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The Evolution of Gender Wage Differentials and Discrimination in Thailand: 1991-2007 —An Application of Unconditional Quantile Regression

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Abstract: Using unconditional quantile regression combined with Oaxaca-Blinder decomposition, we study the gender wage differentials over the whole distribution in Thailand from 1991 to 2007. A V-shape pattern of the overall gender gap is observed in each year, most attributable to the wage structure effect ("discrimination"), and persistent sticky floors are documented. We also develop a "double decomposition" method to analyze the over-time changes in gender wage gaps, and find that the degree of gender inequality in the Thai labor market has improved compared to the 1990s, while relative changes in characteristics explained only very small part of the total changes.

Keywords: Southeast Asia; Thailand; unconditional quantile regression; sticky floors; discrimination

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1. Introduction

Over the last decade, research on gender wage differentials has shifted its focus from the mean to the pattern along the whole earnings distribution. For example, Albrecht, Björklund and Vroman (2003) find an increasing gender gap along the wage distribution in Sweden; Arulampalam, Booth and Bryan (2007) study 11 European countries and found a *glass ceiling* effect for most countries. Other such studies for developed countries also point to the existence of glass ceilings while a few existing studies for South and South-East Asia point mainly to the prevalence of sticky floors.[1] In this paper we study the nature of gender earnings gap in Thailand using 1991-2007 Labor Force Survey data. Applying recently developed methodology of unconditional quantile regression (Firpo, Fortin and Lemieux, 2009), we are able to trace the individual determinants of the gender wage gap at various points of the wage distribution. In addition, we also propose a double-decomposition approach to study the over-time developments in gender discrimination.

Using Labor Force Survey data, the overall gender wage gap has decreased by 10 percentage points during this period, with the lowest value of 6.4% observed in 1998.[2] Raw gaps at the bottom have been wider than those at the top of the wage distribution over the entire period. Questions of interest then arise: Is there a persistent sticky floor effect in Thailand? Why has the gender wage gap declined over time? Has "discrimination" also declined? To answer these questions, we will decompose the gender wage differentials at different parts of the distribution as well as over time.

The decomposition methodology used in this paper is based on unconditional quantile regression. As is widely known, the traditional Oaxaca-Blinder (Blinder 1973; Oaxaca 1973) technique can decompose the mean gender wage gap into two components, one due to gender differences in characteristics (characteristics effect) and the other due to gender differences in returns to those characteristics (coefficients effect). To carry out the decomposition at different points of the wage distribution, one has to combine the Oaxaca-Blinder technique with (conditional) quantile regression (Koenker and Bassett 1978). There are many approaches proposed in the literature, including Machado and Mata (2005) who construct the counterfactual wage distribution by randomly sampling the quantiles and observations.[3] Empirical applications using this approach include Albrecht et al. (2003), Arulampalam et al. (2007), De la Rica, Dolado and Llorens (2008), Kee (2006) and

Ganguli and Terrell (2005), among several others. However, all of these methods share the same problem, namely, they cannot account for the contribution of individual covariate in the characteristics effect or coefficients effect.

To mitigate the problem, we use unconditional quantile regression methodology recently developed by Firpo et al. (2009). As the estimate from unconditional quantile regression provides the average partial effect of a small location shift of an independent variable on the unconditional quantile of the dependent variable, one can proceed with the decomposition of the gender wage gap (or the wage gap between any two groups) in a similar fashion to the standard Oaxaca-Blinder decomposition. Therefore, we adopt this decomposition method to analyze the gender wage differentials in Thailand by period.

We also propose a method of decomposing over-time change in gender wage gaps at each quantile to explore the determinants behind these changes. We refer to this method as "double-decomposition", since there are two differences in both the explained and unexplained components. Previous studies on the evolution of gender wage gaps either choose individual cross-sections and decompose the gap at quantiles by year (Chi and Li 2008) or only decompose the change in gender wage gaps at the mean ((Démurger, Fournier and Chen, 2007; Ng, 2007). Pham and Reilly (2007), while attempting to decompose the change in gender wage gaps at quantiles, could not provide an intuitive interpretation of the decomposition components; this is because the characteristics gap had to be conditional on a specific quantile of the wage distribution in order to decompose the unconditional gap using coefficient estimates from conditional quantile regressions. In contrast, the unconditional quantile regression approach allows easy and meaningful decomposition of the change in gender wage differentials at any quantile, along the lines of decomposition at the mean. Using this double decomposition, we investigate how current gender wage differentials are different from those in the early 1990s and late 1990s. We can also observe how much of the change at some specific percentile of the wage distribution is attributable to changes in different individual characteristics of men and women and how much is attributable to changes in gender-specific returns to those characteristics. The latter component also reveals the trend in discrimination over time. Detailed description of the double decomposition is given in section 2.

Our study finds that the counterfactual gender wage differentials at the lower part of the wage distribution are wider than those at the upper part over the entire 1991-2007 period, indicating a sticky floor effect.[4] This is consistent with evidence in other Asian countries, such as Singapore, the Philippines, Vietnam, China and Sri-Lanka (Sakellariou 2004a; Sakellariou 2004b; Pham and Reilly 2007; Chi and Li 2008; Gunewardena et al. 2008). Using double decomposition, we find that gender differences in observable characteristics do not change substantially over time, and therefore, they cannot account for the change in patterns of gender wage differentials over time. In contrast, we find that most of the over-time changes in the wage gaps are attributable to changes in wage structures between men and women, especially as it relates to age/experience premiums as well as other effects associated with the constant.

The paper is organized as follows: The conceptual framework is given in section 2; section 3 describes the data and provides an overview of the raw gender wage differentials. Results from RIF-regressions and decomposition results are discussed in section 4. Section 5 gives a summary of the findings.

2. Conceptual framework

2.1 Decomposition of the gender wage gap at quantiles

Consider wage equations for male and female employees:

$$lnW_m = g_m(X_m, \varepsilon_m);\ lnW_f = g_f(X_f, \varepsilon_f)$$

where $lnW_i (i = m, f)$ denotes the logarithm of hourly wage, $X_i (i = m, f)$ is a vector of explanatory variables and $\varepsilon_i (i = m, f)$ the error term. The wage differential at quantile τ can be decomposed into two parts:

$$Q_\tau(lnW_m) - Q_\tau\big(lnW_f\big) = [Q_\tau(lnW_m) - Q_\tau(lnW_c)] + [Q_\tau(lnW_c) - Q_\tau\big(lnW_f\big)]$$

where lnW_c is the counterfactual log hourly wage. In this paper, we use the female's characteristics and male's wage structure to construct the counterfactual wage distribution. Hence, the first component measures the wage gap due to gender differences in characteristics (characteristics effect) and the second component the wage gap due to differences in returns to those characteristics

(coefficients effect).[5] The coefficients effect is also indicative of the degree of gender discrimination in the labor market.

To estimate the two components of the decomposition, a reweighting approach (Firpo, Fortin and Lemieux, 2007; Dinardo et al. 1996)) is used; hence, no specific functional forms or parametric distributions are assumed in total decomposition. In deriving the re-weighting functions, the probability that a person belongs in the "female" group conditional on X (propensity score) is estimated from a logit regression.

Next, to get the estimates of the effects of each individual variable on the wage gap, we use the decomposition method based on unconditional quantile regression recently developed by Firpo et. al. (2009).The estimation of unconditional quantile regression consists of two steps. The first step is to derive the re-centered influence function (RIF) of the dependent variable, hence the name RIF regression; the second step involves estimating an OLS regression of the generated RIF variable on covariates.[6] As shown in Firpo et. al. (2009), the estimated coefficients are in fact unconditional partial effects of small location shifts of the covariates. Therefore, it is as easy to decompose the gender wage gap at quantiles as decomposing at the mean using Oaxaca-Blinder methodology.

Specifically, the RIF of variable Y at quantile τ is:

$$RIF(Y; Q_\tau, F_Y) = Q_\tau + \frac{\tau - \mathrm{I}(Y \le Q_\tau)}{f_Y(Q_\tau)}$$

where Q_τ can be estimated by the sample quantile and $f_Y(\cdot)$ can be estimated using Kernel density. If the specification of unconditional quantile regression is linear, i.e., $RIF(Y; Q_\tau,\ F_Y) = X\beta + \varepsilon$, then the OLS estimate of β (namely, RIF-OLS estimator) provides a consistent estimator of the marginal effect on the unconditional quantile of a small location shift in the distribution of X, holding else constant. However, if the unconditional quantile regression is not linear, RIF-OLS estimates may not be consistent. Instead, an alternative non-parametric estimator may need be used (see Firpo et. al. 2009 for further discussion).

As $\widehat{Q_\tau}(Y) = \overline{X}\widehat{\beta_\tau}$, the decomposition of gender wage differentials can be rewritten as

$$Q_\tau(lnW_m) - Q_\tau(lnW_f) = \left[(\overline{X_m} - \overline{X_f})\widehat{\beta_{m\tau}} + R_X\right] + \left[\overline{X_f}(\widehat{\beta_{m\tau}} - \widehat{\beta_{f\tau}}) + R_s\right]$$

where R_X and R_s are approximation errors which will appear in practice because of the first order approximations and the way the counterfactual wage distribution is constructed.[7]

In contrast with other counterfactual decompositions in the literature (see, Machado and Mata, 2005 and Melly, 2006 for example), one of the advantages of the RIF decomposition is that it cannot only decompose the unconditional gender wage gap at any quantile of the wage distribution, but also allows the characterization of the contribution of any single covariate on each component. The identification problem in this sort of detailed decompositions as pointed out by Oaxaca and Ransom (1999) is that the coefficients effect is not invariant to the choice of reference group; this problem is dealt with using the averaging approach proposed by Yun (2005).[8] The other advantage of RIF decomposition is its computational efficiency as it only requires OLS regression estimation on the RIF variable. Therefore, we choose in this paper the technique of RIF-decomposition to analyze the gender wage differentials in Thailand in 1991-2007.

2.2 Decomposition of changes in gender wage gaps over time

A natural question to ask after observing changes in gender wage gaps over time is what is behind these changes. Similar to the counterfactual decomposition of gender wage gaps, we propose an approach of double decomposition to explore the determinants of changes in gender wage gaps .

Denoting $Q_\tau(lnW_m) - Q_\tau(lnW_f)$ as ΔQ_τ , the change in gender wage gaps can be decomposed as:

$$(\Delta Q_\tau)_1 - (\Delta Q_\tau)_0 = \{[(\Delta\bar{X})_1 - (\Delta\bar{X})_0]\beta_{m\tau}{}^1 + (\Delta\bar{X})_0(\beta_{m\tau}{}^1 - \beta_{m\tau}{}^0)\}$$
$$+ \left\{\overline{X_f}^1[(\Delta\beta_\tau)_1 - (\Delta\beta_\tau)_0] + \left(\overline{X_f}^1 - \overline{X_f}^0\right)(\Delta\beta_\tau)_0\right\} \qquad (2)$$

where:

$$\Delta\bar{X} = \overline{X_m} - \overline{X_f}; \qquad \Delta\beta_\tau = \beta_{m\tau} - \beta_{f\tau}$$

The change in gaps is decomposed into four parts. The first two parts taken together correspond to the change in characteristics effect, which can be referred to as the explained part and the last two parts measure the change in coefficients effect, referred to as the unexplained part. In this paper we will focus on the interpretation of the first and third components since they reflect the effects of the changes in characteristics and coefficients on the change in total gap. The second component

measures the effect of changing the reference point from period 1 to period 0 with respect to changes in the characteristics effect, while the fourth component measures the effect of changing the reference point from period 1 to period 0 with respect to changes in coefficients effect; both components are thus named as the reference effects in the table reported. And, similar to the single decomposition, approximation errors will appear as well. The trend in discrimination over time is reflected in the third part. If it is positive, the degree of discrimination has worsened; on the contrary, a negative sign indicates an improvement of gender inequality. We'll be exploring the reasons underlying the changes between current gender wage differentials relative to those in early 1990s and late 1990s.

