the 90th

and 75th quantile is significant at the 5 percent level for the model that includes the broadest set of control variables, while the statistical significance of the difference vanished in the model with basic human capital variables. Somewhat higher statistical confidence may be expressed for the differences in estimated coefficients on the gender dummy at the 75th and 50th quantile. To a certain extent, the gender wage gap, which is mostly shown as significantly higher at the upper tail of the wage distribution, confirms the presence of a glass-ceiling effect in Croatia.

Table 4 **Results of Interquantile Regressions**

| | 90th – 10th | 75th – 25th | 75th – 50th | 90th – 75th |
|---|---|---|---|---|
| **1998** | | | | |
| (1) Gap with education and experience as control variables | -0.072***<br>(0.019) | -0.048***<br>(0.011) | -0.019**<br>(0.009) | -0.012<br>(0.011) |
| (2) Gap with education, experience, employer size, sector, immigrant, rural, and non-regular working hours as control variables | -0.089***<br>(0.020) | -0.060***<br>(0.010) | -0.033***<br>(0.009) | -0.023*<br>(0.012) |
| (3) Gap with education, experience, employer size, sector, and other control variables, including occupation | -0.089***<br>(0.019) | -0.046***<br>(0.011) | -0.019**<br>(0.009) | -0.028**<br>(0.014) |
| **2005** | | | | |
| (1) Gap with education and experience as control variables | -0.089***<br>(0.018) | -0.051***<br>(0.011) | -0.029***<br>(0.007) | -0.024<br>(0.015) |
| (2) Gap with education, experience, employer size, sector, immigrant, rural, and non-regular working hours as control variables | -0.100***<br>(0.020) | -0.049***<br>(0.010) | -0.036***<br>(0.008) | -0.023*<br>(0.013) |
| (3) Gap with education, experience, employer size, sector, and other control variables, including occupation | -0.112***<br>(0.019) | -0.051***<br>(0.012) | -0.023***<br>(0.008) | -0.025**<br>(0.011) |

*Note: Reported figures are the estimated coefficients for the gender dummy, followed by standard errors in parentheses. Statistics are computed using the bootstrap estimator. * denotes statistical significance at the 10 percent. ** denotes statistical significance at the 5 percent. *** denotes statistical significance at the 1 percent.*
*Source: Author's calculations based on the 1998 and 2005 Labour Force Survey.*

Turning back to Table 3, we can now compare the estimated gender wage gap in 1998 and 2005. There was only a minor increase in the gap from 1998 to 2005 in model (3) on average and at most parts of the wage distribution (except at the 10th quantile). However, in model (2), which excludes the influence of occupational divisions, the gap is found to be notably higher in 2005 than in 1998 (18.4 percent vs. 16.5 percent on average). It appears that the Croatian transition in the 2000s, especially the increasing share of the private sector due to the privatisation of state-owned companies and growth of its business, has eventually brought a certain increase in the gender wage gap in spite of the improved legislative situation, where the Labour Law and the Gender Equality Law (the latter enacted in 2003) declare an equal treatment of women in the labour market. The

wage gap in the private sector is found to be wider than in the public sector (see Section 5) and notable expansion of the private sector has contributed to the overall increase in the gender wage gap.

## 4.2 Quantile Regressions by Gender

Rewards relating to the labour market characteristics may differ between men and women rather than being equal, as assumed in the pooled quantile regressions. Quantile regression estimates performed separately for men and women can reveal this situation at various points in their respective distribution. Table 5 presents gender specific rewards to education and experience (i.e. their estimated coefficients) in the specification that also controls for firm size, occupation, and dummies for sector, urban/rural residence, non-regular working hours, and immigrant status. Results are shown for 2005. Results for 1998 convey basically the same message and are not presented here to save space.

The marginal returns to experience for men are considerably above the corresponding returns for women, and the difference grows at the upper parts of the wage distribution, as suggested by the estimated coefficients on experience. The first year of experience will bring a 1.7 percent higher wage on average to a man and 0.8 percent to a woman. At the $90^{th}$ quantile, the corresponding rewards are 2.2 percent for men and 0.8 percent for women. However, at the actual work experience of around 30 years, men start to exhibit negative returns, while the wage-experience profile for women is found to be much flatter, as indicated by the estimated coefficients for experience squared. Therefore, women's experience at the later stages of working life is rewarded more than men's experience.

Women face strikingly lower returns to education at all levels of education and at all points of the wage distribution. This is particularly the case for higher levels of education (i.e. post-secondary) and at the top of the wage distribution. For example, at the $90^{th}$ quantile, the reward for a male employee who holds a university degree is estimated to be around 22 percent higher (i.e. 0.515-0.299) than the corresponding reward for a woman. Such a difference at the median is estimated at about 10 percent.

Results presented in Table 5 suggest that returns to education and returns to experience are different for males and females in Croatia. This stresses the importance of accounting for gender specific returns to labour market characteristics in the gender wage gap estimation.

| Table 5 **Quantile Regressions by Gender, 2005** | | | | | | |
|---|---|---|---|---|---|---|
| | **OLS** | **Quantile** | | | | |
| | | **10th** | **25th** | **50th** | **75th** | **90th** |
| **Women** | | | | | | |
| Experience | 0.008*** | 0.009*** | 0.009*** | 0.008*** | 0.009*** | 0.008*** |
| | (0.002) | (0.002) | (0.002) | (0.001) | (0.002) | (0.003) |
| Experience squared (/100) | -0.003 | -0.011 | -0.010** | -0.003 | -0.009** | -0.006 |
| | (0.004) | (0.006) | (0.005) | (0.003) | (0.004) | (0.008) |
| Primary | -0.026 | 0.017 | -0.001 | -0.023 | -0.024 | -0.017 |
| | (0.059) | (0.078) | (0.074) | (0.046) | (0.071) | (0.249) |
| Vocational Secondary | 0.056 | 0.142* | 0.074 | 0.056 | 0.038 | 0.025 |
| | (0.059) | (0.080) | (0.071) | (0.046) | (0.069) | (0.246) |
| General Secondary | 0.122** | 0.213*** | 0.116* | 0.132*** | 0.112* | 0.093 |
| | (0.060) | (0.079) | (0.066) | (0.047) | (0.067) | (0.247) |
| 2-year College | 0.216*** | 0.335*** | 0.245*** | 0.221*** | 0.186*** | 0.183 |
| | (0.061) | (0.089) | (0.069) | (0.051) | (0.072) | (0.242) |
| University Graduate | 0.305*** | 0.374*** | 0.333*** | 0.335*** | 0.280*** | 0.299 |
| | (0.065) | (0.095) | (0.081) | (0.059) | (0.077) | (0.242) |
| Postgraduate | 0.596*** | 0.610*** | 0.555*** | 0.594*** | 0.629*** | 0.560*** |
| | (0.088) | (0.115) | (0.107) | (0.107) | (0.101) | (0.372) |
| Constant | 2.422*** | 2.004*** | 2.205*** | 2.400*** | 2.602*** | 2.768*** |
| | (0.060) | (0.087) | (0.082) | (0.049) | (0.063) | (0.249) |
| **Men** | | | | | | |
| Experience | 0.017*** | 0.013*** | 0.015*** | 0.019*** | 0.020*** | 0.022*** |
| | (0.002) | (0.003) | (0.002) | (0.002 | (0.002) | (0.003) |
| Experience squared (/100) | -0.033*** | -0.022*** | -0.028*** | -0.038*** | -0.039*** | -0.041*** |
| | (0.004) | (0.009) | (0.005) | (0.004) | (0.005) | (0.009) |
| Primary | 0.069 | 0.127 | 0.111*** | 0.100*** | 0.060*** | 0.102 |
| | (0.060) | (0.085) | (0.047) | (0.044) | (0.057) | (0.119) |
| Vocational Secondary | 0.160*** | 0.243*** | 0.232*** | 0.192*** | 0.131** | 0.154 |
| | (0.060) | (0.086) | (0.044) | (0.044) | (0.056) | (0.123) |
| General Secondary | 0.233*** | 0.305*** | 0.272*** | 0.264*** | 0.222*** | 0.231* |
| | (0.060) | (0.083) | (0.050) | (0.049) | (0.059) | (0.124) |
| 2-year College | 0.368*** | 0.392*** | 0.399*** | 0.390*** | 0.340*** | 0.434*** |
| | (0.064) | (0.089) | (0.051) | (0.055) | (0.070) | (0.132) |
| University Graduate | 0.447*** | 0.538*** | 0.494*** | 0.436*** | 0.442*** | 0.515*** |
| | (0.069) | (0.099) | (0.060) | (0.071) | (0.076) | (0.156) |
| Postgraduate | 0.695*** | 0.713*** | 0.664*** | 0.597*** | 0.711*** | 0.933*** |
| | (0.093) | (0.116) | (0.079) | (0.124) | (0.107) | (0.264) |
| Constant | 2.461*** | 1.983*** | 2.224*** | 2.432*** | 2.645*** | 2.828*** |
| | (0.059) | (0.086) | (0.054) | (0.049) | (0.057) | (0.122) |

