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GENDER WAGE GAP IN LATVIA

Authors: Madara Gaveika
Kristilla Skrūzkalne

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Madara Gaveika
and
Kristilla Skrūzkalne

Supervisor: Anna Zasova

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Abstract

The principle objective of this paper is to analyze the gender wage gap development from 2004 until 2009 in Latvia. The basis of this study is the Oaxaca-Ransom decomposition model, accompanied by quantile analysis and Heckman selection correction model. Findings indicate that women in Latvia are earning substantially lower wages than men and this magnitude cannot be explained by any of the observed factors; thus suggesting gender discrimination in the Latvian labour market. Moreover, results suggest that the gender wage gap movements follow economic cycles in Latvia, during economic boom gender wage gap surged, while during the crisis it narrowed. These fluctuations are mainly associated with occupational factors - when economy boomed, higher wages were typically rewarded to men-dominated sectors which in turn were the hardest hit by the crisis. Further analysis indicates that glass ceiling effect is present in Latvia for the most of the sample period and that the gender wage gap is underestimated due to selection bias.

JEL classification: J01, J71

Keywords: Gender wage gap, Oaxaca-Ransom decomposition, Heckman selection correction, Economic cycles, Quantiles, Glass ceiling

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Introduction

Gender wage gap has been among the most widely discussed issues in labour economics and reducing it has been a continuous aim on the gender equality and European Employment Strategy policy agenda (Plantenga & Remery, 2006). In recent decades governments and organizations alike have been striving to eliminate the gap via different policy measures and incentives, and although the earnings differences between men and women have steadily decreased, the gender wage gap perseveres. It has been a persistent source of public concern and researchers have raised question whether the gap is the result of female discrimination or differences in lifestyle and job characteristics.

Gender wage gap (observed or unadjusted) is expressed as the difference between the male and female (hourly) natural logarithm earnings (Eurostat, 2012). In the analysis of this phenomenon, researchers differentiate between unadjusted (*raw*) and adjusted (*unexplained*) gender wage gap. The adjusted gap takes into account the differences in human capital characteristics such as the level of education, experience, hours worked, etc. Along with increased female participation in the work force and acquiring better education, such factors as occupational segregation (i.e., opting for lower-paid jobs and industries) and lifestyle choices (i.e., women with children tend to work less hours a week) have become increasingly important in explaining the gender wage gap.

According to Eurostat (2012a), in the European Union the unadjusted gender wage gap has been relatively stable and in 2010 women had 17.5% lower gross hourly earnings than men; however, in Latvia the unadjusted gap has been fluctuating over the recent years, from 13.4% in 2008 to 17.6% in 2010 (see Table 2). Few studies have attempted to study gender wage gap in Latvia, moreover they have analyzed the gap prior to 2005. In our study we will aim to study the recent gender wage gap development in Latvia throughout the period of 2004 until 2009 for full-time earners, thus observing the gap trend during the economic boom and crisis.

We define our research question as: *"How has the gender wage gap developed in Latvia over the time period of 2004 until 2009?"* We shall aim to analyze the explained and unexplained gender wage gap and the main factors contributing to the widening or narrowing of the gap.

The time studied in our research is highlighted by great changes in economic development. From 2004 until 2009 the Latvian economy has experienced both rapid

economic development and economic turmoil and crisis. From 2004 until 2007 Latvia had substantial real GDP growth, amounting to 11% in 2006 and 9.6% in 2007, however by the end of 2008 the overheated Latvian economy went into recession and 2009 was underlined by deepest GDP decline in the EU when Latvian economy shrank by 17.7% (Eurostat, 2012b). Such extreme shifts in the economic environment had significant impact also on the Latvian labour market. During economic boom years wages and employment rose for both men and women, but crisis had more severe impact on men whose wages decreased slightly more than those of women and men also had much larger unemployment in 2009 (20% vs 13.8%) (Eurostat, 2012c). Thus it is plausible that economic cycles had also an impact on gender wage gap. Thus we arrive at our first hypothesis:

Hypothesis #1: Gender wage gap fluctuates along with economic cycles in Latvia.

Also, in order to better comprehend the situation in Latvia, we will explore the characteristics of the most narrow and widest gender wage gaps, thus we shall analyze the gap quantiles from which we will be able to observe whether there exists a glass ceiling effect in Latvia which has been reported in most developed countries. Thus we define our second hypothesis as follows:

Hypothesis #2: There exists a glass ceiling effect for women in Latvia.

Furthermore, we will research whether there exists a sample selection bias in regards to the gap, namely, whether those women who work significantly differ from those who opt not to participate in the labour market which could potentially underestimate the observed gender wage gap. Hence our third hypothesis is as follows:

Hypothesis #3: Gender wage gap is underestimated due to selection bias.

In our thesis, we specifically analyze the hourly gender wage gap for full time workers and apply a comprehensive data set from European Union Statistics on Income and Living conditions for the sample period of 2004-2009.

The study is structured as follows. Firstly, we will examine previous literature on gender wage gap and its determinants, we will also review studies on gender wage gap specifically in Latvia. Secondly, we shall detail the data used and describe our methodology. Next, we will present our findings and conclusions.

1 Literature review

In this section we review literature on various factors that influence the gender wage gap. Overall, the (unadjusted or observed) gender wage gap refers to the difference between natural logarithm of male's and female's hourly earnings. Although the observed (unadjusted) gender wage gap provides an overall view of the situation between men and women's earnings, it might be the case that men possess better education or more experience and thus when measuring the gender wage gap numerous human capital factors and job characteristics should be accounted for to acquire the adjusted (unexplained) gender wage gap. Researchers have found that women and men differ in these factors and these factors do have differing impact on the returns that men and women earn. In the literature review we examine these factors and their impact on the gap, we also investigate recent researches that have analyzed the gap in Latvia.

Education level is among the most widely studied factors that influence the gender wage gap, at the same time many authors agree that education has ceased to have as high impact on gender pay gap as previously. Metcalf (2009) argues that educational level has equalized between genders, thus it is no more a significant variable in explaining the gender pay gap, moreover educational level has increased more rapidly for females than males in the recent years (O'Neill, 2003; Goldberg Dey & Hill, 2007). Nevertheless, Goldberg Dey and Hill (2007) find that even after controlling for other possible influential factors, women with equal educational level earn lower wages than men.

While it is true that the level of education between genders has converged, women on average choose majors that give smaller future returns (e.g. health, education, psychology). Meanwhile men prefer engineering and sciences. Nevertheless, even within the same major women on average have lower wages than men. What is even more striking is the fact that for majors that promise higher future returns the gender wage gap is found to be higher: in education it is only 5%, while in mathematics 24%. Moreover, gender wage gap widens as the time passes after university graduation, namely 20% one year after graduation and 31% after 10 years (Goldberg Dey and Hill, 2007).

Family status differences between men and women might explain the growing gap after graduation. Goldberg Dey and Hill (2007) suggest that the main impact during these 10 years after graduation emerges from childbirth. Although the

proportion of men and women who are married and have children is almost the same, it has quite the opposite effect with respect to professional life of men and women. It has been discovered that 23% of women with children leave employment altogether and 17% are working part time. Meanwhile, children have negligible effect on men's professional life. Moreover, it is shown that birth of children has a negative effect on women's earnings. On the other hand, what at first might seem striking, men who have children experience higher wage than childless men (Goldberg Dey and Hill, 2007). O'Neill (2003) certifies these findings. The author shows that men contrary to women take on more work after child birth. This factor explains the increased wage for fathers.

Overall, the possibility of having children in itself has an intensifying impact on gender wage gap, women might choose more flexible and less intense job due to the awareness that they will be the ones who will take care of children and the household in the future (O'Neill, 2003). However, the impact of children on gender wage gap mainly comes from decreased working hours after childbirth not from the fact of having children itself (Metcalf, 2009). Barkley, Stock, and Sylvius (1999) find that marriage, even with no children present, has the inverse effect for men and women - married men being more efficient than single men, and the reverse holds for women. Metcalf (2009) contributes with discussion on the impact of children on gender wage gap for different educational degrees. The author finds that women with low level of education face enormous decrease in wage (58%) after childbirth. Moreover, childbirth effect is decreasing as educational degree increases, being just 4% for women with university diploma.

As women tend to work less hours due to children, their work experience diminishes over the years in comparison with that of men. Metcalf (2009) argues that due to lower level of experience and more career brakes for women, higher gender wage gap is observed with the length of career. Therefore, in the case of enhanced compensation to experience, the gender wage gap will increase (Plantenga & Remery, 2006). O'Neill (1985), and Plantenga and Remery (2006) both suggest that gender wage gap also expands as age rises. It is explained by the fact that men outperform women at educational level in older ages.

Alongside human capital reasoning in explaining gender wage gap, occupational segregation has been an increasingly significant factor. Blau and Kahn (1996) argue that recent trends in increasing wage inequality have been associated

with precisely occupational segregation changes. As women are inclined to work in different industries and professions, a rise in return industry differentials will increase the gender wage gap all else equal. Similarly, countries with substantial occupational segregation and higher wages in men-dominated professions will tend to have larger wage gaps. More recently, Blau & Kahn (2003) have found that collective bargaining mechanisms such as unions or minimum wage laws are significantly negatively associated with gender wage gap; this centralized approach is likely to narrow the gap via reduced variation across industries (thus affecting the occupational segregation) and via increased minimum wage. Overall, a more unionized country with centralized wage setting process is expected to have a lower gender wage gap.

Other studies investigating wage differences between men and women working in the same company and occupation (within-job-cell) have found that women and men doing the same job in the same company have significant wage differences, even when controlling for human capital characteristics, thus proving that "equal pay for equal work" does not persist for males and females (Bayard et al. (2003), Datta Gupta & Rothstein (2005), Amuedo-Dorantes & De la Rica (2006)).

Alongside human capital and job characteristics factors, researchers have turned to analyzing the selection bias in the gender wage gap. As gender gap persists also in employment rates across countries and it is plausible that women either choose to participate or to not participate in the labour market, thus sample selection correction is important to evaluate gender wage gaps. Researchers argue that those females who choose not to work are likely those who would receive the lowest returns from work, therefore affecting female wage distribution and participation rates; thus the gender wage gap would be underestimated (Picchio and Mussida, 2011). Hence, sample selection correction would present a more accurate view of the gender wage gap in the case when women and men would have the same propensity to work, i.e., when women would work as much as men. Furthermore, sample selection is essential in order to make international comparisons as countries greatly differ in employment participation rates for women and men (Olivetti and Petrongolo (2008), Albrecht, Vuuren and Vroman (2008)).

Blau and Kahn (2006) claim that selection bias contributed approximately 10% to the gender wage gap in the 1980ties and 1990ties in the US, moreover, the slowing convergence of unexplained gender gap is partly attributable to labour force selectivity.

By using a similar selection correction method as Blau and Kahn (2006), Olivetti and Petrongolo (2008) argue that international differences in gender employment gaps explain cross-country variation in gender wage gaps while controlling for selection. They analyze data from 1994 until 2001 from the US and Europe and find that even in their most conservative estimations, employment selection explains 45% of the negative correlation between employment and wage gaps. The authors argue that if employed women are inclined to have relatively high-wage attributes, then low female employment rates are associated with low gender pay gaps due to the fact that low-wage females would thus not participate in the observed wage distribution.

2 Gender wage gap in Latvia

Within his study "Unemployment and Earnings Structure in Latvia", Hazans (2005) briefly analyzes also the gender wage gap in Latvia from 2000 until 2002. The author finds that gender wage ratio significantly fluctuates across professions and industries; for instance, the difference in wages between men and women in public sector is minor, while in financial intermediation sector the difference is 57%. However, when controlling for profession and hours worked, the gap does not change substantially, hence these factors do not explain the gender wage gap. Using 2002 Labour Force Survey (LFS) data and applying Oaxaca-Ransom methodology, Hazans finds that the gender wage gap amounts to 19% and majority of it remains unexplained. At the same time, females are on average better educated, they have longer job experience and tenure. The author also disentangles the explained gender wage gap and concludes that about 15% is attributed to occupational segregation, while productivity differential explains about 25% of the gap.

Within the study "Wage and its Impacting Factors" (2006), authors briefly explain the gender differences in regards to remuneration. The research analyzes only full-time earners with higher education and obtains data from Latvian Labour Force Survey 2003-2004. The authors find that when controlling for occupations and industries gender wage gap amounts to 21.5%, having children does not have a significant impact on the gap, while the gap is found to be larger in the private sector and cities.

The most comprehensive study that examines the gender wage gap is a research "Gender Equality Aspects in the Labour Market" (2006) conducted by companies Factum & Biss. The study includes full-time employees who have worked at least 35 hours per week, however, to measure the gender wage gap average monthly earnings not hourly earnings are used and Oaxaca-Ransom decomposition method is applied. Authors find that the gender wage gap in 2005 ranges from 21.2% to 23.9%, when occupational control is introduced the gap narrows to 18.2% - 21.5% (see Table 1) . Overall, half of the gender wage gap can be explained when controlling for "age, education, nationality (or Latvian proficiency), marital status, work contract type, profession, number of hours worked, tenure, company location, company ownership sector, sector of activity and number of employees" ("Gender Equality Aspects in the Labour Market", p. 69, 2006).

Table 1 Gender wage gap in Latvia 2005

	LFS data (2005, age 15-74)	LFS data (2005, age 18-64, without higher level managers)	WIF data (2005, age 18-64, without higher level managers)
Gender wage gap without occupational control	21.2%	21.4%	23,9%
Gender wage gap with occupational control	18.2%	18.5%	21.5%

Source: Created by authors using information from "Gender Equality Aspects in the Labour Market" (2006)

The study finds that higher education level is associated with decreasing gender wage gap. Occupational segregation, on the other hand, impacts gender wage gap in the favour of males, almost a quarter of men work in industries with relatively high wages, while for women this proportion is less than 10%. Hence, a significantly larger proportion of women work in lower paying industries. Consistent with previous literature, the study finds that married men tend to receive higher returns than married women. The study also used data from Household budget survey 2002 and 2004, authors found that the gender wage gap increased from 2004 to 2005 which was likely due to the emigration of the labour force.

Christofides, Polycarpou and Vrachimis (2010) analyze gender wage gap in the EU using EU-SILC 2007 data and find that Latvia has among the highest gender wage gaps in Europe (roughly 30%), also the unexplained component is among the largest and glass ceiling is not present in Latvia in 2007. Moreover, they are the first

to correct for sample selection bias using Heckman selection model, the authors find that the selection corrected gender wage gap is 39% in 2007. However, it should be noted that the authors have limited their sample to employees earning over €1000.

A recent study "Widening the gender gap: the impact of public sector pay and job cuts on the employment and working conditions of women in four countries" (Labour research department, 2011) finds that the public sector cuts have resulted in larger wage reductions for women than men, thus widening the unadjusted gender wage gap in Latvia. The study argues that public cuts had such a significant impact on widening the gender wage gap due to the fact that 39% of all women work in public sector and they constitute 63% of all public employees.

