

CHANGES IN THE GENDER WAGE GAP AND THE ROLE OF EDUCATION AND OTHER JOB CHARACTERISTICS: COLOMBIA 1994-2010

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Abstract

This paper studies the adjusted gender wage gap in Colombia at different points of the distribution of wages and the effect of sample selection. We compare 1994 with 2010. A glass ceiling pattern is observed after controlling for observed characteristics in both years. In addition, the sample selection is found to underestimate the adjusted gender wage gap. The effects of education, type of contract and type of employment on the gender wage gap across the wage distribution are also analyzed using a Dinardo, Fortin and Lemieux (1996) (DFL) type methodology. Educational change has helped to reduce the gender wage gap, mainly at the top of the wage distribution. By contrast, the reduction in the proportion of workers in the public sector and the reduction of workers with indefinite contracts have contributed to increasing the gender gap. The type of employment affected is mainly at the top of the distribution whereas the type of contract affected is at the bottom.

Keywords: Gender gap, floor and glass ceiling pattern, semiparametric, quantile regression, sample selection.

JEL: J16, J24, J31, J41

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CAMBIOS EN LA BRECHA SALARIAL POR GÉNERO Y EL ROL DE LA EDUCACIÓN Y OTRAS CARACTERÍSTICAS LABORALES: COLOMBIA 1994-2010

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Resumen

Este artículo estudia la brecha salarial ajustada por género en Colombia a lo largo de la distribución de salarios, así como el efecto de la selección muestral, en los años 1994 y 2010. Después de controlar por características observables, un efecto techo de cristal es observado en los dos años. Además se analiza el efecto de educación, tipo de empleo y tipo de contrato en la distribución de salarios, usando la metodología de Dinardo, Fortin and Lemieux (1996) (DFL). Los resultados muestran que el logro educacional ha contribuido a reducir la brecha salarial por género, especialmente en la parte alta de la distribución. Por otra parte, se concluye que la reducción en la proporción de trabajadores públicos y la reducción en el porcentaje de trabajadores con contrato indefinido han contribuido a incrementar la brecha salarial entre hombres y mujeres. Cambios en el tipo de empleo, han afectado principalmente la parte alta de la distribución, mientras el cambio en el tipo de contrato ha afectado la parte baja de la distribución de salarios.

Palabras claves: brecha salarial, efecto piso y techo de cristal, técnica semiparamétrica, regresión cuantil, selección muestral.

JEL: J16, J24, J31, J41

1. INTRODUCTION

In the last two decades, the Colombian labor market has gone through very significant compositional changes. The most relevant one is the change in the educational attainment of workers. In 1994 the percentage of college-educated workers was just 11%; however, by 2010 this figure had quadrupled. Furthermore, at the other end of the educational distribution, by 2010 there were barely any workers without primary education (the proportion was around 10% in 1994).

In addition, some job characteristics have also experienced a very significant change. The number of employees with indefinite contracts fell by half, mainly in the private sector. Moreover, the proportion of public sector workers also dropped sharply, from 13% in 1994 to 7% in 2010.

These changes have undoubtedly affected the distribution of wages. And given that these changes, as will be seen later, have not affected men and women equally, gender differences in wages are also likely to be affected.

The aim of this paper is precisely to analyze the gender wage gap across the wage distribution and the empirical relationship between changes in the observed gender wage gaps (1994-2010), and the observed changes in education, type of employment (public/private) and type of contract (indefinite/other type of contract) in Colombia. Parametric techniques are used to analyze the trend in wage differentials by gender as well as a semi-parametric approach following Dinardo, Fortin and Lemieux (1996) (DFL hereafter) to account for the effect of education and other job characteristics on the observed gender wage gap.

This paper is organized as follows: Section 2 presents a brief summary of related empirical literature, Section 3 describes the data; Section 4 presents evidence of the adjusted gender wage gap at the mean and in different quantiles; the methodology and results of the counterfactual exercise are presented in Section 5. Section 6 concludes.

2. EMPIRICAL EVIDENCE OF THE GENDER WAGE GAP IN COLOMBIA

Several studies have analyzed the gender wage gap in Colombia. In general the evidence is that on average, hourly wages for men are higher than those for women. Moreover, most of the observable differences cannot be explained by differences in observed measures of human capital or other observable differences in job characteristics. This section summarizes the literature regarding the empirical gender wage gap in Colombia.

One of the first studies that sought to account for gender differences in Colombia was Tenjo, Rivero and Bernat (2002). Using Oaxaca decomposition and correcting for sample selection, they find that the unexplained component of the average gender wage gap (the fraction of the average wage gap that cannot be explained by differences in human capital and observable job characteristics) is positive and significant. More precisely for the years 1981, 1989 and 1998 – the years covered by their study - they find that this unexplained component is 12%, 16% and 8%, respectively. They explain that at least part of this decrease is due to the increase in educational attainment by women and to female returns to education.

The role of labor supply in the gender wage gap is studied by Angel-Urdinola and Wodon (2003). They use weighted OLS regression to estimate the gender wage gap, controlling for a set of observable worker characteristics and then regressing the gap against relative labor supply, controlling for other variables. They conclude that in the presence of gender discrimination and perfect substitution, the increase in the relative labor supply of women as compared to men has helped reduce the gender wage gap over time (1979-2000) from 22% in 1982 to 12% in 2000 in Colombia.

Abadía (2005) finds evidence of statistical discrimination in the private sector: As firms have limited information about the abilities and productivity of applicants, they have an incentive to use easily observable characteristics such as gender, age, race, etc. to discriminate against workers if their characteristics are correlated with workers' performance. Thus, given that women on average quit the labor market more often than men for family reasons, employers may consider female employees as an uncertain factor in the decision to hire them, which finally results in lower wages. This author finds that for 2003 13% of the gender wage gap in the private sector is explained by statistical discrimination.

Bernat (2007) computes discrimination curves for 2000, 2003 and 2006, studying the incidence, intensity and inequality of discrimination throughout the distribution of the gender wage gap. This study concludes that the number of women discriminated against and the intensity of discrimination have increased and there is evidence of a glass ceiling, i.e. women face barriers to promotion to jobs at the top of the wage distribution.

The effect of occupational segregation on the wage gap is studied by Isaza (2009). Using a version of the Oaxaca-Blinder decomposition of the gender wage gap that accounts for the explained and unexplained components of workers' allocation, he concludes that occupational segregation contributes to decreasing the gender wage gap.

Hoyos, Ñopo and Peña (2010) study gender earnings gaps from 1994 to 2006 using a non-parametric technique based on a matching-on-characteristics methodology developed by Ñopo (2008). These authors find that in Colombia the unexplained gender wage gap is between 13% and 23% of average female earnings after controlling for socio-demographic and job characteristics. Moreover they find evidence that this phenomenon affects less productive workers and those who have to work under precarious conditions in the labor market most.

Badel and Peña (2010) study the gender wage gap using the Machado Mata technique³ based on quantile regression. They find evidence of both a glass ceiling effect (a significant gender gap at the top of the distribution) and a quicksand floor effect (a significant gender gap at the bottom of the distribution) for Colombian women. Moreover, they control for self-selection into the labor force and state that it accounts for around 50% of the observed gender gap.

³ The Machado Mata approach allows counterfactual wage distributions to be computed and the raw gender wage gap to be decomposed into a component due to price effect (differences in how men and women are paid) and a composition effect (differences in characteristics between men and women).

Elias and Ñopo (2010) show that labor force participation in Latin America increased on average by 6.5 percentage points from the early 1990's to late 2000's, with most of the increase coming from legally married women who have low education levels, are less educated than their partners and have children living at home. They also state that decreases in fertility and increases in female education have had a minor impact.

This paper seeks to provide an answer for the changes in the gender wage gap in Colombia in the last 16 years, not only at the mean but also at different quantiles of the wage distribution. The adjusted gender wage gap is estimated with a parametric perspective and a semi-parametric technique is then used to look at the extent to which changes in the educational attainment of workers as well as other job characteristics such as type of employment and type of contract contribute to explaining changes in the observed gender wage gap throughout the wage distribution.

More specifically, the questions to be addressed are the following:

- (i) What would the distribution of the gender wage gap in 2010 have been if education had remained at its 1994 level?
- (ii) What would the distribution of the gender wage gap in 2010 have been if the distribution of workers in the public sector had remained at its 1994 level?
- (iii) What would the distribution of the gender wage gap in 2010 have been if the proportion of workers with indefinite contracts had remained at its 1994 level?

This is relevant for policy makers because it may help predict future trends in the gender wage gap in Colombia, and therefore may help to design public policies aimed at decreasing the wage gap between men and women.

3. DATA AND DESCRIPTIVES

The data are drawn from the Colombian Household Survey for the second quarters of 1994 and 2010, carried out by the Colombian National Statistical Department (DANE). This survey contains individual information about the size and structure of the labor force, living conditions and structure of incomes and expenditures of Colombian households.

Second quarter information is used because up to 2000 questions such as the size of firms, tenure, and other relevant firm variables were only asked in this quarter. It was decided to use 1994 as the initial year to avoid comparisons before and after Law 100, which introduced changes with an important impact for the labor market⁴.

⁴ Law 100 of 1993 created the comprehensive social security system, which regulates among other items all matters related to the system of pensions and health in Colombia.

The sample is restricted to public and private sector employees and domestic servants⁵ between 18 and 65 years old who work between 16 and 84 hours per week and live in the 10 largest metropolitan areas: Barranquilla, Bucaramanga, Bogotá, Manizales, Medellín, Cali, Pasto, Villavicencio, Pereira and Cúcuta; they account for 68% of the population according to the 2005 census.

The top 1 percent of the wage distribution in each year and gender is discarded in order to avoid outliers. For each procedure the corresponding expansion factors are used. Wages for 1994 are in constant 2010 prices.

Table 1 gives personal, job and demographic characteristics by gender in the two periods. With respect to gender differences in demographic characteristics, it can be observed that in 2010 both male and female workers are older than in 1994 (by an average of 2-3 years). In addition, it can be seen that the share of workers (both male and female) between 18 and 24 years old has decreased whereas the share of older workers (between 45 and 54) has increased.

As was noted in the introduction, the increase in educational attainment of Colombian employees has been very impressive. The proportion of workers with college educations has increased by more than 20 percentage points. This increase has been more pronounced for female workers, whose proportion of college-educated workers was 8 percentage points higher than that of their male counterparts by 2010. Moreover the proportion of workers with less than secondary education dropped dramatically from 39% and 49% for women and men respectively in 1994 to around 14% for both men and women in 2010.

The family structure of Colombian workers has also undergone major changes. Over the 16 years studied the percentage of married workers decreased, particularly for men (with a drop of around 14 percentage points). By contrast, the percentage of cohabiting couples has increased by almost 11 percentage points. The percentage of households with children under seven years old has decreased significantly by roughly 9 percentage points and the difference by gender has disappeared. The proportion of female heads of household has increased, though the proportion of male heads of household is still much higher. In 2010 about 60% of men are head of households compared with only 26% of women.

Most workers are private sector employees: participation of workers in this sector has increased slightly and in 2010 the proportions of men and women in private sector were approximately 92% and 78% respectively. On the other hand, the proportions of women and men in the public sector decreased by almost 7 and 5 percentage points respectively: as of 2010 7.4% of workers were public employees. Domestic servants are still predominantly women: their participation has increased slightly, with this type of employment accounting for 7.1% of employees in 2010.

With regards to working hours, the percentage of women working part-time (less than 35 hours per week, which is the standard definition of part-time in Colombia) is about 6 points higher than

⁵ Employers and the self-employed are disregarded, which leaves a more homogeneous sample of male and female workers.

for men, while the proportion of woman working overtime (more than 48 hours per week) is 10 percentage points lower than for men. The proportion of women in small firms (with less than 11 employees) is higher than men in both periods and the gender difference is around 10 percentage points in 2010.

Hiring conditions for Colombian employees have also undergone significant changes, particularly with regard to types of contract. In 1994 around 80% of workers had indefinite contracts, but by 2010 this percentage had almost halved. The fall was 35 percentage points for women and 28 for men.

Finally, Table 1A reports the distribution of workers across occupations and economic sectors in the two years under consideration. The most significant feature regarding occupation is the reduction in the proportion of workers in Non-agricultural and Operator occupations (by 7 and 11 percentage points for women and men respectively) and the increase in Service occupations of around 5 and 4 percentage points for women and men respectively. In terms of economic sectors, a reduction is observed in the number of women and men employed in Manufacturing (about 7 and 6 percent respectively), and an increase in employees in the Trade, Restaurants and Hotels sectors, mainly among men (5 percentage points).

Given that the aim of this paper is to analyze changes in the gender wage gap, it must be determined what changes occurred in the wage structure over this 16-year period. Table 2 presents average hourly wages broken down by different characteristics and the respective raw gender wage gap. The raw gender wage gap is computed as the difference between the average logarithms of hourly wages of male and female workers.

As is observed in Table 2, the average real hourly wages of men are higher than those of women in almost all cases, except among non heads of household, public sector employees, big firms and indefinite contract holders, for whom the gap is negative. On average men earn more than women and the increase in real wages is greater for men. Workers reach their peak hourly wage when they are between 45 and 54 years old. The gender wage gap is huge for workers between 45 and 65 years old, but the gap at the ends of the age distribution has decreased.