*Note: Other control variables in regressions are firm size, occupation, and dummies for sector, urban/rural residence, non-regular working hours, and immigrant status. Standard errors are in parentheses. * denotes statistical significance at the 10 percent level. ** denotes statistical significance at the 5 percent level. *** denotes statistical significance at the 1 percent level.*

*Source: Author's calculations based on the 1998 and 2005 Labour Force Survey.*

## 4.3 Counterfactual Gender Wage Gap

The counterfactual gender wage gap points to a part of the gap that is due to differing rewards to the observed labour market characteristics. It is calculated as the difference between the male wage distribution and the counterfactual female wage distribution that would emerge if women were given men's labour market characteristics, but remained to receive returns to those characteristics like women. Table 6 shows estimates at various points of the wage distribution that are calculated following the Machado-Mata decomposition approach. Figure 3 portrays the main results for 1998 and 2005.

Firstly, we compare the raw gender gap (the first row for each year in Table 6) with the estimated counterfactual gap calculated for the three regression specifications that are taken to be the same as in pooled regressions. The counterfactual gap for each specification is sizable. It is wider than the raw gap on average and at almost all the observed points of the wage distribution (results at the 90th quantile are mixed). These findings indicate that: i) there is a rather large "unjustifiable" gender wage gap which can be attributed to women's lower returns to labour market characteristics as compared to men's returns and ii) labour market characteristics of employed women are much better than that of employed men, which explains why the raw (unadjusted) gap is lower than it would be the case if women and men shared the same distribution of characteristics as assumed when the counterfactual gap is estimated. For example, taking the broadest set of characteristics into consideration, women earned around 22 percent less than men at the median in 2005 in spite of having the same characteristics. Women's higher-quality labour characteristics compensate for a part of the gap, so in the unadjusted (raw) form we observe a gap of around 13 percent at the median. The counterfactual gap, which is wider than the raw one, is not a common feature of advanced market economies, and this reflects the situation where women possess some advantages in productive characteristics, mainly education, as it is often the case in CEE economies.[11]

At the upper parts of the distribution, the counterfactual gap is more similar to the raw gender gap indicating that almost the entire raw gender gap can be accounted for by differing rewards. Also, there is no evidence of a glass-ceiling effect due to differing rewards by gender, which is seemingly in contrast with the finding based on the pooled regressions. However, the counterfactual gap assumes that women hold men's characteristics and that gender differences in characteristics cannot influence the result. Therefore, it appears that gender differences in education, experience, and other observable factors, in combination with differing rewards, account for widening the gender gap at the top of the distribution.

Comparison of the counterfactual gaps between 1998 and 2005, as calculated using the broadest set of control variables (Figure 3), shows modest changes on average as well as in the shape of the gap across the wage distribution. In both years, the average gender wage

[11] The counterfactual gap, which is lower than the raw gap, is found in Albrecht et al. (2003) for Sweden and de la Rica at al. (2005) for Spain.

gap is around 20 percent due to differing rewards on labour market characteristics. The gap is somewhat higher in the lower middle part of the distribution, and it declines as we approach the upper middle part of the distribution. This indicates that there is less "discriminatory" practice in giving different rewards for the same characteristics at relatively well-paid jobs. In 2005, unlike in 1998, the counterfactual gap tends to increase a little at the top of the distribution. The tentative explanation for this could be that an increasing role of the private sector in transition period in Croatia has induced the observed change, since the private sector usually penalises women at the upper parts of the distribution more than the public sector. Some more evidence for this can be found in the next section.

Table 6 **Counterfactual Gender Wage Gap**

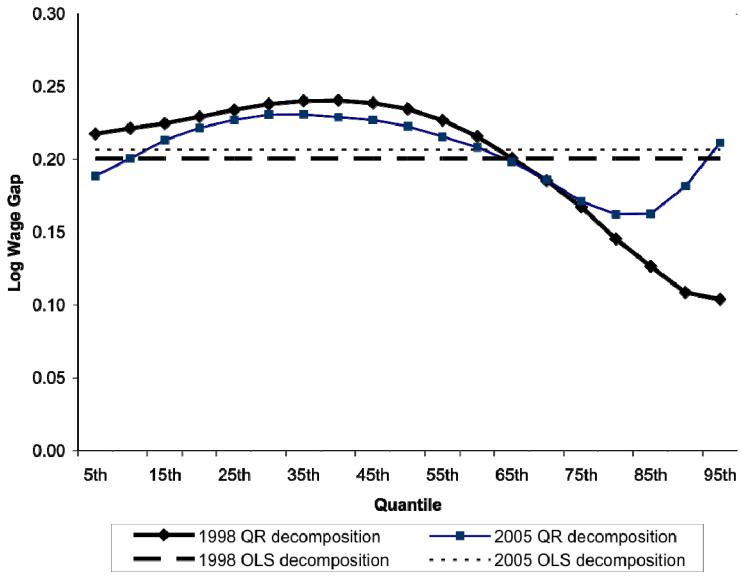
| | OLS | 10th | 25th | 50th | 75th | 90th |
|---|---|---|---|---|---|---|
| **1998** | | | | | | |
| Raw Gender Gap | -0.139 | -0.123 | -0.134 | -0.116 | -0.134 | -0.145 |
| | (0.009) | (0.018) | (0.011) | (0.021) | (0.010) | (0.019) |
| (1) Gap with education and experience as control variables | -0.167 | -0.151 | -0.180 | -0.183 | -0.158 | -0.148 |
| | (0.007) | (0.007) | (0.006) | (0.007) | (0.006) | (0.010) |
| (2) Gap with education, experience, employer size, sector, immigrant, rural, and non-regular working hours as control variables | -0.167 | -0.171 | -0.182 | -0.178 | -0.155 | -0.153 |
| | (0.008) | (0.007) | (0.006) | (0.006) | (0.007) | (0.009) |
| (3) Gap with education, experience, employer size, sector, and other control variables, including occupation | -0.201 | -0.221 | -0.234 | -0.235 | -0.168 | -0.109 |
| | (0.010) | (0.008) | (0.006) | (0.007) | (0.009) | (0.010) |
| **2005** | | | | | | |
| Raw Gender Gap | -0.125 | -0.105 | -0.167 | -0.134 | -0.094 | -0.182 |
| | (0.009) | (0.008) | (0.025) | (0.017) | (0.017) | (0.016) |
| (1) Gap with education and experience as control variables | -0.200 | -0.176 | -0.209 | -0.215 | -0.181 | -0.192 |
| | (0.008) | (0.006) | (0.005) | (0.006) | (0.006) | (0.009) |
| (2) Gap with education, experience, employer size, sector, immigrant, rural, and non-regular working hours as control variables | -0.187 | -0.178 | -0.188 | -0.188 | -0.172 | -0.196 |
| | (0.008) | (0.007) | (0.005) | (0.005) | (0.006) | (0.009) |
| (3) Gap with education, experience, employer size, sector, and other control variables, including occupation | -0.207 | -0.201 | -0.227 | -0.223 | -0.171 | -0.182 |
| | (0.010) | (0.009) | (0.007) | (0.006) | (0.008) | (0.011) |