3 Data

In our study we use Latvia's microdata from The European Union Statistics on Income and Living Conditions (EU-SILC), which annually compiles information on income, and living conditions in the EU. Income reference period for the EU-SILC data is the previous calendar year, i.e., EU-SILC 2005 refers to income data in 2004. In our paper we have obtained data for EU-SILC 2005 until 2010, thus we will analyze earnings and gender wage gap from 2004 until 2009.

EU-SILC sample is a "nationally representative probability sample of the population residing in private households within the country, irrespective of language, nationality or legal residence status" (Eurostat, 2012d). Collective households and people living in institutions (nursing homes, hotels, hospitals, prisons etc.) are excluded from the target population.

We limited our research to analyze hourly gender wage gap for full-time (i.e. working at least 40 hours per week) employed persons aged 19 – 62 who were employed at the time of the interview and who did not work part-time in the previous year, we also excluded the self-employed and those who those who earned less than the gross minimal wage in Latvia in the particular year, we also excluded extreme wage outliers. In our calculations we use net hourly wage. We limited our sample in order to obtain a more homogenous sample which would produce more accurate results. The sample size for the period studied is presented in Table 2.

Table 2 Sample size

	2004	2005	2006	2007	2008	2009
Males	1244	1476	1579	1853	1620	1474

Females	1240	1534	1626	1907	1877	1683

Source: Created by authors, using data from EU-SILC

In our study we use several human capital and job characteristics variables, we control for different education levels, experience[1], different age groups and whether an individual is married and whether he or she has children in a specific age group, we also control for residential area (city or countryside); as for job characteristics, we include 12 industry and 27 occupational dummy variables, whether an individual has worked under a temporary or permanent work contract and whether he/she holds a supervisory position and lastly we control for company size (explanatory variables are presented in Appendix 1).

4 Methodology

To answer our Thesis research question we will be applying quantitative research methods. We will utilize Oaxaca-Ransom decomposition model, quantile regressions and Heckman sample selection correction model.

4.1 Oaxaca-Ransom decomposition

First of the methods applied in our research is a broadly accepted model that has been used in many previous researches on the gender wage gap. This is a decomposition model proposed by Ransom (1994) and Oaxaca (1994). Oaxaca-Ransom model will be applied in order to test our first hypothesis by detecting the gender wage gap and its fluctuation over time. This model helps to distinguish between the explained and unexplained gender wage gap. Firstly, the model runs three different regressions for men, women, and pooled specification with several human capital and occupational indicators. For the first two regressions the following equation is applied:

$$\ln W_{it} = \beta_{ijt} X_{ijt} + \gamma_{ikt} Y_{ikt} + \varepsilon_{it},$$

where lnW_{it} is the natural logarithm of hourly net wages calculated from EU-SILC data set;

i is the indicator of gender- M, W indicates men and women, respectively;

t is the indicator of year (2004-2009);

X_j are different human capital characteristics (e.g. age, education, family status etc.);

[1] Defined as "Number of years spent in paid work"

β_j are the estimated coefficients from regression analysis, showing wage sensitivity to different human capital characteristics;

Y_k are different job characteristics (e.g. sector, occupation, firm size etc.);

γ_k are the estimated coefficients from regression analysis showing wage sensitivity to different job characteristics;

ε_{it} is an i.i.d. error term with expected value of 0.

For the pooled regression gender dummy for female is added. Thus the regression is run in accordance to the equation:

$$\ln W_{it} = \beta_j^* X_{ijt} + \gamma_k^* Y_{ikt} + S_2 + \varepsilon_{it}, \text{ where}$$

S_2 is the dummy variable for female;

β_j^* are the estimated coefficients for the pooled model, showing non-discriminatory wage sensitivity to different human capital characteristics;

γ_k^* are the estimated coefficients for the pooled model, showing non-discriminatory wage sensitivity to different employer characteristics.

This regression shows what would be log-wage sensitivity to different endowment factors if there was no discrimination in the labour market.

After running regressions we shall find the return on different factors (e.g. age, education, occupation etc.) for men and for women separately.

When the coefficients are estimated we turn to the next step; namely, calculating the gender wage gap. We calculate the difference between mean natural logarithm wages for men and women. The following formula is employed for this calculation:

$$\overline{\ln W_{tM}} - \overline{\ln W_{tw}} = \overbrace{\beta_{jt}^* (\overline{X}_{jtM} - \overline{X}_{jtW}) + \gamma_{kt}^* (\overline{Y}_{ktM} - \overline{Y}_{ktW})}^{Explained\_component}$$
$$+ \underbrace{\underbrace{(\beta_{jt}^* - \beta_{jtW})\overline{X}_{jtW} + (\gamma_{kt}^* - \gamma_{ktW})\overline{Y}_{ktW}}_{Female\_disadvantage} + \underbrace{(\beta_{jtM} - \beta_{jt}^*)\overline{X}_{jtM} + (\gamma_{ktM} - \gamma_{kt}^*)\overline{Y}_{ktM}}_{Male\_advantage}}_{Unexplained\_component},$$

where the mean values of natural logarithm wages ($\overline{\ln W_{tM}}$, $\overline{\ln W_{tW}}$), the mean values of different human capital characteristics ($\overline{X_{jtM}}$, $\overline{X_{jtW}}$), and the mean values of different employer characteristics ($\overline{Y_{ktM}}$, $\overline{Y_{ktW}}$) are utilized;

Subscriptions *M, W*, and * indicates men, women, and pooled model, respectively;

βs and *γs* are the estimated coefficients from the previously run regressions.

The mean gender wage gap equation can be decomposed into three parts:

$$\overline{\ln W_{tM}} - \overline{\ln W_{tW}} = E + U_W + U_M$$

$$E = \beta_{jtM}(\overline{X_{jtM}} - \overline{X_{jtW}}) + \gamma_{ktM}(\overline{Y_{ktM}} - \overline{Y_{ktW}})$$

$$U_W = (\beta^*_{jt} - \beta_{jtW})\overline{X_{jtW}} + (\gamma^*_{kt} - \gamma_{ktW})\overline{Y_{ktW}}$$

$$U_M = (\beta_{jtM} - \beta^*_{jt})\overline{X}_{jtM} + (\gamma_{ktM} - \gamma^*_{kt})\overline{Y}_{ktM}$$

The first part, E, indicates proportion of mean gender wage gap that can be explained by the difference in human capital and employer characteristics for men and women weighted by the non-discriminatory coefficients from the pooled model. This is called the explained component of gender wage gap. The second two parts, U_W and U_M, are called unexplained or discriminatory components of gender wage gap. It shows how the return (previously estimated coefficients) on different human capital and job characteristics differ for men and women. The difference of the coefficients demonstrates that the same characteristics are valued differently for male and female employees, leading to discrimination. The first part of unexplained gender wage gap, U_W, shows female disadvantage in terms of wage in labour market compared to non-discriminatory wage. U_M is the second component of unexplained wage gap, which indicates male advantage in terms of wage relative to non-discriminatory wage.

The latter component of gender wage gap is usually attributed to discrimination. Nevertheless, it is important to recognize that it also captures all potential effects of differences in unobserved variables. Thus omitted variable might enhance unexplained gender wage unreasonably high. If it would be possible to include all the characteristics that might differ for men and women then the discriminatory part should be reduced (Watson, 2009).

Now we can study how the gender wage gap has changed during the financial crisis. We will run regressions for each of the years available in our data (2004-2009). Thus we will be able to see how the gender wage gap has changed over this period. Moreover, we can examine what caused the change. Whether the gender wage gap deviated due to change in characteristics of male and female employees, thus being acceptable; or did the return to different characteristics for male and female employees changed, which would indicate to change in discrimination level.

4.2 Quantile regression

The second model we use is the quantile regression method, which is also broadly employed in many previous studies about the gender wage gap. We will apply Oaxaca-Ransom decomposition model adjusted for quantile regressions to test our second hypothesis. We will strive to find whether the gender wage gap differs in different wage distribution percentiles. The first step is to divide dependent variable (i.e. natural logarithm wage) into quantiles to obtain different wage distribution points. Quantile regression model has rather similar methodology as previous model. Once again we start by running regression, but with slightly different specification:

$$\ln W_{itq} = \beta_{ijtq} X_{ijtq} + \gamma_{iktq} Y_{iktq} + \varepsilon_{itq},$$

Where the only difference from previous model is added indicator for quantile specification (q=1, 2, 3...). We choose to have 9 different quantiles to see how gender wage gap develops with higher earning distribution levels.

Now we can calculate adjusted gender wage gap for different quantiles by formula:

$$\overline{\ln W_{tqM}} - \overline{\ln W_{tqw}} = \overbrace{\beta^*_{jtq}(\overline{X}_{jtqM} - \overline{X}_{jtqW}) + \gamma^*_{ktq}(\overline{Y}_{ktqM} - \overline{Y}_{ktqW})}^{Explained\_component}$$
$$+ \underbrace{\underbrace{(\beta^*_{jtq} - \beta_{jtqW})\overline{X}_{jtqW} + (\gamma^*_{ktq} - \gamma_{ktqW})\overline{Y}_{ktqW}}_{Female\_disadvantage} + \underbrace{(\beta_{jtqM} - \beta^*_{jtq})\overline{X}_{jtqM} + (\gamma_{ktqM} - \gamma^*_{ktq})\overline{Y}_{ktqM}}_{Male\_advantage}}_{Unexplained\_component}$$

where βs and γs are the estimated coefficients for each of the quantile (Boheim, Hofer, and Zulehner, 2007).

4.3 Selection Correction

Lastly, we will apply Heckman selection correction model to test our third hypothesis. Several researchers have argued that selection bias can significantly affect the gender wage gap estimates and therefore should be controlled for. They reason that women who choose not to participate in the labour force might be because they do not expect to earn high wages, hence the gender wage gap is underestimated as the selection of women into labour force is not random. The method is as follows. Firstly, the model sets a wage equation:

$$w_i = \beta X_i + \varepsilon_i,$$

where w_i is wage, X_i relates to i'th person's characteristics and ε_i is the error term; w_i is observed only for working individuals. Secondly, the model sets an equation which relates to employment (selection equation):

$$z_i^* = \alpha Y_i + e_i$$

where z_i^* is the propensity to be included in the sample, Y_i is vector of covariates for unit i for selection equation, α is a vector of coefficients for selection equation and e_i is the error term.

$$z_i = \begin{cases} 1 & if\ z_i^* > 0 \\ 0 & otherwise \end{cases}$$

z_i^* equals 1 when the person is participating in the labour market and has positive income, z_i^* equals zero when otherwise. The model further calculates lambda as

$$\lambda_i = \frac{\varphi(\alpha Y_i / \sigma_e)}{\phi(\alpha Y_i / \sigma_e)}$$

where φ is the standard normal density function and ϕ is the standard normal cumulative distribution function.

Thus the first stage of Heckman estimates the expected value of error term from selection equation and in the second stage lambda is included in the wage equation as an additional variable. The existence of sample selection bias is exhibited by the significance of lambda in the second stage; if lambda is not significantly different from zero, selection bias does not significantly affect the gender wage gap; in other words, lambda is the same as a missing variable (i.e., omitted variable bias), which is correlated with ε_i, if lambda does not correlate with the error term from the wage equation, then OLS estimates are not biased and selection bias is not significant.

Thus in the Heckman selection correction sample additionally to the previous sample we include women who do not work and have earned zero income in the last year. Those women who do not work might be affected by being married and having children; we also believe that education might affect the decision of participating in the labour market, namely, that better educated females have more incentives to work and thus probably earn higher wages, additionally we control for residential area and age group, as well as the interaction term of one being married and having children.

Therefore we included these variables in the selection equation. The wage equation is set as identical to our main Oaxaca-Ransom decomposition equation.

5 Descriptive statistics

Descriptive statistics are presented in Appendix 3. Net Earnings increased significantly over the period of 2004 until 2009, men had significantly larger wages than women, however, from 2006 until 2008 women's wage growth was slightly higher than that of men's and in 2009 women's wages fell slightly less than men's, overall in 2009 men's and women's net wages amounted to LVL 458 and LVL 374 respectively.

In general, women are better educated than men in Latvia, over the sample period the education levels had improved for both men and women and in 2009 41% of women and 26% of men had attainted higher education. At the same time, men tend to work more hours per week than women, but from 2004 to 2009 hours worked have decreased for both men and women.

Approximately half of the individuals in the sample are married and majority has at least one child. In regards to supervisory positions, 20% of women and 17% of men had a supervisory position in 2004, over the years this proportion decreased and in 2009 roughly 12% of both men and women obtained a supervisory position. Also the proportion of individuals with temporary work contract decreased from 2004 until 2009 and in 2009 approximately 98% of women and 96% of men had a permanent work contract.

Most men are employed in mining, manufacturing, construction and transport sectors, while women tend to work in trade, education, health and social work sectors. In regards to occupations, women and men are segregated into different professions, namely majority of men work as metal and machinery workers, drivers and plant operators and extraction and building trades workers, while women are employed as sales persons, personal and protective services workers and other associate professionals.

6 Results

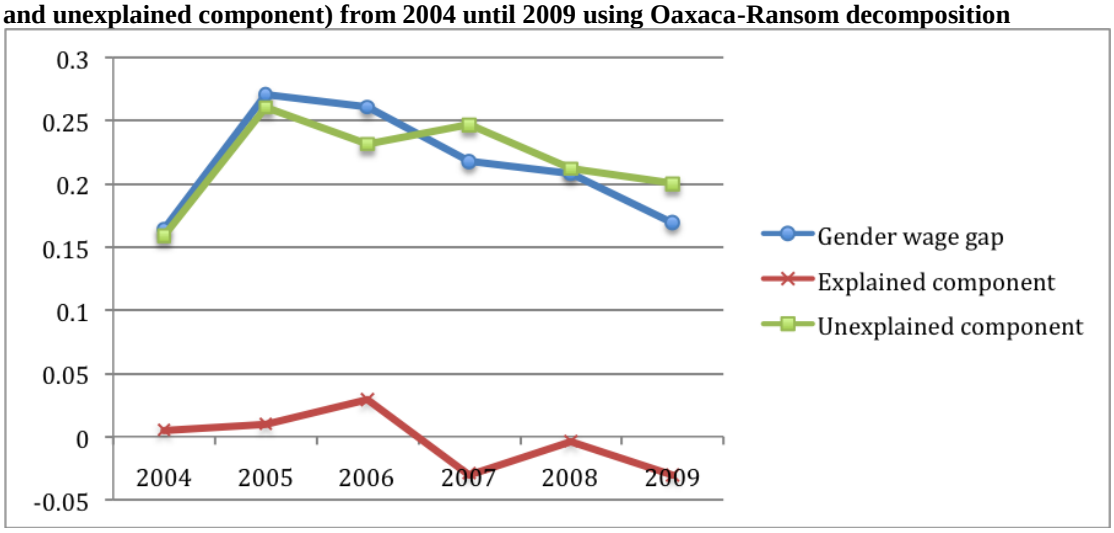
In our results section we will review our findings from Oaxaca-Ransom decomposition, quantile analysis and Heckman selection correction.