Real hourly wages of younger workers and college-educated workers have decreased and the drop has been greater for men, but overall average hourly real wages for all workers have increased. On average wages of non-college-educated workers are around 35% of those of college-educated workers, revealing the existence of a significant wage premium for education. The gender wage gap is about 12% for college-educated workers and has remained almost the same over time, while for non-college workers it increased from 15% in 1994 to 24% in 2010.

On average, heads of household have higher wages than the rest of the household members. Married workers earn more than non-married ones. The biggest gap (around 18%) is found when comparing married with widowed, divorced and separated workers, and the second biggest is for cohabiting workers (13%).

As reported in Table 2, public employees are the group with the highest wages for 2010. They also show a bigger gain in purchasing power than private employees. Female hourly wages in the

public sector are on average more than double those in the private sector. In addition, women in the public sector earn more than men on average and the wage gap by gender in this sector in absolute value has increased greatly in their favour, from -3% to -23%. Abadía (2005) analyzes the presence of statistical discrimination in the private and public sectors and concludes that there is no evidence of statistical discrimination against women in the public sector for the year 2003. She states that the Law of quotas⁶ could explain this finding.

The gap between male and female domestic servants has decreased, but the greatest gap is still found among these workers: it was 34% in 2010.

Hourly real wages of part-time employees have decreased, on average full-time and overtime workers have lower hourly wages than part time workers in both periods. Moreover, the wage gap observed between men and women working overtime hours more than halved from 45% in 1994 to 21% in 2010.

There is a significant wage premium for working in big firms and having indefinite contracts. In 2010 wages of female and male employees of small firms are about 44% and 54% on average of those of employees of big firms respectively. The gender gap for workers with other type of contract, including fixed-term contracts, increased greatly from 5% to around 19%, while the gap between employees with indefinite contracts almost disappeared, shifting from about 15% to -2% in 2010.

The raw gender wage gap is plotted in Figure 1. On average the gap has slightly decreased in the last 16 years, from 13.02% to 12.23% in 2010. However important differences arise in different parts of the wage distribution. In particular, for both years a non-monotonic trend is observed in the raw gender wage gap: it is very broad at the bottom of the distribution (54% and 44% at the 5th percentile in 1994 and 2010 respectively), decreases in the middle and increases slightly observed at the 99th percentile (to 10% and 22% respectively).

4. THE ADJUSTED GENDER WAGE GAP

The gender wage gaps just described are raw gaps, given that they are computed without taking into account differences in observable personal and job characteristics. In this section the adjusted gender wage gap is estimated using standard parametric techniques to regress the hourly wages at the mean and at different quantiles as follows: In subsection 4.1 the gap is adjusted by controlling only for observable characteristics. Subsection 4.2 also takes into account the potential selection of the sample of working men and women.

⁶ Law 581 of 2000 establishes that 30% of the top (i.e. highly qualified and paid) positions in the public sector in Colombia must be occupied by women.

4.1 EVIDENCE OF THE ADJUSTED WAGE GAP

Table 3 presents OLS and quantile wage regressions for 1994 and 2010 respectively. Column 1 shows the results of the OLS regression and columns 2-8 show those of the 5th, 10th, 25th, 50th, 75th, 90th and 95th quantiles.

The logarithms of real hourly wages are regressed against a set of covariates which include a gender dummy to capture the adjusted gender wage gap – the gender gap after controlling for a set of observed characteristics. The controls included are age, age squared, two dummies for education (secondary and college), tenure in current job, a dummy for marital status, head of household status, firm size, type of employment (private sector) and type of contract (indefinite contract). Controls for region, economic sector and occupation are also applied.

Consider first the results from the wage estimation for 1994. An issue to highlight is that in all estimations the gender indicator – the adjusted wage gap – is negative and statistically significant. Figure 2 shows the trend in the adjusted gender wage gap. For 1994 the adjusted gender wage gap is on average 8.5% and is monotonically increasing throughout the distribution of wages: it is 5.8% at 5th quantile and 16.3% at 95th quantile. This result shows the so-called ceiling pattern, which was first introduced by Albrecht, Björklund and Vroman (2003) to refer to the fact that in Sweden women's wages fall further behind men's wages at the top of the distribution than in the middle or at the bottom. Our result is similar, although of smaller magnitude than their findings.

Other results are as follows: Educational attainment brings major wage premiums, as on average college-educated workers are found to earn about 68% more than workers with no formal education or primary education only. Workers with similar characteristics earn more in the private sector than in the public sector. This is especially so at the mean and at the bottom of the distribution. On the other hand, having an indefinite contract means higher wages for all but the highest percentiles.

The second panel of Table 3 shows the results of estimations for 2010. The adjusted gender wage gap is on average 9.4% at the mean and around 4.2% and 18.6% at 5th and 95th percentiles respectively. For this year there is also evidence of a glass ceiling effect: Observable characteristics better explain the gender wage differentials between workers with lower wages. Returns on college education are around 50% and are higher at the top of the distribution. The private sector dummy is negative and statistically significant at the mean and at the top of the distribution of wages.

The premium for having an indefinite contract is much greater in 2010. At the mean it explains around 17% of wages compared to about 4% in 1994. This is consistent with fact that in 1994 almost all workers had indefinite contracts, which was no longer the case in 2010.

At the mean the adjusted gender wage gap slightly increased from 8.5% in 1994 to 9.4% in 2010, which represents 65.13% and 76.70% of the observed gender wage gaps respectively. An important difference with respect to the raw gender wage gap computed in the previous section now emerges: the trend in the adjusted gap across the wage distribution is monotonically

increasing in both years, there is a glass ceiling pattern and the raw gap which previously observed for lower wages disappears. (see Figure 1). Therefore, there is basically no wage gap between similar men and women at the lower end of the distribution, but the gap increases monotonically over it.

4.2 CONTROLLING FOR SAMPLE SELECTION

Female labor force participation in Colombia increased by around 11 percentage points between 1994 and 2010 while male labor force participation remained roughly constant during the same period. This significant increase in female labor force participation may result in a change in the determinants of female selection into the labor market between the two periods under consideration. Given that this study compares female wages in the two periods to look at the gender wage gap, it is necessary to take into account the potential differences in the selection processes for women and men on entering the labor market. Failure to account for this might bias the adjusted wage gap as found in the previous section.

This is done by estimating a two-step Heckman approach for wages at the mean and at different quantiles. In the first step, the decision to work is regressed (using a probit model) on the standard determinants for working. Table 4 reports the results of this two-step approach. The first column presents the Heckman two-step regression at the mean and the following columns present the 5th, 10th, 25th, 50th, 75th, 90th and 95th quantile regressions of wages, once nonrandom selection of workers has been controlled for in the samples.

The estimated coefficients of the first step probit model are presented in Table 4A. The dependent variable of the participation equation takes a value of 1 if the individual is working and zero otherwise⁷. Dummies for gender, age, region, education, marital status and head of household status are included. The presence of children under 1 year old in households, the number of children between 2 and 6 years old in households, non labor income (NLI) and total family income (TFI) are also included as identification variables. Non labor income is income from interest, pensions, rentals, remittances, etc. Total family income is defined as the total income of the household (labor and non labor) minus the total individual income⁸.

Identification variables included in the participation equation (Table 4A) affect the participation decision but not wages once all relevant variables are included.

The main equation includes the same independent variables explained in Table 3. Gender dummies are again negative and statistically significant in all cases.

For the two years it can be seen that the selection variable is positive and statistically significant at the mean and at the upper end of the distribution.

⁷ Individuals with permanent disabilities rendering them incapable of working are excluded from the participation equation.

⁸ For 2010 the number of children between 2 and 6 years old and total family income are excluded from the participation equation, given that they are not statistically significant.

These results confirm that sample selection is an important issue to take into account when estimating wages in Colombia and that if sample selection is not controlled for the adjusted gender wage gap found is smaller than the actual gap. At the mean, sample selection explains around 72% and 34% of the raw wage gaps in 1994 and 2010 respectively. Figures 3 and 4 show the trend in the adjusted gender wage gap with and without controlling for sample selection in 1994 and 2010 respectively. As expected, from the 50th percentile on, the gap with control for sample selection is higher than the gap without it. These figures reveal that the gap is monotonic increasing throughout the wage distribution and the glass ceiling effect observed without control for non-randomness in the sample is stronger after controlling for selectivity.

This result is now compared with other empirical findings for Colombia. A closely related paper already mentioned is that of Badel and Peña (2010). In particular they find that for 2006 the raw gender wage gap has a U-shape, it is large at the ends of the distribution and the magnitudes are around 35% at low levels and 30% at the 99th percentile. They conclude that minimum wages may explain the lowest levels of the gap observed at the middle of the distribution, as they may compress the gender gap at intermediate quantiles.

In comparison with Badel and Peña (2010), the results of the present study confirm a very wide gender wage gap at the bottom of the wage distribution but a smaller gap at the 99th percentile (10% and 22% in 1994 and 2010 respectively). They also find that sample selection underestimates the wage gap: the same finding is made in this paper for both the periods analyzed. However is important to note that Badel and Peña (2010) use information not only on employees but also on self-employed persons and employers.

5. THE EFFECT OF EDUCATION, PUBLIC SECTOR EMPLOYMENT AND THE TYPE OF CONTRACT ON THE GENDER WAGE GAP

As mentioned in the introduction, the educational attainment of workers in Colombia has increased significantly. In particular, the share of college-educated female employees increased from 12% in 1994 to 44% in 2010. In addition, the proportion of public-sector workers halved from 14% and 13% (for women and men, respectively) to 7% in 2010 for both. The proportion of workers with indefinite contracts dropped from 82% for women and 81% for men to 47% and 53% respectively in 2010. As argued above, these changes have not affected men and women equally so they are likely to have contributed to changes in the gender wage gap over these 16 years.

The aim of this section is to compute what the distribution of wages would have been in 2010 had the educational attainment, the proportion of public-sector workers and the proportion of indefinite contracts remained at 1994 levels. The counterfactual distribution is computed separately for each of the three characteristics and simultaneously when the three characteristics are fixed at 1994 levels. This reveals the extent to which the gender wage gap has been affected by changes observed in each of the three characteristics and by all three of them together.

The methodology used to compute the counterfactual distributions is described first, then the results are presented.

5.1 METHODOLOGY

The counterfactual density of the gender wage gap in 2010 is computed using the methodology developed by Dinardo, Fortin, Lemieux (DFL) (1996). This enables the weighted kernel density that would have prevailed if any characteristic of interest– in our case education level, type of contract and type of employment - had remained at its 1994 level to be calculated.

In this case, the DFL approach entails estimating the conditional probability of a worker at a point of time with given characteristics having a college education (or working in the public or private sector or having a particular type of contract). The probabilities estimated are used to compute a reweighting function, which up-weights workers in 2010 who are underrepresented and vice versa in order to represent the distribution of any characteristic of interest of the 1994 sample.

For each worker there is a vector represented by (w, x, t) , where w is the wage, x is a vector of personal and job characteristics, including a dummy y , the variable of interest and t the date, which is the year 1994 or 2010.

So, for example, if the objective is to analyze the contribution of changes in the education level of workers to the wage distribution, y is a dummy with a value of one for college-educated workers and zero otherwise⁹.

The density of wages in 2010 is: $f(w; t_w = 2010, t_x = 2010, t_{y/x} = 2010)$

$$= \iint f(w/y, x, t_w = 2010) dF(y/x, t_{y/x} = 2010) dF(x/t_x = 2010)$$

Following the DFL approach, the counterfactual density of wages in 2010 if y had remained at its 1994 level can be expressed as the distribution of wages in 2010 with the weights adjusted, i.e.:

$$\begin{aligned} & f(w; t_w = 2010, t_x = 2010, t_{y/x} = 1994) \\ &= \iint f(w/y, x, t_w = 2010) dF(y/x, t_{y/x} = 1994) dF(x/t_x = 2010) \\ &= \iint f(w/y, x, t_w = 2010) \gamma_{y/x}(y, x) dF(y/x, t_{y/x} = 2010) dF(x/t_x = 2010) \end{aligned}$$

Where the reweighting function is defined as:

⁹ For the type of contract y is one for employees with indefinite contracts and zero otherwise; for the type of employment, y is one for workers in the public sector and zero otherwise.

$$\gamma_{y/x}(y, x) = \frac{dF(y/x, t_{y/x} = 1994)}{dF(y/x, t_{y/x} = 2010)}$$

As y is a dummy variable that takes values one and zero, the reweighting function is:

$$\gamma_{y/x}(y, x) = y \frac{dF(y = 1/x, t_{y/x} = 1994)}{dF(y = 1/x, t_{y/x} = 2010)} + (1 - y) \frac{dF(y = 0/x, t_{y/x} = 1994)}{dF(y = 0/x, t_{y/x} = 2010)} \quad (1)$$

The conditional probability $dF(y = 1/x, t_{y/x} = t)$ is estimated using a probit model. x is a set of covariates that vary depending on the objective variable to be predicted. In general it consists of dummies for gender, education, tenure, age, age squared, region, economic activity, occupations, size of the firm and full-time work and an indicator for type of employment. Gender is usually interacted with education variables and tenure.

The weighted kernel density introduced by DFL is used:

$$\hat{f} = \sum_{i=1}^n \frac{\theta_i}{h} K\left(\frac{w - W_i}{h}\right)$$

where K is the kernel¹⁰, h the bandwidth, and θ_i the sample weight normalized to sum one¹¹.

The counterfactual density is estimated using as new weights $\tilde{\theta}_i = \gamma_{y/x} \theta_i$, this is the reweighting function times the sample weights.