*Note: Reported gap is based on female counterfactuals constructed by using male characteristics and female rewards. Standard errors are in parentheses. Statistics are computed using the bootstrap estimator. All the coefficients are statistically significant at the 1 percent level.*
*Source: Author's calculations based on the 1998 and 2005 Labour Force Survey.*

The counterfactual gaps calculated for the three specifications, using different sets of control variables, reveal the importance of occupational divisions in explaining the gap. There are notable differences in the estimated gap in model (2) and (3), i.e. in the

specifications with and without the occupation dummy variables, as shown in Table 6. Adding the occupation increases the gender gap in the low to middle part of the distribution, but decreases it a little at the top of the distribution (90$^{th}$ quantile) in both 1998 and 2005. On average, the counterfactual gap increases after controlling for occupation. This finding is counterintuitive at first sight and might indicate that the gender gap between occupations is less important than the gap observed within occupations. The result may also reflect a level of details used in occupational classification. We used only 10 major occupational categories and, therefore, a within-occupation gap could be large.

Figure 3 **Counterfactual Gender Wage Gap**




*Note: The counterfactual gap is calculated using the broadest set of control variables.*
*Source: Author's calculations based on the 1998 and 2005 Labour Force Survey.*

# 5 Gender Wage Gap for Women with Children

The gender wage gap could be affected by women's responsibility for children. From human capital perspective, the wage effects of career interruption due to child bearing are connected with the loss of human capital accumulation or even a depreciation in human capital during the period of absence. By expecting to take child-related leaves, women may choose jobs which both require less continued skills upgrading and provide a more family-friendly environment, but at the expense of lower wages. On the other side, employers may suffer from a longer worker's absence even if they do not cover compensations for child-related leaves, as is the case in most countries. Employers face costs of hiring and training additional workers and may presumably expect less career commitment from their female employees. Therefore, they may be less willing to hire women and provide them high wages or offer them promotion. This effect may be more

pronounced in countries with entitlements for long periods of child-related absence from work.

Empirical studies examining the wage effects of career interruption due to child bearing give mixed results. Some studies have found that career interruption and loss of human capital accumulation due to lengthy leave have a negative impact on women's relative wages (Ruhm, 1998), while others find no permanent effect on the wage gap (Albrecht et al. 1999; Datta Gupta and Smith, 2002). The focus of these studies was on a comparison of wages between mothers and non-mothers. In a similar spirit, by comparing the gender wage gap between mothers and childless women, we explore whether women with children in Croatia are in a worse-off situation supposedly because of their extended absence from work due to child bearing.

Croatia is a country with relatively generous entitlements for child related leaves, more in terms of length of leave and less in terms of compensation. Most women take one year leave after childbirth. Mothers exclusively use the first six months of the leave (maternity leave), while the other six months (parental leave) can be shared between the parents.[12] Mothers use virtually all parental leave and less than 1 percent is taken up by fathers. Women are often absent from work for some time before childbirth, usually 45 days and possibly more, depending on medical considerations. In addition, mothers with young children can be absent from work as often as needed to take care of a sick child.[13] In all these circumstances, wages are compensated to a certain extent by health insurance and by the state. However, the compensation rate is rather low, up to 100 percent of the average Croatian wage for maternity leave (in the first six months); and even less for parental leave, up to 60 percent of the average.[14]

The wage effects of lengthy leaves have been studied for the Nordic countries where the overall system is generous in terms of time, the compensation rate, and availability of child care system. In Croatia only one part of the system is generous (length of leave), while other elements are not so family-friendly (compensation rate and child-care system). Generous maternal and parental leave schemes have been found to increase women's participation in the labour market (see for instance Ruhm, 1998; Waldfogel, 1998; and Jaumotte, 2004). To a certain extent, the same seems to be true for Croatia (Table A4 in

[12] For other features of the child birth related leave schemes in Croatia see Table A3 in Appendix.

[13] Lengthy absence from work in Croatia are reflected in the highest rate of health-related leave in Europe, almost 10 days per worker per year in 2004, as documented in European Foundation for Improving of Living and Working Conditions (2007). Gender division is not provided in the document, but it is highly possible that a notable part of that figure can be attributed to maternity and parental leaves, as well as leaves due to the care of sick child. Gender difference in absence from work can be illustrated by figures from the LFS data base. In 2005, in our sample of employees, there were 2.3 percent of man and 6.2 percent of women that were absent from work for more than one month at the time of the survey.

[14] Underdeveloped child day care schemes make the labour market position of women with children even more vulnerable. Some 40 percent of children of pre-school age (0-6 years) are covered by child care (around 14 percent in 0-2 years age group), while relatively short opening hours is another limiting factor (Matković, 2007). School in Croatia starts typically at the age of 6-7 years and in-school child care arrangements are poorly developed. Schools have relatively short hours, and they often interchange the morning and early afternoon starts, making day care of school age child even more complicated.

Appendix). In 2005, the participation rate for women in prime child bearing age (25-40 years) was around 80 percent as compared to 90 percent for men in the same age group. There is only a slightly lower participation rate for mothers compared to childless women.[15]

We now turn to the gender wage gap and its relation to motherhood by looking at the evidence regarding whether mothers face different wage treatments compared to childless women. A comparison of the wage gap between mothers and childless women cannot unambiguously confirm that the observed difference is due to child-related leave policies, but it can illustrate the possibly disadvantageous position of women with children.[16] It is also possible that private and public sector responses to lengthy leaves are different. The private sector is under stronger market pressures to economise, and it is possible that employers, led by efficiency considerations, compensate "inefficient" child-related leave of mothers by their lower wage and segmentation into poorly-paid jobs. Therefore, we distinguish private sector employers from public sector employers.

Table 7 presents the gender wage gap for mothers with young children (less than 12 years old) and the gap for other women, both calculated against the male wages. The raw (unadjusted) gender gap in 2005 is around 23 percent on average for mothers with children and about 17 percent for non-mothers, both in the private sector. The substantial difference in the gap between these two groups of women is observed at different points of the wage distribution, where the gap considerably widens at the upper tail (at the $90^{th}$ quantile). In the public sector, the raw gender gap was substantially smaller and there was virtually no difference in the gap for these two groups of women.[17] At some points of the distribution an even better-off position of mothers is observed. These findings indicate the unequal wage treatment of mothers with young children in the private sector, especially at the upper part of the wage distribution.

After controlling for education and experience in pooled OLS and quantile regressions with mother and non- mother dummies, the estimated gender wage gap for mothers working in the private sector increased a bit in 1998 and remained almost the same in 2005, both compared to the raw gap in the respective years (the second panel in Table 7). In both years, a certain difference in the mean wage gap between mothers and other women is found in the private sector, but it is not statistically significant (at 5 percent level) either at the mean, or at the $10^{th}$, $50^{th}$ and $90^{th}$ quantiles. Inclusion of more control variables in the model resulted in a slightly lower gender wage gap for both mothers and

[15] Some other forms of mothers' self-selection seem weak in Croatia. In our sample of employees, only a fraction of women (0.5 percent) work less than 20 hours per week, and there is no significant difference between mothers and non-mothers. There is also no strong evidence for self-selection of mothers in the public sector (Table A5 in Appendix).

