THE GENDER PAY GAP IN VIETNAM, 1993-2002: A QUANTILE REGRESSION APPROACH

T. Hung Pham
Department of Economics
University of Sussex
Falmer
Brighton
BN1 9SN
United Kingdom
e-mail: t.pham@sussex.ac.uk

Barry Reilly
Department of Economics
University of Sussex
Falmer
Brighton
BN1 9SN
United Kingdom
e-mail:b.m.reilly@Sussex.ac.uk

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Abstract

This paper uses mean and quantile regression analysis to investigate the gender pay gap for the wage employed in Vietnam over the period 1993 to 2002. It finds that the Doi moi reforms have been associated with a sharp reduction in gender wage disparities for the wage employed. The average gender pay gap in this sector halved between 1993 and 2002 with most of the contraction evident by 1998. There has also been a contraction in the gender pay at most selected points of the conditional wage distribution with the observed effect most pronounced at the top end of the distribution. However, the decomposition analysis suggests that the treatment effect is relatively stable across the conditional wage distribution and little evidence of a 'glass-ceiling' is detected for Vietnamese women in the wage employment sector in any of the years examined.

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1. Introduction

The process of economic transition from a centrally planned to a market economy has important implications for the labour market. The *Doi moi* reforms have had a major impact on the labour market in Vietnam (see Croll, 1998). The removal of a centrally determined wage system, which in the past limited the degree of gender wage inequality, creates potential for a widening in the gender pay gap. The reform process has, as in other transitional economies, led to a reduction in a variety of public services including support facilities for children. Enterprise kindergartens, schools and other health-care facilities, which were relatively commonplace under the centrally planned system, have steadily disappeared with the increased emphasis on market reform.

The creation of a private labour market ended the dependence on the state sector as the only source of formal employment. Female workers were however found to be more vulnerable in the restructuring of the state-owned sector. The reduction from more than 12,000 state-owned enterprises (SOEs) to around 5,500 in the first ten years of the reform process displaced large numbers of workers. Women with limited work experience and low educational attainment were the main victims of the early redundancy programmes with about 70% of laid-off workers female (Rama, 2001). Beresford (1994) reveals that over half-a-million female workers were made redundant from SOEs in 1990-1991. Liu (2004b) suggests that the downsizing in the SOE sector provides a potential channel through which the gender pay gap could widen given workers were more formally protected in the SOEs than in the private sector.

Vietnamese women are accorded a wide range of rights and privileges at work under the Vietnam Labour Code. Maternity leave is fully paid and time-off during either pregnancy or when nursing a child less than twelve months is also regulated. Female employees are generally exempt from a unilateral termination of their contracts during this period (Brassard, 2004). As enterprises have an increasing autonomy in managing business activities, including human resources, there may be a tendency for employers to favour male workers and this may result in a worsening relative position of women in the labour market.

In contrast to these potentially more negative impacts of the *Doi moi* reforms on the female position in the labour market, there are also certain improvements evident primarily in terms of new employment opportunities for women. The impressive growth over the past fifteen years has been partly driven by the exports of light manufacturing, a sector dominated by female workers. For instance, the exports of the garment industry account for almost a quarter of total manufacturing exports over the past 15 years (GSO, 2005). This sector is one of the major employment sources for female workers, including rural female migrants (Thornburn and Jones, 2002; Thornburn, Ha and Hoa, 2002). Although the proportion of agricultural exports has steadily decreased over time, agricultural products still remain a major export commodity. The fact that women are more dependent on agriculture than men may suggest that the growth in agricultural exports has resulted in more income-generating activities for women.

Given the foregoing, it is uncertain whether women have been the gainers or losers during Vietnam's transition process. It is not easy to identify the impact of the *Doi moi* reforms on the female position in the Vietnamese labour market. The experience in other transitional economies tends to suggest a mixed picture. The reduction in female participation was a stylized fact in the transitional economies of Central and Eastern Europe (CEE), Russia, and other countries of the Former Soviet Union (FSV) (see Allison and Ringold, 1996). However, evidence on the gender pay gap has been less clear-cut. For instance, Newell and Reilly (2001) report that the gender pay gap widened in Bulgaria and Romania, was relatively stable in FRYugoslavia, Slovenia, Russia, Kyrgyzstan, but fell in the Czech Republic, Slovakia, Poland, and Hungary.