3. Data description and raw gender wage differentials

3.1 Data description

The data used are from the Labor Force Surveys (LFS) of Thailand for years 1991-2007. The LFS includes detailed information on demographic and personal characteristics (such as age, gender, region, marital status and education) and information on employment/unemployment (such as work status, hours worked, salary per month, occupation and industry). From 1984 to 1997, there were three rounds of the LFS annually (on February, May and August); from 1998 to 2001, a fourth round (November) was added and starting from 2001, the LFS is conducted monthly. For consistency purposes, we make use of the Round 1 from 1991 to 2000 and February data from 2001 to 2007.

In order to explore the reasons underlying the changes in gender wage differentials, three periods are chosen, namely 1991/1993, 1998/2000 and 2005/2007. Grouping three years can help to reduce the effect of any unusual event on gender wage differentials; this grouping also allows comparisons that may reveal information on the effect of the Asian financial crisis (which peaked in 1998) on gender wage differentials.

The dependent variable in this study is the logarithm of real hourly wage generated from real wage per day[9] and hours worked according to wage type. The subsamples we use for the analysis contain all employees between 25 and 65 years with valid information on gender, region (Bangkok, Central, North, Northeast and South), urbanity, marital status, education attainment (no education, less than primary, primary, lower secondary, upper secondary, diploma, university), and job

characteristics such as hourly wage, private sector vs. public sector employment, occupation (officials and managers, professionals, associate professionals, clerks, service and sales, agriculture related occupations, trades, operators, unskilled labor) and industry[10] (agriculture/forestry/fishing/mining, manufacturing, electricity/gas/water, construction, sales, hotels/transportation, finance, public administration, social work, other). Employers, the self-employed and unpaid family workers are dropped from the sample. Sample selection is not considered in the paper for two reasons: first, there are no usable variables available for participation equations; second, female labor participation in Thailand has been historically high (Mammen and Paxon 2000).

Descriptive statistics of all the explanatory variables are reported in Table 1 by year and gender. Table 1 shows that a higher proportion of men were married relative to women; however, the proportion of married men has been decreasing over time. More than three quarters of workers were employed in the private sector, with a slightly higher proportion for women. The proportion of workers with only primary education or less has decreased over time, with a corresponding increase in workers with secondary education. The proportion with university education increased from 13.6 to 16.6 percent for men and from 20.2 to 25 percent for women in the last decade; however, it declined slightly in recent years (by 3 percentage points for men and 1 percentage point for women). Finally, compared to men, women are more likely to work as professionals, clerks, service and sales workers and unskilled workers. They are also more likely to be found in manufacturing, social work and other low-paying industries relative to men. On the contrary, men are more likely to be officials, managers, in trade related occupations and in construction.

[Table 1 about here]

3.2 Raw gender wage differentials

The evolution of raw gender wage gaps over the 1991-2007 period is shown in Figure 1. The mean log-gap is around 0.2 from 1991 to 1995 and has declined sharply between 1995 and 1998. After the 1997 Asian financial crisis, the average raw gender wage gap increased slightly and fluctuated around 0.1 ever since. Figure 1 also plots the evolution of the gender wage gap at 10^{th} percentile, median and 90^{th} percentile. The line for 10^{th} percentile lies consistently above that for the median, which in turn lies way above that for the 90^{th} percentile.

[Figure 1 and 2 about here]

This relationship is highlighted in Figure 2, which plots the raw gender wage gap by period, namely 1991/1993, 1998/2000 and 2005/2007. In 1991/1993, the gap declines significantly from 0.32 at the 5th percentile to 0.08 at the 95th percentile; the gaps in 1998/2000 and 2005/2007, though smaller in magnitude, also show a decreasing trend over the entire wage distributions. In addition, the gaps in 2005/2007 are quite close to those in 1998/2000, while all three plots show a slightly increase in wage gaps at the top of the distributions.

Table 2 presents the average real hourly wage by gender, time period and personal characteristics. The proportion of women in the higher paying occupations and industries are quite small relative to men. For workers with university education, the hourly wage constantly increases for men while the wage increase stagnates for women in recent years, which leads to a wider gap between male and female hourly wages. Moreover, the figures show that the real hourly wage in 2005/2007, is higher compared to early 1990s, but a little lower compared to late 1990s, except for workers who are either very low or very high in the education/occupation ladder.

[Table 2 about here]

4. Unconditional quantile regressions and decomposition of the gender wage gap

4.1 Unconditional quantile regressions by gender

Table 3 reports the estimates of coefficients of unconditional quantile regressions by gender at the 10th percentile, median and 90th percentile in 1991/1993, 1998/2000 and 2005/2007. The estimated returns to characteristics are generally different between men and women at all quantiles and time periods. For example, in 1991/1993, the gender difference in the premium of university education (compared to no education) increases from 0.15 at the 10th percentile to 0.65 at the 90th percentile. Specifically, men with university education earned 63 percent more than men without any education at the lower part of the wage distribution and 136 percent more at the upper part; on the other hand, women with university education earned 48 percent more than women without education at the lower part and only 72 percent more at the upper part of the wage distribution. Therefore, one can expect that in

1991/1993, different rewards of university education contributed positively to the unexplained gender wage gap at both the bottom and the top, and more so at the top of the wage distribution.

[Table 3 about here]

Looking at university premiums over time, in 2005/2007 men with university education earned 50 percent more than men without education at the 10th percentile, while women at the same percentile earned 78 percent more than women without any education. So at the 10th percentile, the gender difference in returns to university education relative to no education as reflected by the estimated coefficient has increased from 0.15 in favor of men in 1991/1993 to 0.28 in favor of women in 2005/2007. On the other hand, the situation at the 90th percentile is quite different, as the premium of university education is consistently higher for men and the gender difference has increased over time. Consequently, one can expect that the changes in differential returns to education between genders reduced the wage gap at the 10th percentile but widened the gap at the 90th percentile.

4.2 The gender wage gap by year

Table 4 reports the decomposition of the gender wage gap at 10th percentile, median and 90th percentile in three periods. Looking at the top of the table, gender differences in characteristics can explain only a small fraction of the total gap at the 10th percentile, whereas at the upper half of the wage distribution the entire gap is due to gender differences in returns to those characteristics. Looking at the row referring to the coefficients effect, a sticky floor pattern becomes evident.

[Table 4 about here]

As explained before, one of the benefits of unconditional quantile regression is that it not only allows the decomposition of gender wage differentials into characteristics effect and coefficients effect but also the determination of the contribution of each individual covariate in each component of the gender gap. We group all the explanatory variables into seven categories: age, marital status, region, sector, education, occupation and industry;[11] the residual in the last row of each part corresponds to the approximation error. We observe that most approximation errors are not statistically significantly different from zero, suggesting the validity of model specification.

We find that at the lower part of the wage distributions, gender differences in occupation and industry composition play an important role in explaining the wage differentials; on the other hand,

the major contributor to discrimination at the median of the wage distributions is age grpup (a proxy for experience), at the top the main contributor is education, while at the bottom, unobservable characteristics associated with the constant.

Note that the effect of the constant in gender wage differentials tends to be large, which may reflect the effect of gender differences in some hard-to-measure characteristics and attributes [12] . Indeed, Manning, Swaffield and Street (2008) find that gender differences in psychological variables can explain almost half of the counterfactual gender wage gap.[13] However, it is hard to tell whether gender differences in the psychological measures are intrinsic, or determined by the social environments and cultures. If gender differences in these measures are associated with nurture rather than nature, studies on discrimination should not control for them. In fact, existing findings indeed support the nurture view. For example, Gneezy et al. (2009) find that women in the matrilineal societies are as competitive as men in the patriarchal societies. Booth and Nolen (2009) observe that girls in single-sex schools are more competitive than girls in co-ed schools. Therefore, no matter which psychological differences the constant term represents, it is probably more appropriate to include it in the "discrimination" component.

[Figure 3 about here]

Figures 3(a), 3(b) and 3(c) plot the decomposition of the gender wage differentials in 1991/1993, 1998/2000 and 2005/2007, respectively. In each figure, there are three plots: the first depicts the decomposition of gender wage differentials into two parts, characteristics and coefficients effects and the other two plots graph the contribution of each group of variables in the characteristics and coefficients effects (not including the constant). It is easily seen from these figures that age is the most influential determinant of gender wage differentials, while gender differences in returns to other productivity related or demographic characteristics does not contribute substantially in wage gaps. Finally, in each year-group, the coefficients effects generally decrease along the wage distributions, indicating the persistent existence of a sticky floor effect in Thailand.

4.3 The evolution of gender wage gaps over time

As illustrated in Figure 2, gender wage differentials in 2005/2007 have declined dramatically (especially at the lower half of the wage distribution) compared to that in early 1990s. However, it

seems that the pattern has changed little after the 1997 Asian financial crisis. Using decompositions based on RIF-regressions, we graph the coefficients effect at the mean and coefficients effects at the 10th percentile, median and 90th percentile in each year, so that we can observe the evolution of gender discrimination more clearly.[14] As shown in Figure 4, the average discrimination has declined only a little, except for 1998 where it drops about 8 percentage points. Moreover, it shows that women at the lower part of the wage distribution faced more sever discrimination than women at the upper part. However, the overall trend is not clear.

[Figure 4 about here]

What are the forces behind these changes in gender wage differentials (inasmuch as they reflect discrimination)? In this subsection, we will attempt to answer these questions by means of the double-decomposition technique which has been described in section 2.2. Gender wage differentials in 2005/2007 are compared with those in 1991/1993 and in 1998/2000. Table 5 presents the double-decomposition results at three specific points of the wage distribution, i.e., 10th percentile, median and 90th percentile.

First, let's look at the comparison between 2005/2007 and 1991/1993. Relative to early 1990s, gender wage differentials have decreased five percentage points on average (calculated as (47.644-44.879)/44.879-(41.487-37.345)/37.345 using data in Table 2); however the estimates vary at different points of the wage distributions. For example, the gender wage gap decreased by 4.6 percentage points at the 10th percentile and by 8.1 percentage points at the median. Decomposing the change into two major parts, namely, explained part and unexplained part, we can identify the forces underlying these changes. Take the 90th percentile as an example. The gender wage differential at the 90th percentile has decreased by 5.2 percentage points, of which 6.9 percentage points can be attributed to changes in gender differences in characteristics. On the other hand, changes in gender differences in wage structures have an opposing effect, contributing to an increase in the gap by 1.7 percentage points - which suggests that women at the top of the wage distribution are facing more severe discrimination compared to the early 1990s.