[16] The leave scheme was roughly unchanged from 1998 to 2005 (the amount of allowance changed a bit, while student mothers and unemployed mothers are entitled for benefit only since mid-2004, too short period to be reflected in data for 2005), so we cannot look at differences in the wage gap which can be attached to changes in leave policy.

[17] In the public sector, especially in budgetary public sector (education, health care and public administration), a close parity in wages between sexes, as well as between mothers and non-mothers is due to more transparent wage setting rules that exclude *a priori* discrimination.

non-mothers. In the "full" model (3), the wage disadvantage of mothers against non-mothers is mild on average, with a widening at the upper part of the distribution. However, the difference is statistically significant (at the 10 percent level) only at the 90$^{th}$ quantile in the private sector, in 1998 as well as in 2005, but not at the other observed points of the wage distribution. Results of the pooled regression give us no clear evidence that employers in general impose a different wage treatment for mothers with small children in comparison with other women. However, private sector employers provide lower wages to mothers at the top of the distribution compared to childless women with otherwise comparable labour characteristics.

Decomposition analysis is a step further in exploring the effects of having children on women's wages by pointing to the gap that is due to the difference in returns to labour market characteristics. Figure 4 presents the results (see also Table A6 in Appendix). First of all, the average gap for both mothers and childless women is lower in the public sector than in the private sector in 1998 as well as in 2005. From 1998 to 2005, the average gap in the private sector has increased, whereas it has substantially decreased in the public sector.

In the private sector, the counterfactual gap for mothers is higher than that of non-mothers all along the whole wage distribution in 1998, while in 2005 the opposite is found for the very low part of the distribution. On average, mothers are in a worse-off situation in both years compared to non-mothers. An increase in the wage gap for all women is found at the top of the distribution. In the public sector, the relation between the gap for mothers and non-mothers is less clear. On average, the wage gap for mothers is lower than the gap for non-mothers. However, the gap for women in general is found to be declining as we move up the wage distribution. A sticky floor for women in the public sector might be in place due to their poor returns to the labour characteristics for low-paid jobs.

| Table 7 **Gender Gap Based on Pooled Quantile Regressions With Mother Dummy** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **Private sector** | | | | **Public sector** | | | |
| | **OLS** | **10th** | **50th** | **90th** | **OLS** | **10th** | **50th** | **90th** |
| **1998** | | | | | | | | |
| Raw Gender Gap | | | | | | | | |
| Mother | -0.174 | -0.087 | -0.239 | -0.154 | -0.094 | -0.105 | -0.091 | -0.118 |
| | (0.018) | (0.029) | (0.010) | (0.043) | (0.015) | (0.033) | (0.032) | (0.037) |
| Non-Mother | -0.152 | -0.087 | -0.192 | -0.154 | -0.108 | -0.154 | -0.093 | -0.077 |
| | (0.016) | (0.029) | (0.021) | (0.027) | (0.012) | (0.034) | (0.025) | (0.025) |
| (1) Gap with education and experience | | | | | | | | |
| Mother | -0.184 | -0.123 | -0.187 | -0.265 | -0.137 | -0.110 | -0.121 | -0.159 |
| | (0.016) | (0.032) | (0.018) | (0.030) | (0.013) | (0.018) | (0.011) | (0.018) |
| Non-Mother | -0.148 | -0.096 | -0.153 | -0.214 | -0.150 | -0.108 | -0.142 | -0.181 |
| | (0.014) | (0.028) | (0.015) | (0.021) | (0.010) | (0.017) | (0.009) | (0.019) |
| (2) Gap with education, experience, employer size, sector, immigrant, rural, and non-regular working hours as controls | | | | | | | | |
| Mother | -0.184 | -0.122 | -0.191 | -0.264 | -0.136 | -0.096 | -0.110 | -0.177 |
| | (0.016) | (0.038) | (0.019) | (0.033) | (0.013) | (0.021) | (0.011) | (0.025) |
| Non-Mother | -0.148 | -0.102 | -0.155 | -0.217 | -0.151 | -0.111 | -0.141 | -0.196 |
| | (0.014) | (0.026) | (0.013) | (0.021) | (0.010) | (0.019) | (0.010) | (0.016) |
| (3) Gap with education, experience, employer size, sector, and other control variables, including occupation | | | | | | | | |
| Mother | -0.181 | -0.127 | -0.170 | -0.271 | -0.131 | -0.089 | -0.115 | -0.159 |
| | (0.016) | (0.034) | (0.017) | (0.028) | (0.012) | (0.021) | (0.016) | (0.027) |
| Non-Mother | -0.150 | -0.113 | -0.154 | -0.199 | -0.147 | -0.109 | -0.143 | -0.169 |
| | (0.015) | (0.027) | (0.019) | (0.031) | (0.010) | (0.017) | (0.013) | (0.022) |
| **2005** | | | | | | | | |
| Raw Gender Gap | | | | | | | | |
| Mother | -0.228 | -0.174 | -0.223 | -0.357 | -0.066 | -0.088 | 0.000 | -0.143 |
| | (0.016) | (0.023) | (0.016) | (0.047) | (0.017) | (0.039) | (0.015) | (0.034) |
| Non-Mother | -0.166 | -0.138 | -0.182 | -0.212 | -0.066 | -0.129 | -0.025 | 0.000 |
| | (0.014) | (0.023) | (0.004) | (0.050) | (0.013) | (0.034) | (0.021) | (0.028) |
| (1) Gap with education and experience | | | | | | | | |
| Mother | -0.229 | -0.160 | -0.214 | -0.294 | -0.154 | -0.092 | -0.134 | -0.182 |
| | (0.014) | (0.026) | (0.015) | (0.023) | (0.014) | (0.028) | (0.016) | (0.026) |
| Non-Mother | -0.201 | -0.127 | -0.195 | -0.261 | -0.154 | -0.107 | -0.159 | -0.204 |
| | (0.012) | (0.016) | (0.010) | (0.028) | (0.010) | (0.018) | (0.013) | (0.020) |
| (2) Gap with education, experience, employer size, sector, immigrant, rural, and non-regular working hours as controls | | | | | | | | |
| Mother | -0.219 | -0.165 | -0.209 | -0.246 | -0.136 | -0.088 | -0.120 | -0.176 |
| | (0.014) | (0.026) | (0.018) | (0.033) | (0.014) | (0.027) | (0.014) | (0.023) |
| Non-Mother | -0.199 | -0.140 | -0.199 | -0.229 | -0.140 | -0.098 | -0.138 | -0.191 |
| | (0.012) | (0.017) | (0.012) | (0.021) | (0.010) | (0.020) | (0.010) | (0.019) |
| (3) Gap with education, experience, employer size, sector, and other control variables, including occupation | | | | | | | | |
| Mother | -0.192 | -0.131 | -0.183 | -0.251 | -0.123 | -0.053 | -0.104 | -0.171 |
| | (0.014) | (0.022) | (0.019) | (0.023) | (0.014) | (0.020) | (0.017) | (0.020) |
| Non-Mother | -0.174 | -0.127 | -0.171 | -0.209 | -0.125 | -0.068 | -0.129 | -0.180 |
| | (0.012) | (0.021) | (0.015) | (0.024) | (0.011) | (0.019) | (0.012) | (0.015) |