The current paper examines the evolution of the gender pay gap for the wage employed in Vietnam over the period covering 1993 to 2002. The primary objective of the current paper is to provide some clearer insights on the impact of the reform process on the gender pay gap in this sector. Most of the recent literature on gender in Vietnam to date has emphasized the negative effects on women of the transition in terms of their access to public services and their workforce participation (Gallup, 2002; Brassard, 2004; Long, Le, Truitt, Mai, and Dang, 2000). The recent studies of Liu (2004a,b), using data drawn from the household surveys conducted in 1993 and 1998, arguably provide the first systematic studies on the gender pay gap in Vietnam. The contribution of the current paper, however, compared to Liu (*op.cit.*), is two-fold. Firstly, our analysis focuses on a longer time period given our use of data drawn from a more recent survey. Secondly, in contrast to the mean regression approach used by Liu, we enhance the analysis by using a quantile regression approach that allows us to explore the gender pay gap at selected points of the conditional wage distribution. In addition, this study offers a modest contribution to the empirical literature on the temporal decomposition of the gender pay gap using the quantile regression approach by suggesting a very simple decomposition that may have application in other contexts.

The structure of the paper can now be outlined. Section two provides a description of the datasets to be used in investigating the gender pay gap and notes some features on female participation, female employment, and the gender pay gap using these data. The empirical methodology is detailed in section three. The empirical results are reported in section four, which is then followed by a section containing some concluding remarks.

2. Data and Overview of the Gender Pay Gap in Vietnam

2.1 Data

This paper draws on data from the three household surveys, including the first two rounds of the Vietnam Living Standard Surveys (commonly referred as the VLSS 1992/93 and 1997/98) and the Vietnam Household Living Standard Survey (or VHLSS 2002 for short).[1] These surveys were conducted by the General Statistic Office (GSO), under the technical assistance of the World Bank, with funding from UNDP and Sida. The overall approach used in these surveys is compliant with the framework used in the World Bank's Living Standard Measurement Surveys. These surveys are thus widely recognized as of high quality and nationally representative.

The VLSS 1992/93 was undertaken using a sample of 4,800 households, of which 4,000 were then re-interviewed in the VLSS 1997/98, which comprised a sample of 6,000 households in total. Although these surveys have been widely used to explore the impacts of the *Doi moi*, they have been subject to criticism regarding their relatively small sample sizes. This was a primary motive for the launch of the second phase of household surveys in 2002 designed to cover the 2002 – 2010 period. The first survey of this second phase, the VHLSS 2002, collected information from a sample of 30,000 households. However, there was no re-interview of individuals from the original VLSS panel as the sampling frame for this new phase was substantially different from the earlier period.[2]

The three surveys included two types of questionnaire: (i) household questionnaire; and (ii) community questionnaire. The household questionnaire covers a wide range of information from household size and composition, health, education, housing characteristics, employment, expenditure and food consumption, ownership of consumer durables, and savings. The community questionnaires consist of questions on basic physical and demographic characteristics, general economic conditions and economic activities, physical infrastructure conditions and transportation, agricultural production at the communal level, as well as information on schooling and health facilities in each commune (see World Bank, 2000; 2001 for details). Although the VHLSS 2002 questionnaires were simplified relative to the earlier VLSS, the basic content of the survey remained intact and thus allow, for the purpose of the

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[1] The VLSS 1992/93 dataset was officially released in 1995; the VLSS 1997/98 in 2000; and the VHLSS 2002 dataset was available for official uses in December 2004.

[2] The VLSS used the 1989 Population Census as the sampling frame, while the VHLSS 2002 used the 1999 Population and Housing Census.

current exercise, construction of a set of variables that are compatible across all three surveys. The next sub-section describes some stylized features of the gender pay gap for the wage employed in Vietnam using data drawn from these three surveys.

2.2 Overview of the Gender Pay Gap in Vietnam

Vietnam's labour market is characterized by a high participation rate among both men and women. Around 84% of Vietnamese men and 82% of women aged 15 to 60 were working in the 1993-2002 period (see table 1). In rural areas, the gender-specific participation rates are even higher. These high participation rates are comparable with the experience of the former Soviet Union and other CEE centrally planned economies prior to the transition. However, the relatively stable participation rates for female workers in Vietnam is in contrast to these other countries, where the contraction in participation was relatively large during the transition period (Newell and Reilly, 2001).