Up to now the description has covered how to obtain the reweighting function when only one variable changes. This methodology can however also be used to analyze the effect of changes in more than one variable at the same time. In particular, it would be interesting to compute the counterfactual gender wage gap that would have prevailed if the level of education, the proportion of indefinite contracts and the proportion of public-sector workers had remained at 1994 levels but the structure of wages was that of 2010. In this case the reweighting function is defined as the product of the three new weights (computed separately using the predicted probabilities in equation 1) times the sample weights normalized to sum up to one.

¹⁰ A Gaussian function is used.

¹¹ The Choice of the bandwidth is crucial in the estimation of the kernel density. When h is larger than the optimal value the estimated density is oversmoothed and when h is smaller than the optimal value is less smooth. This paper uses the “rule-of-thumb” method developed by Silverman (1986) to compute the bandwidth.

5.2 THE CONTRIBUTION OF EDUCATION TO THE CHANGE IN THE GENDER WAGE GAP

The increase in educational attainment of Colombian workers over the sixteen year period studied is remarkable. The proportion of workers with college education increased by around 32 percentage points for women and 25 for men. This section determines what the counterfactual gender wage gap would be in 2010 if the education levels of men and women had remained at their 1994 levels. Given that the change in the educational attainment of men and women has not been of the same magnitude, this change can be expected to have an impact on the trend in the gender wage gap.

In order to show the changes in the composition of college and non-college educated workers over these years, Table 5 gives the average characteristics of both groups. College-educated men in 2010 are younger and have less tenure than in 1994, while non-college-educated workers are older than their counterparts in 1994. There has been an increase in the proportion of college-educated workers less than 24 years old and in the proportion of women between 45 and 54 years old.

The presence of children in the households of college-educated workers is lower than in those of the non-college-educated in both years. Moreover this proportion decreases for all workers, with the highest fall being observed for men - a reduction of 9 and 8 percentage points for the non-college and college-educated respectively. There are more non-college-educated than college-educated female heads of household, and this proportion has increased over time by around 11 percentage points for the former and 7 percentage points for the latter. In 1994 the proportion of married women and men is higher among college-educated workers, but in 2010 this situation is reversed. The share of college- and non-college-educated married women increased by about 2 and 9 percentage points respectively while the share of college- and non-college-educated married men decreased by 11 and 2 percentage points respectively.

Regarding job characteristics, a reallocation of workers with college educations from the public to the private sector is observed. The number of private-sector employees with college educations is up by almost 20 percentage points while the proportion in the public sector is halved. In 1994 there were more non-college-educated than college-educated men and women working in the private sector, and the reverse was true for the public sector. In 2010 the number of workers in the private sector is higher, except for non-college-educated women, and the number of college-educated private-sector workers is up by around 22 percentage points for women and 19 for men. However, the proportion of workers in the public sector has decreased, especially college-educated workers. The numbers are down by 22 and 10 percentage points for college- and non-college-educated women respectively and by 20 and 6 percentage points for men. Domestic servants are predominantly non-college-educated women workers and the proportion is up by 11 percentage points.

The proportion of college-educated women working part-time (less than 35 hours per week) is down by in about 9 percentage points while the presence of non-college-educated women working part-time is up by 2 percentage points. Moreover in 2010 more employees work

overtime - more than 45 hours per week - especially among the non-college-educated, for whom the figure is up by 11 percentage points for both women and men.

In 2010 there are more workers in small firms (with less than 11 employees), and the biggest increase (11 percentage points) is observed for non-college-educated women; the proportion of non-college-educated workers is higher than that of college-educated workers in both years.

The percentage of college- and non-college-educated women with indefinite contracts decreased from 87% and 81% in 1994 to 66% and 32% in 2010 whereas for men the figure dropped from 88% and 80% to 66% and 45% respectively.

In general, non-college-educated employees work more overtime hours, are more likely to work in small firms and are less likely to have indefinite contracts. In conclusion, in 2010 there are more college-educated women who are heads of household, who work in the private sector, who work overtime hours and who work in small firms. Moreover, there are fewer of them in the public sector, working part-time and with indefinite contracts. Moreover in 2010 there are less households with college-educated men where there are, there are fewer college-educated men who are heads of household, married, working in the public sector, working part-time and with indefinite contracts, but there are more college-educated men working in the private sector.

Table 6 presents hourly wages at the mean and by percentiles for college and non-college-educated workers. College-educated workers earn more than those without college educations. In real terms hourly wages have decreased for both college- and non-college-educated workers, but especially for the former. Average wages of women with college educations are down by about 28%, with the biggest falls in the 50th and 75th percentiles (41% and 31% respectively). The loss of purchasing power of women without college educations is around 26%, with the biggest decrease taking place at the top end of the distribution. On the other hand, the fall in wages for men with college educations is on average 26%, and here also the biggest drop is at the top of the wage distribution. The hourly wages of non-college-educated men are down on average by around 16%, and once again workers at the top of the distribution are the most affected.

Table 7 shows the raw and counterfactual gender wage gaps at the mean and at different percentiles for 1994 and 2010. The first and second columns show the observed wage gap by gender and the third column presents the counterfactual wage gap, i.e. the wage gap that would have existed in 2010 if education had remained at its 1994 level and workers had been paid according to the wage schedule observed in 2010. It is computed using the reweighting technique by DFL explained in the previous section.

It is interesting to observe that the increase in educational attainment has helped reduce the average gender wage gap, i.e. if the wage structure and the observable characteristics was that of 2010 but the distribution of college-educated workers was that of 1994, the average raw wage gap would be 4 percentage points higher.

In addition, a look at the percentiles reveals that the increase in education has changed the distribution of workers' wages, especially in the middle and at the top of the distribution. It has contributed to a drop in wages in the middle of the distribution and increased the number of workers with higher wages. This latter impact is lower for men than for women. The greatest impact is observed at the 75th and 90th percentiles, with reductions of about 14 and 10 percentage points. This is consistent with the fact that the increase in women with college educations is

much greater than that of men in 2010. An interesting finding is that no effect is observed at the 95th percentile of the wage distribution.

A clear illustration of these changes is represented in Figure 5, which shows the Kernel estimation of the actual and counterfactual densities of wages by gender. In this figure the impact of education is clearly observed, and it shows the exact points of the wage distribution where the main effects of the changes in education have taken place.

5.3 THE EFFECT OF CHANGES IN JOB CHARACTERISTICS ON THE GENDER WAGE GAP

This section isolates the effect first of observed changes in the proportion of workers employed in the public sector, then of changes in the composition of workers with indefinite contracts on the gender wage gap. Both characteristics have undergone remarkable changes over the years considered.

5.3.1 PUBLIC SECTOR EMPLOYMENT AND THE GENDER WAGE GAP

The number of public-sector employees almost halved between 1994 and 2010, decreased from 14% (women) and 12% (men) to 7% (both). In this period the Colombian government enacted a number of legal reforms directly related to the reduction of the size of the state. In particular, law 720 (2002) led to a merger of some ministries and public institutions directly related with the executive branch, which entailed the elimination of many jobs in the public sector. Moreover the Colombian government privatized some companies related to telecommunications, electricity and coal among others¹².

Table 8 shows average personal and job characteristics of workers in the public (odd columns) and private sectors (even columns).

On average, public-sector employees are older and have more tenure than private-sector employees. In 2010 women working in the public sector are older and have longer tenure in their current jobs than their male counterparts. The average age of female public-sector employees has increased by 7 years and they have on average around 5 years more tenure than in 1994. Moreover, most of women working in the public sector have college degrees (89% versus 70% for men), which contrasts with the proportions of college-educated workers in the private sector (40% and 33% for women and men respectively).

The proportion of private-sector employees working overtime is higher than that of public-sector employees and the difference has increased over time.

Table 9 contains a breakdown by gender of the average hourly wages at the mean and at different percentiles of public- and private-sector employees. On average female and male public-sector

¹² In 2000 major companies were privatized, including the telecommunication company “Empresa de Telefonos de Bogotá”, the electric utility “Isagen” and the marketer of coal “Carbocol”. The national telecommunications company “Telecom” was sold in 2006 and in 2008 the Colombian government sold 8 regional electric utilities, among others.

employees earn more than private-sector workers. Hourly wages of employees in both sectors have increased although the increase is greater for public-sector workers, especially for women. In 1994 the average hourly wages of male public-sector employees were slightly higher than those of women; however in 2010 this situation was reversed, with female public-sector employees earning more than men at the mean and at all percentile except 95%.

In 1994 women working in the public sector earned 84% more than women in the private sector. This gap increased to 167% in 2010. At the mean the increase in wages of female public-sector employees is around 52% and the largest gains in purchasing power are observed from the 50th percentile on. For men, the gain of purchasing power for public sector workers is about 34% at the mean and is accounted for mainly by the top end of the wage distribution.

Table 10 shows the actual and counterfactual gender wage gaps at the mean and at some percentiles. The first and second columns show the observed gender wage gap. The third column presents the counterfactual distribution, i.e. the gender wage gap that would have existed if the distribution of workers in the public sector had remained at its 1994 level.

From Figure 6 it can be clearly observed that the reduction in the number of workers in the public sector has changed the wage distribution of women more than that of men, mainly at the top end of the distribution. Comparing the actual and counterfactual distributions for women, it can be observed that the former contains more women at the low end of the wage distribution, whereas the proportion of women earning higher wages is lower. Therefore the reduction of workers in the public sector has contributed to the increase in the gender wage gap and the biggest effect is observed from the 25th percentile on.

It is also interesting to highlight that at the 70th and 90th percentiles the gender wage gap would have been negative.

Given that by 2010 women in the public sector earned more than their male counterparts at the mean and at almost all percentiles of the wage distribution, the reduction in the share of public sector workers has helped to increase the gap, especially for workers at the top of the wage distribution. Workers who have switched from the public to the private sector have clearly worsened their wage levels. Given that most of those who have switched are women, the consequence is an increase in the gender wage gap.

5.4.1 THE CONTRIBUTION OF THE TYPE OF CONTRACT ON THE GENDER WAGE GAP

The next characteristic examined is the change in the proportion of workers with indefinite and other type of contract, including fixed-term contracts, respectively. As mentioned above, the proportion of workers with permanent contracts has decreased remarkably in this 16-year period. In 1994 82% of women and 81% of men had indefinite contracts, whereas in 2010 the proportion

was just 47% and 53%, respectively. Labor reform 798 (2002)¹³ was implemented in Colombia to promote more flexible contracts. Previously, laws 50 (1990) and 100 (1993) had already encouraged fixed-term hiring in Colombia.

As a consequence, the proportion of workers with indefinite contracts halved. Given that the change did not affect men and women equally, this reduction can be expected to contribute to changes in the gender wage gap.

Table 11 shows workers with indefinite and other type of contracts, respectively.

As might be expected, workers with indefinite contracts have on average more years of tenure in their current jobs in both years. In addition, the education level of female workers with indefinite contracts is considerably higher than those workers without indefinite contract. For men, the difference in education level between the two types of worker is much smaller.

Another interesting feature can be seen for women working as domestic servants: The proportion of them working with indefinite contracts has dropped by 10 percentage points while domestic servants with non-indefinite contracts have increased by around 15 percentage points. In addition, employees working overtime without indefinite contracts have increased by about 14 and 12 percentage points for women and men respectively.

Finally, the proportion of workers with indefinite contracts who work in small firms has decreased by almost 23 percentage points for women and 18 for men.

Table 12 presents hourly wages at the mean and at different percentiles for women and men by types of contract. On average workers with indefinite contracts earn more, and the difference seems to be quite stable in both years.

The hourly wages of women and men with indefinite contracts have increased over time by an on average of 40% and 27% respectively. The biggest increases are observed at the low end of the wage distribution. This contrasts with male workers, whose wages have increased over this period by a very similar amount throughout the wage distribution. However, the wages of female workers without indefinite contracts have decreased on average.

The last column of table 10 shows the counterfactual gender gap, i.e. with the distribution of workers with indefinite contracts at its 1994 level and the wage structure as in 2010: on average the observe gender wage gap would have been around 7 percentage points lower. Important changes are observed at the bottom of the distribution, i.e. for the 5th, 10th and 25th percentiles. A smaller contribution is observed in the 75th, 90th and 95th percentiles.

Figure 7 shows that the reduction in the number of workers with indefinite contracts contributes to an increase in the number of workers earning lower wages, the effect being greater for women. Moreover it helps increase the number of women at the mean of the distribution.

¹³ Law 789 of 2002 extended the definition of daytime by four hours, reduced the surcharge for Sunday work and holiday and severance pay, changed the learning contract and created the temporary employment subsidy.

Therefore, the reduction in indefinite contracts observed between 1994 and 2010 increases the gender wage gap, especially for those at the low end of the wage distribution. This is consistent with the results of the quantile regressions presented in a previous section, where it was found that for 2010 the highest returns of indefinite contracts with respect to worker with other type of contract, including fixed-term contracts, were observed mainly at the 5th and 10th percentiles. Hence policies that encourage indefinite hiring may help to reduce the gap, especially at the bottom of the distribution.

So far this analysis has covered the effects of education, type of employment and type of contract on the gender wage gap separately. However given that these three changes have occurred during the period of reference simultaneously, it would be interesting to learn to what extent the three together have changed the female and male wage distributions, and hence the gender wage gap. It is noted in the previous section that the increase in educational attainment helps to reduce the gender wage gap while the change in the proportion of public sector jobs and the reduction in indefinite contracts produce the opposite effect. Furthermore, the main contribution of changes in education and in public-sector jobs is observed at the top end of the wage distribution whereas the change in type of contracts mainly affects the bottom end. Depending of which of them dominates, the counterfactual gender wage gap may be higher or lower than the actual gap.