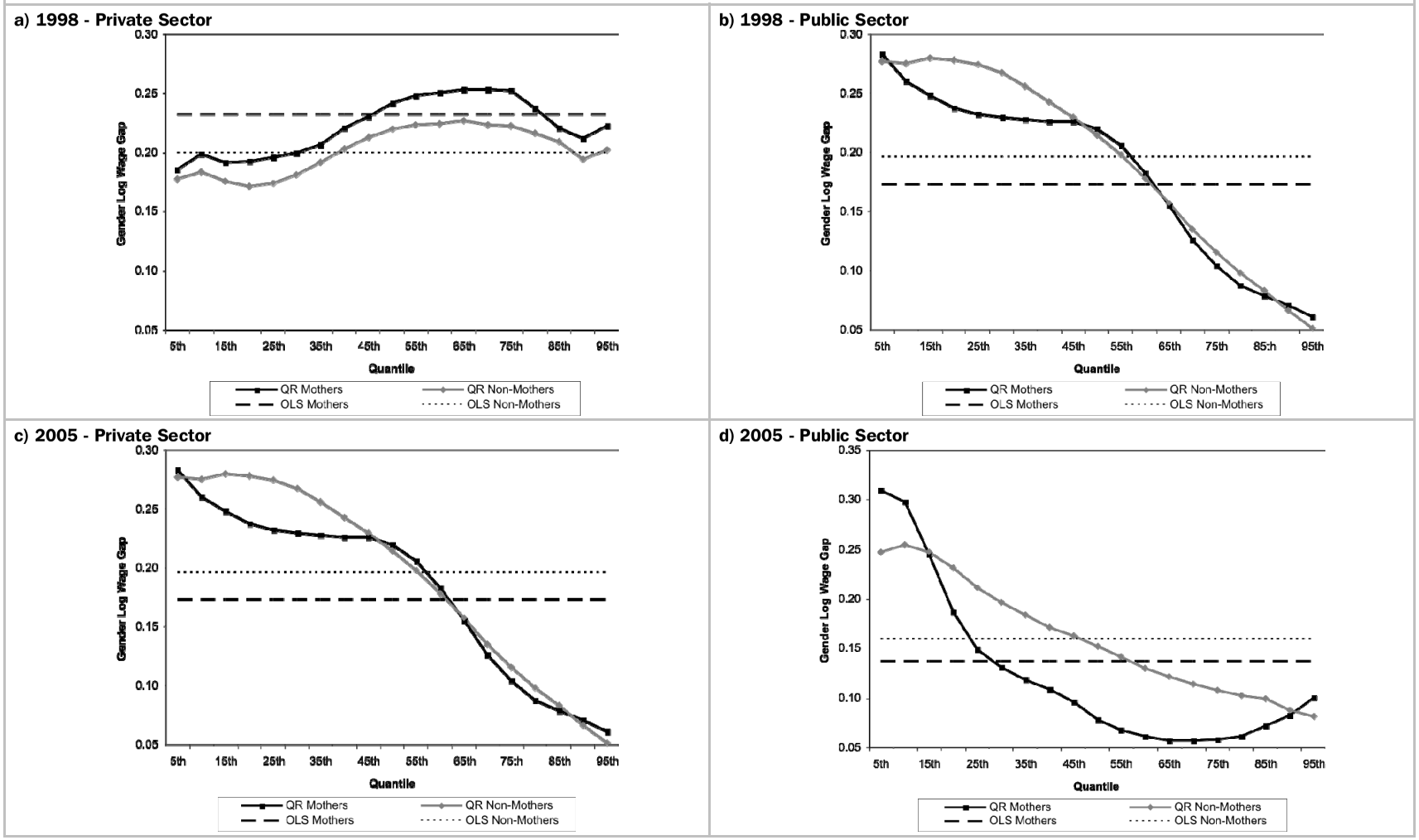
*Note: Mother is defined by having at least one child under 12. Reported figures are the estimated coefficients for mother and gender dummies, followed by their standard errors in parentheses. Statistics are computed using the bootstrap estimator. All the coefficients are statistically significant at the 1 percent level.*
*Source: Author's calculations based on the 1998 and 2005 Labour Force Survey.*

The difference between the counterfactual gaps for mothers and non-mothers that is shown in Figure 5 illustrates the aforementioned findings. In 2005, mothers find themselves more disadvantaged than non-mothers in the private sector, especially at the central part of the wage distribution. They are in comparatively better position in the public sector, notably at the middle of the distribution. In both sectors, the differences are more pronounced in 2005 than in 1998.

Private sector employers in Croatia are more restrained while providing wages for women with children. Lengthy absences from work might explain this finding. However, having in mind almost universal coverage of leave schemes in Croatia and the situation where women take up almost all of the total leave period (the share of men taking up parental leave is negligible), there may be negative effects of parental leave schemes on wages for all young women who are potential mothers, not only on mothers' wages, as pointed out by Datta Gupta and Smith (2002) for the case of Denmark. In a separate set of gender wage gap estimates, we have compared the wage gaps calculated for young women (taken to be under 40 years of age) with those for older women and find the same major findings as in a comparison of the gap between mothers and non-mothers. Young women are faced with a wider gap in the private sector compared with older women, while the situation in the public sector is less conclusive.[18] Therefore, we could speculate that it is not the actual absence from work due to child bearing that lowers women's relative wages, but their potential absence from work which leads to the disadvantageous position for all young women.

[18] The results are not presented to save space. However, the complete set of the estimates are available from the author upon request.

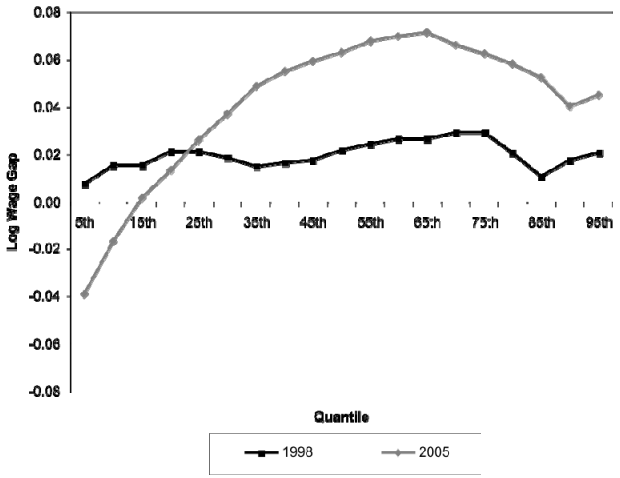
Figure 4 **Counterfactual Gender Wage Gaps for Mothers and Non-Mothers**



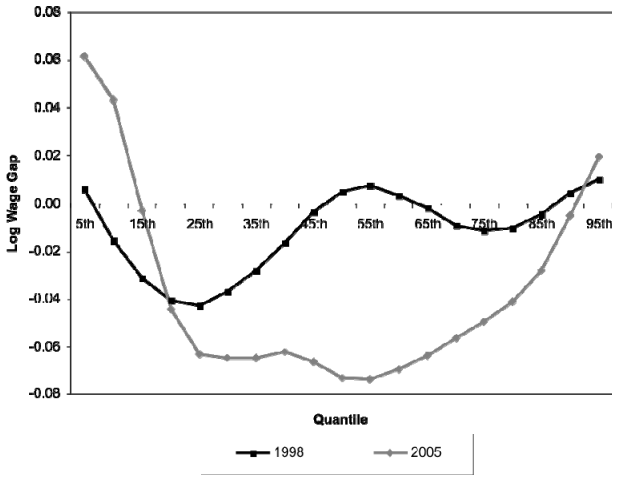

*Source: Author's calculations based on the 1998 and 2005 Labour Force Survey.*

Figure 5 **Difference in Counterfactual Gender Gaps Between Mothers and Non-Mothers**

**a) Private Sector**




**b) Public Sector**




*Source: Author's calculations based on the 1998 and 2005 Labour Force Survey.*

# 6 Conclusion

This paper has provided a comprehensive profile of the gender wage gap in Croatia. The data employed in the study were taken from the Labour Force Survey for 1998 and 2005. Empirical evidence was based on the utilisation of the quantile regression technique and the Machado-Mata counterfactual decomposition method. Our main finding is that women in Croatia have received much lower market rewards for their human capital characteristics than men. In addition, employed women possess a sizable educational advantage over men and a relatively low and narrowing deficit in work experience. Therefore, the relatively small raw (unadjusted) gender wage gap of 12.5 percent in 2005 hides much larger gender disparities.