6.1 Oaxaca-Ransom decomposition

Figure 1 indicates results from the Oaxaca-Ransom decomposition, detailed results are presented in Appendix 12. Gender wage gap has fluctuated from 2004 until 2009, in 2004 the difference between male and female hourly earnings was 16.4%, but in 2005 it suddenly increased to 27.1% reaching its peak in the six year period, in the following years the gap gradually narrowed and in 2009 gender wage gap amounted to 16.9%.

As mentioned earlier, Oaxaca-Ransom model decomposes the unadjusted gender wage gap into two components, explained component indicates different characteristics between men and women (e.g. different education levels or a tendency to work in different occupations), the unexplained component denotes how these characteristics are rewarded in the labour market (e.g. how large returns do different characteristics yield for men and women given that men and women have the same set of characteristics). From this point of view, if men are rewarded higher payoffs from the same characteristics, unexplained component signals the level of discrimination, while if men possess better characteristics (better education or experience), the explained component indicates that men are fairly rewarded higher wage than women.

Figure 1 Gender wage gap for full time earners aged 19-62 in Latvia (decomposed into explained and unexplained component) from 2004 until 2009 using Oaxaca-Ransom decomposition



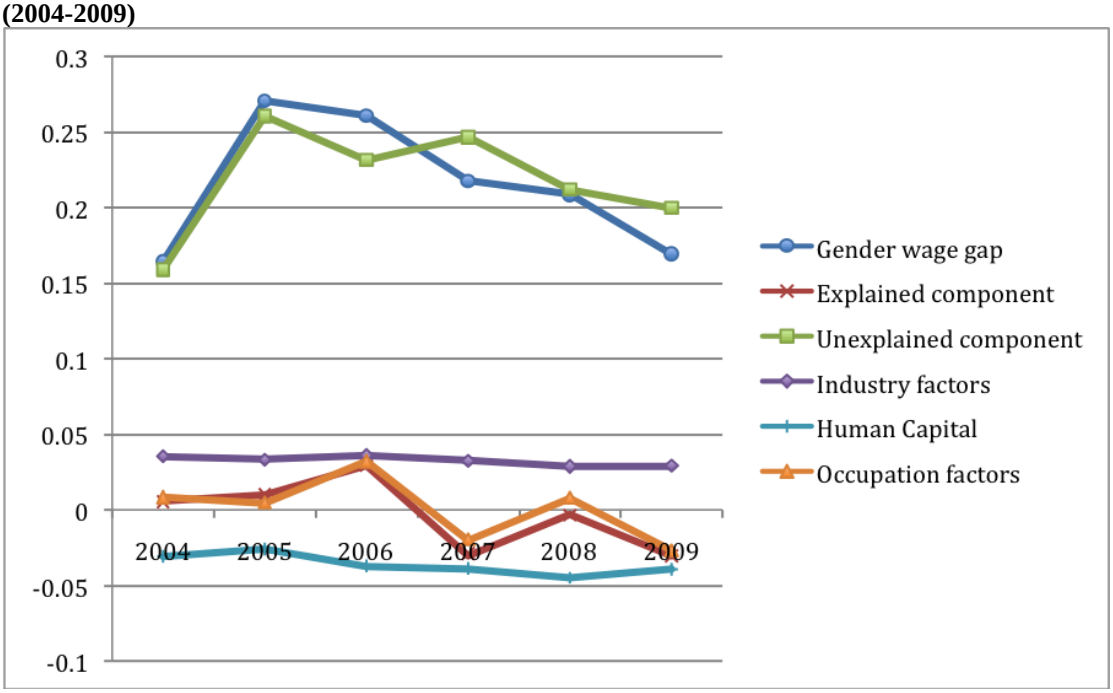
Source: Created by authors

The decomposition into explained and unexplained (i.e. discrimination or unobserved characteristics) components suggests that gender wage gap in Latvia

throughout the period of 2004 to 2009 is mainly due to discrimination or unobserved characteristics. From 2004 until 2006 the explained component slightly increased, meaning that men had obtained a slightly better set of characteristics, at the same time unexplained component constituted approximately 89%-96% of the gender wage gap. Furthermore, starting from 2007 situation deteriorated and explained component became negative, thus the adjusted gender wage gap became higher than the observed gap and therefore according to the observed characteristics men were more highly rewarded for the same endowments as women, in other words although a male and a female might had the same education, age, experience, work in the same industry and occupation and had the same family status, men received higher returns from a set of those characteristics. These results suggest that from 2007 until 2009 the gender wage gap was entirely due to female discrimination or unobserved factors.

To further analyze the explained component, we decomposed explained component into human capital, industry and occupation factors (see Figure 2). Results show that the fluctuation in the explained component is solely due to the occupation factors, while human capital and industry factors remained constant throughout the sample period. Up to 2006 men were employed in more advantageous occupations, but starting from 2007 women caught up and occupation factors turned negative. Human capital characteristics have persistently been negative, suggesting that women had obtained a more advantageous set of human capital characteristics (this is supported by evidence that women in Latvia, for instance, are better educated than men). In contrast, industry factors have constantly been positive, suggesting that men have chosen to work in industries that provide higher wages or in turn that men dominated industries have typically had higher wages.

Figure 2 Explained component decomposed into human capital, industry and occupation factors (2004-2009)



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We will now specifically analyze the endowments that have affected the gender wage gap. As mentioned, occupations seem to be amongst the most significant factors impacting the gender wage gap, results for occupations are both relatively more significant and consistent over the sample period. Typically, men-dominated occupations (e.g. Metal, machinery and related trades workers and Metal, machinery and related trades workers) are associated with smaller gender wage gap, while in women-dominated professions (e.g. Personal and protective services workers, Models, sales persons, and demonstrators, Office and customer services clerks) the opposite is observable. For instance, in 2007 a typical female dominated occupation sales and services workers are associated with 2.97% higher gender wage gap (significant at 1% level), while metal and machinery workers occupation is associated with 1.5% lower gender wage gap in 2007 (significant at 1% level).

Industry factors in general yield inconsistent and often insignificant results, men dominated and women dominated industries do not present such distinct results as occupations, with the exception of such female dominated industries as education, health and social services which are associated with higher gender wage gap. However, there exists a number of men dominated sectors associated with higher difference between male and female earnings and vice versa for female dominated sectors. For instance, construction sector, which employed a large fraction of men employees (23% of men and 2% of women in 2007), is associated with higher gender

wage gap, at the peak of economic boom in 2007 construction sector was associated with 2.4% higher gender wage gap (at 1% significance level). In our sample women are slightly more employed in the public administration and defense sector than men and they tend to receive significantly higher returns for their characteristics, namely, the unexplained coefficient is negative at - 2.1% in 2009; therefore if a male and a female possess the same set of characteristics (same level of education, experience etc.), the female will be rewarded with higher wage than the male in the public sector.

With respect to the company size where the individual works, working in a small firm (less than 10 employees) is related with higher gender wage gap as compared to working in a medium sized firm, the opposite results are observable for employees of large firms, however in this case the results are insignificant. With respect to education, higher education is associated with lower gender wage gap, furthermore, women tend to receive higher payoffs from higher education than men. Experience also has a significant impact on the gender wage gap, better experience is associated with lower difference in earnings between men and women. A summary of the impact of different factors on the gender wage gap is presented in Appendix 5.

6.2 Subsample results

Further we proceed by comparing gender wage gap for different types of subsamples (Appendix 6). We will compare the gender wage gap by dividing our sample into several sub groups by urban area, marital status, children, managerial position, and citizenship and repeat the Oaxaca-Ransom decomposition for these particular subsamples (in Figure 3 and Figure 4 we report results for 2007 and 2009 as indicative examples of the economic boom and crisis).

Figure 3 Gender wage gap decomposed into explained and unexplained component for subgroups in 2007

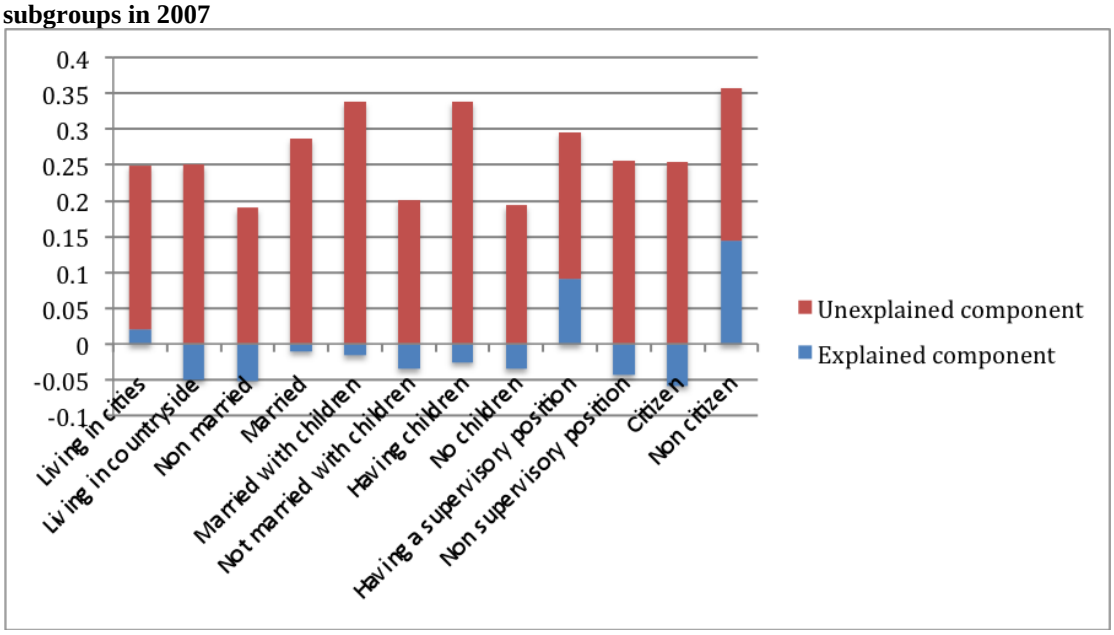

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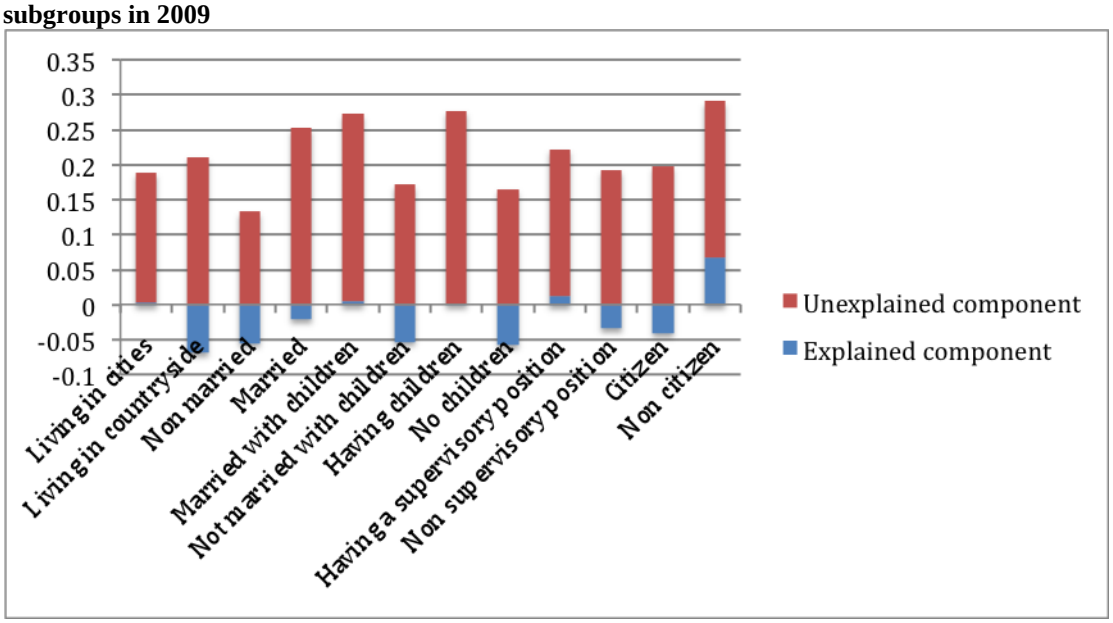
Figure 4 Gender wage gap decomposed into explained and unexplained component for subgroups in 2009



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We find that the urban area where a person lives does not contribute to gender wage gap very much. We observe quite similar unadjusted gender wage gap for employees who live in city and in the countryside. However, since 2007 the gender wage gap is 3-4% lower for employees from countryside, this is consistent with the study "Wage and its Impacting Factors"(2006). Moreover, we find that men living in city are on average more qualified than women living in city. Meanwhile, the opposite is observed for men living in countryside where they are less qualified than women,

especially since 2007. Thus lower gender wage gap for people living in countryside is partly explainable by the fact that women possess better human capital and employer characteristics than men in the countryside.

Marital status has a significant effect on the gender wage gap. We find that the gender wage gap is much higher for the subsample of married people. This difference is almost fully composed by the unexplained part of gender wage gap. In 2004 married women was discriminated (unexplained component) against 22.7% while the ones who were not married had unexplained gender wage gap of only 8.1%. However, during the economic boom this difference in discrimination decreased and reached the lowest difference in 2006; further on it started to increase once again and when the crisis hit in 2009 it had reached similar levels to the ones prior the economic boom.

Similar pattern can be observed for subsample of employees with children. The discrimination is much more severe against women with children. In 2005 the unexplained component was 24.9% for the sub sample of people with children while it was only 9.4% for childless people. Until 2006 the discrimination level caught up for the subsample of childless individuals and came closer to the level of individuals with children. However, onwards it once again deviated away and became much lower than for individuals with children.

When we add marriage to having children we observe only slight deviation from previous results. Thus we can conclude that for both single and married parents the gender wage gap and discrimination against women are rather similar. Subsample of employees with supervisory position has a 5-7% higher gender wage gap than employees without supervisory position.