The first two columns of Table 13 show the actual wage gaps in 1994 and 2010. The third column presents the counterfactual wage gap that would exist if the figures for educational attainment, type of employment and type of contract remained at their 1994 levels.

The results indicate that on average the counterfactual gender wage gap would have been negative. This is because the reduction in public-sector jobs and the reduction in indefinite contracts reduce average female wages more than those of their male counterparts, as they affect women more than men. Figure 8 shows the actual distribution of female wages. It can be seen that there is a higher proportion of women at the bottom than in the counterfactual distribution. For men, the effects are clearly smaller and are mainly observed in the middle of the wage distribution.

Summarizing, taken together the three changes have increased the gender wage gap – the positive effect of education with regards to reducing the gap is exceeded by the negative effect of other changes in job characteristics, such as the proportion of public-sector employment and the proportion of indefinite contracts.

6. CONCLUSIONS

This paper analyzes the trend in the raw gender wage gap and the adjusted gender wage gap throughout the wage distribution in Colombia for the period 1994 to 2010. The raw gender wage gap shows a U shape, with remarkable gaps at the two ends of the wage distribution. However, when observable characteristics are controlled for, the U shape disappears. For both years under study, the adjusted wage gap increases monotonically throughout the wage distribution, evidencing a glass ceiling pattern. At the 95th percentile the gap is around 22% in 1994 and 26% in 2010.

Given that female labor force participation increased by around 11% between 1994 and 2010, it is necessary to control for sample selection. Failure to do this would result in the gender gap being underestimated, particularly for higher wages.

The analysis also covers the effects of changes in education, type of employment and type of contract on the observed gender wage gap between 1994 and 2010 using the DFL semi-parametric technique. These characteristics are found to be crucial in explaining the observed changes in the wage distribution of female and male workers and therefore in the gender wage gap. The observed increase in the educational attainment of workers, the reduction in the proportion of public-sector jobs and the reduction in the proportion of indefinite contracts among employees have changed the structure of wages not only at the mean but also throughout the wage distribution. Moreover, the impact has been much higher for women than for men.

In particular, the increase in the proportion of women with college educations with respect to men has helped to reduce the gender wage gap, especially at the top of the wage distribution. On average, the gender wage gap has decreased by around 4 percentage points, and the impact has been higher at the high end of the wage distribution.

The reduction in public-sector jobs has helped to increase the gender wage gap, as relatively more women have been affected by the switch from public- to private-sector jobs, with a significant wage reduction. This effect is higher at the high end of the wage distribution. Finally, the reduction in the proportion of indefinite contracts has also helped to increase the gender wage gap, as more women than men have been affected by the switch from indefinite to other type of contract, as fixed-term contracts. This impact has been particularly high at the bottom end of the wage distribution.

Taken together, the effects of all three changes prove to have increased the gender wage gap. The increasing effects of the reduction in public-sector jobs and the proportion of indefinite contracts more than offset the decreasing effects of the increase in educational attainment.

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FIGURES

Figure No. 1

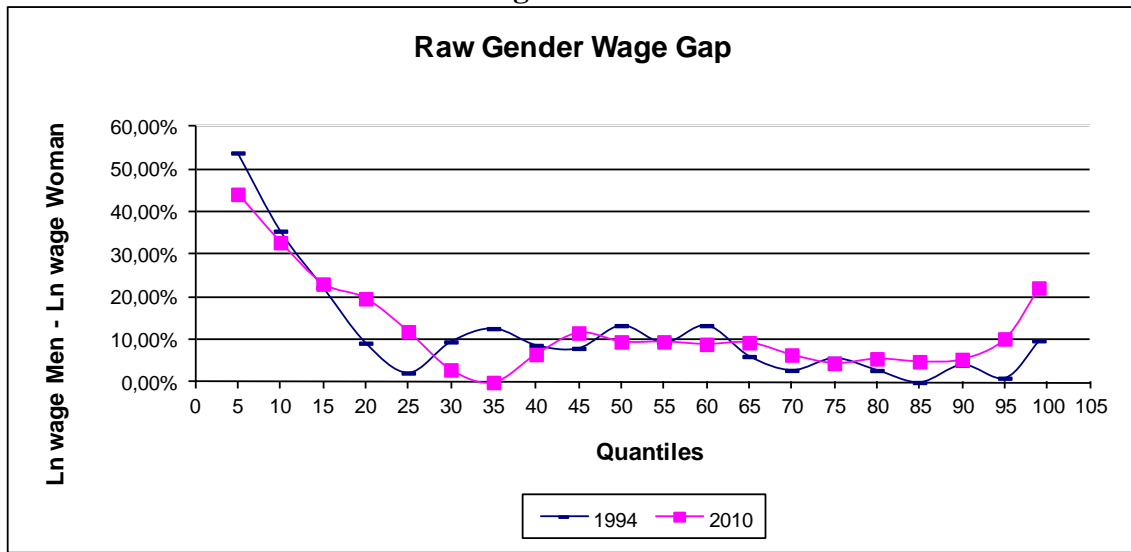


Figure No. 2

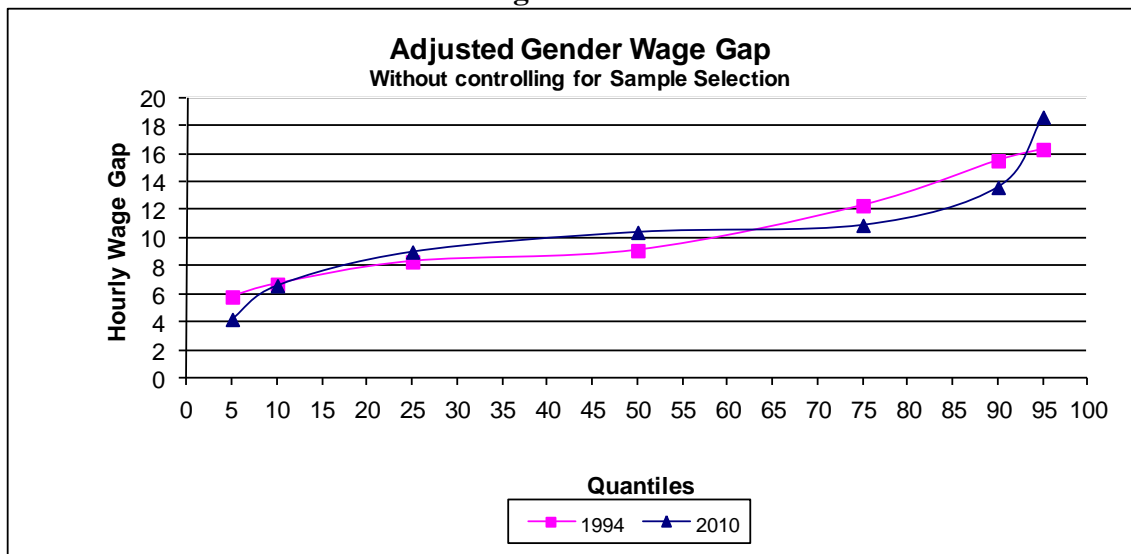


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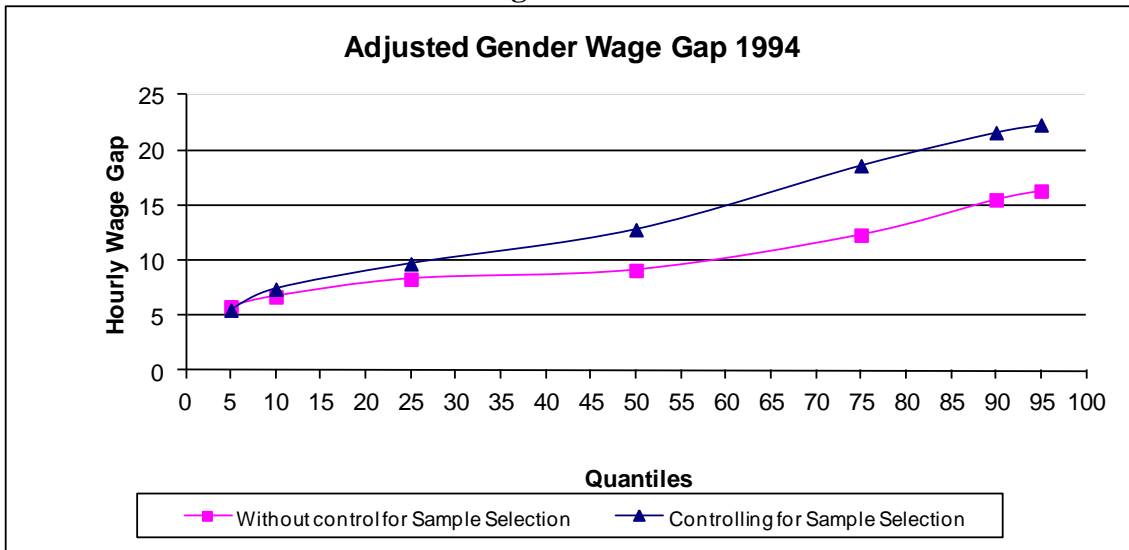


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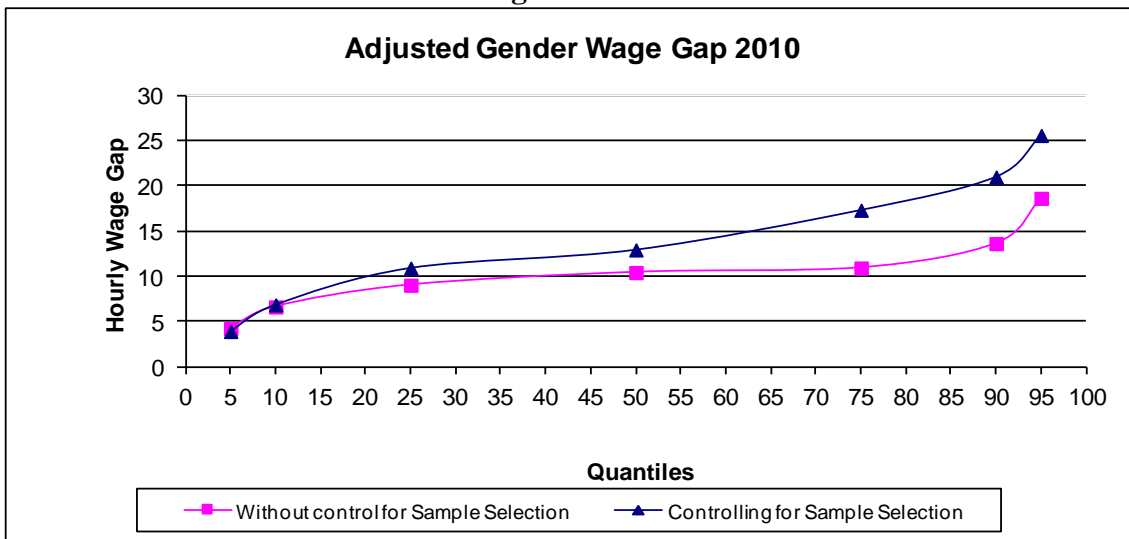


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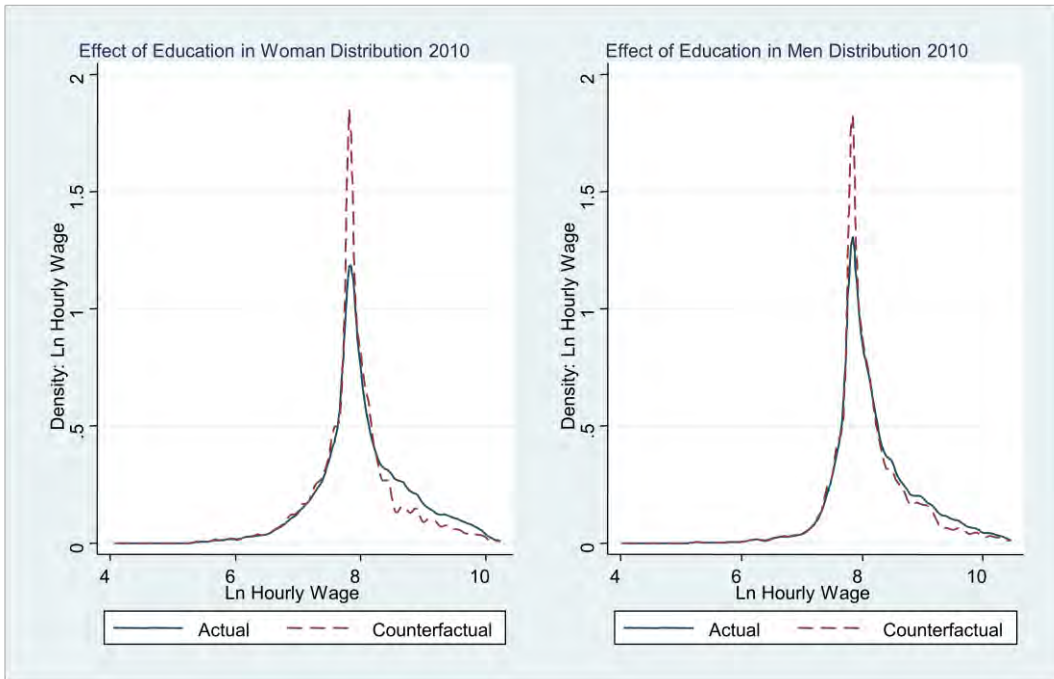