The gender wage gap of around 19 percent on average in 2005 was estimated from the pooled regressions, including control variables for education and experience. Adding more control variables reduced the gap only modestly to around 17 percent. This suggests that a large part of the gender wage differences remains unexplained by the observed individual, job, and employer characteristics. The inclusion of occupation variables in the set of explanatory variables decreased the gap to a certain extent, suggesting that occupational segregation might be important. The gender wage gap is relatively mild at the lower part of the wage distribution and gets larger as we move towards the top of the distribution. Although of limited statistical significance, this finding indicates a possible presence of a glass-ceiling in Croatia. It also appears that the gender wage gap adjusted for labour market characteristics has increased between 1998 and 2005.

Regression estimates stratified by gender indicate that returns to education and experience are markedly different for men and women. Women face much lower returns, and this kind of disparity gets higher at the upper parts of the wage distribution. Therefore, a counterfactual decomposition analysis has been undertaken in order to determine the part of the gap, which results from the difference in returns to the observed labour characteristics. It was found that the gap is around 20 percent on average due to differing returns by gender. This is probably the best measure of women's disadvantaged status in the wage setting in Croatia, since it is conditioned on the exactly same characteristics for men and women. Due to differences in returns, the gap is the largest at the middle of the distribution, tempering therefore our previous finding on the presence of a glass ceiling. However, it seems that the interplay between differing returns and women's educational advantage at high-paid jobs produces a kind of a glass ceiling.

This paper has also explored the potential impact of motherhood on women's relative wages in Croatia. It was found that private sector employers provide lower wages to mothers with young children than to other women with the same observed labour characteristics. The difference was significant at the top of the wage distribution, but not elsewhere. In the public sector, there was no clear evidence of a different wage treatment between mothers and non-mothers.

The estimated gender wage gap for Croatia could be illustrative for many other countries in Central and Eastern Europe. Relatively low raw gender wage gap widens after accounting for education, as women in many of these countries possess a relative education advantage over men. A relatively generous parental leave policy gives women a strong incentive to participate in the labour market in their prime child bearing age. At the same time, a strong career commitment is not easy to follow when the family policy is restricted to allow only for lengthy leaves, without other family-friendly measures for women's inclusion in the labour market (for instance, an affordable and flexible child day-care system). In situations where women take up almost the whole leave period and take the major responsibility for child rearing, the door is open for wages for all young women to fall behind their male counterparts. Only a more equitable sharing of family responsibilities between parents, including a take up of parental leave, could significantly reduce the part of the gap that is due to child-related absence from work.

# Appendix

Table A1 **OLS and Quantile Regressions, 1998**

| | OLS | 10th | 25th | 50th | 75th | 90th |
|---|---|---|---|---|---|---|
| Female | **-0.160** | **-0.116** | **-0.130** | **-0.157** | **-0.177** | **-0.204** |
| | **(0.008)** | **(0.016)** | **(0.009)** | **(0.010)** | **(0.011)** | **(0.016)** |
| Experience | **0.007** | **0.006** | **0.006** | **0.008** | **0.008** | **0.009** |
| | **(0.001)** | **(0.002)** | **(0.001)** | **(0.001)** | **(0.001)** | **(0.002)** |
| Experience Squared (/100) | *-0.008* | -0.010 | -0.006 | **-0.009** | *-0.008* | **-0.009** |
| | *(0.004)* | (0.006) | (0.004) | **(0.003)** | *(0.003)* | **(0.006)** |
| Education (vs. Unfinished Primary) | | | | | | |
| Primary | *0.056* | 0.036 | **0.074** | **0.082** | **0.090** | 0.041 |
| | *(0.024)* | (0.033) | **(0.027)** | **(0.027)** | **(0.025)** | (0.061) |
| Vocational Secondary | **0.134** | **0.106** | **0.144** | **0.152** | **0.174** | *0.128* |
| | **(0.025)** | **(0.032)** | **(0.029)** | **(0.029)** | **(0.027)** | *(0.060)* |
| General Secondary | **0.212** | **0.181** | **0.224** | **0.246** | **0.262** | **0.227** |
| | **(0.025)** | **(0.033)** | **(0.027)** | **(0.030)** | **(0.026)** | **(0.060)** |
| 2-year College | **0.333** | **0.392** | **0.370** | **0.330** | **0.327** | **0.313** |
| | **(0.028)** | **(0.044)** | **(0.030)** | **(0.033)** | **(0.032)** | **(0.068)** |
| University Graduate | **0.429** | **0.402** | **0.431** | **0.460** | **0.439** | **0.451** |
| | **(0.032)** | **(0.053)** | **(0.035)** | **(0.040)** | **(0.044)** | **(0.076)** |
| Postgraduate | **0.568** | **0.555** | **0.545** | **0.528** | **0.533** | **0.665** |
| | **(0.051)** | **(0.054)** | **(0.043)** | **(0.048)** | **(0.060)** | **(0.141)** |
| Occupation (vs. Elementary) | | | | | | |
| Plant/Machine Operator | **0.044** | -0.018 | *0.034* | **0.072** | **0.084** | 0.039 |
| | **(0.015)** | (0.032) | *(0.016)* | **(0.016)** | **(0.018)** | (0.029) |
| Craftsman | **0.067** | 0.028 | **0.056** | **0.071** | **0.092** | **0.047** |
| | **(0.015)** | (0.034) | **(0.016)** | **(0.015)** | **(0.021)** | **(0.030)** |
| Farming | -0.042 | -0.077 | -0.022 | 0.018 | 0.041 | 0.036 |
| | (0.051) | (0.158) | (0.069) | (0.073) | (0.044) | (0.059) |
| Service and Sales | **0.036** | **0.011** | **0.045** | **0.050** | **0.072** | **0.013** |
| | **(0.015)** | **(0.029)** | **(0.015)** | **(0.014)** | **(0.019)** | **(0.031)** |
| Clerk | **0.204** | **0.203** | **0.209** | **0.212** | **0.226** | **0.178** |
| | **(0.015)** | **(0.027)** | **(0.015)** | **(0.015)** | **(0.019)** | **(0.029)** |
| Technician | **0.276** | **0.262** | **0.279** | **0.291** | **0.299** | **0.240** |
| | **(0.016)** | **(0.031)** | **(0.017)** | **(0.017)** | **(0.023)** | **(0.032)** |
| Professional | **0.381** | **0.374** | **0.385** | **0.371** | **0.438** | **0.353** |
| | **(0.026)** | **(0.044)** | **(0.026)** | **(0.027)** | **(0.035)** | **(0.056)** |
| Management and Administration | **0.566** | **0.519** | **0.506** | **0.514** | **0.659** | **0.756** |
| | **(0.041)** | **(0.062)** | **(0.035)** | **(0.041)** | **(0.069)** | **(0.111)** |
| Military | **0.593** | **0.521** | **0.627** | **0.639** | **0.623** | **0.542** |
| | **(0.025)** | **(0.075)** | **(0.050)** | **(0.042)** | **(0.022)** | **(0.052)** |
| Firm Size (vs. <10 Employees) | | | | | | |
| 10-50 Employees | 0.017 | 0.011 | 0.013 | 0.013 | 0.012 | 0.006 |
| | (0.011) | (0.021) | (0.011) | (0.009) | (0.014) | (0.017) |
| 50-200 Employees | 0.005 | -0.002 | 0.010 | -0.008 | -0.005 | -0.003 |
| | (0.011) | (0.018) | (0.012) | (0.011) | (0.012) | (0.017) |
| Over 200 Employees | **0.052** | **0.051** | **0.044** | **0.037** | *0.029* | 0.026 |
| | **(0.011)** | **(0.019)** | **(0.015)** | **(0.011)** | *(0.013)* | (0.019) |
| Public | **0.045** | **0.104** | **0.098** | **0.068** | **0.032** | *-0.025* |
| | **(0.009)** | **(0.012)** | **(0.009)** | **(0.008)** | **(0.011)** | *(0.012)* |
| Rural | **-0.058** | **-0.065** | **-0.062** | **-0.059** | **-0.061** | **-0.058** |
| | **(0.008)** | **(0.014)** | **(0.009)** | **(0.007)** | **(0.008)** | **(0.013)** |
| Non-regular Hours | **0.059** | **0.058** | **0.049** | **0.046** | **0.084** | **0.085** |
| | **(0.012)** | **(0.020)** | **(0.013)** | **(0.010)** | **(0.013)** | **(0.020)** |
| Immigrant | -0.041 | -0.074 | -0.039 | -0.011 | -0.049 | 0.006 |
| | (0.025) | (0.045) | (0.036) | (0.026) | (0.028) | (0.061) |
| Constant | **2.125** | **1.745** | **1.876** | **2.072** | **2.269** | **2.584** |
| | **(0.026)** | **(0.041)** | **(0.030)** | **(0.028)** | **(0.031)** | **(0.069)** |
| (Adjusted R2) Pseudo R2 | (0.3866) | 0.1914 | 0.2379 | 0.2529 | 0.245 | 0.2316 |