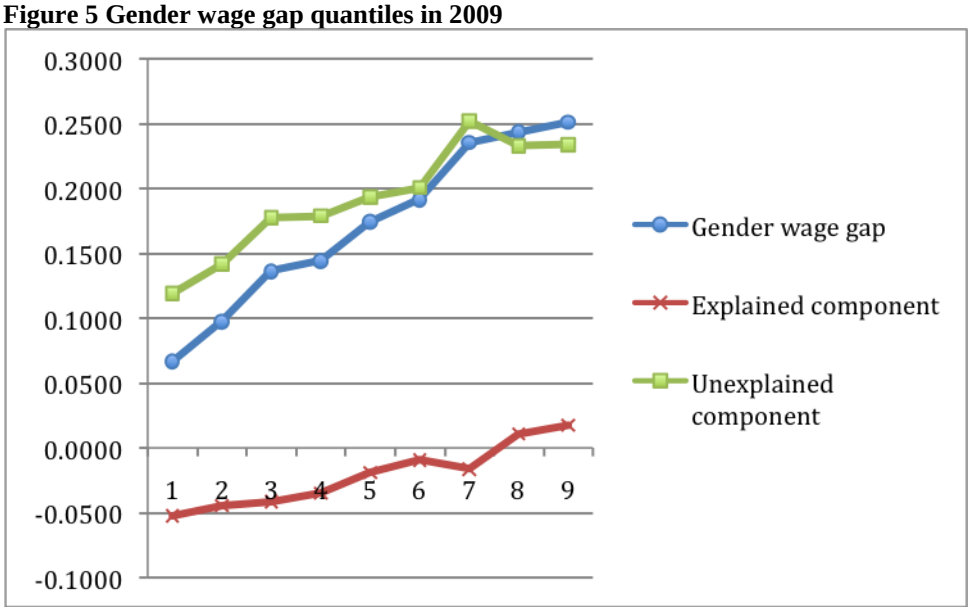
The most interesting result can be observed in subsamples of citizens and non citizens. The difference in unadjusted wage gap is quite substantial; it has steadily decreased from being 21.37% higher for non citizens in 2004 to 13.24% in 2009. However, the most interesting part is that in the citizen subsample women are on average 2-4% better qualified than men. Meanwhile, in non citizen subsample men are 7% to 19% better qualified in all the sample years. This indicates that non citizens have smaller discrimination against women, since they are much less qualified compared with men thus the gender wage gap is explained better. However, it should be noted that citizenship per se might not affect the gender wage gap, but rather is a proxy for Latvian language knowledge.

When the sample is divided into age groups, we find that on average the lowest gender wage gap (10.35%) is observed for the youngest employees who are 19-25 years old. We observe a surge in gender wage gap for the group of employees aged 26-35 for whom it is 23.01%. Further on, as one gets older, the gender wage gap is quite steady and is deviating around 22% for all other age groups. This increase could be explained by the fact that 25 is the age when more women get married and have children; since, as previously discussed, these are that factors that contribute to the gender wage gap tremendously.

6.3 Quantile regressions

Appendix 7 and Appendix 9 indicate results of quantile regressions. We observe a clear pattern in quantile regression for all the sample years; the results show that unadjusted gender wage gap is increasing with earnings, being the largest for the highest earners.

Figure 5 Gender wage gap quantiles in 2009



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While the unadjusted wage gap is distributed quite similarly over the sample period, the magnitude of it varies. During the beginning of economic boom the difference between the highest and lowest earning individual wage gaps was rather moderate. In 2005 the gender wage gap for the employees in the highest earning quantile is only 64.22% higher compared to the lowest earners (19% for the lowest earners vs. 31% for the highest earners). Further on this difference widened and reached its peak in 2009 with a difference of 277% (6.7% vs. 25%) (see Figure 5). Thus we can see that over our sample period the situation in unadjusted gender wage

gap has become more disadvantageous for the women with the highest earnings compared with lowest earning women.

Next we turn to explore whether the increasing unadjusted gender wage gap with higher earnings comes from higher discrimination against higher earning women or whether it can be explained by the fact that men become more qualified relative to women in higher earning distributions.

Even at the first glance at our results we can see that the increase in unadjusted gender wage gap with higher earnings quantile can partly be explained by the fact that men in highest parts of distribution on average have increasing human capital and employer characteristics relative to women.

In all sample period we can observe that at lowest levels of earning distribution the explained component is even negative and only with increasing earnings it becomes positive. This fact shows that women are on average better qualified in lowest earning quantiles relative to men. However, it reversed with higher earnings where men become better qualified than women. Thus this is part of the explanation why the gender wage gap is less intense for women with lowest earnings.

Furthermore, in most of the years (2006, 2007, 2008, and 2009) these gender wage gap differences between highest and lowest distribution points is also enhanced by the discriminatory component of the gender wage gap quite significantly.

Even after taking into account human capital and employer characteristics we see that the adjusted gender wage gap is still increasing with earnings' distribution levels in the most of the sample years. This indicates the fact that not only returns to different characteristics are higher for men than women, but also these returns are increasing for men relative to women with higher distributional levels of earnings. This result suggests that the glass ceiling effect is present in our sample data, which states that discrimination of women in respect to wage is the most severe in the highest quantiles of earnings.

Discriminatory component shows that over our sample years discrimination have become more severe against women in the highest earning distribution compared to lowest earning women. In 2004 and 2005 it was quite constant for all the distribution and did not show increasing patterns with earnings. However, further one we can see gradually increasing discriminatory component with higher earning distribution.

Moreover, in all the sample years we observe that male advantage component of unexplained gender wage gap is negligible and rather constant over quantiles. It is deviating around zero in all the sample years. Therefore we can see that unexplained gender wage gap comes fully from disadvantageous position for women in labour market. Thus we find that men are earning the wages that should be observed in fair and competitive market conditions, however, women are valued significantly lower in terms of wage than they should if no discrimination existed in Latvian labour market. Moreover, with higher earnings women returns to different characteristics are undervalued more and more relative to what they should be if valued against non-discriminatory point of reference.

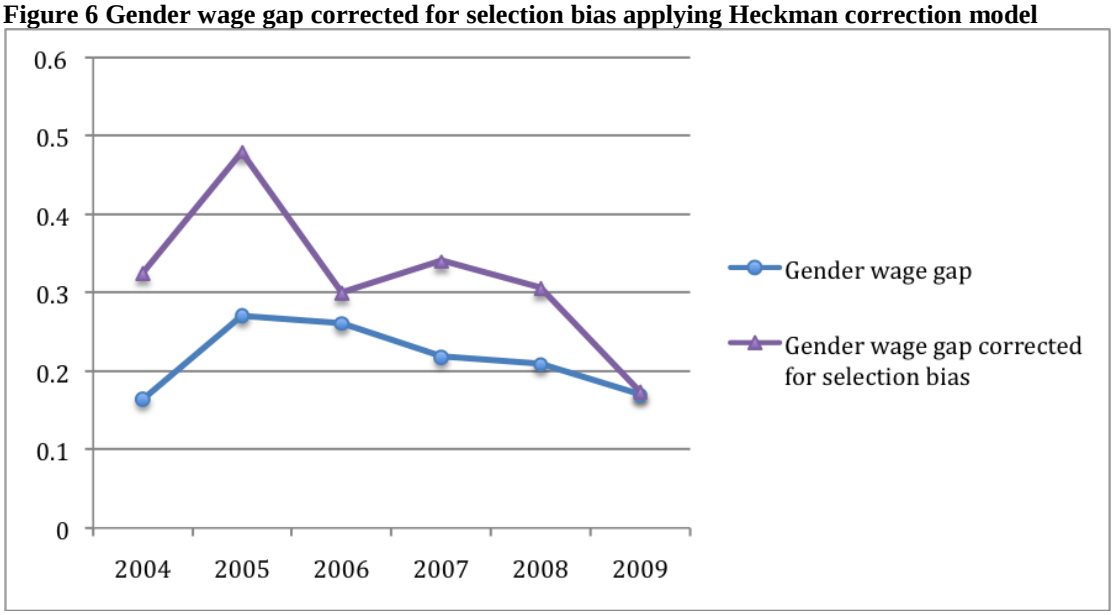
After considering all the years in our sample we can draw conclusion that increasing gender wage gap for higher earners are coming from two factors. First being the fact that in the highest quantiles men become relatively more skilled and have better occupational characteristics. Secondly, women are more discriminated in the highest part of earnings distribution, thus it is clear that "glass ceiling" really exist in our sample.

6.4 Selection correction

Next we turn to analyzing whether the gender wage gap might be underestimated or overestimated due to women's selection in the labour force. As mentioned earlier, selection bias occurs when working women significantly differ from non-working women because non-working women might have more children or worse education and they might not earn as high wages as working women would, thus the gender wage gap would be underestimated if all women would participate in the labour market. Heckman selection correction estimates what would the gender wage gap be if all women participated in the labour force, i.e., it corrects the selection bias.

In Figure 6 we present Heckman selection correction results, which indicate that for most of our sample period the selection bias does occur, namely that working women do significantly differ from non-working women and observed gender wage gap in Latvia is underestimated (Appendix 10). For instance, if all women participated in the labour market the gender wage gap would be 33.9% in contrast to the observed gender wage gap of 21.7% in 2007.

Figure 6 Gender wage gap corrected for selection bias applying Heckman correction model



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Selection correction suggests that non-working women in Latvia obtain a set of characteristics that would earn relatively lower wages as compared to working women, namely, they tend to be married and have children and have lower level of education.

In 2006 and 2009 the selection bias was not significant in Latvia; results for selection bias in 2006 seem perplexing, although it could be argued that in 2006 there was great labour shortage and even previously non-working women were starting to participate in the labour market, it does not explain why the results become significant in the following year. However, in 2009 the unemployment rates increased rapidly and the non-working women population constitued not only from women who chose not to work, but also who were rendered unemployed due to the crisis, thus the differences between working women and not-working women might have become less pronounced and hence the selection bias was not significant.

7 Discussion

In this section we will compare our results with previous findings on gender wage gap and discuss plausible reasons behind the trends in the gender wage gap. In our study we strived to find out how has the gender wage gap developed from 2004 until 2009 in Latvia and how different factors have contributed to it. Consistent with research by Anspal and Rõõm (2010) that studied gender wage gap in Estonia, we find that gender wage gap does indeed fluctuate along with economic cycles throughout the sample period, namely that the gap between male and female earnings increased during economic boom, but narrowed in crisis.

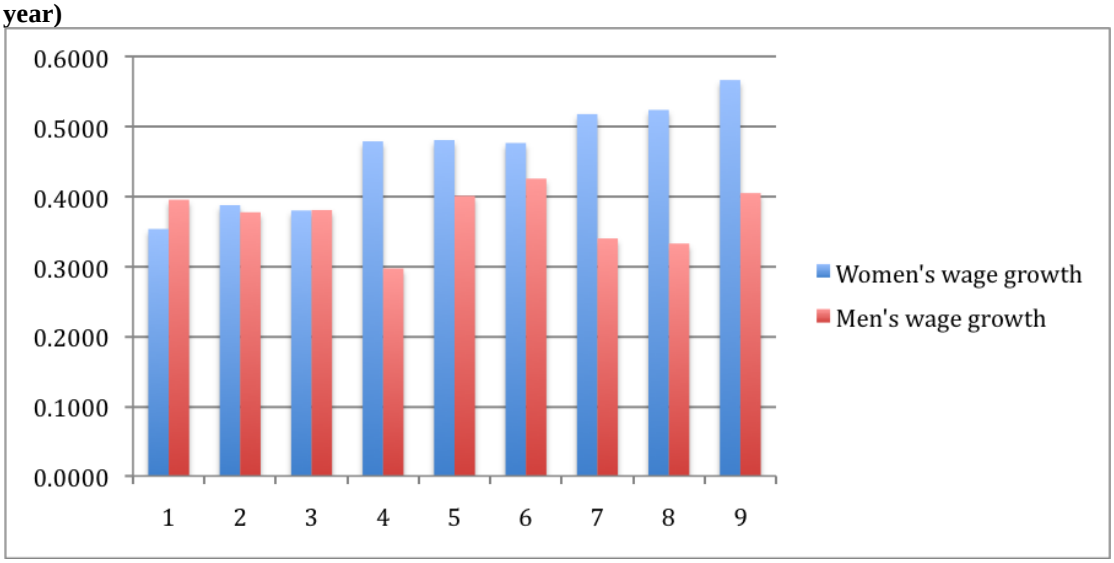
When specifically analyzing obtained results, it is obvious that the gender wage gap rapidly increased in 2005, however, none of the factors that we examined seem to explain such sharp widening of the gender wage gap; this result is consistent with the findings by "Gender Equality Aspects in the Labour Market" (2006) that also find significant increase in 2005. This shift could be explained by labour emigration. In 2004 Latvia joined the European Union and since then emigration followed. Hazans and Philips (2010) demonstrate that in 2005 twice as many individuals emigrated from Latvia compared to 2004 and a large part of the emigrants were young people. From our results it is observable that among young people (aged 19 – 25) the gender wage gap is among the lowest (on average only 10.3%), therefore if a subgroup with exceptionally low gender wage gap emigrates, the overall gender wage gap increases. Also our data confirm that the proportion of men aged 19-26 decreased by 16.6% in 2005, suggesting possible emigration. Furthermore, young men earned 15% lower wages than men on average, thus if low earning men emigrate, men on average have higher wages, and all else equal the gender wage gap increases.

In economic boom years (2005-2007), wages were higher in men dominated occupations such as metal and machinery workers, drivers and plant operators and extraction and building trades workers in comparison with female dominated occupations, moreover, men-dominated professions experienced a more rapid drop in wages than female-dominated occupations. And during the crisis, men mainly had a sharper drop in income than females. This indicates that gender wage gap trend in Latvia is strongly associated with changes in wages in different professions. Gender wage gap in Latvia increased during economic boom because in the overheated

economy male dominated occupations earned more on average and suffered more during the crisis (Appendices 12 and 13).

Moreover, when we specifically analyze men's and women's monthly wages in quantiles, we observe that in 2005 men's earnings increased considerably more across all wage distribution, but specifically more at the highest distribution, meaning that high earning men's wages increased much more than high earning women's wages (Appendix 11). Therefore gender wage gap obviously increased. In 2006 women's wages commenced to catch up and increased across lowest and middle wage distributions, while still in the highest wage distribution men's earnings increased more.

Figure 7 Wage growth in 2007 across wage quantiles (as percentage change over the previous year)



Source: Created by authors

In 2007 women's wages increased more than men's in the highest wage distribution, namely, women's wage growth in the highest wage distribution for the first time surpassed that of men's (Figure 7). In 2008, the wage growth across quantiles equalized between men and women and in 2009 when the crisis reached its peak, men's wages fell considerably more than women's across all wage distribution, but more substantially in the middle of the wage distribution. Overall, a pattern emerges; when the economic boom commenced in Latvia, men and particularly high earning men gained the most in terms of wage growth, while women's wage also increased, it grew two times slower than that of men's. Over time, women's wages started to pick up and that translated into narrowing gender wage gap, in 2007 women's wage growth exceeded that of men's, however, women were still earning considerable less.

Quantile regression results give further insight into the wage developments in Latvia during the economic boom. During the first years of economic boom (2005 and 2006) explained component of the gender wage gap was still positive, indicating that high earning men with better endowments were rewarded with higher wages, in 2005 and 2006 men's wage increase gained momentum and in 2007 men's higher wages were not explained by observed characteristics, suggesting that according to the observed factors men received unjustifiably higher wages than women. This indicates that in 2007 across all income groups men received higher wages without any significant changes in qualifications, exemplifying that the overheated Latvian economy rewarded higher wages without justification. Our results differ from those of the study by Christofides, Polycarpou and Vrachimis (2010) that find no glass ceiling effect in Latvia, but rather an reversed U shape distribution. However, this could be due to the fact that the authors limited their sample to those earning €1000 which corresponds to the highest earners in Latvia, and if we look at the highest parts of the earning distribution in our sample we also distinguish a similar pattern.