Figure 6

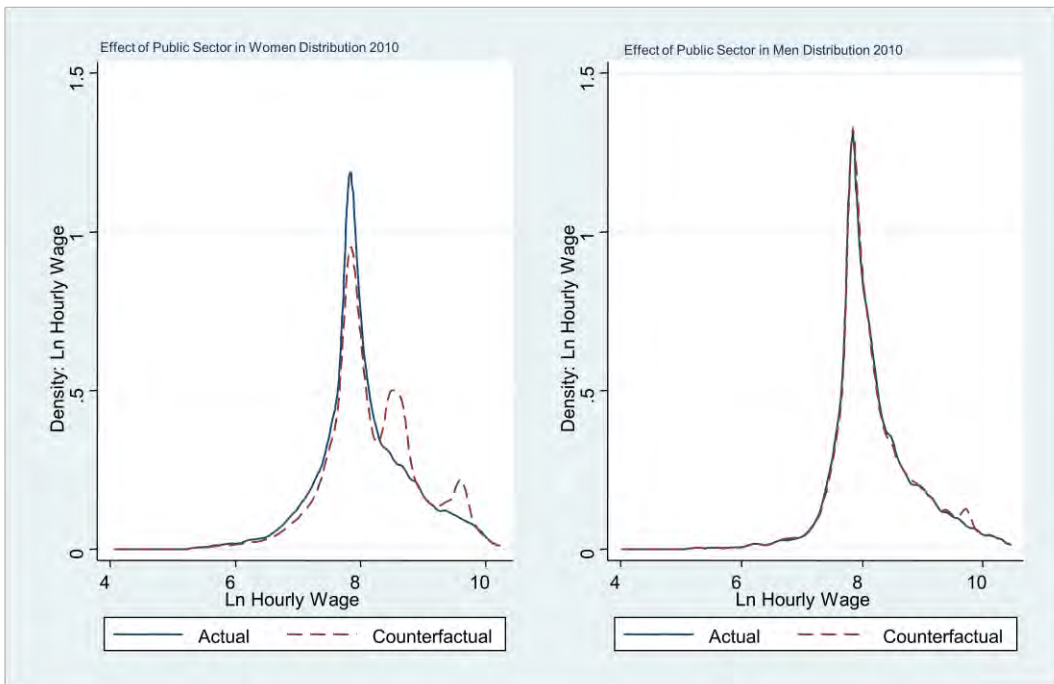


Figure 7

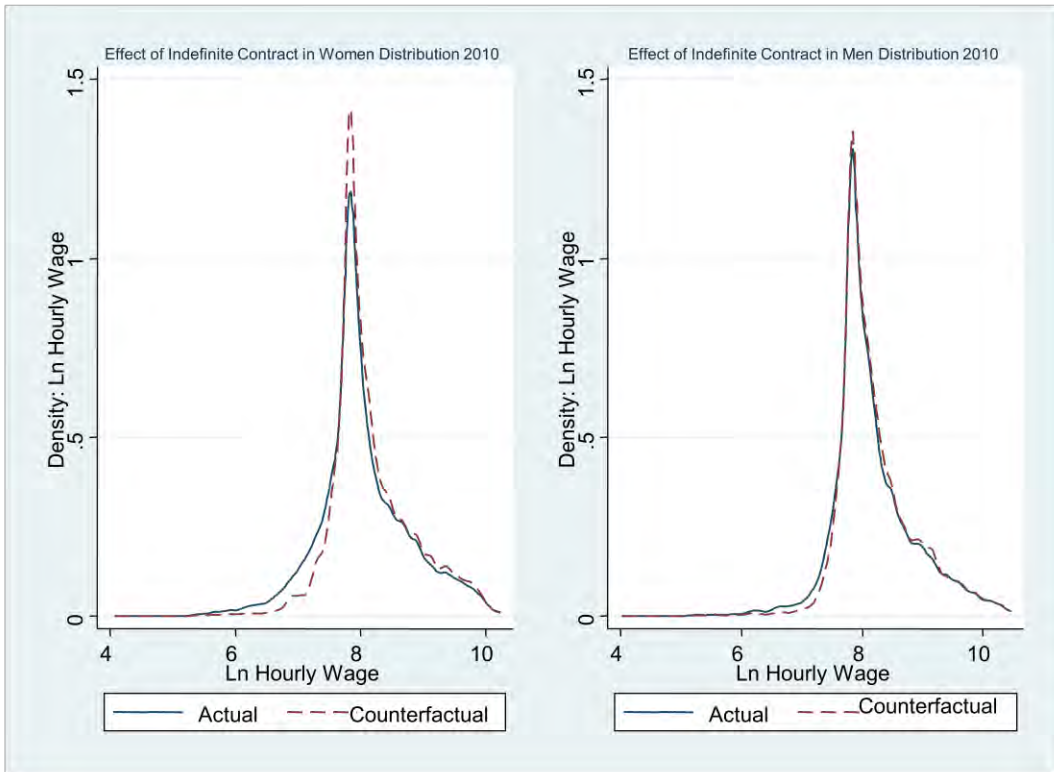
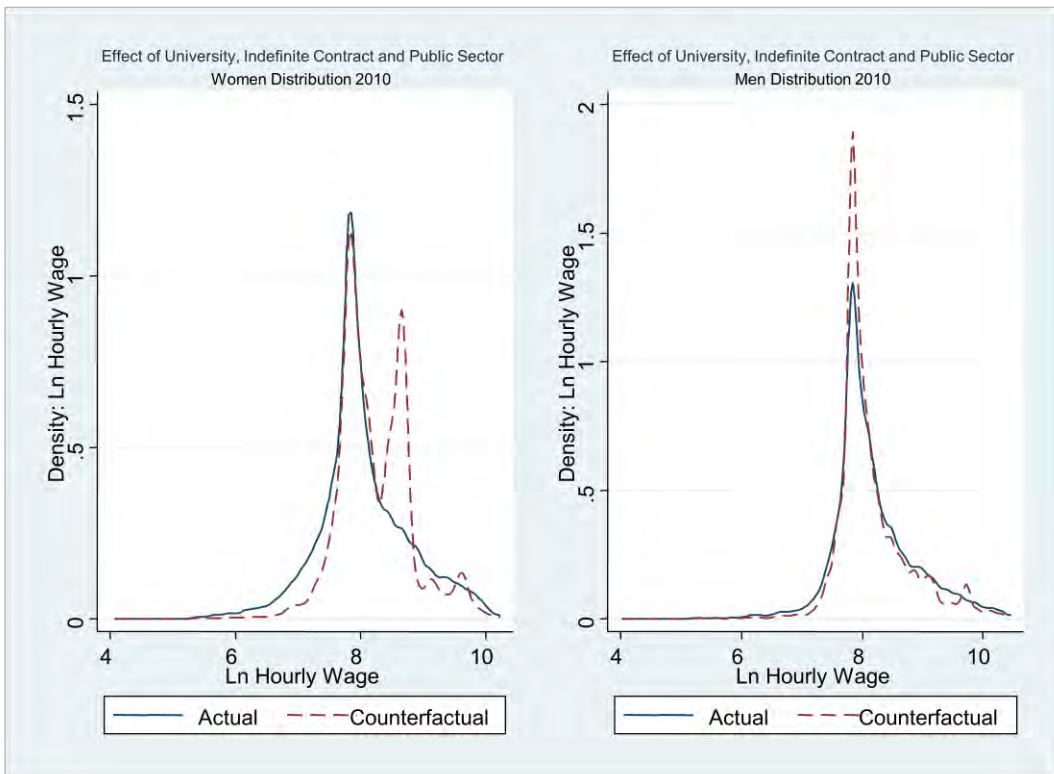


Figure 8



TABLES

Table 1. Descriptive Statistics of Female and Male Workers

| | 1994 | | | | 2010 | | | |
|---------------------------------------|----------|-----------|----------|-----------|----------|-----------|----------|-----------|
| | Women | | Men | | Women | | Men | |
| | Average | SD | Average | SD | Average | SD | Average | SD |
| Age | 32.01 | 9.46 | 33.07 | 10.48 | 35.25 | 10.46 | 35.01 | 10.82 |
| Tenure | 4.60 | 6.27 | 5.11 | 6.90 | 4.57 | 6.44 | 4.59 | 6.30 |
| Weekly Hours | 46.49 | 10.90 | 50.41 | 11.25 | 47.52 | 11.65 | 51.18 | 10.89 |
| | % | SD | % | SD | % | SD | % | SD |
| Age groups | | | | | | | | |
| <i>Distribution by age categories</i> | | | | | | | | |
| 18 to 24 | 24.82 | 0.43 | 24.37 | 0.43 | 17.24 | 0.38 | 18.21 | 0.38 |
| 25 to 34 | 39.51 | 0.49 | 37.24 | 0.48 | 33.95 | 0.47 | 35.87 | 0.48 |
| 35 to 44 | 24.09 | 0.43 | 22.46 | 0.42 | 26.56 | 0.44 | 24.51 | 0.43 |
| 45 to 54 | 9.41 | 0.29 | 11.52 | 0.32 | 17.95 | 0.38 | 16.08 | 0.36 |
| 55 to 65 | 2.01 | 0.14 | 4.20 | 0.20 | 4.18 | 0.20 | 5.24 | 0.22 |
| Children <7 | 40.01 | 0.49 | 45.74 | 0.50 | 34.39 | 0.47 | 34.65 | 0.47 |
| Head of Household | 17.89 | 0.38 | 60.40 | 0.49 | 25.85 | 0.44 | 59.70 | 0.49 |
| Education Variables | | | | | | | | |
| None or Primary Incomplete | 9.33 | 0.29 | 9.87 | 0.30 | 0.58 | 0.07 | 0.87 | 0.09 |
| Primary or Secondary Incomplete | 38.76 | 0.48 | 48.55 | 0.50 | 13.59 | 0.34 | 14.42 | 0.35 |
| Secondary or University Incomplete | 40.11 | 0.49 | 31.50 | 0.39 | 41.76 | 0.49 | 49.29 | 0.50 |
| University | 11.80 | 0.32 | 10.08 | 0.30 | 44.05 | 0.50 | 35.37 | 0.48 |
| Marital Status | | | | | | | | |
| Cohabiting | 12.04 | 0.32 | 21.19 | 0.40 | 23.80 | 0.43 | 32.06 | 0.47 |
| Married | 26.15 | 0.44 | 40.85 | 0.49 | 21.71 | 0.41 | 27.41 | 0.45 |
| Widowed, Divorced or Separated | 18.67 | 0.38 | 3.54 | 0.18 | 20.50 | 0.40 | 7.85 | 0.27 |
| Never Married | 43.13 | 0.49 | 34.41 | 0.47 | 33.98 | 0.47 | 32.66 | 0.47 |
| Job Characteristics | | | | | | | | |
| Type of Employment | | | | | | | | |
| Private Sector Employee | 73.58 | 0.44 | 87.64 | 0.33 | 78.11 | 0.41 | 92.14 | 0.27 |
| Public Sector Employee | 14.02 | 0.34 | 12.19 | 0.33 | 7.28 | 0.26 | 7.54 | 0.26 |
| Domestic Servants | 12.39 | 0.33 | 0.17 | 0.04 | 14.60 | 0.35 | 0.31 | 0.05 |
| Part-time | 9.70 | 0.29 | 3.50 | 0.18 | 9.94 | 0.29 | 3.62 | 0.19 |
| Full-time | 68.30 | 0.46 | 64.39 | 0.49 | 62.91 | 0.48 | 59.03 | 0.49 |
| Overtime | 22.00 | 0.41 | 32.11 | 0.47 | 27.15 | 0.44 | 37.34 | 0.48 |
| Small Firm | 37.70 | 0.48 | 31.08 | 0.46 | 38.16 | 0.48 | 28.15 | 0.45 |
| Indefinite Contract | 82.13 | 0.38 | 80.99 | 0.39 | 46.95 | 0.50 | 52.91 | 0.49 |
| N. Observations Unweighted | 7913 | | 10532 | | 7804 | | 8364 | |
| N. Observations Weighted | 1393475 | | 1796303 | | 2034537 | | 2243559 | |