*Note: Bootstrap standard errors are in parentheses. Bold letters indicate statistical significance at the 1 percent level, whereas italics indicate statistical significance at the 5 percent level.*
*Source: Author's calculations based on the 1998 and 2005 LFS.*

| Table A2 **OLS and Quantile Regressions, 2005** | | | | | | |
|---|---|---|---|---|---|---|
| | **OLS** | **10th** | **25th** | **50th** | **75th** | **90th** |
| Female | **-0.169** | **-0.104** | **-0.140** | **-0.168** | **-0.191** | **-0.217** |
| | **(0.007)** | **(0.011)** | **(0.009)** | **(0.010)** | **(0.011)** | **(0.016)** |
| Experience | **0.013** | **0.010** | **0.011** | **0.014** | **0.015** | **0.015** |
| | **(0.001)** | **(0.002)** | **(0.002)** | **(0.001)** | **(0.001)** | **(0.002)** |
| Experience Squared (/100) | **-0.020** | **-0.015** | **-0.018** | **-0.022** | **-0.024** | **-0.023** |
| | **(0.003)** | **(0.006)** | **(0.005)** | **(0.003)** | **(0.003)** | **(0.006)** |
| Education (vs. Unfinished Primary) | | | | | | |
| Primary | 0.028 | 0.127 | 0.090 | 0.035 | 0.030 | 0.068 |
| | (0.044) | (0.068) | (0.046) | (0.031) | (0.042) | (0.077) |
| Vocational Secondary | **0.128** | **0.240** | **0.204** | **0.138** | *0.113* | **0.131** |
| | **(0.044)** | **(0.070)** | **(0.047)** | **(0.032)** | *(0.046)* | **(0.079)** |
| General Secondary | **0.201** | **0.303** | **0.244** | **0.219** | **0.196** | **0.211** |
| | **(0.045)** | **(0.070)** | **(0.049)** | **(0.031)** | **(0.046)** | **(0.077)** |
| 2-year College | **0.320** | **0.442** | **0.378** | **0.330** | **0.292** | **0.331** |
| | **(0.046)** | **(0.077)** | **(0.049)** | **(0.036)** | **(0.053)** | **(0.084)** |
| University Graduate | **0.405** | **0.509** | **0.457** | **0.410** | **0.396** | **0.462** |
| | **(0.050)** | **(0.079)** | **(0.059)** | **(0.042)** | **(0.060)** | **(0.093)** |
| Postgraduate | **0.667** | **0.741** | **0.647** | **0.637** | **0.692** | **0.748** |
| | **(0.066)** | **(0.080)** | **(0.066)** | **(0.060)** | **(0.082)** | **(0.116)** |
| Occupation (vs. Elementary) | | | | | | |
| Plant/Machine Operator | **0.042** | 0.016 | 0.027 | *0.046* | **0.072** | **0.077** |
| | **(0.015)** | (0.024) | (0.018) | *(0.019)* | **(0.021)** | **(0.029)** |
| Craftsman | **0.143** | **0.123** | **0.127** | **0.128** | **0.169** | **0.177** |
| | **(0.016)** | **(0.027)** | **(0.021)** | **(0.018)** | **(0.023)** | **(0.040)** |
| Farming | -0.001 | -0.136 | 0.013 | 0.105 | **0.137** | **0.203** |
| | (0.059) | (0.141) | (0.066) | (0.060) | **(0.028)** | **(0.062)** |
| Service and Sales | **0.063** | **0.073** | **0.057** | **0.071** | **0.093** | *0.086* |
| | **(0.015)** | **(0.020)** | **(0.016)** | **(0.016)** | **(0.020)** | *(0.034)* |
| Clerk | **0.221** | **0.220** | **0.231** | **0.217** | **0.246** | **0.276** |
| | **(0.015)** | **(0.029)** | **(0.022)** | **(0.017)** | **(0.024)** | **(0.034)** |
| Technician | **0.322** | **0.329** | **0.330** | **0.315** | **0.342** | **0.337** |
| | **(0.016)** | **(0.024)** | **(0.020)** | **(0.016)** | **(0.023)** | **(0.038)** |
| Professional | **0.464** | **0.427** | **0.402** | **0.413** | **0.512** | **0.544** |
| | **(0.027)** | **(0.043)** | **(0.039)** | **(0.032)** | **(0.042)** | **(0.046)** |
| Management and Administration | **0.676** | **0.522** | **0.576** | **0.662** | **0.857** | **0.864** |
| | **(0.041)** | **(0.046)** | **(0.053)** | **(0.031)** | **(0.066)** | **(0.057)** |
| Military | **0.344** | **0.454** | **0.344** | **0.321** | **0.285** | **0.336** |
| | **(0.025)** | **(0.042)** | **(0.037)** | **(0.029)** | **(0.037)** | **(0.077)** |
| Firm size (vs. <10 Employees) | | | | | | |
| 10-50 Employees | **0.062** | **0.096** | **0.061** | **0.050** | *0.028* | *0.039* |
| | **(0.010)** | **(0.016)** | **(0.012)** | **(0.011)** | *(0.011)* | *(0.017)* |
| 50-200 Employees | **0.046** | **0.083** | **0.038** | **0.038** | *0.023* | 0.035 |
| | **(0.011)** | **(0.017)** | **(0.012)** | **(0.012)** | *(0.012)* | (0.019) |
| Over 200 Employees | **0.085** | **0.095** | **0.072** | **0.074** | **0.068** | **0.076** |
| | **(0.011)** | **(0.017)** | **(0.013)** | **(0.012)** | **(0.013)** | **(0.019)** |
| Public | **0.087** | **0.203** | **0.177** | **0.110** | **0.055** | **-0.020** |
| | **(0.008)** | **(0.013)** | **(0.012)** | **(0.010)** | **(0.011)** | **(0.015)** |
| Rural | **-0.056** | **-0.047** | **-0.056** | **-0.055** | **-0.054** | **-0.049** |
| | **(0.007)** | **(0.010)** | **(0.008)** | **(0.008)** | **(0.010)** | **(0.012)** |
| Non-regular Hours | **0.087** | 0.025 | **0.066** | **0.084** | **0.100** | **0.154** |
| | **(0.011)** | (0.020) | **(0.015)** | **(0.010)** | **(0.015)** | **(0.023)** |
| Immigrant | *-0.050* | -0.055 | **-0.064** | *-0.042* | -0.040 | 0.000 |
| | *(0.020)* | (0.031) | **(0.024)** | *(0.020)* | (0.023) | (0.039) |
| Constant | **2.511** | **1.983** | **2.244** | **2.494** | **2.703** | **2.859** |
| | **(0.044)** | **(0.071)** | **(0.047)** | **(0.033)** | **(0.048)** | **(0.083)** |
| (Adjusted R2) Pseudo R2 | (0.4773) | 0.2719 | 0.3096 | 0.3175 | 0.3053 | 0.3028 |