When the crisis hit, men's wages were more severely impacted and experienced larger drop across wage distribution, which rendered a smaller gender wage gap. For instance, crisis had particularly damaging impact on construction industry where unskilled men previously received high wages, therefore the proportion of high earning men declined and thus the gender wage gap narrowed.

When analyzing the gender wage gap in regards to different factors, results are mainly consistent with previous literature. We found that the gender wage gap is considerably higher for married women and women with children, suggesting that women have less time to focus on their jobs due to taking care of the household and children. Furthermore, consistent with findings by O'Neill (1985), and Plantenga and Remery (2006), overall gender wage gap increases with age, with the youngest subsample having the lowest earnings differences between men and women. Also consistent with findings on gender wage gap in Latvia, residing in cities in comparison to countryside is associated with higher gender wage gap.

Our results indicated that gender wage gap in Latvia is mainly due to unexplained component, namely, discrimination or unobserved characteristics. Similar composition of the gender wage gap was found in Estonia (Anspal &Rõõm, 2010). In regards to these unobserved characteristics which could be difficult to measure, men might possess better negotiating skills or more confidence,

productivity, higher motivation, aspiration and ambitions to earn more and to achieve a higher social status. However, these factors were not in the scope of this research and could be further studied more specifically.

In the light of these findings policy makers should focus on eliminating gender discrimination, improve women's negotiating skills and on eliminating glass ceiling effect in Latvia, also combating occupational segregation will prove valuable in reducing the gender wage gap. Following the example of Norway, Latvia could introduce legislation on equal gender representation on firm boards, thereby requiring a minimum percentage of both men and women on company boards and thus mitigating the glass ceiling effect. In order to improve women's negotiating skills and thus plausibly to narrow the gender wage gap, policy makers should introduce seminars for wage-negotiating skills and send delegations of such to both schools and largest work-places in Latvia. Also promoting Equal Pay Day in Latvia would encourage public discussion on the issue. As mentioned earlier occupational factors fluctuated the most throughout the sample period and therefore reducing the occupational segregation would prove beneficial to lessen the impact of economic cycles on gender wage gap in Latvia. However, mitigating this phenomena is challenging as both genders are associated with typical male and female occupations and these beliefs are rooted in the cultural system.

When comparing our results to the Eurostat statistics on the unadjusted gender pay gap, differences are evident. Eurostat (2012e) applies a different sample limitation and from 2007 it used data provided by national sources which could be biased due to the large extent of the shadow economy in Latvia in which men tend to participate more, thus significantly underestimating the gender wage gap; while the data applied in this study uses a different income reporting method which might help to avoid the impact of income underreporting.

We acknowledge the limitations in the scope of this study. We study only full time earners and gender wage gap differs if all workers are included in a sample. Moreover, it should be noted that the income data as such is rather sensitive and it is plausible that even when the respondents were interviewed, the income data reported might differ from real income due to one participating in the shadow economy and fearing to disclose full information. As mentioned we also were not able to analyze such unobserved factors as negotiating skills or ambition which might explain a larger proportion of the unexplained gender wage gap.

9 Conclusions

In our study we attempted to study *"How has the gender wage gap developed in Latvia over the time period of 2004 until 2009?"*. We applied Oaxaca-Ransom decomposition, quantile regressions and Heckman selection correction. We obtained data from European Statistics on Income and Living Conditions and specifically analyzed full-time earners aged 19-62. Few studies have attempted to study wage gap in Latvia and have focused on time period prior to 2005; our results shed light on how gender wage gap has developed over a period of sharp changes in economic cycles.

The regression analysis allowed us to fail to reject our first hypothesis, *Gender wage gap fluctuates along with economic cycles in Latvia*. During economic boom period in Latvia (2005 – 2007) gender wage gap increased significantly, while at the peak of the crisis difference between male and female earnings narrowed, reaching the level prior to the boom. Furthermore, we examined these changes with respect to explained and unexplained component. Overall, we found that fluctuations in the explained component are mainly due to occupations, while industry and human capital characteristics remained constant throughout the sample period. Up to 2006 men dominated occupations experienced higher wages which was possibly because of a larger demand which translated into slightly higher explained component. However, in 2007 and onwards explained component became negative which was due to the fact that women dominated occupations caught up and experienced larger wage growth for both the average wage in female dominated occupations and for women relative to men working in these professions. In 2009 men dominated occupations experienced a larger drop in wages than women dominated occupations and in general, men's wages declined more sharply than those of women at the peak of economic crisis. Thus we can observe that although men dominated occupations gained the most in terms of wage increase during the economic boom, they were also more severely affected than female dominated occupations during the crisis.

We also argued that emigration might have affected these fluctuations, Hazans and Philips (2010) found that typically young men tend to emigrate and as this subgroup had relatively low gender wage gap, all else equal the emigration of younger males increased the gender wage gap.

Oaxaca-Ransom decomposition allowed us to analyze the development of explained and unexplained components. We have found out that even after controlling for variety of factors, gender wage gap in Latvia is manly due to discrimination or

unobserved characteristics which could include such immeasurable factors as confidence, negotiating skills, motivation and ambition. Consistent with previous literature we find that for married individuals the gender wage gap is higher, moreover, the unexplained component for married women is larger, suggesting larger discrimination. Also we find that subgroups of individuals having children, residing in cities, older than 25 years and those having a supervisory position are associated with higher gender wage gap.

In regards to our second hypothesis, *There exists a glass ceiling effect for women in Latvia*, we applied a quantile regression analysis. We find that the glass ceiling effect is indeed present in Latvia for the most of the sample period, indicating that the highest earning women are discriminated the most in regards to wages. Moreover, we were able to find that women were earning significantly lower wage than they should, while men were earning fair wage compared to non discriminatory market.

With respect to the third hypothesis, *Gender wage gap is underestimated due to selection bias*, we applied Heckman selection correction model. We fail to reject our third hypothesis and we conclude that for the most of the sample period selection bias is present in the Latvian labour market, indicating that working women do significantly differ from non-working women and due to this fact the observed gender wage gap is underestimated.

We were able to contribute to the previous literature by examining gender wage gap in the light of sharp changes in economic development which, to our knowledge, is among the first researches to attempt this. Latvia is an interesting example to study in this regard as it experienced rapid development and overheating economy which was followed by the largest decline in GDP in the EU in 2009. Further research could focus on qualitatively studying the unobserved characteristics (negotiating skills, ambitions, confidence etc.) and their impact on explaining the gender wage gap in Latvia.

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Appendix 1 – Explanatory variables

Table 3 Explanatory variables EU-SILC

Explanatory variables	Values
Age	19-25 26-35 36-45 46-55 55-62
Marital Status	1 – married 0 – not married
Citizenship	1 - Person is citizen of Latvia 0 - Person is not citizen of Latvia or is citizen/non citizen of other country
Children	1 – has children 0 – does not have children
Urban Area	0 - densely populated area or Intermediate area 1 – thinly populated area
Highest level of Education attained	0 - Pre-primary education 1 - Primary education 2 - Lower secondary education 3 - (upper) secondary education 4 - Post-secondary non tertiary education 5 - First stage of tertiary education (not leading directly to an advanced research qualification) **or** second stage of tertiary education (leading to an advanced research qualification)
Occupation	ISCO-88 or ISCO-08 code (2 digit: Sub-major groups – second-level definition of occupation) Legislators, senior officials and managers 11 Legislators, senior officials and managers 12 Corporate managers 13 Managers of small enterprises Professionals 21 Physical, mathematical and engineering science professionals 22 Life science and health professionals 23 Teaching professionals 24 Other professionals Technicians and associate professionals 31 Physical and engineering science associate professionals 32 Life science and health associate professionals 33 Teaching associate professionals 34 Other associate professionals Clerks 41 Office clerks 42 Customer services clerks Service workers and shop and market sales workers 51 Personal and protective services workers 52 Models, salespersons and demonstrators Skilled agricultural and fishery workers 61 Skilled agricultural and fishery workers Craft and related trades workers 71 Extraction and building trades workers 72 Metal, machinery and related trades workers 73 Precision, handicraft, craft printing and related trades workers 74 Other craft and related trades workers Plant and machine operators and assemblers 81 Stationary-plant and related operators 82 Machine operators and assemblers 83 Drivers and mobile plant operators Elementary occupations 91 Sales and services elementary occupations 92 Agricultural, fishery and related labourers 93 Labourers in mining, construction, manufacturing and transport Armed forces

	01 Armed forces
Industry	According to NACE REV 1.1 I agriculture, forestry and fishing II mining and quarrying manufacturing electricity, gas, steam and air conditioning supply water supply; sewerage, waste management and remediation activities III construction IV wholesale and retail trade; repair of motor vehicles and motorcycles V transportation and storage VI accommodation and food service activities VII information and communication VIII financial and insurance activities IX real estate activities professional, scientific and technical activities administrative and support service activities X public administration and defence; compulsory social security XI education XII human health and social work activities XIII arts, entertainment and recreation other service activities activities of households as employers; undifferentiated goods- and services-producing activities of households for own use activities of extraterritorial organisations and bodies
Size of company's local unit	Small firm: 1- 10 employees Medium firm: 11 – 49 employees Large firm: 50 and more employees
Type of contract	0 – Permanent job contract 1 – Temporary job contract
Managerial position	1 – Supervisory 0 – non-supervisory
Work experience	Number of years spent in paid work

Source: Created by authors

Appendix 2 – Gender wage gap in the EU and Latvia

Table 4 Gender wage gap in unadjusted form

	2006	2007	2008	2009	2010
EU (27 countries)	17.7	17.6	17.4	16.9	16.4
Latvia	15.1	15.4	13.4	14.9	17.6

Source: Eurostat (2012a)

Appendix 3 – Descriptive statistics

Table 5 Descriptive statistics (2004-2009)

	2005		2006		2007		2008		2009		2010	
	male	female	male	female	male	female	male	female	male	female	male	female
Married	0.5540	0.4883	0.5812	0.4757	0.5543	0.4607	0.5677	0.4684	0.5866	0.4800	0.5777	0.4709
Citizen	0.8086	0.8230	0.8081	0.8393	0.8371	0.8557	0.8464	0.8592	0.8292	0.8618	0.8297	0.8811
Experience	18.8058	21.1513	18.9744	20.8012	19.0443	21.1291	19.5240	21.4948	19.6418	21.6346	20.3268	21.8643
Experience^2	489.5313	566.1891	487.9206	549.0208	492.0089	564.9435	511.1484	588.5713	512.7528	597.0931	537.3790	592.7973
Children												
Children (0-6)	0.1657	0.0925	0.1839	0.0778	0.1932	0.0891	0.2046	0.0970	0.2168	0.1076	0.2203	0.1142
Children (7-12)	0.1553	0.1657	0.1604	0.1607	0.1591	0.1634	0.1552	0.1429	0.1658	0.1530	0.1642	0.1719
Children (13-18)	0.2546	0.3652	0.2617	0.3441	0.2348	0.3170	0.2132	0.2926	0.1978	0.2584	0.1547	0.2419
Age												
Age (19-25)	0.1521	0.0748	0.1268	0.0791	0.1218	0.0706	0.1187	0.0772	0.1032	0.0665	0.0818	0.0453
Age (26-35)	0.2626	0.1987	0.2691	0.1860	0.2569	0.1843	0.2599	0.1727	0.2561	0.1941	0.2601	0.1907
Age (36-45)	0.2554	0.3065	0.2685	0.3150	0.2683	0.3047	0.2535	0.2770	0.2580	0.2621	0.2527	0.2790
Age (46-55)	0.2258	0.3170	0.2201	0.2981	0.2355	0.3028	0.2503	0.3234	0.2660	0.3254	0.2764	0.3537
Age (56-62)	0.1041	0.1030	0.1154	0.1218	0.1174	0.1376	0.1176	0.1497	0.1167	0.1519	0.1291	0.1313
Eduaction												
Pre-primary education	0.0040	0.0008	-	-	0.0006	0.0000	0.0011	0.0005	0.0006	0.0005	-	-
Primary education	0.1282	0.0531	0.0027	0.0013	0.0076	0.0012	0.0054	0.0005	0.0018	0.0000	0.0020	0.0012
Lower secondary education	0.0497	0.0217	0.1369	0.0583	0.1749	0.0608	0.1923	0.0600	0.1468	0.0570	0.1318	0.0536
Secondary education	0.5601	0.4996	0.5866	0.4712	0.5600	0.4889	0.5789	0.5206	0.5682	0.4842	0.5459	0.4564
Post secondary non- tertiary	0.1082	0.1352	0.0906	0.1581	0.0852	0.1364	0.0462	0.0772	0.0571	0.0728	0.0561	0.0789
Higher education	0.1498	0.2896	0.1832	0.3111	0.1717	0.3127	0.1762	0.3412	0.2254	0.3855	0.2642	0.4099
Countryside	0.5156	0.4425	0.4497	0.4297	0.5164	0.4803	0.5231	0.4836	0.5018	0.4916	0.4905	0.5144
Temporary job contract	0.0969	0.0523	0.0537	0.0311	0.0587	0.0154	0.0381	0.0110	0.0713	0.0332	0.0358	0.0112
Managerial position	0.1713	0.1995	0.1396	0.1568	0.1149	0.1222	0.1192	0.1356	0.1075	0.1123	0.1257	0.1189

	2005		2006		2007		2008		2009		2010	
	male	female	male	female	male	female	male	female	male	female	male	female
Industry												
Agriculture, hunting, forestry, and fishing	0.0905	0.0387	0.0716	0.0338	0.0758	0.0406	0.0677	0.0297	0.0602	0.0238	0.0649	0.0253
Mining, quarrying, manufacturing, electricity, gas, and water supply	0.2572	0.1790	0.2296	0.1904	0.2342	0.1641	0.2320	0.1613	0.2317	0.1210	0.2345	0.1173
Construction	0.1843	0.0145	0.2066	0.0130	0.2096	0.0203	0.2288	0.0167	0.1592	0.0132	0.1196	0.0130
Wholesale and retile trade, repair of motor vehicles, motorcycles, and personal and household goods	0.1154	0.2081	0.1121	0.2157	0.1174	0.2096	0.1037	0.2171	0.1063	0.2039	0.1169	0.1903
Hotels and restaurants	0.0096	0.0452	0.0088	0.0500	0.0114	0.0510	0.0102	0.0465	0.1278	0.0497	0.1385	0.0619
Transport, storage, and communication	0.1234	0.0556	0.1418	0.0702	0.1199	0.0725	0.1273	0.0595	0.0104	0.0502	0.0108	0.0312
Financial intermediation	0.0144	0.0339	0.0122	0.0279	0.0101	0.0270	0.0086	0.0292	0.0307	0.0169	0.0331	0.0230
Real-estate, and renting and business activities	0.0465	0.0419	0.0635	0.0513	0.0593	0.0479	0.0623	0.0543	0.0148	0.0322	0.0209	0.0354
Public administration and defense	0.0873	0.0935	0.0858	0.0871	0.0859	0.0977	0.0967	0.1190	0.0572	0.0613	0.0696	0.0577
Education	0.0288	0.1274	0.0203	0.1176	0.0227	0.1266	0.0220	0.1310	0.1254	0.1241	0.1155	0.1220
Health and social work	0.0128	0.1065	0.0162	0.0864	0.0183	0.0897	0.0140	0.0924	0.0313	0.1638	0.0338	0.1638
Other community, social, and personal service activities, private house holds with employed persons	0.0296	0.0556	0.0317	0.0565	0.0354	0.0529	0.0269	0.0433	0.0148	0.0935	0.0189	0.1184
Extra territorial organizations and bodies									0.0301	0.0465	0.0230	0.0407
Occupation												
Armed forces	0.0064	0.0008	0.0034	0.0000	0.0032	0.0000	0.0027	0.0000	0.0043	0.0000	0.0081	0.0006
Legislators, senior officials, and managers	0.0064	0.0048	0.0094	0.0117	0.0120	0.0111	0.0215	0.0209	0.0308	0.0253	0.0162	0.0141