Use of unconditional quantile regression allows an easy and intuitive decomposition of changes at the individual variable level. For example, from Table 5, comparing the 2005/2007 period

to the early 1990s, the over-time changes in industry composition of men and women have contributed 0.7 percentage points to the decrease in gender gap at the 10th percentile; however, the payoff structure relating to industry affiliation has worsen. Still looking at changes at the 10th percentile and comparing the same time periods, the change in gender differences in returns to industry affiliation contributes 7.4 percentage points to the increase of gender wage gap.

[Table 5 about here]

Similarly, we can analyze changes in gender wage differentials between 2007 and late 1990s. It is found that after the 1997 Asian financial crisis, not only there is no improvement in gender discrimination, but deterioration. For example, discrimination increased by 8.7 percentage points at the 10th percentile and 6.7 percentage points at the 90th percentile; most of the over-time change is due to changes in gender differences in rewards to those characteristics associated with the constant.

[Figure 5 about here]

Figure 5 shows the double-decomposition results in more detail. Decompositions of the changes between gender wage gaps in 2005/2007 and gender wage gaps in 1991/1993 across quantiles are plotted in Figure 5(a), while those between 2005/2007 and 1998/2000 are shown in Figure 5(b). Generally speaking, gender discrimination in the middle part of the wage distribution has improved since the early 1990s; however, the circumstances at the bottom, after improving at the early 1990s, have deteriorated after the 1997 financial crisis. What is worse, at the top of the wage distribution, the situation has deteriorated compared to either early 1990s or late 1990s, suggesting the tendency glass ceilings to appear.

From the first plot in Figure 5(a), we see that the gender wage gap has narrowed at almost every point of the wage distribution, with the most significant change occurring between the 20th and the 40th percentiles. However, the closing of gender wage gap is not due to changes in gender differences in characteristics, but due to changes in gender differences in wage structures. Furthermore, the change in wage structures at the upper half of the wage distribution has made women worse-off (the line for the unexplained gap lies above zero after the 70th percentile). Looking at the other two plots, only the change in gender differences in the return to age/experience matters and it contributes considerably in narrowing the gender wage gap (except the 70th percentile point).

Note, however, that the very large effect of the constant term is not shown in the unexplained effects plot. Comparing plot 3 with the unexplained line in plot 1, we can conclude that relative to early 1990s, changes in gender differences in characteristics not controlled for, have contributed to a widening of the gender wage gap, especially for women in better paying jobs.

However, if we compare the current labor market environment with that after 1997 Asian financial crisis, the gaps get wider at both ends of the distribution and all changes are accounted for by the unexplained part. In other words, compared to late 1990s, discrimination becomes more severe among people with low income as well as people with high income.

5. Conclusions

Using a methodology which combines unconditional quantile regressions with the Oaxaca-Blinder decomposition technique, we explore in detail the evolution of gender wage differentials in Thailand over the 1991-2007 period. We find that on average, the raw gender wage differentials declined in the early 1990s and changed little after the 1997 Asian financial crisis. Using Oaxaca-Blinder decomposition, we also find that most of the differentials are due to "discrimination". From the distributional perspective, the pattern of the overall gender gap is V-shaped in each year, with the left side much steeper. Moreover, the gap dropped at almost every point of the wage distributions in the early 1990s and increased at both tails after the 1997 financial crisis. Using decomposition techniques combined with unconditional quantile regression methodology, persistent sticky floors (in weak sense) are documented and all gaps are attributable to discrimination, with the exception of the bottom in the early 1990s. We also find that the gender differences in returns to age (experience) seem to be the most important factor in determining the wage gap, especially in the 1990s. Finally, using double decomposition, the current wage gaps are compared with early 1990s and late 1990s. Our findings suggest that gender inequality in the labor market generally improved compared to the 1990s, with small attribution from changes in relative characteristics between men and women.

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Table 1: Descriptive statistics by time period and gender

	1991/1993				1998/2000				2005/2007			
	Male		Female		Male		Female		Male		Female	
	mean	s.d.	mean	s.d.	mean	s.d.	mean	s.d.	mean	s.d.	mean	s.d.
Age	36.491	(9.202)	35.570	(8.654)	37.817	(9.404)	36.602	(8.843)	38.591	(9.511)	37.499	(9.076)
Age squared	14.163	(7.497)	13.401	(6.962)	15.186	(7.729)	14.179	(7.122)	15.797	(7.831)	14.885	(7.358)
Married	0.818	(0.386)	0.669	(0.471)	0.798	(0.401)	0.667	(0.471)	0.766	(0.423)	0.675	(0.468)
Urban	0.427	(0.495)	0.478	(0.500)	0.425	(0.494)	0.491	(0.500)	0.387	(0.487)	0.441	(0.496)
Private	0.749	(0.434)	0.769	(0.422)	0.750	(0.433)	0.780	(0.414)	0.790	(0.408)	0.793	(0.405)
Education Dummies												
No education	0.024	(0.153)	0.053	(0.225)	0.019	(0.136)	0.042	(0.200)	0.022	(0.148)	0.040	(0.195)
Less than primary	0.552	(0.497)	0.521	(0.500)	0.392	(0.488)	0.377	(0.485)	0.267	(0.443)	0.249	(0.432)
Primary	0.074	(0.262)	0.055	(0.229)	0.177	(0.382)	0.152	(0.359)	0.243	(0.429)	0.207	(0.405)
Lower secondary	0.102	(0.303)	0.053	(0.225)	0.135	(0.341)	0.084	(0.278)	0.135	(0.342)	0.105	(0.307)
Upper secondary	0.041	(0.198)	0.028	(0.165)	0.057	(0.231)	0.043	(0.202)	0.139	(0.346)	0.109	(0.311)
Diploma	0.070	(0.256)	0.087	(0.282)	0.054	(0.226)	0.053	(0.223)	0.052	(0.221)	0.048	(0.214)
University	0.136	(0.343)	0.202	(0.402)	0.166	(0.372)	0.250	(0.433)	0.140	(0.347)	0.241	(0.428)
Occupation dummies												
Official/manager	0.041	(0.198)	0.023	(0.150)	0.048	(0.214)	0.031	(0.173)	0.050	(0.218)	0.019	(0.136)
Professional	0.102	(0.302)	0.185	(0.388)	0.123	(0.329)	0.214	(0.410)	0.069	(0.253)	0.120	(0.325)
Assoc. professional	0.003	(0.052)	0.002	(0.046)	0.002	(0.048)	0.003	(0.058)	0.072	(0.258)	0.101	(0.301)
Clerical	0.091	(0.287)	0.124	(0.330)	0.074	(0.262)	0.109	(0.311)	0.047	(0.212)	0.107	(0.309)
Service/sales	0.088	(0.283)	0.095	(0.293)	0.106	(0.308)	0.114	(0.318)	0.064	(0.245)	0.100	(0.300)
Agric. worker	0.174	(0.379)	0.231	(0.421)	0.160	(0.366)	0.173	(0.378)	0.065	(0.246)	0.061	(0.239)
Trades	0.312	(0.463)	0.225	(0.418)	0.290	(0.454)	0.222	(0.416)	0.254	(0.435)	0.113	(0.317)
Operator	0.111	(0.314)	0.026	(0.160)	0.116	(0.320)	0.024	(0.154)	0.156	(0.363)	0.104	(0.305)
Unskilled worker	0.080	(0.271)	0.089	(0.285)	0.081	(0.272)	0.110	(0.312)	0.223	(0.416)	0.274	(0.446)
Industry dummies												
Agric./mining	0.186	(0.389)	0.230	(0.421)	0.162	(0.368)	0.173	(0.378)	0.173	(0.379)	0.164	(0.370)
Manufacturing	0.189	(0.391)	0.262	(0.440)	0.205	(0.404)	0.290	(0.454)	0.209	(0.407)	0.302	(0.459)
Electricity/gas/water	0.018	(0.135)	0.006	(0.078)	0.021	(0.142)	0.007	(0.084)	0.011	(0.103)	0.002	(0.049)
Construction	0.201	(0.401)	0.060	(0.238)	0.181	(0.385)	0.049	(0.216)	0.194	(0.396)	0.049	(0.217)

Sales	0.073	(0.260)	0.070	(0.255)	0.086	(0.280)	0.087	(0.281)	0.109	(0.312)	0.098	(0.297)
Hotels/transportation	0.061	(0.239)	0.019	(0.138)	0.055	(0.227)	0.018	(0.134)	0.064	(0.244)	0.064	(0.244)
Finance	0.034	(0.180)	0.034	(0.182)	0.043	(0.202)	0.047	(0.211)	0.050	(0.218)	0.054	(0.225)
Public admin.	0.185	(0.388)	0.177	(0.382)	0.189	(0.392)	0.168	(0.374)	0.094	(0.292)	0.061	(0.239)
Social work	0.022	(0.148)	0.056	(0.231)	0.024	(0.153)	0.062	(0.241)	0.091	(0.288)	0.176	(0.381)
Other	0.031	(0.173)	0.084	(0.277)	0.034	(0.182)	0.100	(0.300)	0.004	(0.061)	0.030	(0.171)
Region dummies												
Bangkok	0.204	(0.403)	0.251	(0.434)	0.187	(0.390)	0.248	(0.432)	0.157	(0.364)	0.195	(0.396)
Central	0.272	(0.445)	0.310	(0.462)	0.278	(0.448)	0.302	(0.459)	0.295	(0.456)	0.325	(0.468)
North	0.190	(0.392)	0.182	(0.386)	0.175	(0.380)	0.166	(0.372)	0.170	(0.376)	0.166	(0.372)
Northeast	0.233	(0.423)	0.175	(0.380)	0.261	(0.439)	0.196	(0.397)	0.270	(0.444)	0.201	(0.401)
South	0.101	(0.301)	0.082	(0.275)	0.098	(0.298)	0.089	(0.284)	0.108	(0.311)	0.114	(0.317)
Obs.	25963		17880		50321		38785		24543		20885	

Table 2: Mean real hourly wage (in 2007 Baht)

	1991/1993		1998/2000		2005/2007	
	Male	Female	Male	Female	Male	Female
Mean	41.487	37.345	50.079	48.323	47.644	44.879
Age group						
25<age<35	33.448	32.946	39.993	39.865	37.464	37.187
35<age<45	45.997	42.387	52.262	52.488	46.594	45.369
45<age<55	57.394	46.510	64.483	63.162	64.387	61.066
55<age<65	49.680	31.453	66.553	57.166	59.670	48.678
Education						
No education	19.758	15.610	25.938	21.794	26.048	22.197
Less than primary	26.265	19.183	31.866	29.223	30.584	23.939
Primary	32.744	23.272	31.895	27.058	29.492	23.989
Lower secondary	46.066	38.122	49.907	40.231	37.406	28.807
Upper secondary	45.830	46.672	47.565	41.334	48.906	39.888
Diploma	63.041	61.766	72.945	69.112	62.955	52.806
University	95.852	81.747	108.780	93.934	117.992	95.823
Occupation						
Official/manager	101.066	107.379	106.079	115.819	106.256	125.155
Professional	92.933	81.892	108.068	93.974	121.480	110.006
Assoc. professional	53.631	57.951	91.970	44.872	81.741	64.567
Clerical	59.486	52.228	62.902	52.684	64.695	58.828
Service/sales	40.331	21.812	47.765	29.202	42.037	29.929
Agric. worker	18.213	15.918	23.877	22.298	28.396	28.498
Trades	31.564	21.365	37.181	36.601	34.998	21.468
Operator	33.252	26.618	39.815	28.030	35.574	26.735
Unskilled worker	26.762	21.392	31.019	25.328	27.314	23.829
By industry						
Agric./mining	19.305	15.981	24.951	22.694	28.032	25.215
Manufacturing	38.416	26.162	48.531	40.834	40.982	31.294
Electricity/gas/water	80.571	88.863	93.222	117.911	119.510	122.339
Construction	28.526	20.567	31.966	25.854	34.309	31.081
Sales	42.296	37.476	48.027	43.209	39.846	37.962
Hotels/transportation	51.491	64.612	66.125	78.064	55.487	41.420
Finance	71.895	74.450	79.982	85.301	75.891	75.451
Public admin.	67.780	76.378	75.882	86.841	69.588	74.668
Social work	56.794	61.210	63.608	66.380	86.443	79.190
Other	31.722	19.161	38.445	26.238	29.778	19.216