SD = standard deviation

Table 1A. Descriptive Statistics of Female and Male Workers

| | 1994 | | | | 2010 | | | |
|---|---------|------|---------|------|---------|------|---------|------|
| | Women | | Men | | Women | | Men | |
| | % | SD | % | SD | % | SD | % | SD |
| Occupations | | | | | | | | |
| <i>Distribution by occupations</i> | | | | | | | | |
| Professionals and Technicians | 14.01 | 0.35 | 10.19 | 0.30 | 14.95 | 0.36 | 13.85 | 0.34 |
| Managers and Public Supervisors | 1.65 | 0.13 | 1.85 | 0.13 | 3.19 | 0.17 | 3.20 | 0.17 |
| Administrative Staff | 25.99 | 0.44 | 13.74 | 0.34 | 23.42 | 0.42 | 16.10 | 0.37 |
| Traders and Sellers | 13.45 | 0.34 | 10.29 | 0.30 | 15.39 | 0.36 | 10.92 | 0.31 |
| Service Workers | 28.08 | 0.45 | 12.34 | 0.33 | 33.40 | 0.47 | 16.24 | 0.37 |
| Agricultural and Forestry workers | 0.58 | 0.07 | 1.23 | 0.11 | 0.26 | 0.05 | 0.83 | 0.09 |
| Non-agricultural workers and operators | 16.25 | 0.37 | 50.36 | 0.50 | 9.38 | 0.29 | 38.86 | 0.49 |
| Economic Sector | | | | | | | | |
| Agriculture and Livestock | 0.73 | 0.08 | 1.30 | 0.11 | 0.67 | 0.08 | 1.09 | 0.10 |
| Mines and Quarries | 0.27 | 0.05 | 0.53 | 0.07 | 0.06 | 0.02 | 0.60 | 0.07 |
| Manufacture Industry | 23.45 | 0.42 | 29.00 | 0.45 | 16.18 | 0.37 | 23.35 | 0.42 |
| Electricity, Gas, Water | 0.51 | 0.07 | 1.2 | 0.10 | 0.37 | 0.06 | 1.19 | 0.10 |
| Construction | 1.22 | 0.11 | 10.47 | 0.30 | 0.57 | 0.07 | 9.70 | 0.29 |
| Trade, Restaurants, Hotels | 22.50 | 0.42 | 17.20 | 0.37 | 24.13 | 0.43 | 23.65 | 0.42 |
| Transport, Communications | 2.17 | 0.14 | 9.95 | 0.29 | 4.65 | 0.21 | 9.79 | 0.29 |
| Financial Establishments and Insurance | 9.06 | 0.28 | 8.52 | 0.27 | 12.11 | 0.32 | 13.72 | 0.34 |
| Personal, Social and community services | 40.06 | 0.49 | 21.81 | 0.41 | 41.25 | 0.49 | 16.91 | 0.37 |
| <u>Demographic Characteristics</u> | | | | | | | | |
| <i>Metropolitan Areas</i> | | | | | | | | |
| Medellin | 18.70 | 0.39 | 18.81 | 0.39 | 18.98 | 0.39 | 19.37 | 0.39 |
| Barranquilla | 7.25 | 0.26 | 8.33 | 0.28 | 5.78 | 0.23 | 6.38 | 0.24 |
| Bogotá | 43.11 | 0.49 | 40.98 | 0.49 | 45.54 | 0.50 | 42.87 | 0.49 |
| Manizales | 2.16 | 0.14 | 14.83 | 0.35 | 2.08 | 0.14 | 2.19 | 0.14 |
| Villavicencio | 1.22 | 0.11 | 1.30 | 0.11 | 1.65 | 0.12 | 1.80 | 0.13 |
| Pasto | 1.90 | 0.14 | 1.68 | 0.13 | 1.45 | 0.11 | 1.43 | 0.11 |
| Cúcuta | 3.58 | 0.18 | 3.77 | 0.19 | 2.61 | 0.15 | 2.77 | 0.16 |
| Pereira | 3.70 | 0.18 | 3.67 | 0.18 | 2.75 | 0.16 | 3.21 | 0.17 |
| Bucaramanga | 5.80 | 0.23 | 5.39 | 0.22 | 4.97 | 0.21 | 4.57 | 0.20 |
| Cali | 12.55 | 0.33 | 13.55 | 0.34 | 10.86 | 0.31 | 12.21 | 0.33 |
| N. Observations Unweighted | 7913 | | 10532 | | 7804 | | 8364 | |
| N. Observations Weighted | 1393475 | | 1796303 | | 2034537 | | 2243559 | |

Table 2. Average Hourly Wages and Gender Wage Gap by Characteristics

| | 1994 | | 2010 | | Gender Wage Gap % | |
|---------------------------------|---------|----------|---------|---------|-------------------|--------|
| | Women | Men | Women | Men | 1994 | 2010 |
| | 3932.26 | 4262.93 | 4165.92 | 4607.88 | 13.02 | 12.23 |
| Real Hourly wage | | | | | | |
| Age groups | | | | | | |
| 18 to 24 | 2936.62 | 3040.12 | 2777.29 | 2887.62 | 12.49 | 5.52 |
| 25 to 34 | 3988.10 | 4070.46 | 4046.16 | 4427.32 | 7.65 | 9.95 |
| 35 to 44 | 4561.78 | 5106.34 | 4589.89 | 5204.39 | 16.39 | 16.41 |
| 45 to 54 | 4625.22 | 5430.00 | 4947.40 | 5789.79 | 19.70 | 19.85 |
| 55 to 65 | 4355.77 | 5376.00 | 4681.80 | 5424.83 | 21.82 | 17.32 |
| Non head of Household | 3855.34 | 3535.05 | 4076.34 | 3761.56 | 0.21 | -0.68 |
| Head of Household | 4285.21 | 4740.16 | 4396.75 | 5179.51 | 14.27 | 18.18 |
| Education Variables | | | | | | |
| Non College | 3271.33 | 3601.46 | 2411.99 | 3023.67 | 15.38 | 23.93 |
| College | 8873.51 | 10166.21 | 6385.42 | 7502.77 | 10.45 | 11.80 |
| Marital Status | | | | | | |
| Cohabiting | 3194.34 | 3557.68 | 3529.54 | 3717.93 | 15.22 | 13.25 |
| Married | 4924.25 | 5182.93 | 5673.07 | 6266.69 | 4.37 | 9.78 |
| Widowed, Divorced, Separated | 3677.37 | 4254.58 | 3585.65 | 4153.09 | 20.32 | 17.77 |
| Never Married | 3647.07 | 3605.79 | 3978.30 | 4199.43 | 8.21 | 4.58 |
| Job Characteristics | | | | | | |
| Type of Employment | | | | | | |
| Private Sector Employee | 3886.57 | 3939.09 | 4066.12 | 4265.26 | 1.86 | 3.17 |
| Public Sector Employee | 6495.80 | 6621.08 | 9904.86 | 8878.82 | -3.72 | -21.46 |
| Domestic Servants | 1302.52 | 2120.72 | 1792.30 | 2534.75 | 50.99 | 34.20 |
| Part-time | 5934.57 | 6954.39 | 4746.86 | 5706.28 | 12.85 | 15.87 |
| Full-time | 4142.98 | 4573.76 | 4525.75 | 5203.43 | 10.64 | 13.05 |
| Overtime | 2395.02 | 3346.15 | 3096.74 | 3560.27 | 44.90 | 20.58 |
| Small Firm | 2545.32 | 3189.12 | 2348.29 | 2879.47 | 32.12 | 22.29 |
| Big Firms | 4771.53 | 4747.11 | 5279.44 | 5285.22 | -2.06 | -2.36 |
| Indefinite Contract | 4067.98 | 4469.07 | 5686.79 | 5686.42 | 15.15 | -1.77 |
| Other Type of Contract | 3308.11 | 3384.65 | 2808.10 | 3396.27 | 4.79 | 19.38 |

Table 3. OLS and Quantile Regression 1994 and 2010

| 1994 | | | | | | | | |
|---------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| | Average | $\theta=5$ | $\theta=10$ | $\theta=25$ | $\theta=50$ | $\theta=75$ | $\theta=90$ | $\theta=95$ |
| Woman | -0.085*** (0.011) | -0.058*** (0.017) | -0.067*** (0.013) | -0.083*** (0.010) | -0.091*** (0.010) | -0.123*** (0.013) | -0.155*** (0.016) | -0.163*** (0.024) |
| Age | 0.025*** (0.003) | 0.028*** (0.004) | 0.025*** (0.004) | 0.025*** (0.003) | 0.027*** (0.003) | 0.023*** (0.003) | 0.024*** (0.004) | 0.029*** (0.006) |
| Age ² | -0.000*** (0.000) | -0.000*** (0.000) | -0.000*** (0.000) | -0.000*** (0.000) | -0.000*** (0.000) | -0.000*** (0.000) | -0.000*** (0.000) | -0.000*** (0.000) |
| Secondary | 0.281*** (0.011) | 0.232*** (0.017) | 0.213*** (0.014) | 0.232*** (0.010) | 0.250*** (0.010) | 0.299*** (0.014) | 0.332*** (0.017) | 0.369*** (0.025) |
| College | 0.676*** (0.023) | 0.538*** (0.037) | 0.532*** (0.028) | 0.624*** (0.020) | 0.654*** (0.020) | 0.720*** (0.026) | 0.712*** (0.033) | 0.699*** (0.050) |
| Tenure | 0.011*** (0.001) | 0.006*** (0.001) | 0.008*** (0.001) | 0.011*** (0.001) | 0.012*** (0.001) | 0.012*** (0.001) | 0.010*** (0.001) | 0.010*** (0.002) |
| Married | 0.088*** (0.010) | 0.098*** (0.015) | 0.086*** (0.012) | 0.079*** (0.009) | 0.083*** (0.009) | 0.083*** (0.012) | 0.082*** (0.015) | 0.086*** (0.022) |
| Head of Household | 0.069*** (0.011) | 0.073*** (0.018) | 0.082*** (0.014) | 0.065*** (0.010) | 0.069*** (0.010) | 0.084*** (0.014) | 0.077*** (0.017) | 0.061*** (0.026) |
| Small firm | -0.202*** (0.010) | -0.305*** (0.014) | -0.270*** (0.012) | -0.236*** (0.009) | -0.202*** (0.009) | -0.179*** (0.012) | -0.163*** (0.015) | -0.180*** (0.022) |
| Private Sector | 0.035** (0.015) | 0.074*** (0.022) | 0.070*** (0.017) | 0.087*** (0.013) | -0.002 (0.014) | -0.046** (0.019) | -0.009 (0.022) | 0.020 (0.034) |
| Indefinite Contract | 0.041*** (0.012) | 0.054*** (0.018) | 0.027* (0.014) | 0.034*** (0.011) | 0.036*** (0.011) | 0.039*** (0.014) | 0.022 (0.017) | 0.010 (0.025) |
| Constant | 7.171*** (0.056) | 6.650*** (0.089) | 6.786*** (0.070) | 6.927*** (0.051) | 7.146*** (0.051) | 7.465*** (0.069) | 7.666*** (0.083) | 7.771*** (0.126) |
| Observations | 18.445 | 18.445 | 18.445 | 18.445 | 18.445 | 18.445 | 18.445 | 18.445 |
| R-squared | 0.482 | 0.351 | 0.323 | 0.259 | 0.294 | 0.324 | 0.324 | 0.306 |
| 2010 | | | | | | | | |
| | Average | $\theta=5$ | $\theta=10$ | $\theta=25$ | $\theta=50$ | $\theta=75$ | $\theta=90$ | $\theta=95$ |
| Woman | -0.094*** (0.013) | -0.042** (0.019) | -0.066*** (0.013) | -0.090*** (0.009) | -0.104*** (0.008) | -0.109*** (0.010) | -0.136*** (0.015) | -0.186*** (0.020) |
| Age | 0.031*** (0.004) | 0.022*** (0.005) | 0.024*** (0.004) | 0.021*** (0.002) | 0.017*** (0.002) | 0.018*** (0.003) | 0.020*** (0.004) | 0.021*** (0.005) |
| Age ² | -0.000*** (0.000) | -0.000*** (0.000) | -0.000*** (0.000) | -0.000*** (0.000) | -0.000*** (0.000) | -0.000*** (0.000) | -0.000*** (0.000) | -0.000*** (0.000) |
| Secondary | 0.137*** (0.016) | 0.127*** (0.025) | 0.166*** (0.018) | 0.147*** (0.012) | 0.151*** (0.010) | 0.156*** (0.013) | 0.161*** (0.019) | 0.190*** (0.025) |
| College | 0.504*** (0.022) | 0.394*** (0.032) | 0.405*** (0.022) | 0.398*** (0.015) | 0.439*** (0.013) | 0.536*** (0.016) | 0.655*** (0.023) | 0.760*** (0.030) |
| Tenure | 0.014*** (0.001) | 0.013*** (0.002) | 0.013*** (0.001) | 0.015*** (0.001) | 0.016*** (0.001) | 0.017*** (0.001) | 0.015*** (0.001) | 0.014*** (0.001) |
| Married | 0.053*** (0.012) | 0.046*** (0.017) | 0.048*** (0.012) | 0.043*** (0.008) | 0.053*** (0.007) | 0.054*** (0.009) | 0.068*** (0.013) | 0.082*** (0.017) |
| Head of Household | 0.072*** (0.012) | 0.062*** (0.018) | 0.074*** (0.013) | 0.046*** (0.009) | 0.050*** (0.007) | 0.072*** (0.010) | 0.096*** (0.014) | 0.092*** (0.018) |
| Small firm | -0.223*** (0.013) | -0.558*** (0.018) | -0.394*** (0.013) | -0.290*** (0.009) | -0.227*** (0.008) | -0.189*** (0.011) | -0.184*** (0.016) | -0.163*** (0.020) |
| Private Sector | -0.066*** (0.023) | 0.005 (0.029) | -0.009 (0.020) | -0.013 (0.014) | -0.050*** (0.012) | -0.092*** (0.016) | -0.112*** (0.024) | -0.086*** (0.032) |
| Indefinite Contract | 0.171*** (0.012) | 0.282*** (0.016) | 0.212*** (0.012) | 0.165*** (0.009) | 0.132*** (0.008) | 0.127*** (0.010) | 0.162*** (0.014) | 0.167*** (0.018) |
| Constant | 6.978*** (0.071) | 6.605*** (0.106) | 6.705*** (0.074) | 6.979*** (0.051) | 7.267*** (0.042) | 7.430*** (0.054) | 7.554*** (0.078) | 7.587*** (0.104) |
| Observations | 16.165 | 16.165 | 16.165 | 16.165 | 16.165 | 16.165 | 16.165 | 16.165 |
| R-squared | 0.559 | 0.337 | 0.337 | 0.313 | 0.336 | 0.428 | 0.464 | 0.453 |

Dependent variable: Ln. real hourly wage. Robust standard errors in parentheses.