One million new entrants have entered the labour force in Vietnam per annum between 1993 and 2002. The rising trend in the unemployment rate suggests that the impressive growth associated with the reforms has not been sufficient to absorb the fast growing labour force. As a result, unemployment, defined as those in the labour force and actively looking for work, has steadily risen over the 1993-2002 period. The unemployment rate nearly doubled from roughly 4.4% in 1993 to 8.4% in 2002. On average, the male unemployment rate was two percentage points higher than the female rate. One explanation for this gender differential could be the rapid growth of female worker-intensive exports such as garments, footwear, and agricultural products over the past decade.

Table 1 also reveals some notable features regarding Vietnam's labour market dynamics over the 1993-2002 period. Off-farm employment has become an increasingly important activity. On average, the employment share in agriculture has fallen by roughly one-fifth for both male and female workers. Most of this decrease in agricultural employment was absorbed by the wage employment sector. Given that wage employment is generally characterised by higher labour productivity than other employment outcomes, this shift provides an important impetus for economic growth.

Despite the change in the structure of employment, female workers are still more dependent on agriculture and self-employment activities than male workers. For instance, wage employment accounted for one-fifth of female employment and one-third of male employment in the latest year. Tran and Le (1998) and UNDP (1996) report that the downsizing of the SOEs impacted more adversely on women than men. Other studies on Vietnam also reveal that women are more likely than men to be employed in the informal sector, largely comprising self-employment and agricultural activities (World Bank, 1999). As this sector is generally comprised of lower paid jobs, the dependence of women on these two sources of employment suggests they may be poorly placed in terms of labour market wage rewards compared to men. However, this is not an issue on which we can inform in this paper given our exclusive emphasis on the wage employment sector.

The average real wage rate has rapidly grown by an average of 12% per annum over the 1993-2002 period. Other studies on Vietnam's labour market during the 1990s also reported the rapid growth in wages rates. Nga (2002) and Gallup (2002), using data from the first two rounds of the household living standard surveys, report a 10% increase in the annual growth rate of hourly wages. The increasing wage trend in Vietnam is contrary to what has been found for other transitional economies in the earliest phases of their transition to a market economy (Rutkowski, 1996)

It is interesting to note that the rapid growth of real average wages in Vietnam is accompanied by a continuing improvement of the female position in the labour market over time (table 2). In 1993, an average female worker earned roughly three-quarters of the average male wage. After ten years, the average female earned 88% of the average male wage. The same pattern of change in the gender pay gap is also observed when comparing gender pay gaps across regions, educational attainment levels, and employment sectors over time. The relative female wage position is better in the public than in the private sector, which is also reported for other transitional economies (see Jurajda, 2003 for the case of the Czech Republic; Newell and Reilly, 2001 for Uzbekistan). There is almost no difference in the earnings levels of those with less than upper secondary education and those with tertiary education qualification in the early year of the transition. This reflects the low return to education widely observed in many transitional economies in the early stages of reform (Newell and Reilly, 1999). The raw returns to education appear highest in the later half of the 1998-2002 period. Among these five different levels of educational attainment, the mean wage rate of those with tertiary level education has grown faster than those with lower levels. Workers with tertiary education qualifications earn considerably more than those with secondary education levels. In terms of the gender pay gap across educational levels, though the female disadvantage slightly widened between 1998 and 2002, it narrowed over the entire 1993-2002 period. Other studies on Vietnam's labour market have reported a significant difference in mean wages among regions and between the northern and southern parts of the country. It is generally observed that the average wage rates in the south are much higher than those in the north (Liu, 2004a and Moocks *et al.,* 2002) and this is confirmed by the data used here.

The same pattern of a comparative improvement in the relative female position was also found in many transitional economies in Central and Eastern Europe such as Hungary, Poland, the Czech Republic and Slovakia (Newell and Reilly, 2001). Brainerd (2000) also reports six of the eight post-communist countries experienced an improvement in the female relative wage position. This pattern is also in line with the empirical evidence reported for the gender pay gap in China (Kidd and Meng, 2001; Liu, 1998).