Table 3: Coefficients of unconditional quantile regressions

(a) 1991/1993

	10th percentile				50th percentile				90th percentile			
	Male		Female		Male		Female		Male		Female	
Age	0.023***	(0.008)	0.030***	(0.010)	0.046***	(0.005)	0.023***	(0.007)	0.067***	(0.008)	0.099***	(0.007)
Age squared	-0.030***	(0.010)	-0.048***	(0.013)	-0.048***	(0.006)	-0.029***	(0.008)	-0.042***	(0.010)	-0.086***	(0.008)
Married	0.033	(0.023)	0.083***	(0.022)	0.082***	(0.015)	0.026	(0.016)	0.174***	(0.022)	0.133***	(0.019)
Urban	0.040***	(0.015)	0.087***	(0.021)	0.117***	(0.013)	0.124***	(0.018)	0.049**	(0.023)	0.036	(0.025)
Private	-0.342***	(0.029)	-0.147***	(0.026)	-0.459***	(0.026)	-0.414***	(0.035)	-0.716***	(0.067)	-0.509***	(0.058)
Less than prim	0.250***	(0.084)	0.185***	(0.067)	0.132***	(0.029)	0.102***	(0.035)	0.132***	(0.035)	0.111***	(0.019)
Primary	0.413***	(0.089)	0.314***	(0.081)	0.304***	(0.037)	0.355***	(0.055)	0.405***	(0.046)	0.330***	(0.033)
Lower sec.	0.446***	(0.086)	0.485***	(0.075)	0.367***	(0.036)	0.556***	(0.055)	0.450***	(0.048)	0.285***	(0.039)
Upper sec.	0.482***	(0.091)	0.556***	(0.076)	0.385***	(0.043)	0.587***	(0.060)	0.451***	(0.058)	0.426***	(0.058)
Diploma	0.536***	(0.086)	0.522***	(0.075)	0.565***	(0.039)	0.722***	(0.054)	0.725***	(0.062)	0.495***	(0.059)
University	0.625***	(0.088)	0.480***	(0.076)	0.665***	(0.039)	0.721***	(0.054)	1.362***	(0.070)	0.715***	(0.054)
Official/manager	-0.586***	(0.058)	-0.291***	(0.060)	0.104***	(0.036)	0.246***	(0.057)	1.466***	(0.080)	1.457***	(0.111)
Professional	-0.183***	(0.033)	-0.155***	(0.046)	0.356***	(0.032)	0.390***	(0.054)	1.065***	(0.069)	0.838***	(0.059)
Assoc. prof.	0.022	(0.074)	-0.151	(0.217)	0.392***	(0.114)	0.527***	(0.190)	0.354*	(0.208)	1.560***	(0.400)
Clerical	-0.129***	(0.032)	-0.177***	(0.042)	0.382***	(0.030)	0.330***	(0.049)	0.221***	(0.050)	0.057	(0.044)
Serv./sale worker	-0.204***	(0.036)	-0.546***	(0.057)	0.085***	(0.030)	-0.081*	(0.044)	0.049	(0.033)	0.047	(0.035)
Agric. worker	-0.473***	(0.073)	-0.024	(0.076)	-0.118**	(0.050)	-0.151	(0.114)	0.138***	(0.046)	0.144	(0.122)
Trades	-0.040	(0.031)	-0.279***	(0.034)	0.239***	(0.025)	0.084**	(0.040)	0.065**	(0.027)	0.009	(0.027)
operators	-0.131***	(0.036)	-0.099*	(0.060)	0.205***	(0.028)	0.172**	(0.069)	-0.005	(0.030)	0.025	(0.046)
Agric/mining	-0.229***	(0.078)	0.326***	(0.088)	0.041	(0.056)	0.307***	(0.119)	0.050	(0.060)	-0.047	(0.123)
Manufacturing	0.111**	(0.047)	0.399***	(0.053)	0.102***	(0.038)	0.418***	(0.047)	0.146***	(0.048)	0.102***	(0.039)
Elec./gas/water	-0.062	(0.055)	0.428***	(0.061)	-0.017	(0.056)	0.276***	(0.086)	0.215*	(0.120)	0.384**	(0.166)
Construction	0.348***	(0.049)	0.798***	(0.057)	0.024	(0.040)	0.102*	(0.053)	0.107**	(0.047)	0.119***	(0.041)
Sales	0.104**	(0.051)	0.420***	(0.058)	0.102***	(0.039)	0.344***	(0.042)	0.110**	(0.048)	0.150***	(0.039)
Hotels/transpt.	-0.118**	(0.057)	0.381***	(0.064)	-0.053	(0.043)	0.263***	(0.068)	0.174***	(0.060)	0.134	(0.091)
Finance	0.129***	(0.049)	0.483***	(0.050)	0.204***	(0.041)	0.541***	(0.050)	0.035	(0.074)	0.310***	(0.074)
Public admin.	-0.049	(0.053)	0.443***	(0.056)	0.107**	(0.044)	0.416***	(0.054)	-0.688***	(0.080)	-0.253***	(0.067)
Social work	0.013	(0.064)	0.447***	(0.057)	0.160***	(0.051)	0.442***	(0.057)	-0.642***	(0.094)	-0.478***	(0.078)

Central	-0.040**	(0.016)	-0.018	(0.020)	-0.167***	(0.016)	-0.188***	(0.020)	-0.104***	(0.029)	-0.077***	(0.026)
North	-0.319***	(0.024)	-0.395***	(0.032)	-0.526***	(0.017)	-0.509***	(0.023)	-0.165***	(0.031)	-0.203***	(0.029)
Northeast	-0.395***	(0.024)	-0.453***	(0.034)	-0.481***	(0.017)	-0.452***	(0.024)	-0.159***	(0.031)	-0.157***	(0.031)
South	0.077***	(0.023)	-0.054*	(0.030)	-0.243***	(0.022)	-0.342***	(0.029)	-0.211***	(0.034)	-0.132***	(0.037)
_cons	2.164***	(0.184)	1.435***	(0.215)	2.298***	(0.115)	2.441***	(0.143)	2.562***	(0.176)	1.980***	(0.159)

Notes: In parentheses are bootstrap errors with 50 repetitions. ***, ** and * indicate the significance level at 1%, 5% and 10% respectively.

(b) 1998/2000

	10th percentile				50th percentile				90th percentile			
	Male		Female		Male		Female		Male		Female	
Age	0.017***	(0.005)	0.040***	(0.008)	0.044***	(0.004)	0.020***	(0.005)	0.077***	(0.008)	0.101***	(0.010)
Age squared	-0.020***	(0.006)	-0.057***	(0.010)	-0.044***	(0.005)	-0.022***	(0.006)	-0.044***	(0.010)	-0.069***	(0.012)
Married	0.039***	(0.014)	0.018	(0.015)	0.040***	(0.013)	-0.005	(0.012)	0.084***	(0.026)	-0.002	(0.029)
Urban	0.043***	(0.008)	0.081***	(0.014)	0.110***	(0.010)	0.132***	(0.011)	0.059***	(0.018)	0.087***	(0.022)
Private	-0.179***	(0.021)	-0.090***	(0.015)	-0.339***	(0.023)	-0.215***	(0.022)	-0.403***	(0.069)	-0.444***	(0.071)
Less than prim	0.186***	(0.058)	0.169***	(0.054)	0.031	(0.031)	0.080***	(0.026)	0.031	(0.035)	0.157***	(0.023)
Primary	0.223***	(0.060)	0.246***	(0.059)	0.126***	(0.034)	0.099***	(0.032)	0.537***	(0.042)	0.575***	(0.039)
Lower sec.	0.330***	(0.059)	0.441***	(0.059)	0.301***	(0.034)	0.323***	(0.036)	0.459***	(0.045)	0.441***	(0.045)
Upper sec.	0.362***	(0.062)	0.519***	(0.059)	0.351***	(0.039)	0.428***	(0.044)	0.568***	(0.052)	0.461***	(0.047)
Diploma	0.417***	(0.059)	0.495***	(0.058)	0.545***	(0.037)	0.627***	(0.040)	0.690***	(0.060)	0.611***	(0.065)
University	0.490***	(0.060)	0.458***	(0.059)	0.684***	(0.036)	0.685***	(0.039)	1.364***	(0.064)	0.845***	(0.067)
Official/manager	-0.440***	(0.037)	-0.138***	(0.038)	-0.002	(0.030)	0.341***	(0.037)	1.158***	(0.073)	1.178***	(0.113)
Professional	-0.102***	(0.022)	-0.061*	(0.032)	0.254***	(0.025)	0.382***	(0.034)	0.986***	(0.065)	0.799***	(0.061)
Assoc. prof.	-0.074	(0.053)	0.015	(0.113)	0.140	(0.099)	0.651***	(0.121)	0.848***	(0.317)	0.815***	(0.100)
Clerical	-0.011	(0.021)	-0.067**	(0.031)	0.358***	(0.027)	0.341***	(0.034)	0.037	(0.045)	0.046	(0.043)
Service/sales	-0.132***	(0.025)	-0.279***	(0.040)	0.052**	(0.025)	-0.013	(0.032)	0.066**	(0.033)	0.086***	(0.029)
Agric. worker	-0.191***	(0.046)	0.056	(0.073)	-0.115***	(0.034)	-0.054	(0.066)	0.103**	(0.042)	0.067	(0.065)
Trades	0.063***	(0.020)	-0.196***	(0.028)	0.168***	(0.021)	0.035	(0.028)	0.055**	(0.025)	0.328***	(0.040)
operators	-0.030	(0.022)	0.065	(0.045)	0.177***	(0.025)	0.015	(0.046)	-0.015	(0.033)	0.027	(0.039)
Agric/mining	-0.164***	(0.050)	0.272***	(0.078)	0.103**	(0.040)	0.251***	(0.068)	0.140**	(0.058)	0.228***	(0.071)
Manufacturing	0.078***	(0.029)	0.388***	(0.037)	0.121***	(0.032)	0.284***	(0.033)	0.226***	(0.051)	0.234***	(0.045)
Elec./gas/water	-0.017	(0.040)	0.384***	(0.042)	0.018	(0.050)	0.221***	(0.057)	0.756***	(0.140)	0.848***	(0.189)