***, ** and * represent significance at 99, 95 and 90%, respectively.

Nine dummies for region, seven for economic sector and twelve dummies for occupations are included.

Control group: workers with less than secondary education who are domestic servants or work in the public sector in firms with more than 11 employees, widowed, divorced, separated or never married, non heads of household and with contracts other than indefinite contracts.

Table 4. OLS and Quantile Regression Controlling for Selectivity 1994 and 2010

| 1994 | | | | | | | | |
|---------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| | Average | $\theta=5$ | $\theta=10$ | $\theta=25$ | $\theta=50$ | $\theta=75$ | $\theta=90$ | $\theta=95$ |
| Woman | -0.146*** (0.013) | -0.055*** (0.019) | -0.074*** (0.019) | -0.097*** (0.013) | -0.128*** (0.013) | -0.186*** (0.019) | -0.216*** (0.022) | -0.223*** (0.032) |
| Age | 0.026*** (0.002) | 0.028*** (0.004) | 0.025*** (0.003) | 0.025*** (0.002) | 0.026*** (0.002) | 0.021*** (0.004) | 0.023*** (0.004) | 0.028*** (0.006) |
| Age ² | -0.000*** (0.000) | -0.000*** (0.000) | -0.000*** (0.000) | -0.000*** (0.000) | -0.000*** (0.000) | -0.000*** (0.000) | -0.000*** (0.000) | -0.000*** (0.000) |
| Secondary | 0.299*** (0.010) | 0.232*** (0.018) | 0.216*** (0.014) | 0.238*** (0.010) | 0.266*** (0.010) | 0.325*** (0.015) | 0.350*** (0.017) | 0.386*** (0.026) |
| College | 0.718*** (0.021) | 0.535*** (0.039) | 0.538*** (0.033) | 0.649*** (0.022) | 0.701*** (0.021) | 0.800*** (0.031) | 0.793*** (0.037) | 0.792*** (0.053) |
| Tenure | 0.011*** (0.001) | 0.006*** (0.001) | 0.008*** (0.001) | 0.011*** (0.001) | 0.012*** (0.001) | 0.012*** (0.001) | 0.011*** (0.001) | 0.011*** (0.002) |
| Married | 0.086*** (0.009) | 0.099*** (0.015) | 0.083*** (0.012) | 0.076*** (0.009) | 0.074*** (0.009) | 0.069*** (0.013) | 0.079*** (0.015) | 0.080*** (0.022) |
| Head of Household | 0.120*** (0.015) | 0.068*** (0.020) | 0.093*** (0.021) | 0.085*** (0.014) | 0.118*** (0.014) | 0.171*** (0.022) | 0.156*** (0.025) | 0.134*** (0.036) |
| Small Firm | -0.238*** (0.008) | -0.304*** (0.014) | -0.269*** (0.011) | -0.235*** (0.008) | -0.201*** (0.008) | -0.180*** (0.013) | -0.170*** (0.014) | -0.170*** (0.021) |
| Private Sector | 0.035*** (0.013) | 0.074*** (0.022) | 0.069*** (0.017) | 0.090*** (0.012) | 0.001 (0.013) | -0.044** (0.019) | -0.016 (0.022) | 0.012 (0.032) |
| Indefinite Contract | 0.026*** (0.010) | 0.055*** (0.018) | 0.027* (0.014) | 0.033*** (0.010) | 0.035*** (0.010) | 0.041*** (0.014) | 0.020 (0.017) | 0.014 (0.024) |
| Selection Variable | 0.099*** (0.023) | -0.010 (0.024) | 0.019 (0.034) | 0.039* (0.022) | 0.096*** (0.022) | 0.167*** (0.033) | 0.176*** (0.039) | 0.163*** (0.055) |
| Constant | 7.136*** (0.048) | 6.654*** (0.089) | 6.785*** (0.069) | 6.910*** (0.049) | 7.106*** (0.048) | 7.394*** (0.072) | 7.621*** (0.083) | 7.708*** (0.120) |
| Observations | 35.959 | 18.445 | 18.445 | 18.445 | 18.445 | 18.445 | 18.445 | 18.445 |
| 2010 | | | | | | | | |
| | Average | $\theta=5$ | $\theta=10$ | $\theta=25$ | $\theta=50$ | $\theta=75$ | $\theta=90$ | $\theta=95$ |
| Woman | -0.126*** (0.011) | -0.039* (0.021) | -0.068*** (0.016) | -0.109*** (0.012) | -0.129*** (0.010) | -0.173*** (0.012) | -0.210*** (0.017) | -0.256*** (0.021) |
| Age | 0.023*** (0.002) | 0.022*** (0.005) | 0.024*** (0.004) | 0.021*** (0.002) | 0.016*** (0.002) | 0.017*** (0.003) | 0.016*** (0.004) | 0.019*** (0.005) |
| Age ² | -0.000*** (0.000) | -0.000*** (0.000) | -0.000*** (0.000) | -0.000*** (0.000) | -0.000*** (0.000) | -0.000*** (0.000) | -0.000*** (0.000) | -0.000*** (0.000) |
| Secondary | 0.177*** (0.012) | 0.124*** (0.026) | 0.169*** (0.019) | 0.160*** (0.013) | 0.167*** (0.011) | 0.193*** (0.014) | 0.211*** (0.020) | 0.236*** (0.025) |
| College | 0.537*** (0.016) | 0.390*** (0.033) | 0.409*** (0.024) | 0.418*** (0.017) | 0.465*** (0.014) | 0.601*** (0.017) | 0.733*** (0.024) | 0.842*** (0.030) |
| Tenure | 0.015*** (0.001) | 0.013*** (0.002) | 0.013*** (0.001) | 0.015*** (0.001) | 0.016*** (0.001) | 0.016*** (0.001) | 0.015*** (0.001) | 0.014*** (0.001) |
| Married | 0.067*** (0.008) | 0.044** (0.018) | 0.049*** (0.012) | 0.047*** (0.009) | 0.061*** (0.007) | 0.068*** (0.009) | 0.091*** (0.013) | 0.096*** (0.017) |
| Head of Household | 0.108*** (0.013) | 0.058*** (0.022) | 0.079*** (0.019) | 0.078*** (0.015) | 0.092*** (0.012) | 0.171*** (0.014) | 0.214*** (0.018) | 0.209*** (0.022) |
| Small Firm | -0.275*** (0.009) | -0.557*** (0.018) | -0.393*** (0.013) | -0.299*** (0.009) | -0.229*** (0.009) | -0.189*** (0.011) | -0.185*** (0.015) | -0.168*** (0.020) |
| Private Sector | -0.052*** (0.014) | 0.006 (0.029) | -0.007 (0.020) | -0.007 (0.014) | -0.049*** (0.013) | -0.087*** (0.016) | -0.112*** (0.024) | -0.082*** (0.031) |
| Indefinite Contract | 0.181*** (0.009) | 0.281*** (0.016) | 0.212*** (0.012) | 0.165*** (0.009) | 0.131*** (0.008) | 0.127*** (0.010) | 0.160*** (0.014) | 0.159*** (0.018) |
| Selection Variable | 0.089*** (0.028) | -0.012 (0.029) | 0.011 (0.037) | 0.087*** (0.032) | 0.109*** (0.024) | 0.260*** (0.027) | 0.317*** (0.032) | 0.309*** (0.036) |
| Constant | 7.015*** (0.053) | 6.619*** (0.109) | 6.692*** (0.081) | 6.890*** (0.060) | 7.179*** (0.048) | 7.191*** (0.059) | 7.307*** (0.082) | 7.313*** (0.105) |
| Observations | 31.734 | 16.165 | 16.165 | 16.165 | 16.165 | 16.165 | 16.165 | 16.165 |

Dependent variable: Ln. real hourly wage. Standard errors in parentheses.

***, ** and * represent significance at 99, 95 and 90%, respectively. Nine dummies for region, seven for economic sector and twelve for occupations are included in the main equation. Control group: employees with less than secondary education who are domestic servants or work in the public sector in firms with more than 11 employees, widowed, divorced, separated or never married, non heads of household and with non indefinite contracts. The selection variable is the predicted probability of working for all workers using probit estimation.

Table 4A. Probability of being employed by year

| | 1994 | 2010 |
|-------------------------|----------------------|----------------------|
| Women | -0.228*** (0.023) | -0.387*** (0.016) |
| Age | 0.011*** (0.001) | -0.008*** (0.001) |
| Secondary | 0.153*** (0.024) | 0.264*** (0.021) |
| College | 0.457*** (0.046) | 0.438*** (0.022) |
| Married | 0.113*** (0.024) | 0.116*** (0.016) |
| Head of Household | 0.575*** (0.031) | 0.672*** (0.018) |
| Presence of Children <1 | -0.079** (0.038) | -0.111*** (0.030) |
| Number Children 3-6 | -0.006 (0.015) | |
| Non Labor Income | -0.000*** (0.000) | -0.000*** (0.000) |
| Total Familiar Income | 0.000*** (0.000) | |
| Constant | 0.546*** (0.059) | -0.114*** (0.036) |
| Observations | 21.927 | 21.395 |

Nine dummies of region not reported here were included.

Table 5. Average Characteristics of Workers by Education and Gender

| | 1994 | | | | 2010 | | | |
|----------------------------|---------|---------|---------|---------|---------|---------|---------|---------|
| | Women | | Men | | Women | | Men | |
| | College | NC | College | NC | College | NC | College | NC |
| Age | 33.51 | 31.80 | 36.85 | 32.64 | 33.97 | 36.27 | 34.03 | 35.53 |
| Tenure | 5.72 | 4.45 | 6.63 | 4.94 | 5.57 | 3.79 | 5.27 | 4.22 |
| Age groups | | | | | | | | |
| 18 to 24 | 10.14 | 26.78 | 5.82 | 26.45 | 17.48 | 16.83 | 16.90 | 18.93 |
| 25 to 34 | 48.16 | 38.35 | 39.37 | 37.00 | 39.66 | 29.55 | 41.94 | 32.55 |
| 35 to 44 | 32.01 | 23.03 | 32.95 | 21.29 | 24.77 | 28.03 | 23.82 | 24.89 |
| 45 to 54 | 8.84 | 9.48 | 18.41 | 10.75 | 15.35 | 20.04 | 13.74 | 17.35 |
| 55 to 65 | 0.84 | 2.17 | 3.45 | 4.32 | 2.70 | 5.36 | 3.56 | 6.17 |
| Children <7 | 31.25 | 41.28 | 34.17 | 47.05 | 29.44 | 38.37 | 26.76 | 38.97 |
| Head of Household | 14.15 | 18.39 | 68.14 | 59.53 | 21.41 | 29.40 | 56.31 | 61.55 |
| Married | 43.27 | 37.52 | 63.16 | 61.91 | 44.81 | 46.19 | 51.75 | 63.70 |
| Job Characteristics | | | | | | | | |
| Type of Employment | | | | | | | | |
| Private Sector Employee | 62.47 | 75.07 | 66.25 | 90.03 | 84.03 | 73.42 | 85.09 | 96.01 |
| Public Sector Employee | 37.53 | 10.88 | 33.75 | 9.77 | 14.74 | 1.44 | 14.86 | 3.54 |
| Domestic Servants | 00.00 | 14.05 | 00.00 | 0.19 | 1.23 | 25.14 | 0.04 | 0.45 |
| Part-time | 16.97 | 8.73 | 6.99 | 3.11 | 8.36 | 11.21 | 5.42 | 2.64 |
| Full-time | 71.72 | 67.84 | 71.91 | 63.54 | 73.02 | 54.88 | 69.77 | 53.15 |
| Overtime | 11.30 | 23.43 | 21.10 | 33.34 | 18.61 | 33.91 | 24.80 | 44.21 |
| Small Firm | 11.40 | 41.22 | 10.73 | 33.36 | 15.88 | 55.74 | 12.85 | 36.52 |
| Indefinite Contract | 86.88 | 81.50 | 88.39 | 80.16 | 65.71 | 32.20 | 66.43 | 45.51 |
| N. Observ. Unweighted | 883 | 7030 | 975 | 9557 | 3274 | 4529 | 2657 | 5705 |
| N. Observ. Weighted | 164399 | 1229076 | 180997 | 1615306 | 893402 | 1138238 | 793537 | 1449829 |

NC= Non-college

Table 6. Average and Percentile real hourly wage by Education and Gender

| | 1994 | | | | 2010 | | | |
|----------------------|----------|---------|----------|---------|----------|---------|----------|---------|
| | Women | | Men | | Women | | Men | |
| | College | NC | College | NC | College | NC | College | NC |
| Average | 8873.51 | 3271.33 | 10166.21 | 3601.46 | 6385.42 | 2411.99 | 7502.77 | 3023.67 |
| Percentiles % | | | | | | | | |
| 5 | 2941.18 | 792.32 | 3011.21 | 1421.85 | 2005.45 | 778.82 | 2301.05 | 1390.74 |
| 10 | 3601.44 | 1176.47 | 3781.52 | 1728.69 | 2506.81 | 1101.47 | 2506.81 | 1699.23 |
| 25 | 5252.11 | 1980.79 | 5882.36 | 2100.84 | 3008.18 | 1735.65 | 3212.62 | 2336.45 |
| 50 | 7923.18 | 2488.24 | 8823.54 | 2750.19 | 4672.90 | 2506.81 | 5155.76 | 2596.05 |
| 75 | 11812.74 | 3781.52 | 12605.06 | 4201.68 | 7788.16 | 2803.74 | 9735.20 | 3407.32 |
| 90 | 15882.37 | 6050.43 | 18907.58 | 6302.53 | 13629.28 | 3504.67 | 15771.03 | 4672.90 |
| 95 | 18334.63 | 7815.13 | 22689.10 | 8193.28 | 17036.60 | 4380.84 | 20768.43 | 5841.12 |