	2005		2006		2007		2008		2009		2010	
	male	female	male	female	male	female	male	female	male	female	male	female
Corporate managers	0.0577	0.0476	0.0639	0.0422	0.0398	0.0338	0.0532	0.0396	0.0523	0.0433	0.0568	0.0548
Managers of small enterprises	0.0176	0.0177	0.0061	0.0084	0.0139	0.0129	0.0075	0.0177	0.0098	0.0222	0.0135	0.0253
Physical, mathematical, and engineering science professionals	0.0353	0.0145	0.0357	0.0201	0.0284	0.0178	0.0365	0.0198	0.0387	0.0143	0.0453	0.0183
Life science and health professionals	0.0048	0.0202	0.0054	0.0195	0.0082	0.0117	0.0086	0.0188	0.0080	0.0158	0.0088	0.0177
Teaching professionals	0.0088	0.0460	0.0067	0.0416	0.0069	0.0467	0.0070	0.0537	0.0111	0.0686	0.0108	0.0730
Other professionals	0.0224	0.0637	0.0458	0.0942	0.0442	0.0830	0.0424	0.0929	0.0621	0.1072	0.0649	0.1243
Physical and engineering associate professionals	0.0264	0.0210	0.0323	0.0195	0.0290	0.0160	0.0328	0.0162	0.0492	0.0143	0.0426	0.0153
Life science and health associate professionals	0.0056	0.0524	0.0067	0.0435	0.0057	0.0522	0.0048	0.0423	0.0074	0.0533	0.0088	0.0671
Teaching associate professionals	0.0048	0.0137	0.0027	0.0117	0.0032	0.0080	0.0027	0.0042	0.0037	0.0058	0.0041	0.0024
Other associate professionals	0.0609	0.1137	0.0848	0.1345	0.0795	0.1537	0.0677	0.1586	0.0695	0.1494	0.0669	0.1131
Office clerks	0.0112	0.0879	0.0108	0.0793	0.0133	0.0707	0.0129	0.0657	0.0148	0.0639	0.0169	0.0689
Customer services clerks	0.0008	0.0290	0.0007	0.0208	0.0038	0.0184	0.0021	0.0235	0.0037	0.0222	0.0034	0.0265
Personal and protective services workers	0.0481	0.0960	0.0538	0.0981	0.0486	0.1112	0.0516	0.1085	0.0590	0.1225	0.0730	0.1143
Models, sales persons, and demonstrators	0.0200	0.1129	0.0108	0.1007	0.0139	0.1002	0.0183	0.0934	0.0154	0.0855	0.0162	0.0830
Skilled agricultural and fishery workers	0.0160	0.0161	0.0121	0.0208	0.0126	0.0154	0.0145	0.0141	0.0111	0.0095	0.0101	0.0100
Extraction and building trades workers	0.1282	0.0016	0.1366	0.0032	0.1313	0.0061	0.1343	0.0063	0.0781	0.0042	0.0602	0.0029
Metal, machinery and related trades workers	0.1442	0.0048	0.1353	0.0071	0.1572	0.0135	0.1396	0.0110	0.1359	0.0063	0.1332	0.0035

	2005		2006		2007		2008		2009		2010	
	male	female	male	female	male	female	male	female	male	female	male	female
Precision, handicraft, craft printing, and related trades workers	0.0048	0.0032	0.0114	0.0091	0.0038	0.0074	0.0043	0.0063	0.0062	0.0053	0.0074	0.0047
Other craft and related trades workers	0.0288	0.0605	0.0222	0.0533	0.0227	0.0492	0.0274	0.0412	0.0258	0.0343	0.0243	0.0342
Stationary-planned and related operators	0.0497	0.0097	0.0417	0.0091	0.0385	0.0104	0.0338	0.0099	0.0301	0.0079	0.0304	0.0053
Machine operators and resembles	0.0280	0.0282	0.0236	0.0273	0.0227	0.0203	0.0161	0.0162	0.0105	0.0100	0.0183	0.0106
Drivers and mobile plant operators	0.1370	0.0048	0.1615	0.0052	0.1553	0.0055	0.1633	0.0026	0.1796	0.0037	0.1778	0.0041
Sales and services elementary occupations	0.0184	0.0903	0.0128	0.0903	0.0139	0.0873	0.0102	0.0824	0.0105	0.0766	0.0128	0.0760
Agricultural, fishery, and related labourers	0.0361	0.0153	0.0236	0.0091	0.0164	0.0123	0.0097	0.0094	0.0098	0.0084	0.0122	0.0071
Labourers in mining, construction, manufacturing, and transport	0.0713	0.0234	0.0404	0.0195	0.0720	0.0252	0.0747	0.0250	0.0627	0.0201	0.0568	0.0230
Firm size												
Small firm	0.2500	0.2740	0.1961	0.2476	0.2198	0.2697	0.1890	0.2520	0.2592	0.3550	0.2345	0.3049
Medium firm	0.4511	0.4102	0.4822	0.4290	0.4972	0.4373	0.4952	0.4361	0.4920	0.4288	0.5155	0.4591
Large firm	0.2989	0.3159	0.3217	0.3234	0.2830	0.2930	0.3158	0.3119	0.2488	0.2162	0.2500	0.2360
Monthly wage	187.2268	154.2827	241.0711	175.0213	301.1966	220.6842	429.4063	332.7257	506.4774	402.4109	457.7128	374.1895
Hours	44.9616	42.9067	44.4315	42.3590	43.5783	41.8102	42.9302	41.7183	41.5749	41.0786	41.6122	40.9623

Source: Created by authors

Appendix 4 - Oaxaca-Ransom decomposition regression main results

Table 6 Oaxaca-Ransom decomposition regression main results for gender wage gap in 2004-2009

	2004	2005	2006	2007	2008	2009
Gender wage gap	0.1642***	0.2706***	0.2608***	0.2175***	0.2085***	0.1693***
Explained	0.0053	0.0101	0.0293*	-0.0289	-0.0035	-0.0305*
Unexplained	0.1589***	0.2605***	0.2315***	0.2465***	0.2120***	0.1998***

Source: Created by authors

Appendix 5 - Factors associated with gender wage gap

Table 7 Factors associated with gender wage gap

Factors associated with higher gender wage gap	Factors associated with lower wage gap
	Higher education
Being married	Higher experience
Children aged 0 - 12	Children aged 13 - 18
Working in a small company	Working in a large company
Working in female-dominated occupations	Working in male-dominated occupations
Living in urbanized areas (cities)	Citizenship
Having a permanent job contract	Having a non-supervisory position

Source: Created by authors

Appendix 6 - Gender wage gap for sub-samples

Table 8 Gender wage gap for sub-samples 2004-2009

	2004		2005		2006		2007		2008		2009	
	Living in cities	Living in countryside	Living in cities	Living in countryside	Living in cities	Living in countryside	Living in cities	Living in countryside	Living in cities	Living in countryside	Living in cities	Living in countryside
Gender wage gap	0.1762	0.1789	0.2802	0.2688	0.2616	0.2718	0.2499	0.2008	0.2265	0.1928	0.1890	0.1428
Explained component	0.0319	-0.0077	0.0381	-0.0213	0.0808	-0.0165	0.0204	-0.0496	0.0479	-0.0541	0.0027	-0.0686
Unexplained component	0.1443	0.1867	0.2422	0.2901	0.1809	0.2883	0.2295	0.2504	0.1786	0.2468	0.1863	0.2114

	2004		2005		2006		2007		2008		2009	
	Non married	Married	Non married	Married	Non married	Married	Non married	Married	Non married	Married	Non married	Married
Gender wage gap	0.0808	0.2276	0.1965	0.3245	0.2275	0.2897	0.1393	0.2776	0.1075	0.2769	0.0785	0.2321
Explained component	-0.0014	0.0006	-0.0257	0.0198	0.0045	0.0533	-0.0509	-0.0096	-0.0161	0.0091	-0.0545	-0.0204
Unexplained component	0.0821	0.2270	0.2223	0.3047	0.2230	0.2364	0.1902	0.2872	0.1236	0.2678	0.1330	0.2525

	2004		2005		2006		2007		2008		2009	
	Married with children	Not married with children	Married with children	Not married with children	Married with children	Not married with children	Married with children	Not married with children	Married with children	Not married with children	Married with children	Not married with children
Gender wage gap	0.2534	0.1196	0.3517	0.2284	0.3029	0.2341	0.3234	0.1667	0.2928	0.1605	0.2731	0.1190
Explained component	-0.0096	0.0066	0.0310	-0.0002	0.0118	0.0195	-0.0154	-0.0342	0.0068	-0.0178	0.0058	-0.0527
Unexplained component	0.2630	0.1130	0.3206	0.2287	0.2911	0.2145	0.3388	0.2009	0.2860	0.1782	0.2673	0.1716

	2004		2005		2006		2007		2008		2009	
	Having children	No children	Having children	No children	Having children	No children	Having children	No children	Having children	No children	Having children	No children
Gender wage gap	0.2549	0.1095	0.3399	0.2238	0.3167	0.2256	0.3137	0.1598	0.3130	0.1449	0.2775	0.1082

Explained component	0.0063	0.0153	0.0131	-0.0017	0.0251	0.0208	-0.0251	-0.0341	0.0277	-0.0269	0.0018	-0.0573
Unexplained component	0.2487	0.0941	0.3267	0.2255	0.2915	0.2047	0.3388	0.1939	0.2853	0.1718	0.2757	0.1656

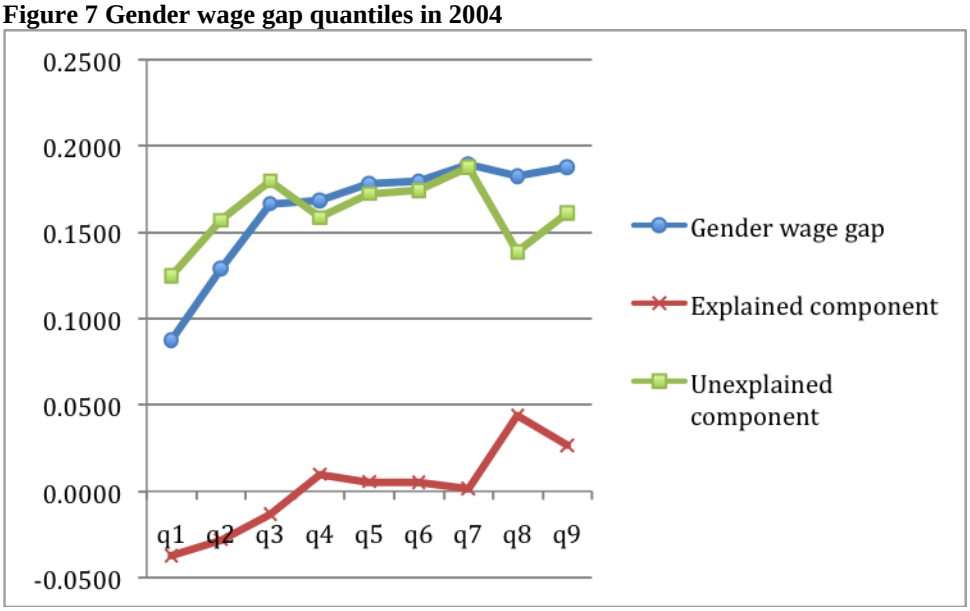
	2004		2005		2006		2007		2008		2009	
	Having a supervisory position	Non supervisory position	Having a supervisory position	Non supervisory position	Having a supervisory position	Non supervisory position	Having a supervisory position	Non supervisory position	Having a supervisory position	Non supervisory position	Having a supervisory position	Non supervisory position
Gender wage gap	0.2225	0.1654	0.3204	0.2710	0.3139	0.2571	0.2959	0.2135	0.1963	0.2110	0.2225	0.1591
Explained component	0.0446	0.0040	-0.0302	0.0267	0.0003	0.0306	0.0918	-0.0430	0.0599	-0.0082	0.0131	-0.0336
Unexplained component	0.1779	0.1614	0.3505	0.2443	0.3136	0.2264	0.2042	0.2565	0.1364	0.2192	0.2094	0.1927

	2004		2005		2006		2007		2008		2009	
	Citizen	Non citizen	Citizen	Non citizen	Citizen	Non citizen	Citizen	Non citizen	Citizen	Non citizen	Citizen	Non citizen
Gender wage gap	0.1264	0.3401	0.2437	0.4152	0.2417	0.3804	0.1958	0.3574	0.1975	0.3088	0.1582	0.2906
Explained component	-0.0321	0.1715	-0.0238	0.1536	-0.0003	0.1774	-0.0580	0.1438	-0.0361	0.1903	-0.0403	0.0678
Unexplained component	0.1585	0.1686	0.2674	0.2617	0.2420	0.2030	0.2538	0.2136	0.2336	0.1185	0.1986	0.2228