Construction	0.206***	(0.031)	0.594***	(0.048)	-0.027	(0.033)	0.133***	(0.039)	0.129***	(0.050)	0.225***	(0.042)
Sales	0.047	(0.032)	0.342***	(0.041)	0.072**	(0.034)	0.167***	(0.029)	0.198***	(0.054)	0.138***	(0.038)
Hotels/transpt.	-0.060*	(0.036)	0.303***	(0.046)	0.013	(0.039)	0.121***	(0.040)	0.330***	(0.069)	0.145	(0.112)
Finance	0.091***	(0.035)	0.406***	(0.037)	0.093**	(0.038)	0.252***	(0.036)	0.176**	(0.073)	0.312***	(0.077)
Public admin.	0.018	(0.034)	0.444***	(0.037)	0.162***	(0.038)	0.270***	(0.035)	-0.426***	(0.081)	-0.203***	(0.073)
Social work	0.046	(0.046)	0.423***	(0.039)	0.131***	(0.044)	0.208***	(0.037)	-0.379***	(0.096)	-0.466***	(0.093)
Central	-0.035***	(0.010)	-0.037**	(0.016)	-0.160***	(0.016)	-0.123***	(0.017)	-0.230***	(0.039)	-0.443***	(0.045)
North	-0.254***	(0.015)	-0.396***	(0.025)	-0.409***	(0.018)	-0.361***	(0.018)	-0.212***	(0.040)	-0.462***	(0.044)
Northeast	-0.240***	(0.014)	-0.350***	(0.024)	-0.426***	(0.017)	-0.394***	(0.018)	-0.303***	(0.039)	-0.471***	(0.044)
South	-0.021	(0.014)	-0.090***	(0.025)	-0.165***	(0.020)	-0.210***	(0.021)	-0.292***	(0.042)	-0.504***	(0.045)
_cons	2.344***	(0.113)	1.574***	(0.164)	2.449***	(0.101)	2.606***	(0.110)	2.124***	(0.195)	1.838***	(0.224)

Notes: In parentheses are bootstrap errors with 50 repetitions. ***, ** and * indicate the significance level at 1%, 5% and 10% respectively.

(c) 2005/2007

	10^{th} percentile				50^{th} percentile				90^{th} percentile			
	Male		Female		Male		Female		Male		Female	
Age	0.021**	(0.008)	0.048***	(0.012)	0.031***	(0.005)	0.022***	(0.005)	0.108***	(0.014)	0.152***	(0.014)
Age squared	-0.024**	(0.010)	-0.062***	(0.015)	-0.027***	(0.006)	-0.020***	(0.006)	-0.052***	(0.017)	-0.097***	(0.017)
Married	0.013	(0.022)	0.044*	(0.025)	0.011	(0.014)	0.032***	(0.012)	0.212***	(0.045)	0.222***	(0.039)
Urban	0.046***	(0.014)	0.158***	(0.021)	0.069***	(0.011)	0.050***	(0.012)	0.143***	(0.036)	-0.024	(0.037)
Private	-0.267***	(0.026)	-0.315***	(0.038)	-0.332***	(0.023)	-0.247***	(0.023)	-0.707***	(0.116)	-0.963***	(0.099)
Less than prim	0.189**	(0.079)	0.412***	(0.099)	0.032	(0.035)	0.051	(0.035)	-0.390***	(0.074)	-0.345***	(0.070)
Primary	0.270***	(0.080)	0.512***	(0.105)	0.096***	(0.035)	0.104***	(0.036)	0.497***	(0.079)	0.489***	(0.075)
Lower sec.	0.341***	(0.080)	0.652***	(0.112)	0.205***	(0.037)	0.208***	(0.040)	0.435***	(0.083)	0.565***	(0.087)
Upper sec.	0.429***	(0.081)	0.731***	(0.114)	0.339***	(0.038)	0.362***	(0.041)	0.687***	(0.091)	0.573***	(0.086)
Diploma	0.452***	(0.080)	0.779***	(0.119)	0.489***	(0.042)	0.520***	(0.045)	1.051***	(0.118)	0.651***	(0.119)
University	0.495***	(0.081)	0.776***	(0.120)	0.569***	(0.040)	0.617***	(0.043)	2.624***	(0.141)	1.521***	(0.116)
Official/manager	0.016	(0.049)	0.043	(0.072)	0.181***	(0.034)	0.350***	(0.044)	1.799***	(0.139)	2.220***	(0.251)
Professional	0.062*	(0.033)	0.066	(0.055)	0.279***	(0.029)	0.343***	(0.033)	1.695***	(0.174)	1.789***	(0.129)
Assoc. prof.	0.158***	(0.031)	0.009	(0.067)	0.378***	(0.025)	0.404***	(0.031)	0.581***	(0.131)	0.411***	(0.093)
Clerical	0.178***	(0.035)	0.085	(0.052)	0.310***	(0.029)	0.367***	(0.031)	0.188*	(0.107)	0.099	(0.075)
Serv./sale worker	0.040	(0.049)	0.026	(0.060)	0.062**	(0.029)	0.116***	(0.027)	0.069	(0.081)	-0.077	(0.055)

Agri. worker	0.142**	(0.058)	0.308***	(0.081)	0.025	(0.028)	0.216***	(0.035)	-0.038	(0.045)	-0.012	(0.058)
Trades	0.216***	(0.029)	-0.566***	(0.061)	0.212***	(0.020)	-0.036	(0.026)	-0.025	(0.050)	0.090	(0.061)
operators	0.165***	(0.035)	0.220***	(0.044)	0.160***	(0.021)	0.053*	(0.029)	-0.040	(0.046)	0.146**	(0.067)
Agric/mining	-0.226	(0.157)	0.185*	(0.109)	-0.008	(0.125)	0.259***	(0.042)	0.287**	(0.146)	0.210***	(0.057)
Manufacturing	0.133	(0.151)	0.379***	(0.098)	-0.080	(0.125)	0.243***	(0.040)	0.173	(0.142)	0.074	(0.066)
Electr./gas/water	-0.025	(0.160)	0.195	(0.145)	-0.034	(0.132)	0.119*	(0.068)	1.623***	(0.315)	1.245**	(0.490)
Construction	0.325**	(0.152)	0.883***	(0.099)	0.020	(0.125)	0.297***	(0.045)	0.233	(0.147)	0.228***	(0.068)
Sales	0.070	(0.153)	0.222**	(0.108)	-0.016	(0.125)	0.223***	(0.040)	0.123	(0.146)	0.162***	(0.061)
Hotels/transpt.	-0.033	(0.154)	0.205*	(0.109)	-0.026	(0.127)	0.160***	(0.041)	0.282*	(0.155)	0.325***	(0.076)
Finance	0.095	(0.153)	0.395***	(0.097)	-0.022	(0.127)	0.300***	(0.042)	0.146	(0.167)	0.520***	(0.108)
Public admin.	-0.000	(0.153)	0.188*	(0.104)	-0.031	(0.127)	0.230***	(0.046)	-1.043***	(0.197)	-0.794***	(0.145)
Social work	0.097	(0.153)	0.225**	(0.107)	-0.017	(0.127)	0.266***	(0.043)	-0.245	(0.205)	-0.373***	(0.085)
Central	-0.075***	(0.014)	-0.066***	(0.021)	-0.144***	(0.017)	-0.113***	(0.017)	-0.147**	(0.071)	-0.411***	(0.058)
North	-0.279***	(0.026)	-0.308***	(0.037)	-0.350***	(0.020)	-0.250***	(0.020)	-0.206***	(0.078)	-0.490***	(0.065)
Northeast	-0.353***	(0.025)	-0.482***	(0.039)	-0.392***	(0.020)	-0.298***	(0.020)	-0.323***	(0.074)	-0.460***	(0.066)
South	-0.090***	(0.023)	-0.181***	(0.037)	-0.187***	(0.022)	-0.181***	(0.022)	-0.400***	(0.081)	-0.579***	(0.070)
_cons	2.232***	(0.235)	1.168***	(0.264)	2.746***	(0.162)	2.429***	(0.113)	0.930***	(0.353)	0.520	(0.336)

Notes: In parentheses are bootstrap errors with 50 repetitions. ***, ** and * indicate the significance level at 1%, 5% and 10% respectively.

Table 4: Decomposition of gender wage differentials at selected quantiles

	1991/1993			1998/2000			2005/2007		
	10th	50th	90th	10th	50th	90th	10th	50th	90th
Total gap	0.255***	0.171***	0.017	0.119***	0.107***	-0.048*	0.208***	0.090***	-0.035
	(0.018)	(0.012)	(0.014)	(0.004)	(0.008)	(0.026)	(0.015)	(0.012)	(0.026)
Char.	0.052***	-0.049***	-0.049***	0.007**	-0.087***	-0.064***	0.010	-0.048***	-0.118***
Effects	(0.008)	(0.013)	(0.011)	(0.003)	(0.008)	(0.014)	(0.011)	(0.011)	(0.027)
Coef.	0.203***	0.220***	0.066***	0.112***	0.195***	0.016	0.199***	0.138***	0.083***
Effects	(0.017)	(0.012)	(0.015)	(0.005)	(0.007)	(0.020)	(0.017)	(0.011)	(0.030)
Characteristics Effects									
Age	-0.001	0.006***	0.029	0.001	0.010***	-0.053**	0.000	0.009***	-0.078**
	(0.001)	(0.001)	(0.018)	(0.001)	(0.001)	(0.026)	(0.002)	(0.002)	(0.037)
Marriage	0.005	0.012***	0.026	0.005***	0.005***	0.000	0.001	0.001	-0.020*
	(0.003)	(0.002)	(0.017)	(0.002)	(0.002)	(0.005)	(0.002)	(0.001)	(0.010)
Region	-0.024***	-0.036***	-0.013	-0.020***	-0.036***	0.035**	-0.025***	-0.027***	0.017
	(0.003)	(0.003)	(0.008)	(0.002)	(0.003)	(0.015)	(0.003)	(0.003)	(0.011)
Sector	0.007***	0.009***	0.014*	0.005***	0.010***	-0.013*	0.001	0.001	-0.003
	(0.002)	(0.002)	(0.008)	(0.001)	(0.002)	(0.007)	(0.001)	(0.002)	(0.005)
Education	-0.006**	-0.020***	-0.062**	-0.010***	-0.033***	0.024	-0.012***	-0.036***	0.106
	(0.003)	(0.003)	(0.031)	(0.002)	(0.003)	(0.023)	(0.003)	(0.003)	(0.073)
Occupation	0.023***	0.004	-0.072*	0.007***	-0.007***	0.031	0.020***	-0.002	0.018
	(0.006)	(0.004)	(0.042)	(0.003)	(0.003)	(0.023)	(0.004)	(0.004)	(0.027)
Industry	0.045***	-0.013***	0.029	0.018***	-0.016***	-0.036**	0.025***	0.010**	-0.043**
	(0.006)	(0.004)	(0.024)	(0.004)	(0.003)	(0.016)	(0.007)	(0.005)	(0.018)
Residual	0.004	-0.011*	0.000	0.001	-0.020***	-0.053**	-0.000	-0.004	-0.115*
	(0.008)	(0.006)	(0.018)	(0.005)	(0.005)	(0.026)	(0.006)	(0.008)	(0.064)
Coefficients Effects									
Age	0.001	0.571***	-0.563	-0.314*	0.583***	0.522	-0.465*	0.227*	0.996
	(0.253)	(0.170)	(0.419)	(0.182)	(0.131)	(0.374)	(0.271)	(0.132)	(0.674)
Marriage	-0.008	0.009**	0.007	0.004	0.008***	-0.026*	-0.005	-0.004	0.003
	(0.005)	(0.004)	(0.006)	(0.003)	(0.002)	(0.014)	(0.006)	(0.003)	(0.016)
Region	-0.020***	-0.008	0.006	-0.012***	-0.007*	-0.001	-0.003	-0.001	0.009
	(0.005)	(0.005)	(0.007)	(0.003)	(0.004)	(0.005)	(0.005)	(0.003)	(0.010)
Sector	-0.052***	-0.012	-0.056	-0.025***	-0.034***	-0.010	0.014	-0.025**	-0.074
	(0.014)	(0.012)	(0.044)	(0.007)	(0.011)	(0.025)	(0.016)	(0.010)	(0.061)
Education	0.035**	0.062***	0.009	0.036***	0.005	0.037***	-0.014	-0.003	0.044***
	(0.016)	(0.015)	(0.013)	(0.008)	(0.007)	(0.014)	(0.012)	(0.007)	(0.017)
Occupation	-0.023	0.041	0.158	0.051***	0.067***	0.047	0.011	0.026***	0.013
	(0.029)	(0.028)	(0.103)	(0.014)	(0.017)	(0.043)	(0.011)	(0.006)	(0.031)
Industry	-0.001	-0.012	0.026	0.002	-0.001	0.035	-0.006	-0.042***	-0.004
	(0.019)	(0.018)	(0.032)	(0.008)	(0.010)	(0.029)	(0.021)	(0.012)	(0.058)
_cons	0.273	-0.445***	0.479	0.371**	-0.446***	-0.542	0.667**	-0.045	-0.946
	(0.263)	(0.172)	(0.375)	(0.182)	(0.132)	(0.396)	(0.274)	(0.132)	(0.667)
Residual	-0.001	0.014**	0.001	-0.001	0.020***	-0.045	0.001	0.006	0.043
	(0.009)	(0.006)	(0.016)	(0.005)	(0.005)	(0.037)	(0.007)	(0.008)	(0.057)