Table 7. Average and Percentile Raw Gender Wage Gap Contribution of Education

| | 1994 | 2010 | 2010 |
|---------------|---------------|---------------|------------------------|
| | Actual | Actual | Counterfactual† |
| Average | 13.02 | 12.23 | 16.65 |
| Percentiles % | | | |
| 5 | 53.90 | 44.18 | 46.03 |
| 10 | 35.53 | 32.85 | 35.22 |
| 25 | 2.22 | 11.91 | 17.05 |
| 50 | 13.35 | 9.53 | 11.87 |
| 75 | 5.66 | 4.50 | 18.06 |
| 90 | 4.08 | 5.41 | 15.42 |
| 95 | 1.05 | 10.23 | 10.95 |

† Dinardo, Fortin, Lemieux approach (1996)

Table 8. Average Characteristics of Workers by Type of Employment and Gender

| | 1994 | | | | 2010 | | | |
|------------------------------------|---------------|----------------|---------------|----------------|---------------|----------------|---------------|----------------|
| | Women | | Men | | Women | | Men | |
| | Public | Private | Public | Private | Public | Private | Public | Private |
| Age | 36.69 | 31.24 | 37.37 | 32.47 | 43.00 | 34.65 | 39.64 | 34.63 |
| Tenure | 9.44 | 3.82 | 9.31 | 4.53 | 13.66 | 3.86 | 10.33 | 4.12 |
| Age groups | | | | | | | | |
| 18 to 24 | 9.23 | 27.36 | 8.34 | 26.59 | 17.74 | 18.21 | 8.75 | 18.98 |
| 25 to 34 | 33.20 | 40.53 | 32.57 | 37.89 | 30.71 | 35.28 | 25.95 | 36.68 |
| 35 to 44 | 36.52 | 22.06 | 34.12 | 20.85 | 38.40 | 26.27 | 29.31 | 24.12 |
| 45 to 54 | 17.46 | 8.09 | 20.65 | 10.26 | 9.96 | 16.37 | 26.53 | 15.22 |
| 55 to 65 | 3.32 | 1.80 | 4.27 | 4.22 | 2.70 | 3.74 | 9.31 | 4.91 |
| Education Variables | | | | | | | | |
| None or Primary Incomplete | 1.00 | 10.69 | 3.52 | 10.75 | 0.00 | 0.63 | 0.00 | 0.94 |
| Primary or Secondary Incomplete | 16.57 | 42.38 | 29.34 | 51.22 | 1.29 | 14.58 | 1.61 | 15.47 |
| Secondary or University Incomplete | 50.85 | 38.36 | 39.23 | 30.43 | 9.80 | 44.34 | 28.69 | 50.98 |
| University | 31.56 | 8.57 | 27.90 | 7.60 | 88.91 | 40.44 | 69.70 | 32.57 |
| Children <7 | 32.58 | 41.32 | 42.27 | 46.23 | 18.68 | 35.68 | 26.76 | 35.29 |
| Head of Household | 21.56 | 17.30 | 75.28 | 18.39 | 36.88 | 25.02 | 73.29 | 58.59 |
| Married | 48.44 | 36.53 | 74.85 | 60.26 | 54.94 | 44.85 | 70.08 | 58.61 |
| Job Characteristics | | | | | | | | |
| Part-time | 16.02 | 8.67 | 5.35 | 3.24 | 18.79 | 9.26 | 7.25 | 3.33 |
| Full-time | 73.86 | 67.34 | 68.59 | 63.81 | 68.97 | 62.38 | 59.91 | 58.96 |
| Overtime | 10.12 | 23.94 | 26.06 | 32.95 | 12.24 | 28.36 | 32.84 | 37.71 |
| Small Firm | 00.00 | 43.84 | 00.00 | 35.39 | 0.31 | 41.20 | 0.12 | 30.43 |
| Indefinite Contract | 89.48 | 80.94 | 90.00 | 79.74 | 92.27 | 43.37 | 86.94 | 50.14 |
| N. Observations Unweighted | 1204 | 7030 | 975 | 9140 | 684 | 7119 | 756 | 7606 |
| N. Observations Weighted | 195431 | 1229076 | 180997 | 157733 | 4148129 | 1883512 | 169259 | 2074107 |

Table 9. Average and Percentile real hourly wage by Type of Employment and Gender

| | 1994 | | | | 2010 | | | |
|---------------|----------|----------|----------|----------|----------|----------|----------|----------|
| | Women | | Men | | Women | | Men | |
| | Public | Private | Public | Private | Public | Private | Public | Private |
| Average | 6495.80 | 3514.08 | 6621.08 | 3935.56 | 9904.86 | 3707.42 | 8878.82 | 4259.52 |
| Percentiles % | | | | | | | | |
| 5 | 2280.91 | 770.31 | 2058.82 | 1440.58 | 3504.67 | 973.52 | 2190.42 | 1557.63 |
| 10 | 2577.03 | 1152.46 | 2488.24 | 1728.69 | 4380.84 | 1362.93 | 3112.48 | 1940.76 |
| 25 | 3781.52 | 1974.79 | 3504.20 | 2100.84 | 5841.12 | 2124.04 | 4672.90 | 2503.34 |
| 50 | 5252.11 | 2488.24 | 5042.02 | 2773.11 | 8956.39 | 2628.50 | 7009.34 | 2920.56 |
| 75 | 8067.23 | 3988.80 | 8403.37 | 4201.68 | 13434.58 | 3894.08 | 11682.24 | 4283.49 |
| 90 | 12100.85 | 6722.69 | 12605.06 | 7352.95 | 17523.36 | 7080.14 | 16822.43 | 7995.85 |
| 95 | 14705.90 | 10084.04 | 17647.08 | 10084.04 | 19210.80 | 10384.21 | 23895.50 | 12169.00 |

Table 10. Average and Percentile Raw Gender Wage Gap Contribution of Job Characteristics

| | 1994 | 2010 | 2010 | 2010 |
|---------------|--------|--------|--|--|
| | Actual | Actual | Counterfactual [†] Public Sector | Counterfactual [†] Indefinite Contract |
| Average | 13.02 | 12.23 | -0.31 | 5.47 |
| Percentiles % | | | | |
| 5 | 53.90 | 44.18 | 28.77 | 18.27 |
| 10 | 35.53 | 32.85 | 17.87 | 8.70 |
| 25 | 2.22 | 11.91 | 1.15 | 0.00 |
| 50 | 13.35 | 9.53 | -0.97 | 6.45 |
| 75 | 5.66 | 4.50 | -18.23 | 0.00 |
| 90 | 4.08 | 5.41 | -15.70 | 0.00 |
| 95 | 1.05 | 10.23 | -3.92 | 4.26 |

[†] Dinardo, Fortin, Lemieux approach (1996)

Table 11. Average Characteristics of Workers by Type of Contract and Gender

| | 1994 | | | | 2010 | | | |
|------------------------------------|------------|--------|------------|--------|------------|---------|------------|---------|
| | Women | | Men | | Women | | Men | |
| | Indefinite | Other | Indefinite | Other | Indefinite | Other | Indefinite | Other |
| Age | 32.43 | 30.05 | 33.50 | 31.23 | 35.95 | 34.65 | 36.39 | 33.45 |
| Tenure | 5.23 | 1.73 | 5.79 | 2.22 | 6.49 | 2.88 | 6.44 | 2.52 |
| Age groups | | | | | | | | |
| 18 to 24 | 23.19 | 32.31 | 22.14 | 33.84 | 12.56 | 21.15 | 11.54 | 25.71 |
| 25 to 34 | 39.37 | 40.11 | 37.96 | 34.16 | 35.58 | 32.60 | 37.24 | 34.34 |
| 35 to 44 | 24.81 | 20.79 | 23.41 | 18.46 | 29.09 | 24.39 | 27.87 | 20.74 |
| 45 to 54 | 10.19 | 5.81 | 11.98 | 9.60 | 18.96 | 17.11 | 17.99 | 13.92 |
| 55 to 65 | 2.24 | 0.98 | 4.36 | 3.68 | 3.79 | 4.54 | 5.31 | 5.17 |
| Education Variables | | | | | | | | |
| None or Primary Incomplete | 9.22 | 9.85 | 8.94 | 13.84 | 0.00 | 1.10 | 0.16 | 1.67 |
| Primary or Secondary Incomplete | 37.09 | 46.46 | 46.91 | 55.56 | 5.89 | 20.44 | 8.78 | 20.76 |
| Secondary or University Incomplete | 41.22 | 35.03 | 33.15 | 24.45 | 32.55 | 50.01 | 46.58 | 52.35 |
| University | 12.48 | 8.67 | 11.00 | 6.15 | 61.56 | 28.42 | 44.41 | 25.22 |
| Children <7 | 39.44 | 4.31 | 45.80 | 45.52 | 31.29 | 37.23 | 33.35 | 36.11 |
| Head of Household | 18.47 | 15.24 | 62.87 | 49.88 | 27.06 | 24.84 | 65.92 | 52.70 |
| Married | 38.01 | 39.04 | 64.47 | 51.70 | 45.66 | 45.51 | 64.85 | 53.42 |
| Job Characteristics | | | | | | | | |
| Type of Employment | | | | | | | | |
| Private Sector Employee | 71.90 | 81.31 | 86.27 | 93.47 | 83.28 | 73.48 | 87.44 | 97.43 |
| Public Sector Employee | 15.28 | 8.26 | 13.54 | 6.41 | 14.33 | 1.06 | 12.40 | 2.09 |
| Domestic Servants | 12.82 | 10.43 | 0.18 | 0.11 | 2.38 | 25.45 | 0.16 | 0.47 |
| Part-time | 8.01 | 17.46 | 2.77 | 6.58 | 4.74 | 14.57 | 1.77 | 5.71 |
| Full-time | 69.20 | 64.15 | 64.96 | 61.95 | 73.15 | 53.74 | 65.60 | 51.65 |
| Overtime | 22.78 | 18.39 | 32.26 | 31.47 | 22.10 | 31.68 | 32.63 | 42.64 |
| Small Firm | 37.08 | 40.53 | 29.72 | 36.88 | 13.69 | 59.91 | 12.23 | 46.03 |
| N. Observ. Unweighted | 6481 | 1432 | 8462 | 2070 | 3430 | 4373 | 4192 | 4170 |
| N. Observ. Weighted | 1144592 | 248883 | 1454826 | 341477 | 953599 | 1078041 | 1187019 | 1056348 |

Table 12. Average and Percentile real hourly wage by Type of Contract and Gender

| | 1994 | | | | 2010 | | | |
|---------------|------------|---------|------------|---------|------------|---------|------------|---------|
| | Women | | Men | | Women | | Men | |
| | Indefinite | Other | Indefinite | Other | Indefinite | Other | Indefinite | Other |
| Average | 4067.98 | 3308.11 | 4469.07 | 3384.65 | 5686.79 | 2808.10 | 5686.42 | 3396.27 |
| Percentiles % | | | | | | | | |
| 5 | 840.34 | 1008.40 | 1508.79 | 1322.98 | 2148.70 | 778.82 | 2005.45 | 1168.22 |
| 10 | 1260.50 | 1382.35 | 1830.07 | 1620.65 | 2506.81 | 1062.02 | 2406.54 | 1557.63 |
| 25 | 2058.82 | 2016.81 | 2218.49 | 2058.82 | 2531.15 | 1671.21 | 2641.20 | 2187.76 |
| 50 | 2750.19 | 2420.17 | 3151.26 | 2493.00 | 3748.05 | 2471.24 | 3650.70 | 2531.15 |
| 75 | 5000.00 | 3596.64 | 5042.02 | 3662.48 | 6939.25 | 3008.18 | 6425.23 | 3407.32 |
| 90 | 8403.37 | 5729.57 | 8613.45 | 5762.31 | 12383.18 | 4867.60 | 11682.24 | 5310.11 |
| 95 | 12100.85 | 9075.64 | 12605.05 | 8403.37 | 16355.14 | 6892.52 | 16688.92 | 8401.87 |

**Table 13. Average and Percentile Raw Gender Wage Gap
Contribution of Education, Type of Employment and Type of Contract**

| | 1994 | 2010 | 2010 |
|---------------|--------|--------|-----------------|
| | Actual | Actual | Counterfactual† |
| Average | 13.02 | 12.23 | -8.00 |
| Percentiles % | | | |
| 5 | 53.90 | 44.18 | 5.88 |
| 10 | 35.53 | 32.85 | 13.50 |
| 25 | 2.22 | 11.91 | 0.00 |
| 50 | 13.35 | 9.53 | -15.42 |
| 75 | 5.66 | 4.50 | -33.31 |
| 90 | 4.08 | 5.41 | 12.78 |
| 95 | 1.05 | 10.23 | 7.70 |

† Dinardo, Fortin, Lemieux approach (1996)