3. Econometric Methodology

3.1 Decomposition Methodologies

Following the seminal work of Mincer (1974), it is conventional to specify log wages as a function of a set of wage determining characteristics, which primarily includes controls for human capital. In the empirical literature on the gender pay gap, the separation of the data points by gender is widely adopted in undertaking gender pay gap decomposition analysis. The gender-specific earnings equation for the i^{th} individual is specified as follows:

$$W_m = X_m'\beta_m + \mu_m \quad (1)$$

$$W_f = X_f'\beta_f + \mu_f \quad (2)$$

where X_j is a $(k \times n)$ matrix of productivity and other characteristics (e.g., education, labour force experience) and j is the gender subscript; β is a $(k \times 1)$ vector of unknown parameters representing the impact of various covariates on the natural log wage (W); μ is a $(n \times 1)$ vector of random error terms; and m and f denote male and female sub-samples, respectively.

The conventional Oaxaca (1973) methodology has been widely used to decompose the average gender pay gap between men and women using the OLS estimation of gender-specific wage equations. The mean gender difference in log wages is generally given by:

$$\overline{W_m} - \overline{W_f} = (\overline{X}_m - \overline{X}_f)'\hat{\beta}_m + \overline{X}_f'(\hat{\beta}_m - \hat{\beta}_f) \quad (3)$$

where the ‘bars’ denote mean values and ‘hats’ denote the OLS coefficient estimates in this case. This allows the overall average differential in wages between the two gender groups to be decomposed into a part attributable to differences in characteristics (the ‘explained’ or ‘endowment’ effect) and a part attributable to differences in the estimated relationship between men and women (the ‘unexplained’ or ‘treatment’ or ‘residual’ effect). The latter part of expression (3) is sometimes taken to capture the effect of unequal treatment (or discrimination) in the labour market.

The use of this approach is subject to the conventional ‘index number’ problem. It is clear that expression (3) could be re-computed using the ‘basket’ of average male characteristics, which potentially yields different numerical values than (3). Thus:[3]

$$\overline{W_m} - \overline{W_f} = (\overline{X}_m - \overline{X}_f)'\hat{\beta}_f + \overline{X}_m'(\hat{\beta}_m - \hat{\beta}_f) \qquad (4)$$

The foregoing decompositions are situated within a mean regression framework. An exclusive focus on the mean, however, provides an incomplete account of the gender pay gap. The quantile regression approach allows the gender pay gap to be estimated at particular quantiles of the conditional wage distribution as opposed to simply the mean. The estimation of a set of conditional quantile functions potentially allows a more detailed portrait of the relationship between the conditional distribution of the wage and selected covariates. In contrast to the OLS approach, the quantile regression procedure is arguably less sensitive to outliers and provides a more robust estimator in the face of departures from normality than the OLS technique (Koenker, 2005; Koenker and Basset, 1978). In addition, according to Deaton (1997), quantile regression models may also have better properties than the OLS ones in the presence of heteroscedasticity. Using this methodology, the log wage equation may be estimated conditional on a given specification and then calculated at various percentiles of the residuals (e.g., 10th, 25th, 50th 75th or 90th) (see Chamberlain, 1994).

In the current case, the quantile regression for the male sub-sample can be defined as:

$$W_m = X_m'\beta_{\theta m} + \mu_{\theta m} \qquad (5)$$

where $Q_\theta(W_m | X_m) = X_m'\beta_{\theta m}$ and $Q_\theta(\mu_{\theta m} | X_m) = 0$, $\beta_{\theta m}$ denotes the unknown male parameter vector for the θ^{th} quantile, and θ denotes the chosen quantile. Similarly, the quantile regression for the female sub-sample can also be defined as:

$$W_f = X_f'\beta_{\theta f} + \mu_{\theta f} \qquad (6)$$

with $Q_\theta(W_f | X_f) = X_f'\beta_{\theta f}$ and $Q_\theta(\mu_{\theta f} | X_f) = 0$

[3] Given the linear nature of the components, the computation of sampling variances for the two parts is straight-forward.