*Note: Bootstrap standard errors are in parentheses. Bold letters indicate statistical significance at the 1 percent level, whereas italics indicate statistical significance at the 5 percent level.*
*Source: Author's calculations based on the 1998 and 2005 LFS.*

| Table A3 **Maternity Leave, Paternity Leave, and Parental Leave in Croatia, 2005** | | |
|---|---|---|
| | **Length of Child Birth Related Leave** | **Benefits** |
| **Maternity** | 45 days before the expected birth date (28 days mandated); 6 months after the birth (42 days mandated) | 100%<br>(min. HRK 1,663 per month, cca 40% of average wage; max. HRK 4,257 cca 100% of average wage) |
| **Paternity** | Up to 7 days | 100% |
| **Parental** | 6 months (with 2 additional months if the father takes at least 3 months leave)<br><br>Until 3 years of the child for twins, the third and any subsequent child<br><br>Until 3 years of the child | Full-time fixed allowance of HRK 1,663-2,500 per month (cca. 40%-60% of average wage)<br><br>Full-time fixed allowance of HRK 1,663 after the first year (cca. 40%of average wage)<br><br>Unpaid (after the first year) |

*Note: Student mothers and unemployed mothers are entitled for 1 year maternity leave (or until 3 years of the child for twins, the third and any subsequent child) with a fixed allowance of HRK 1,663 (cca. 40 percent of the average monthly wage)*
*Source: Author's classification based on Croatian Institute for Health Insurance (2007).*

| Table A4 **Labour Force Participation (15-64 Years)** | | | | | |
|---|---|---|---|---|---|
| | **Men (25-40 years)** | **Other Men** | **Mothers* (25-40 years)** | **Non-Mothers (25-40 years)** | **Other Women** |
| **1998** | | | | | |
| Participation Rate | 89.9% | 60.7% | 75.1% | 83.4% | 46.1% |
| Employment Rate | 80.8% | 53.3% | 66.7% | 73.7% | 40.0% |
| Unemployment Rate | 10.2% | 12.2% | 11.2% | 11.7% | 13.2% |
| **2005** | | | | | |
| Participation Rate | 89.3% | 62.2% | 78.5% | 83.7% | 47.7% |
| Employment Rate | 80.0% | 54.3% | 67.1% | 70.5% | 40.8% |
| Unemployment Rate | 10.4% | 12.7% | 14.5% | 15.7% | 14.4% |

*Note: *Refers to mothers with children of less than 12 years of age.*
*Source: Author's calculations based on the 1998 and 2005 LFS.*

| Table A5 **Sector Composition of Employment** | | | | | |
|---|---|---|---|---|---|
| | **Men (25-40 years)** | **Other Men** | **Mothers* (25-40 years)** | **Non-Mothers (25-40 years)** | **Other Women** |
| **1998** | | | | | |
| Private Sector (% of total) | 39.0% | 36.2% | 40.4% | 41.4% | 38.6% |
| Public Sector (% of total) | 61.0% | 63.8% | 59.6% | 58.6% | 61.4% |
| Number of Observations | 2,395 | 2,959 | 1,355 | 896 | 2,408 |
| **2005** | | | | | |
| Private Sector (% of total) | 62.4% | 57.3% | 62.4% | 62.1% | 51.0% |
| Public Sector (% of total) | 37.6% | 42.7% | 37.6% | 37.9% | 49.0% |
| Number of Observations | 1,978 | 3,084 | 977 | 760 | 2,403 |

*Note: *Refers to mothers with children of less than 12 years of age.*
*Source: Author's calculations based on the 1998 and 2005 LFS.*

| Table A6 **Counterfactual Gender Wage Gap for Mothers/Non-Mothers** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | **Private Sector** | | | | **Public Sector** | | | |
| | **OLS** | **10th** | **50th** | **90th** | **OLS** | **10th** | **50th** | **90th** |
| **1998** | | | | | | | | |
| Raw Gender Gap | | | | | | | | |
| Mother | -0.174 | -0.087 | -0.239 | -0.154 | -0.094 | -0.105 | -0.091 | -0.118 |
| | (0.018) | (0.029) | (0.010) | (0.043) | (0.015) | (0.033) | (0.032) | (0.037) |
| Non-Mother | -0.152 | -0.087 | -0.192 | -0.154 | -0.108 | -0.154 | -0.093 | -0.077 |
| | (0.016) | (0.029) | (0.021) | (0.027) | (0.012) | (0.034) | (0.025) | (0.025) |
| Gap with education, experience, employer size, sector, and other control variables, including occupation | | | | | | | | |
| Mother | -0.233 | -0.199 | -0.242 | -0.212 | -0.173 | -0.260 | -0.220 | -0.071 |
| | (0.025) | (0.015) | (0.010) | (0.019) | (0.028) | (0.017) | (0.012) | (0.013) |
| Non-Mother | -0.199 | -0.183 | -0.220 | -0.194 | -0.196 | -0.275 | -0.214 | -0.066 |
| | (0.025) | (0.013) | (0.010) | (0.020) | (0.028) | (0.014) | (0.011) | (0.015) |
| **2005** | | | | | | | | |
| Raw Gender Gap | | | | | | | | |
| Mother | -0.228 | -0.174 | -0.223 | -0.357 | -0.066 | -0.088 | 0.000 | -0.143 |
| | (0.016) | (0.023) | (0.016) | (0.047) | (0.017) | (0.039) | (0.015) | (0.034) |
| Non-Mother | -0.166 | -0.138 | -0.182 | -0.212 | -0.066 | -0.129 | -0.025 | 0.000 |
| | (0.014) | (0.023) | (0.004) | (0.050) | (0.013) | (0.034) | (0.021) | (0.028) |
| Gap with education, experience, employer size, sector, and other control variables, including occupation | | | | | | | | |
| Mother | -0.253 | -0.190 | -0.285 | -0.264 | -0.138 | -0.298 | -0.079 | -0.083 |
| | (0.027) | (0.013) | (0.010) | (0.025) | (0.042) | (0.020) | (0.010) | (0.013) |
| Non-Mother | -0.220 | -0.207 | -0.222 | -0.224 | -0.160 | -0.255 | -0.152 | -0.088 |
| | (0.027) | (0.012) | (0.009) | (0.018) | (0.042) | (0.014) | (0.008) | (0.016) |

*Note: Mother is defined by having at least one child under 12. Reported gap is based on counterfactuals constructed using male characteristics and female rewards. Standard errors are in parentheses. Statistics are computed using the bootstrap estimator. All the coefficients are statistically significant at the 1 percent level.*
*Source: Author's calculations based on the 1998 and 2005 LFS.*

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