Notes: In parentheses are bootstrap errors with 50 repetitions. ***, ** and * indicate the significance level at 1%, 5% and 10% respectively.

Table 5: Decomposition of changes in gender wage differentials at selected quantiles

	2005/2007-1991/1993			2005/2007-1998/2000		
	10th	50th	90th	10th	50th	90th
Total change	-0.046*	-0.081***	-0.052*	0.089***	-0.017	0.012
	(0.024)	(0.018)	(0.031)	(0.016)	(0.013)	(0.028)
Changing Characteristics	-0.042**	0.002	-0.069**	0.002	0.040***	-0.054*
	(0.018)	(0.014)	(0.033)	(0.014)	(0.014)	(0.029)
Changing Coefficients	-0.004	-0.082***	0.017	0.087***	-0.057***	0.067**
	(0.023)	(0.018)	(0.035)	(0.018)	(0.015)	(0.028)
Explained						
Age	-0.000	0.001	0.011	-0.000	-0.001	-0.008
	(0.000)	(0.001)	(0.009)	(0.001)	(0.002)	(0.012)
Marriage	-0.001	-0.001	-0.012***	-0.001	-0.000	-0.009***
	(0.001)	(0.001)	(0.003)	(0.001)	(0.001)	(0.002)
Region	0.002	0.002	-0.010***	0.004*	0.005**	-0.003
	(0.002)	(0.003)	(0.003)	(0.002)	(0.002)	(0.003)
Sector	0.001	0.001	0.001	0.000	0.000	-0.000
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Education	0.002	0.002	-0.010***	0.004*	0.005**	-0.003
	(0.002)	(0.003)	(0.003)	(0.002)	(0.002)	(0.003)
Occupation	-0.010***	-0.010**	-0.006	-0.011***	-0.013***	-0.026***
	(0.004)	(0.004)	(0.011)	(0.003)	(0.003)	(0.009)
Industry	-0.007*	-0.004	0.005	-0.010***	-0.011***	-0.020**
	(0.004)	(0.004)	(0.011)	(0.003)	(0.004)	(0.009)
Reference	-0.014	-0.024**	-0.038	-0.019*	-0.003	0.042
	(0.018)	(0.012)	(0.025)	(0.010)	(0.008)	(0.028)
Residual	-0.015	0.034**	-0.008	0.035***	0.057***	-0.028
	(0.022)	(0.015)	(0.031)	(0.013)	(0.014)	(0.032)
Unexplained						
Age	-0.480	-0.361	-0.428	-0.157	-0.362**	-0.466
	(0.445)	(0.230)	(0.638)	(0.350)	(0.158)	(0.606)
Marriage	0.003	-0.013**	-0.009	-0.009	-0.012***	-0.017
	(0.009)	(0.005)	(0.011)	(0.006)	(0.004)	(0.013)
Region	0.004	-0.004	-0.011	-0.016	0.001	-0.009
	(0.017)	(0.012)	(0.017)	(0.013)	(0.009)	(0.022)
Sector	-0.003	-0.001	0.044***	-0.014	0.009	0.020
	(0.012)	(0.008)	(0.012)	(0.011)	(0.006)	(0.015)
Education	0.004	-0.004	-0.011	-0.016	0.001	-0.009
	(0.017)	(0.012)	(0.017)	(0.013)	(0.009)	(0.022)
Occupation	0.070**	-0.056*	0.127*	0.029	0.007	0.039
	(0.031)	(0.029)	(0.072)	(0.027)	(0.019)	(0.074)
Industry	0.074***	-0.029	0.060	0.046*	0.006	-0.014
	(0.027)	(0.026)	(0.074)	(0.026)	(0.016)	(0.075)
_cons	0.394	0.400*	0.467	0.297	0.400**	0.404
	(0.444)	(0.235)	(0.629)	(0.353)	(0.164)	(0.610)
Reference	0.003	-0.045*	0.026	-0.013	0.014**	0.067***
	(0.024)	(0.024)	(0.020)	(0.008)	(0.007)	(0.021)
Residual	-0.074	0.030	-0.247*	-0.059	-0.122***	0.052
	(0.083)	(0.065)	(0.126)	(0.063)	(0.047)	(0.118)

Note: In parentheses are bootstrap errors from 50 replications in parentheses.

Figure 1:

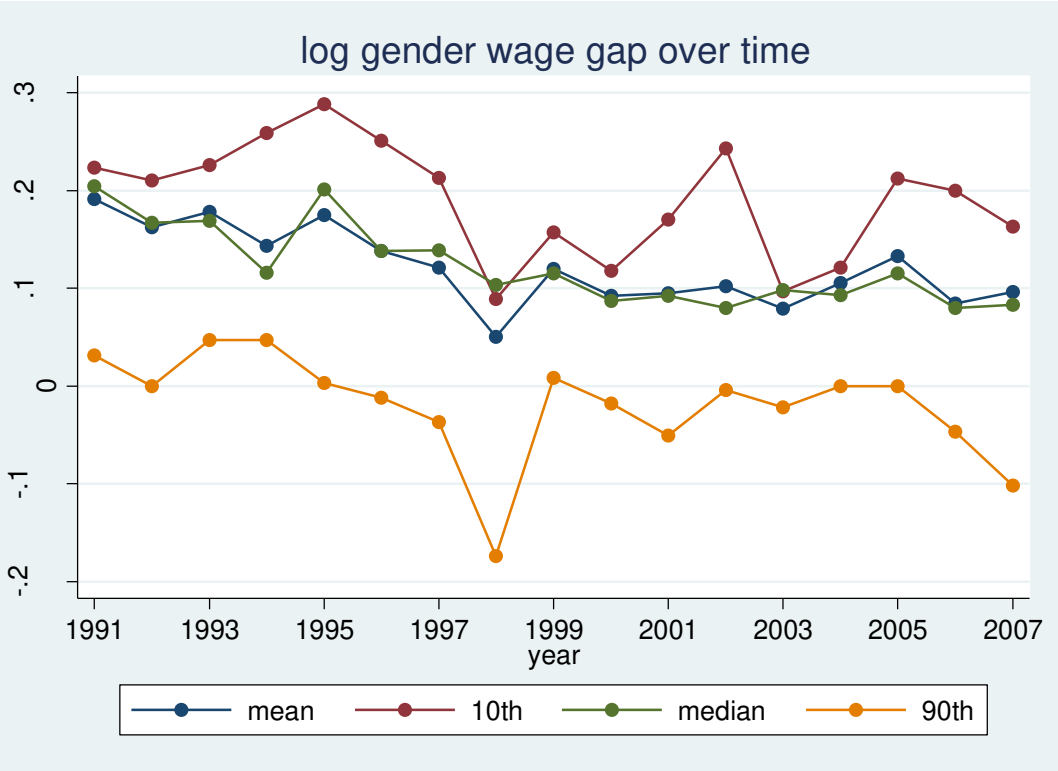


Figure 2:

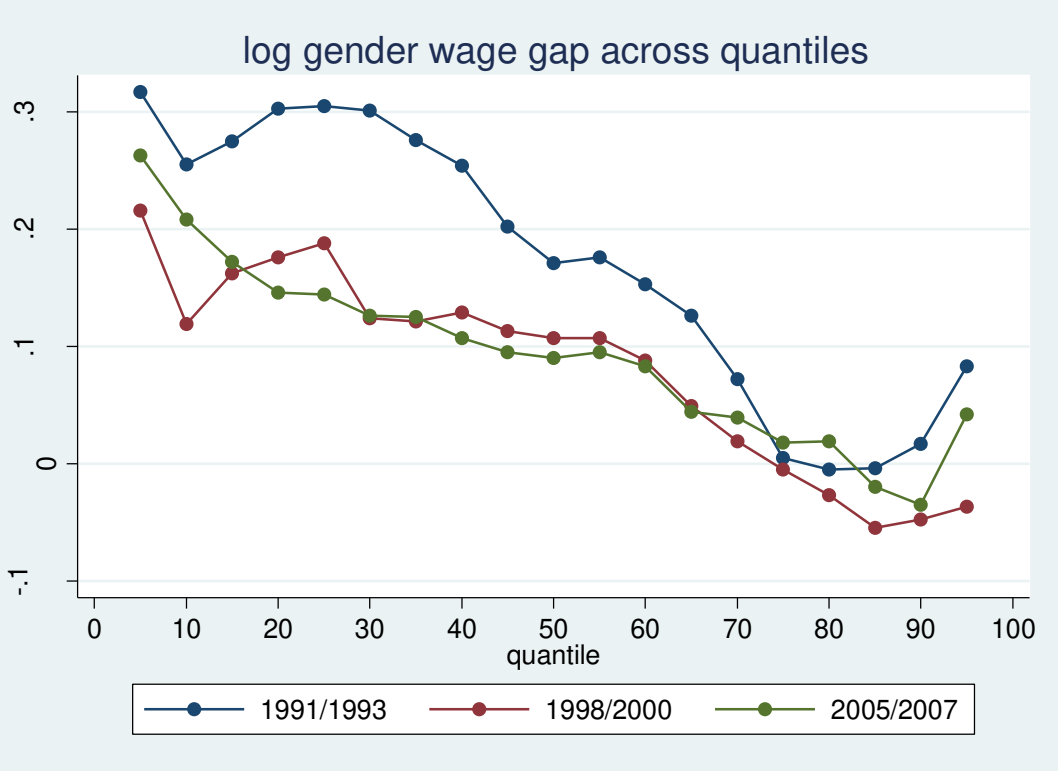
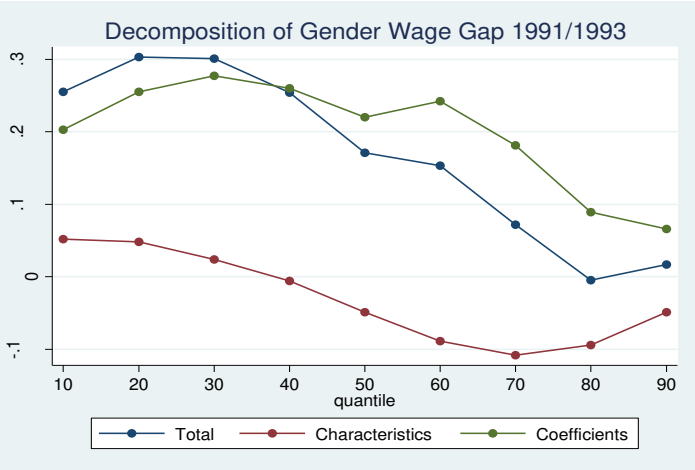
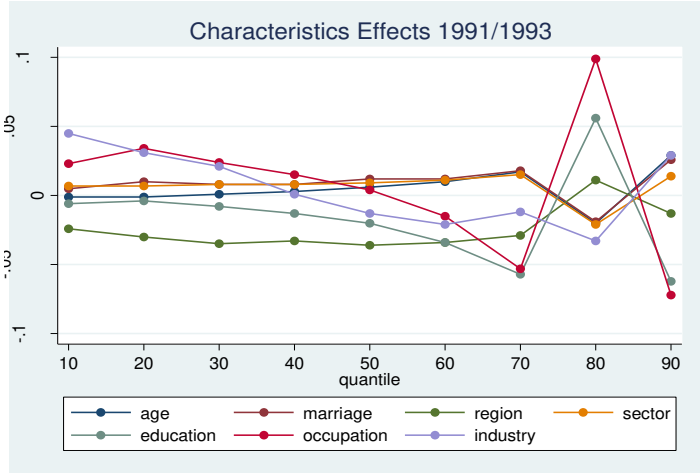
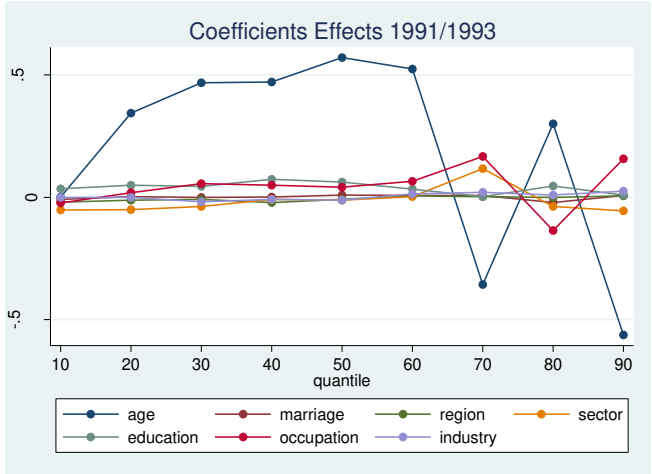


Figure 3: Decomposition of gender wage gaps

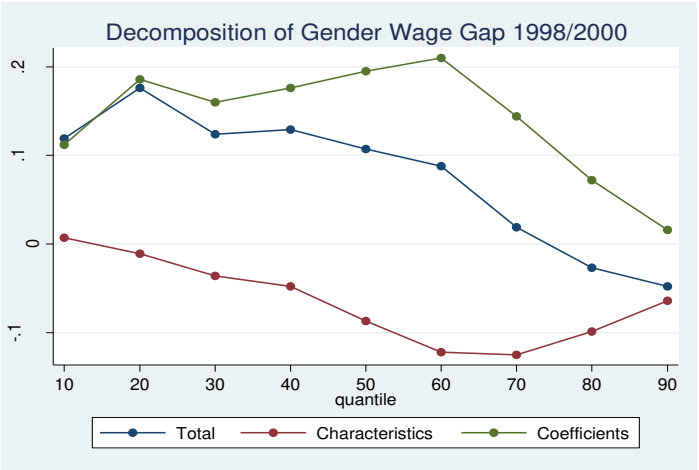
(a) 1991/1993

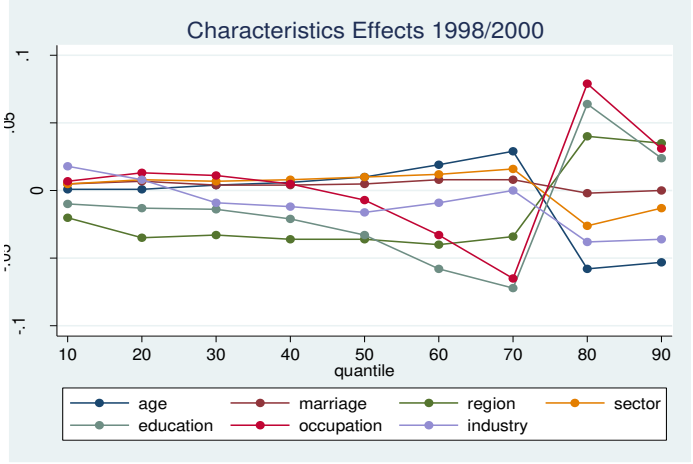


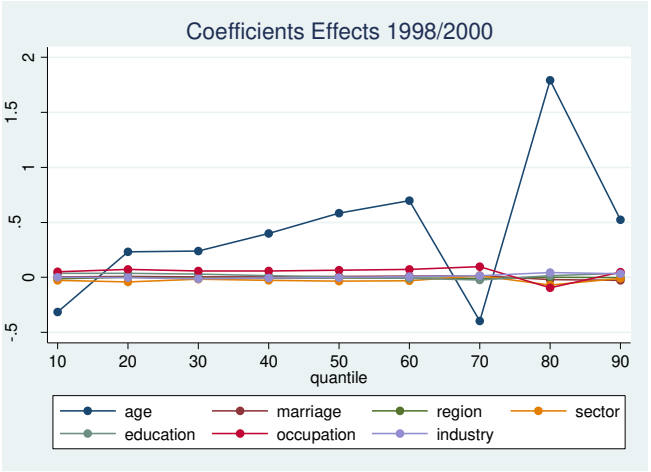




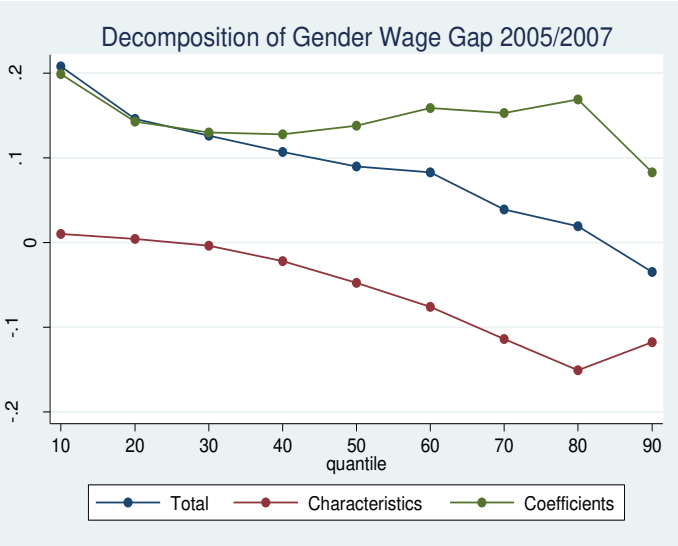
(b) 1998/2000

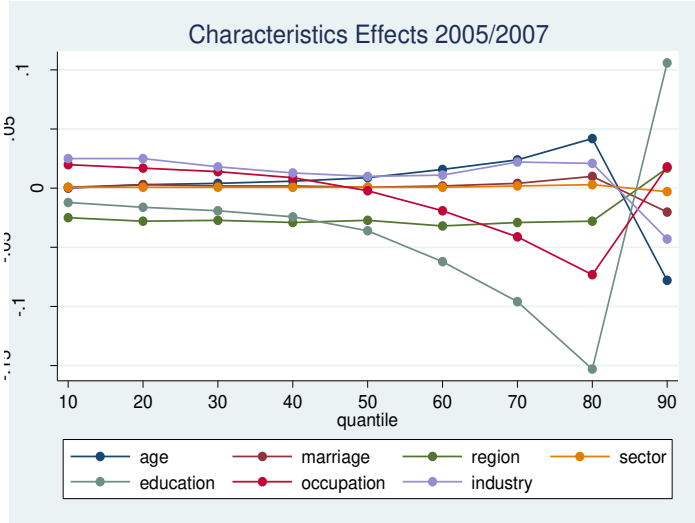






(c) 2005/2007


Decomposition of Gender Wage Gap 2005/2007
-.2
-.1
0
.1
.2
10
20
30
40
50
60
70
80
90
quantile
Total
Characteristics
Coefficients


Characteristics Effects 2005/2007
-.1
0
.05
.1
10
20
30
40
50
60
70
80
90
quantile
age
marriage
region
sector
education
occupation
industry

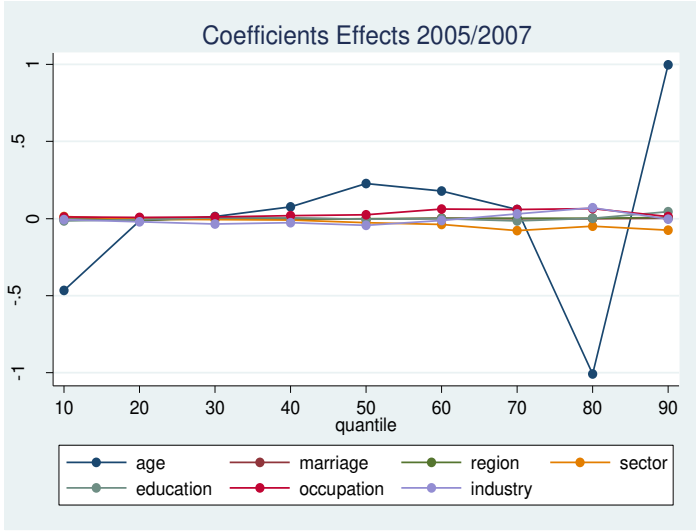

Coefficients Effects 2005/2007
-1
-.5
0
.5
1
10
20
30
40
50
60
70
80
90
quantile
age
marriage
region
sector
education
occupation
industry