From equations (5) and (6):

$$Q_\theta(W_m) = E(X_m | W_m = Q_\theta(W_m))'\hat{\beta}_{\theta m} + E(\mu_{\theta m} | W_m = Q_\theta(W_m)) \tag{7}$$

and

$$Q_\theta(W_f) = E(X_f | W_f = Q_\theta(W_f))'\hat{\beta}_{\theta f} + E(\mu_{\theta f} | W_f = Q_\theta(W_f)) \tag{8}$$

In these expressions, characteristics are evaluated conditionally at the unconditional quantile log wage value and not unconditionally as in the case of the mean regression approach. The terms $E(\mu_{\theta m} | W_m = Q_\theta(W_m))$ and $E(\mu_{\theta f} | W_f = Q_\theta(W_f))$ are thus non-zero. From (7) and (8), the gender pay gap at the θ^{th} quantile is defined as Δ_θ and this can be decomposed into three parts:

$$\begin{aligned}\Delta_\theta &= [E(X_m | W_m = Q_\theta(W_m)) - E(X_f | W_f = Q_\theta(W_f))]'\hat{\beta}_{\theta m} \\ &+ E(X_f | W_f = Q_\theta(W_f))'(\hat{\beta}_{\theta m} - \hat{\beta}_{\theta f}) \\ &+ [E(\mu_{\theta m} | W_m = Q_\theta(W_m)) - E(\mu_{\theta f} | W_f = Q_\theta(W_f))]\end{aligned} \tag{9}$$

This can be re-written more compactly as:

$$\Delta_\theta = \Delta\Omega_\theta'\hat{\beta}_{\theta m} + \Omega_{\theta f}'\Delta\hat{\beta}_\theta + R_\theta \tag{10}$$

where $\Delta\hat{\beta}_\theta = (\hat{\beta}_{\theta m} - \hat{\beta}_{\theta f})$

$\Delta\Omega_\theta = \Omega_{\theta m} - \Omega_{\theta f}$ where $\Omega_{\theta f} = E(X_f | W_f = Q_\theta(W_f))$ and $\Omega_{\theta m} = E(X_m | W_m = Q_\theta(W_m))$

$R_\theta = [E(\mu_{\theta m} | W_m = Q_\theta(W_m)) - E(\mu_{\theta f} | W_f = Q_\theta(W_f))]$

The estimates for this procedure are also sensitive to the structure assumed under equal treatment and the gender pay gap can thus also be decomposed as:

$$\Delta_\theta = \Delta\Omega_\theta'\hat{\beta}_{\theta f} + \Omega_{\theta m}'\Delta\hat{\beta}_\theta + R_\theta \tag{11}$$

Using mean characteristics in (10) and (11) may provide unrepresentative realizations for the basket of characteristics at points other than the conditional mean wage to which they actually relate. Therefore, it is necessary to use realizations for the basket of characteristics that more accurately reflect the relevant points on the conditional wage distribution. The auxiliary regression-based framework outlined in Gardeazabal and Ugidos (2005) provides one approach that has been used in other studies to obtain the empirical realizations for the characteristics (see Hyder and Reilly, 2006). In this paper, however, we use a variation of an approach originally suggested by Machado and Mata (2005) to derive the characteristics at different quantiles of the wage distribution. From each of the male and female sub-samples, 100 observations are randomly drawn with replacement. Each observation once ranked comprises a percentile point on the wage distribution. The full set of characteristics for the observation at the θ^{h} wage quantile is then retrieved. This process is replicated 200 times to obtain 200 observations at the θ^{h} quantile.[4] The mean characteristics of these observations at each quantile are then used to construct the realizations for $\Omega_{\theta m}, \Omega_{\theta f}$ in equations (10) and (11) above.[5]

In the context of the quantile regression approach, we use a relatively *ad hoc* method for the temporal decomposition of the gender pay gap at selected quantiles. The overall gender pay gap at the θ^{h} quantile can be expressed as:

$$\Delta_{\theta 0} = \Delta\Omega_{\theta 0}'\hat{\beta}_{\theta m0} + \Omega_{\theta f0}'\Delta\hat{\beta}_{\theta 0} + R_{\theta 0} \tag{12}$$

$$\Delta_{\theta 1} = \Delta\Omega_{\theta 1}'\hat{\beta}_{\theta m1} + \Omega_{\theta f1}'\Delta\hat{\beta}_{\theta 1} + R_{\theta 1} \tag{13}$$

where 0 denotes the early year and 1 the later year. The temporal decomposition of the gender pay gap is as follows:

$$\begin{aligned}\Delta_{\theta 1} - \Delta_{\theta 0} &= (\Delta\Omega_{\theta 1} - \Delta\Omega_{\theta 0})'\hat{\beta}_{\theta m1} + (\Omega_{\theta f1} - \Omega_{\theta f0})'\Delta\hat{\beta}_{\theta 1} \\ &+ \Delta\Omega_{\theta 0}'(\hat{\beta}_{\theta m1} - \hat{\beta}_{\theta m0}) + \Omega_{\theta f0}'(\Delta\hat{\beta}_{\theta 1} - \Delta\hat{\beta}_{\theta 0}) + (R_{\theta 1} - R_{\theta 0})\end{aligned} \tag{14}$$