Source: Created by authors

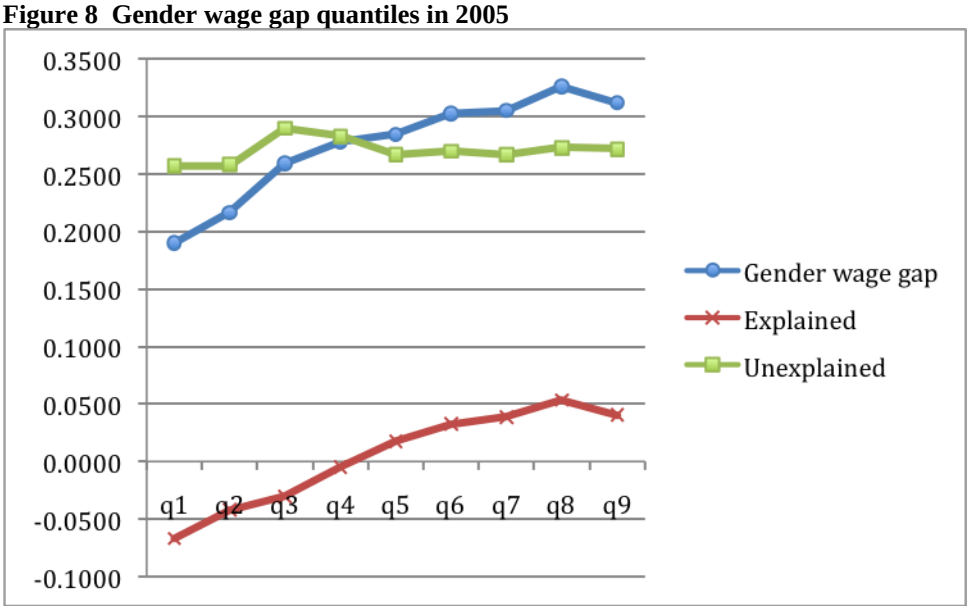
Appendix 7 - Gender wage gap quantiles

Figure 7 Gender wage gap quantiles in 2004



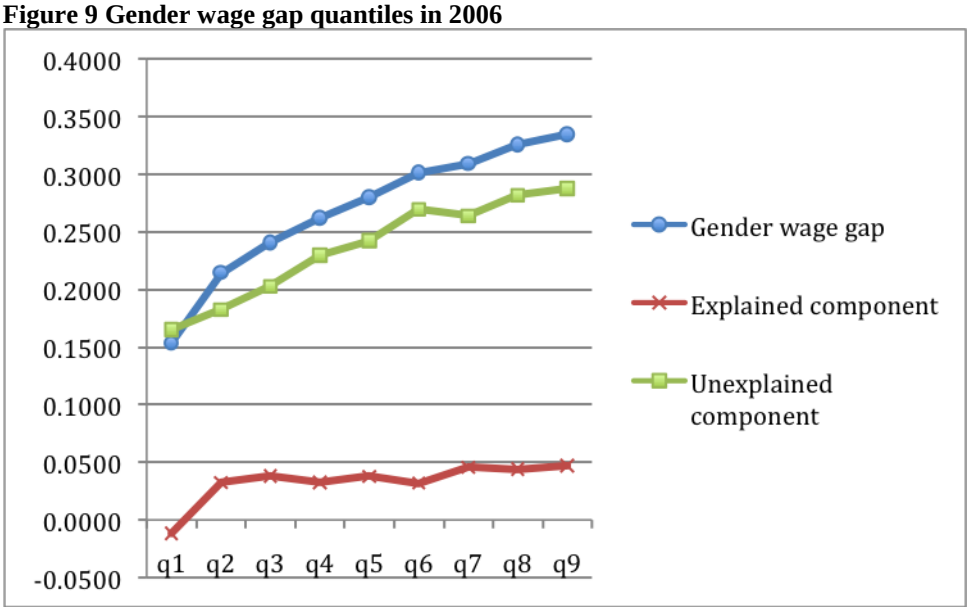
Source: Created by authors

Figure 8 Gender wage gap quantiles in 2005



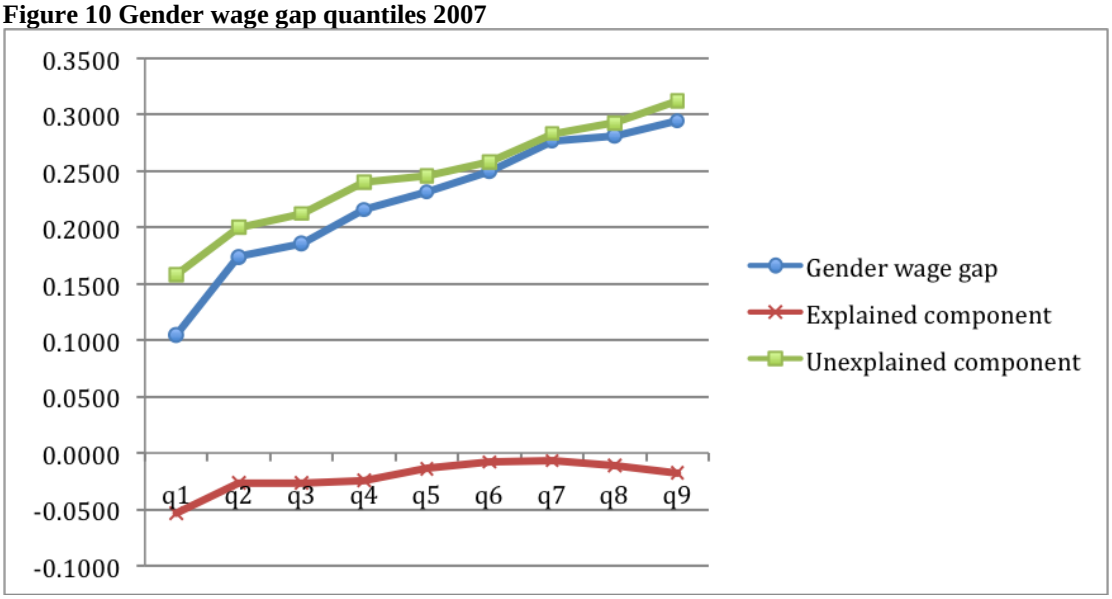
Source: Created by authors

Figure 9 Gender wage gap quantiles in 2006



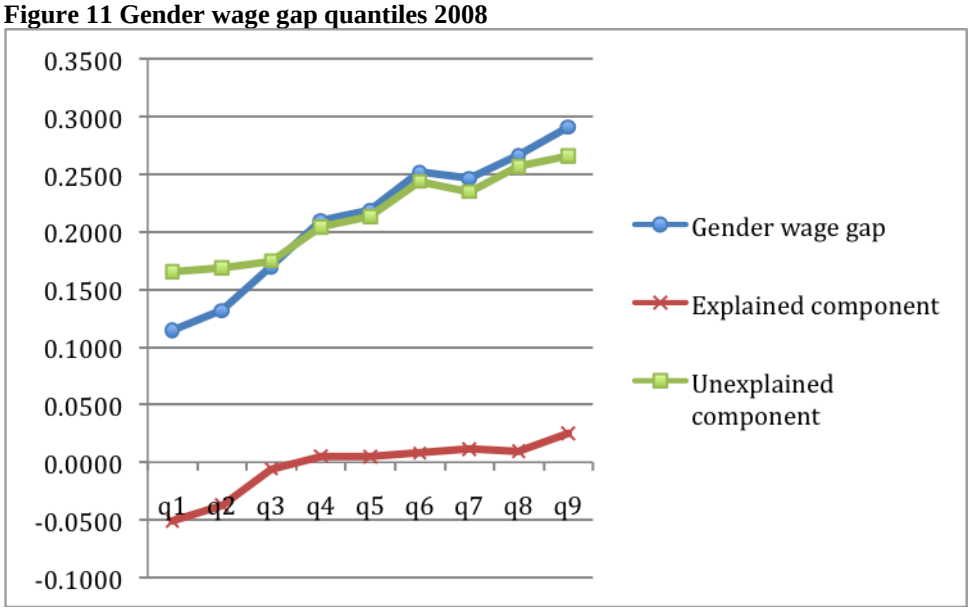
Source: Created by authors

Figure 10 Gender wage gap quantiles 2007



Source: created by authors

Figure 11 Gender wage gap quantiles 2008



Source: Created by authors

Appendix 8 – Detailed Oaxaca-Ransom decomposition results

Table 9 Oaxaca-Ransom regression results with all the variables (2004-2009)

	2004		2005		2006		2007		2008		2009	
	explained	unexplained	explained	unexplained	explained	unexplained	explained	unexplained	explained	unexplained	explained	unexplained
Married	0.002	0.0622***	0.0006	0.0464**	-0.0026	0.0132	0.0001	0.0232	0.0008	0.0463**	0.0004	0.0389**
Citizen	-0.0009	-0.0665*	-0.0023*	-0.0043	-0.0011	-0.0072	-0.0011	-0.0215	-0.0029**	0.0141	-0.0037***	0.0074
Experience	-0.0430***	-0.2499	-0.0229**	-0.0196	-0.0209*	-0.3265	-0.0307***	-0.2325	-0.0291***	-0.3003	-0.0158**	-0.2703
Experience^2	0.0320***	0.0746	0.0132	0.0073	0.0093	0.1272	0.0211**	0.1422	0.0162*	0.2488**	0.0108**	0.1153
Children												
Children (0-6)	0.0037*	0.0083	0.0050*	0.0043	0.0016	0.0036	0.0051**	0.0169***	0.0036	0.0138**	0.0081***	0.0083
Children (7-12)	0.0001	0.0036	0	0.0028	0	0.0232***	0	0.0095	0.0002	0.0047	-0.0001	-0.0022
Children (13-18)	-0.0027	0.0004	0.0002	-0.006	-0.0008	-0.0163**	-0.0032**	0.0028	-0.001	0.0121*	-0.0012	0.0062
Age												
Age (19-25)	0.0087*	-0.0276**	0.004	-0.0094	0.0054*	-0.0232**	0.0057**	-0.0033	0.0032	-0.002	-0.0001	-0.0085
Age (26-35)	0.0047*	-0.02	0.0123***	-0.0107	0.0058**	-0.0194	0.0084***	0.011	0.0049**	0.02	0.0004	0.0025
Age (36-45)	Omitted	Omitted	Omitted	Omitted	Omitted	Omitted	Omitted	Omitted	Omitted	Omitted	Omitted	Omitted
Age (46-55)	0.0041	-0.014	0.0040*	-0.0082	0.0052**	0.0174	0.0036*	0.0207	0.0047**	0.0036	0.0004	0.0141
Age (56-62)	0	0.0056	0.0004	-0.0087	0.0032	-0.0004	0.0018	0.0014	0.0039*	-0.0187	0	0.0075
Education												
Pre-primary education	-0.0003	0.0001	-	-	-0.0007	0	-0.0001	-0.0003	0	-0.0003	-	-
Primary education	-0.0103***	-0.0051	-0.0002	0.0002	-0.002	-0.0004	-0.0004	0.0003	0.0002	-0.0001	0.0002	-0.0006
Lower secondary education	-0.0008	-0.0026	-0.0086***	0.0017	-0.0099***	-0.0058	-0.0048	-0.0009	-0.0085***	0.002	-0.0037*	0.001
Secondary education	Omitted	Omitted	Omitted	Omitted	Omitted	Omitted	Omitted	Omitted	Omitted	Omitted	Omitted	Omitted
Post secondary non-tertiary	0.0007	-0.0091	-0.0019	-0.0027	0.0001	0.0015	-0.0009	0.0038	-0.0005	0.0028	-0.0003	0.0090**
Higher education	-0.0288***	-0.0338**	-0.0296***	-0.0261**	-0.0295***	-0.0035	-0.0433***	-0.0184	-0.0406***	0.0008	-0.0347***	-0.0084

	2004		2005		2006		2007		2008		2009	
	explained	unexplained	explained	unexplained	explained	unexplained	explained	unexplained	explained	unexplained	explained	unexplained
Countryside	-0.0075***	0.0114	-0.0024	0.0006	-0.0035*	0.0302*	-0.0051**	0.0023	-0.0007	0.0273	0.0018	-0.0001
Temporary job contract	0.0007	-0.0095	0.0003	-0.0018	-0.0003	0.0016	-0.0011	-0.0022	-0.0045***	-0.0042	-0.001	0.0003
Managerial position	-0.0031	0.0081	-0.0031	0.0073	-0.0013	0.0073	-0.0024	0.0013	-0.0002	-0.0031	0.0007	0.0067
Industry												
Agriculture, hunting, forestry, and fishing	0.0012	-0.0103*	-0.0035*	-0.0045	-0.0063***	-0.0007	-0.0030*	-0.0034	-0.0045**	-0.002	-0.0021	-0.0022
Mining, quarrying, manufacturing, electricity, gas, and water supply	Omitted	Omitted	Omitted	Omitted	Omitted	Omitted	Omitted	Omitted	Omitted	Omitted	Omitted	Omitted
Construction	0.0165**	-0.0063	0.0095	-0.0027	0.0136*	0.006	0.0243***	-0.0012	0.0033	-0.002	-0.0013	-0.0054
Wholesale and retile trade, repair of motor vehicles, motorcycles, and personal and household goods	-0.0013	0.012	0.0038	0.006	0.0015	0.0088	0.0036	0.0074	0.0114***	0.0032	0.0038	-0.0056
Hotels and restaurants	0.0072***	-0.0028	0.0018	-0.0033	0.0040*	0.0002	0.002	-0.002	0.0078***	0.0113**	0.0104***	0.007
Transport, storage, and communication	0.0042	0.0088	0.0046*	0.0077	0.002	0.0117*	0.0052**	0.0077	0.0060***	0.0006	0.0015	-0.0035
Financial intermediation	-0.0052**	-0.0001	-0.0043**	0.0016	-0.0033**	0.0023	-0.0067***	0.0031	-0.0002	-0.0007	0.0011	-0.0035
Real-estate, and renting and business activities	0.0005	-0.0087*	0.0013	-0.0155***	0.0011	-0.0069	0.0006	-0.0024	-0.0049***	0.0042	-0.0055**	0.0003
Public administration and defense	-0.0005	-0.0067	0	-0.0133**	-0.0004	-0.0156**	-0.0028*	0.0031	-0.0001	-0.0077	-0.0003	-0.0207***
Education	0.0119**	-0.0027	0.0106***	-0.0076	0.0157***	-0.0049	0.0094**	-0.0120**	0.0002	0.0029	0	-0.0186**
Health and social work	-0.0002	-0.0046	0.0084**	-0.0017	0.0081**	0.0044	0.0007	0.0033	0.0071	-0.0086	0.0120***	-0.002
Other community, social, and personal service activities, private house holds with employed persons	0.001	-0.0112**	0.001	0.0014	0	-0.0021	-0.0009	0.0022	0.0021	0.0028	0.0088**	-0.0028
Extra territorial organizations and bodies	-	-	-	-	-	-	-	-	0.0005	0.0015	0.0008	-0.0017