Figure 4: Coefficients Effects over time

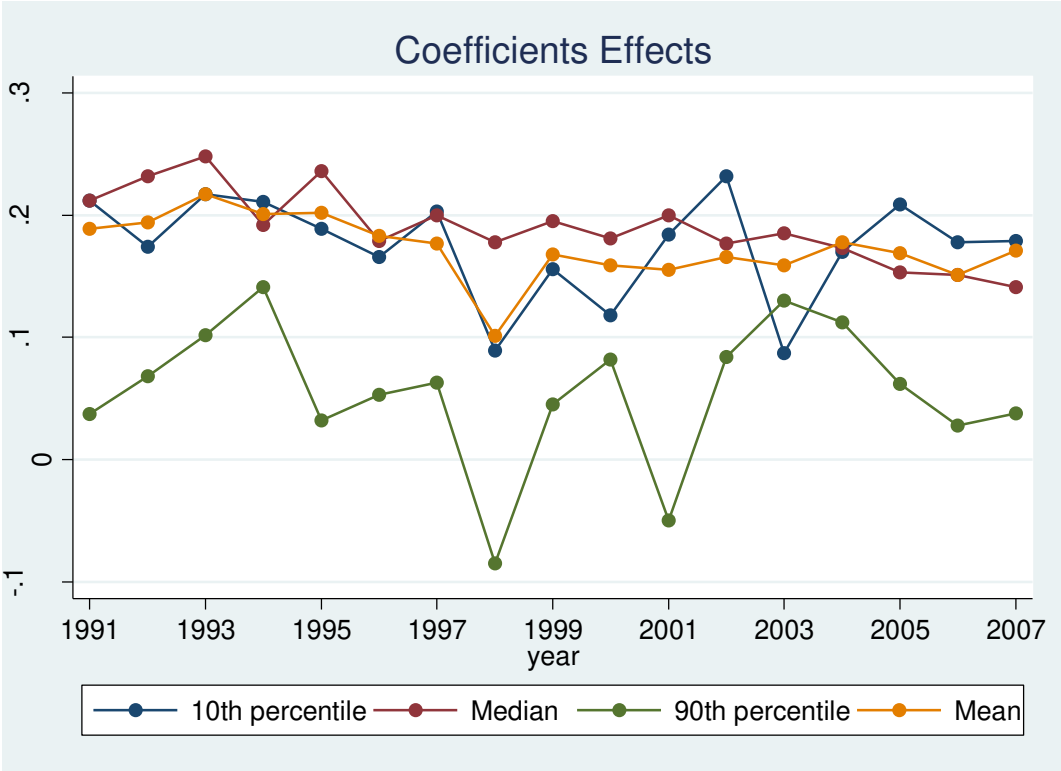
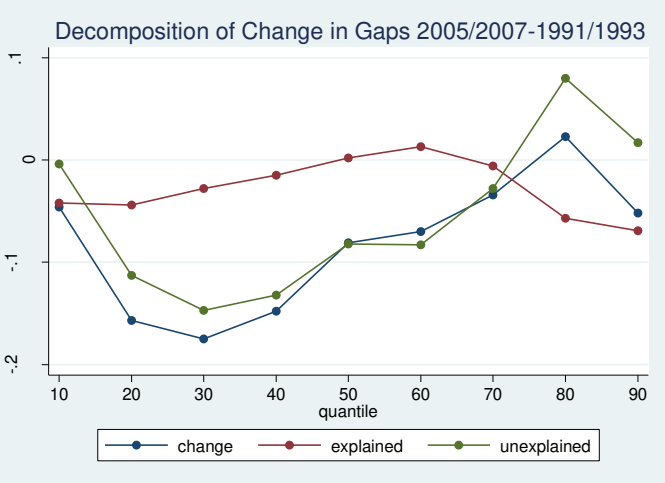
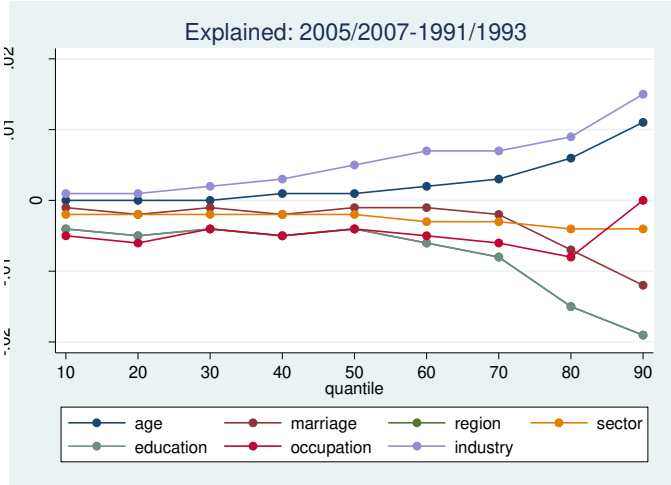
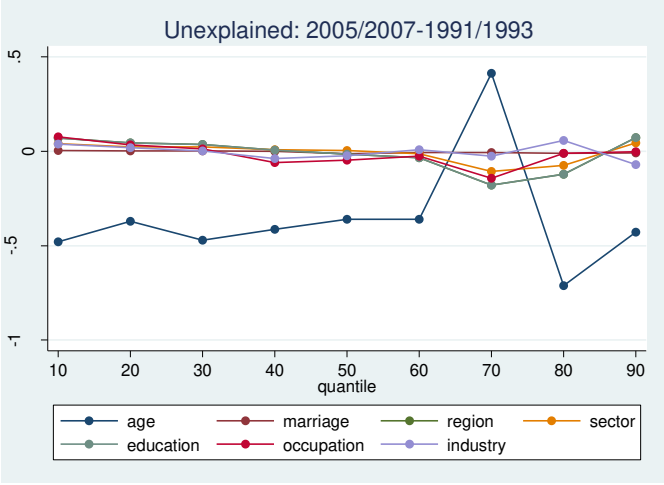


Figure 5: Decomposition of change in gender wage gaps

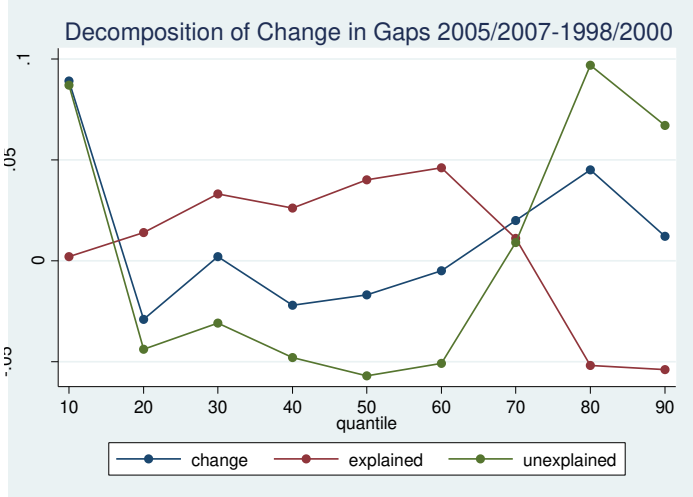
(a) 2005/2007-1991/1993

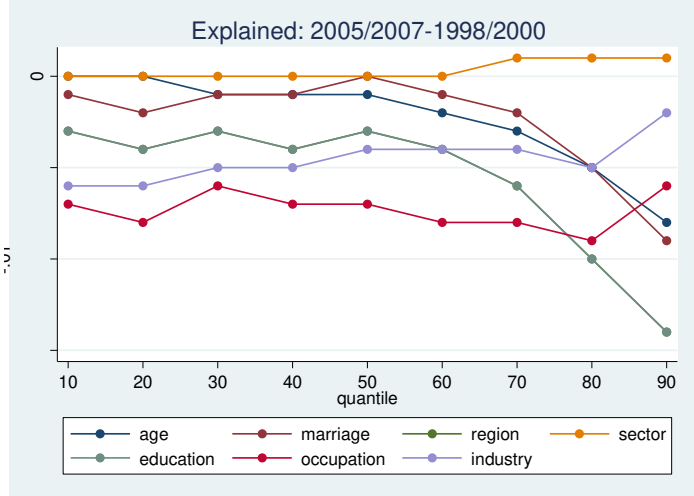


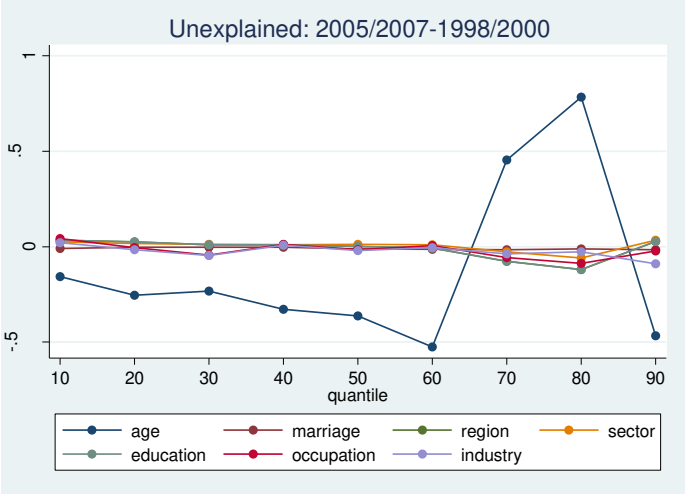




(b) 2005/2007-1998/2000







[1] See Chzhen and Mumford (2009), Kee (2006), De la Rica et al. (2008), Gardeazabal and Ugidos (2005), Pham and Reilly (2007); Chi and Li (2008); Sakellariou (2004a; 2004b), Fang and Sakellariou (2010), among several others.

[2] Thailand has experienced rapid economic growth before the 1997 Asian Financial Crisis. According to Mammen and Paxon (2000), real GDP per capita in Thailand has increased by 125% from $2178 in 1980 to $4891 in 1995.

[3] Other approaches include Juhn, Murphy and Pierce (1993), DiNardo, Fortin and Lemieux (1996), Fortin and Lemieux (1998) and Melly(2006).

[4] In its weak definition a sticky floor exists when the 10^{th} percentile gap is at least 2 percentage points higher than that at the 90^{th} percentile. Other definitions include comparisons of 10^{th} percentile gap and all the other gaps, gaps in the first half of distribution, or only at the median (see for example, Arulampalam et al. 2007).

[5] Sometimes the two effects are referred to as the explained/unexplained part, or the composition/wage structure effect.

[6] The influence function is widely used in the robust estimation of statistical and econometric models. It reflects the influence of an observation on the specific distributional statistic. The re-centered influence function is obtained by adding back the statistic to the influence function and its expectation equals precisely the statistic.

[7] As $E[RIF(Y; Q_\tau, F_Y)|X] = X\beta$ and $E[RIF(Y; Q_\tau, F_Y)] = Q_\tau$, taking expectations on both sides yields $Q_\tau(Y) = \overline{X}\beta$. So, $\widehat{Q_\tau}(Y) = \overline{X}\widehat{\beta_\tau}$.

[8] Other solutions to the identification problem in the detailed wage decompositions include Nielsen (2000) and Gardeazabal and Ugidos (2005). But Nielsen (2000)'s method cannot distinguish the constant term from dummy variables; and, Gardeazabal and Ugidos (2005)'s approach, though produces identical results in zero normalization, may be not so attractive as Yun (2005)'s from a practical point of view. The basic idea of Yun (2005)'s solution is to get the estimates for all possible reference groups and then derive the averaging ones; and fortunately the implementation doesn't necessarily involve tedious and repeated regressions for varying reference groups and a STATA command *Devcon* is ready for this purpose.

[9] We use regional CPI to calculate the real wage rate since it is more accurate compared to general CPI, while province CPI is not complete for all the 17 years.

[10] Variables in previous years are recoded as in LFS2005.

[11] The contributions of each single characteristic in the gender wage differentials are available from the authors upon request.

[12] For example, Niederle and Vesterlund (2007) find that women are less competitive than men in tournament experiments. Furthermore, it has been observed in field studies that women are more risk averse than men (Eckel and Grossman 2003).

[13] Psychological variables are often subject to the criticism such as not being genuinely predetermined or invariant over time.

[14] The evolution of characteristics effects was also graphed but not presented in the paper. It essentially shows that on average, the characteristics effect hardly explains any of the gender wage differentials over the last two decades.