Thus, the overall change in the gender pay gap between two years at the θ^{h} quantile can be decomposed into five parts. The first part is attributable to the temporal change in the gender differential in realizations of observable characteristics at the θ^{h} quantile of the wage distribution evaluated using male coefficients. The second part is attributable to the temporal change in the realizations of the observable female characteristics at the θ^{h} quantile of the wage distribution. The third part is attributable to the temporal change in the male wage structure at the θ^{h} quantile of the wage distribution. The fourth term is attributable to the temporal change

[4] These represent more modest numbers of both draws and replications than used by Machado and Mata (2005).

[5] The sampling variances for the quantile regression estimates are obtained using bootstrapping with 200 replications. Given the linear nature of the 'treatment' and 'endowment' components in (12) and (13), the sampling variances are easily computable, though the use of the bootstrapped variance-covariance may not be entirely desirable here for the computation of the sampling variance of a point estimate.

in unequal treatment (or wage discrimination) at the θ^{h} quantile of the wage distribution. The final term is unexplained and may be attributable to the changing role of unobservables over time. As expression (14) is subject to an 'index number' problem, the temporal gender pay gap can also be re-cast as:

$$\begin{aligned}\Delta_{\theta 1}-\Delta_{\theta 0} &= (\Delta\Omega_{\theta 1}-\Delta\Omega_{\theta 0})'\hat{\beta}_{\theta f1}+(\Omega_{\theta m1}-\Omega_{\theta m0})'\Delta\hat{\beta}_{\theta 1} \\ &+\Delta\Omega_{\theta 0}'(\hat{\beta}_{\theta f1}-\hat{\beta}_{\theta f0})+\Omega_{\theta m0}'(\Delta\hat{\beta}_{\theta 1}-\Delta\hat{\beta}_{\theta 0})+(R_{\theta 1}-R_{\theta 0})\end{aligned} \quad (15)$$

The temporal decomposition suggested by Juhn, Murphy and Pierce (1991) could be used to decompose the average pay gap over time but this procedure is neither outlined nor pursued here in terms of the mean regression analysis.[6]

3.2 Wage Specification Issues

The wage regression analysis reported in this study uses hourly real wage rates. The wage rates include basic rates and other payments in terms of bonuses, allowances, subsidies in cash and kind.[7] This definition of the wage has been widely used in studies on Vietnam such as Glewwe, Gragnolati, and Zaman (2001) and Liu (*op.cit.*). The nominal wage rates are deflated by the monthly CPI to yield a real hourly wage rate. The natural logarithms of these real wage rates are then used in the augmented Mincerian wage equations, which control for, *inter alia*, human capital, ethnicity, industry affiliation, and other characteristics (see table A1 for variable descriptions and selected summary statistics).

It is customary to use a years-in-education variable in the standard human capital wage specification. In our case, the schooling years would have to be computed from the information on the highest educational qualifications obtained as reported in the household surveys. However, as demonstrated in other studies, this might introduce noise into the measurement of this particular variable (for instance Duraisamy, 2002) and this study thus uses a set of educational dummies to capture human capital effects. In addition, the age of an individual is used to proxy for labour market experience rather than using a potential labour force measure as

[6] The complete results of this exercise for a variety of comparator years are available on request.

[7] These 'other payments' constitute an average share of 9% in the total earnings in general and around 18% in the rural labour market in the 1993-2002 period.

in Liu (2004a). This is acknowledged as a constraint in this application but data limitations prevent use of a more accurate measure.[8]

The set of other regressors in the wage equations include worker characteristics (such as marital and health status); social exclusion which is proxied by ethnic origin; and ownership type. A set of seven different regional dummies are also included in the wage regression models. Furthermore, it is reasonable to argue that adjusting the nominal wage rates by the monthly price deflator does not fully capture potential seasonal effects. This is particularly the case for rural non-farm activities, which can be linked with the harvest time during the year. Consequently, a set of dummies for the interview date are also included to control for potential seasonal effects.