	2004		2005		2006		2007		2008		2009	
	explained	unexplained	explained	unexplained	explained	unexplained	explained	unexplained	explained	unexplained	explained	unexplained
Occupation												
Armed forces	0.0015	-0.0004	0.0022*	0.0004	0.0006	0.0001	0.0010*	0	0.0018**	-0.0001	0.0032**	0.0003
Legislators, senior officials, and managers	0.0004	-0.002	-0.0004	0.0024	0.0003	-0.0046**	0.0002	-0.0003	0.0021	-0.0064*	0.0009	-0.0022
Corporate managers	0.0014	-0.0028	0.0019	0.0008	0.001	-0.0023	0.0025*	-0.0023	0.0027	-0.0006	0.0003	-0.0026
Managers of small enterprises	0.0001	0.0001	-0.0002	0.0004	0	-0.0019	-0.001	0.0052***	-0.0013	-0.0011	-0.0023*	0.0014
Physical, mathematical, and engineering science professionals	0.0019	0.0036	0.0021*	0.0037	0	0.0005	0.0013	0.0013	0.0044**	0.0038	0.0048**	0.0019
Life science and health professionals	-0.0015	0.0001	-0.0030**	0.0026	-0.0009	0.0003	-0.0037**	0.0039*	-0.0029**	0.0033	-0.0017	0.0005
Teaching professionals	-0.0082***	0.0013	-0.0094***	0.0039	-0.0092***	0.0025	-0.0138***	0.0098***	-0.0126***	0.0070**	-0.0148***	0.0011
Other professionals	-0.0094***	0.0049	-0.0054**	0.0019	-0.0052***	-0.0011	-0.0108***	-0.0021	-0.0075***	-0.0039	-0.0083***	0.0027
Physical and engineering associate professionals	0.0003	0.0052	0.0008	0.0016	0.0009	0.0023	0.0015	0.003	0.0045**	0.005	0.0027*	0.0041
Life science and health associate professionals	0.0082**	0.0002	-0.0014	0.0050**	-0.0005	-0.0043	-0.0041*	-0.0047*	-0.0064***	-0.0013	-0.0042	-0.0033
Teaching associate professionals	-0.0013	0.0005	-0.0019*	0.0017*	0.0001	0.0007	0.0002	0.0016	0.0004	0.0008	-0.0002	-0.0006
Other associate professionals	Omitted	Omitted	Omitted	Omitted	Omitted	Omitted	Omitted	Omitted	Omitted	Omitted	Omitted	Omitted
Office clerks	0.0104**	0	0.0097***	0.0022	0.0106***	-0.0047	0.0033	-0.0014	0.0039*	-0.0031	0.0065***	-0.0069**
Customer services clerks	0.0072***	-0.0004	0.0029*	0.0003	0.0024**	0.0013	0.0012	0.0001	0.0024**	-0.0009	0.0049***	-0.0005
Personal and protective services workers	0.0098***	0.0069	0.0108***	0.0064	0.0118***	-0.0051	0.0144***	0.0021	0.0126***	0.0021	0.0085***	0.004
Models, sales persons, and demonstrators	0.0318***	0.0003	0.0322***	-0.0049	0.0294***	-0.0049	0.0190***	0.0011	0.0121***	0.0054*	0.0181***	-0.0013
Skilled agricultural and fishery workers	0	0.0019	0.0015	0.0025	0.0006	-0.0014	0	-0.0003	-0.0005	-0.0008	0	0.0004

	2004		2005		2006		2007		2008		2009	
	explained	unexplained	explained	unexplained	explained	unexplained	explained	unexplained	explained	unexplained	explained	unexplained
Extraction and building trades workers	-0.0177**	0.0007	-0.0139*	0.0003	0.0012	-0.0126**	-0.0138**	-0.0008	-0.0064	0.0036	-0.0099***	0
Metal, machinery and related trades workers	-0.0153**	-0.0002	-0.0170***	-0.001	-0.0211***	-0.0036	-0.0154***	0.0036	-0.0059	0.0034	-0.0182***	-0.0038
Precision, handicraft, craft printing, and related trades workers	-0.0001	0.0011	-0.0005	0.0006	0.0009	-0.0007	0.0004	-0.0005	-0.0001	-0.0009	-0.0006	-0.0005
Other craft and related trades workers	0.0066***	0.0009	0.0094***	-0.0016	0.0058***	0.0052	0.0032**	0.0045	0.0023	0.0049*	0.003	0.0016
Stationary-planned and related operators	-0.0067**	0.0013	-0.0109***	-0.001	-0.0083***	-0.0054**	-0.0084***	-0.0029	-0.0068***	-0.0029	-0.0076***	-0.0035*
Machine operators and resembles	0	0.0023	0.0008	0.0025	-0.0003	-0.002	0.0001	-0.0016	-0.0002	0.0015	-0.0011	0.0029
Drivers and mobile plant operators	-0.0233***	-0.0038	-0.0299***	-0.0074	-0.0099	-0.0157***	-0.0132**	-0.0009	-0.0065	-0.001	-0.0233***	-0.0078
Sales and services elementary occupations	0.0327***	0.0009	0.0360***	0.001	0.0344***	-0.0021	0.0297***	-0.0021	0.0240***	0.0008	0.0214***	-0.0027
Agricultural, fishery, and related labourers	-0.0083***	0.0017	-0.0049***	-0.0027	-0.0007	0.0002	-0.0001	-0.0003	-0.0006	-0.0001	-0.0018	-0.0019
Labourers in mining, construction, manufacturing, and transport	-0.0122**	0.0003	-0.0067***	-0.0035	-0.0119***	-0.0054	-0.0133***	-0.0003	-0.0073***	0.0057	-0.0070***	-0.0015
Firm size												
Small firm	0.0026	-0.0111	0.0032**	0.0081	0.0038**	0.0036	0.0052***	0.0102	0.0050***	-0.0064	0.0036**	0.0229**
Medium firm	Omitted	Omitted	Omitted	Omitted	Omitted	Omitted	Omitted	Omitted	Omitted	omitted	Omitted	Omitted
Large firm	-0.0004	-0.0121	0	-0.0067	-0.0006	-0.0192*	0.0002	-0.0068	0.0049**	0.0089	0.0014	0.011
Cons		0.4539***		0.2999*		0.4858***		0.2651*		0.1122		0.3158**

Source: Created by authors

Appendix 9 - Quantile regression main results

Table 10 Quantile regression main results (2004-2009)

2004	q1	q2	q3	q4	q5	q6	q7	q8	q9
Gender wage gap	0.0875	0.1290	0.1666	0.1684	0.1781	0.1794	0.1893	0.1825	0.1877
Explained	-0.0373	-0.0279	-0.0132	0.0099	0.0056	0.0052	0.0016	0.0439	0.0266
Unexplained	0.1248	0.1569	0.1798	0.1585	0.1724	0.1742	0.1877	0.1386	0.1612
Unexplained_male	-0.0021	-0.0132	0.0197	0.0049	0.0072	-0.0067	-0.0046	-0.0177	-0.0218
Unexplained_female	0.1268	0.1701	0.1601	0.1535	0.1652	0.1809	0.1923	0.1563	0.1830

2005	q1	q2	q3	q4	q5	q6	q7	q8	q9
Gender wage gap	0.1898	0.2162	0.2590	0.2774	0.2841	0.3023	0.3050	0.3258	0.3117
Explained	-0.0669	-0.0419	-0.0306	-0.0049	0.0175	0.0327	0.0385	0.0534	0.0406
Unexplained	0.2567	0.2580	0.2895	0.2823	0.2666	0.2696	0.2666	0.2723	0.2712
Unexplained_male	0.0090	0.0022	0.0122	0.0094	-0.0050	-0.0084	0.0043	0.0078	-0.0164
Unexplained_female	0.2478	0.2559	0.2773	0.2729	0.2716	0.2779	0.2622	0.2645	0.2876

2006	q1	q2	q3	q4	q5	q6	q7	q8	q9
Gender wage gap	0.1534	0.2147	0.2406	0.2620	0.2799	0.3013	0.3092	0.3256	0.3345
Explained	-0.0117	0.0324	0.0381	0.0325	0.0377	0.0320	0.0456	0.0441	0.0471
Unexplained	0.1650	0.1823	0.2025	0.2295	0.2422	0.2693	0.2636	0.2815	0.2874
Unexplained_male	0.0215	0.0151	-0.0053	0.0101	0.0062	0.0018	-0.0086	0.0006	-0.0003
Unexplained_female	0.1436	0.1672	0.2078	0.2194	0.2360	0.2676	0.2722	0.2809	0.2877

2007	q1	q2	q3	q4	q5	q6	q7	q8	q9
Gender wage gap	0.1046	0.1738	0.1858	0.2159	0.2316	0.2500	0.2766	0.2815	0.2946
Explained	-0.0534	-0.0265	-0.0266	-0.0243	-0.0141	-0.0080	-0.0068	-0.0111	-0.0176
Unexplained	0.1581	0.2003	0.2124	0.2401	0.2457	0.2580	0.2834	0.2925	0.3122
Unexplained_male	0.0115	0.0072	-0.0042	-0.0030	0.0054	-0.0003	0.0001	-0.0163	-0.0010
Unexplained_female	0.1465	0.1930	0.2166	0.2432	0.2403	0.2583	0.2834	0.3088	0.3132

2008	q1	q2	q3	q4	q5	q6	q7	q8	q9
Gender wage gap	0.1144	0.1314	0.1691	0.2095	0.2179	0.2515	0.2461	0.2661	0.2907
Explained	-0.0508	-0.0372	-0.0057	0.0055	0.0048	0.0079	0.0114	0.0096	0.0251
Unexplained	0.1652	0.1686	0.1748	0.2040	0.2131	0.2437	0.2347	0.2565	0.2656
Unexplained_male	0.0200	0.0089	0.0069	0.0078	-0.0067	-0.0057	-0.0089	-0.0114	-0.0043
Unexplained_female	0.1452	0.1597	0.1679	0.1961	0.2198	0.2494	0.2436	0.2679	0.2699

2009	q1	q2	q3	q4	q5	q6	q7	q8	q9
Gender wage gap	0.0666	0.0972	0.1359	0.1440	0.1743	0.1913	0.2354	0.2435	0.2511
Explained	-0.0524	-0.0446	-0.0415	-0.0349	-0.0191	-0.0095	-0.0165	0.0108	0.0174
Unexplained	0.1190	0.1418	0.1774	0.1789	0.1934	0.2007	0.2519	0.2327	0.2336
Unexplained_male	0.0204	-0.0062	0.0020	-0.0015	0.0015	-0.0018	0.0107	-0.0097	-0.0079
Unexplained_female	0.0986	0.1480	0.1755	0.1804	0.1918	0.2025	0.2411	0.2424	0.2415

Source: Created by authors

Appendix 10 - Selection corrected gender wage gap

Table 11 Selection corrected gender wage gap in Latvia (using Heckman selection correction model)

	2004	2005	2006	2007	2008	2009
Gender wage gap	0.3245	0.4794	0.2994	0.3397	0.3054	0.1733
Lambda value	0.4105**	0.5771***	0.1439	0.4462***	0.3229**	0.0103

Source: Created by authors

Appendix 11 – Annual wage growth

Table 12 Wage growth for men and women, 2005-2009

	2005		2006		2007		2008		2009	
Quantile	Women	Men	Women	Men	Women	Men	Women	Men	Women	Men
1	0.1216	0.1947	0.2374	0.1401	0.3531	0.3950	0.2912	0.2728	0.0206	0.0163
2	0.1262	0.2578	0.2885	0.2276	0.3873	0.3771	0.2350	0.1851	-0.0221	-0.0202
3	0.1398	0.2444	0.3723	0.2595	0.3797	0.3803	0.2100	0.1853	-0.0425	-0.0612
4	0.1704	0.2706	0.3186	0.2665	0.4785	0.2968	0.1770	0.2222	-0.0513	-0.1441
5	0.1443	0.3527	0.3065	0.2618	0.4804	0.4006	0.1817	0.1415	-0.0670	-0.1213
6	0.1202	0.3165	0.3420	0.2208	0.4761	0.4252	0.1780	0.1512	-0.0682	-0.1120
7	0.1677	0.2266	0.2579	0.2867	0.5175	0.3397	0.1895	0.1545	-0.0810	-0.0901
8	0.1258	0.2777	0.2226	0.2898	0.5234	0.3324	0.2014	0.1638	-0.0962	-0.0836
9	0.1133	0.3592	0.2073	0.2386	0.5662	0.4045	0.2256	0.1932	-0.0905	-0.1047

Source: Created by authors

Appendix 12 – Annual wages in men dominated occupations

Table 13 Wages and wage growth in male dominated occupations 2004-2009

Extraction and building trades workers	2004	2005	2006	2007	2008	2009
Male wage	181.2992	237.6027	322.7007	389.3365	405.7901	346.9157
Female wage	151.1333	153.8889	320.2924	343.2667	289.9449	321.7158
Average wage	180.3906	234.1146	322.5797	387.2264	397.4559	345.3407
Male wage growth		0.3106	0.3582	0.2065	0.0423	-0.1451
Female wage growth		0.0182	1.0813	0.0717	-0.1553	0.1096
Average wage growth		0.2978	0.3779	0.2004	0.0264	-0.1311

Metal, machinery and related trades workers	2004	2005	2006	2007	2008	2009
Male wage	169.5364	209.6659	267.7612	365.1220	431.3148	373.7987
Female wage	111.6019	149.5000	168.8862	220.1808	285.1213	244.0145
Average wage	166.7921	205.5636	259.4005	354.2901	422.6789	369.3670
Male wage growth		0.2367	0.2771	0.3636	0.1813	-0.1334
Female wage growth		0.3396	0.1297	0.3037	0.2949	-0.1442
Average wage growth		0.2325	0.2619	0.3658	0.1930	-0.1261

Drivers and mobile plant operators	2004	2005	2006	2007	2008	2009
Male wage	173.8430	204.4211	274.2487	386.2124	444.5411	394.7176
Female wage	136.7407	200.2083	282.9413	295.8330	337.9911	411.8587
Average wage	171.9982	204.2236	274.5883	384.7499	441.3762	395.2217
Male wage growth		0.1759	0.3416	0.4083	0.1510	-0.1121
Female wage growth		0.4641	0.4132	0.0456	0.1425	0.2185
Average wage growth		0.1874	0.3445	0.4012	0.1472	-0.1046

Source: Created by authors

Appendix 13 – Annual wages in female dominated occupations

Table 14 Wages and wage growth in female dominated occupations 2004-2009

Personal and protective services workers	2004	2005	2006	2007	2008	2009
Male wage	171.4495	229.3185	251.3556	352.9032	404.3647	364.3828
Female wage	113.9044	137.0011	184.2290	232.1590	276.1651	260.4969
Average wage	133.0861	169.4474	204.1855	270.2888	314.0071	297.7454
Male wage growth		0.3375	0.0961	0.4040	0.1458	-0.0989
Female wage growth		0.2028	0.3447	0.2602	0.1896	-0.0567
Average wage growth		0.2732	0.2050	0.3237	0.1617	-0.0518

Models, salespersons and demonstrators	2004	2005	2006	2007	2008	2009
Male wage	155.7853	184.0667	199.8618	323.1302	375.1685	300.7538
Female wage	105.1661	116.7521	157.0605	220.9349	251.9721	230.3411
Average wage	112.9536	124.2733	162.1230	237.2478	269.3873	240.8819
Male wage growth		0.1815	0.0858	0.6168	0.1610	-0.1984
Female wage growth		0.1102	0.3452	0.4067	0.1405	-0.0859
Average wage growth		0.1002	0.3046	0.4634	0.1355	-0.1058

Other associate professionals	2004	2005	2006	2007	2008	2009
Male wage	217.0346	267.4301	340.5831	467.3841	503.0582	471.7437
Female wage	197.9250	213.1622	255.1730	356.6172	419.5976	412.7018
Average wage	204.5831	233.8509	283.7186	389.0745	443.5925	432.8526
Male wage growth		0.2322	0.2735	0.3723	0.0763	-0.0623
Female wage growth		0.0770	0.1971	0.3976	0.1766	-0.0164
Average wage growth		0.1431	0.2132	0.3713	0.1401	-0.0242

Source: Created by authors