The problem of selectivity bias, as mediated through either participation or selection into wage employment, may be an issue for both the mean and quantile regression models. The participation effect may be of less importance given the high participation rates already noted for Vietnam for both gender groups. The wage employment sector selection is clearly more of an issue. The fact that there are more than two possible employment outcomes in the labour market (see table 1) suggests use of the Lee (1983) method, which extends the Heckman two-step procedure to a multiple-outcome model. Following Liu (2004a), the identification of the selection effect was explored using household structure variables (i.e., number of children and the dependency ratio *etc*.) and non-labour income. However, the estimated effects corresponding to the selection correction terms were not well determined. There is a suspicion that the instruments used may be weak as they were poorly correlated with the probability of wage employment and efforts to obtain superior instruments proved futile given the limited nature of the data available to us.[9] This outcome, however, is not a complete surprise given the fact that the two-step procedure has been subject to criticism given its sensitivity to distributional assumptions and identifying restrictions (Manski, 1995). In addition, the techniques required to correct for selectivity bias in quantile regression models is less well developed though Buchinsky (2001) suggests an approach using the work of Newey (1999). Nevertheless, there remain complications that arise in regard to identifying the constant term in such wage regression models when higher order terms are used to capture selection as suggested

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[8] In the VLSS 1992/93 and the VLSS 1997/98, there is information on the experience in the current job. However, this information provides an inaccurate measure of the actual labour-force experience because the information on experience from the other previous jobs is not reported. In addition, information on current job tenure is not reported in the most recent VHLSS 2002.

[9] The additional instruments included educational levels and the occupation of the head of the household (which can be argued to capture 'network' effects) and household access to land of different quality. The use of commune-level characteristics was also explored for the rural samples only, given commune-level information is not available for urban communes from the three household surveys used here.

by Newey (1999). This is a relatively important issue in any pay gap application (see Hyder and Reilly, 2006). Given the difficulties encountered in obtaining plausible instruments to identify the selection effects, we do not use a selection correction procedure in this paper in either the mean or quantile regression models.

The econometric specification used in this study is slightly different from that of Liu (2004a) in a number of other key respects that go beyond issues relating to the correction for selection bias. Firstly, educational levels and the individual's age are used instead of years in schooling and potential experience. This is to avoid the introduction of a possible measurement error in key explanatory variables (see above), though it is acknowledged that the use of either age or a potential experience measure, as compared to the use of an actual measure, is likely to inflate the magnitude of the unequal treatment component in the decompositions undertaken here. Secondly, occupation controls for the wage employed workers are not included in our regression models. This is a judgement call and we take the view that the inclusion of controls that may reflect the outcome of a labour market discriminatory process is undesirable in this case. In addition, there is also a concern regarding the potential endogeneity of the occupational attachment variables. Finally, in contrast to Liu (*op.cit.*), we also introduce controls for the interview date to capture possible seasonality effects and introduce an individual's health status to capture human capital depletion effects.

4. Empirical Results

The wage regression estimates, using the mean and the quantile regression models, are provided in tables A2 to A7 in the Appendix and are not the subject of detailed discussion here. However, it is noteworthy that the fits of the Mincerian equations have improved for both gender groups over the time period reviewed here and that the point estimates for the returns to the higher formal human capital measures have increased sharply. This could be taken to reflect the enhanced role of the labour market in valuing human capital in Vietnam over the reform period.

The first rows of table A2 to A4 report *ceteris paribus* gender pay gaps estimated over the 1993-2002 period using a pooled wage regression model with a gender intercept term. The estimates reflect the improvement in the relative female wage position. For instance, in 1993 a male wage employee earned 31% more than a comparable female, on average and *ceteris paribus* but by 1998 the 'mark-up' had declined to 19% and exhibited stability thereafter to 2002. The findings on the gender pay gap in regard to the two earlier years are in line with other empirical studies on the gender pay gap in Vietnam (Nga, 2002; Liu, *op.cit.*).

The first rows of table A2 to A4 also provide the estimated gender effects at different quantiles of the conditional wage distribution. These estimates suggest considerable improvements in the female relative wage position in the Vietnamese labour market. The gender pay gap tends to display a modest decrease with movement across the conditional wage distribution. This tentatively suggests that gender pay inequality is larger in the low-paid than in the high-paid jobs though this is interrogated more closely using the decompositions reported below. The decreasing *ceteris paribus* gender pay gap across the different quantiles of the conditional wage distribution, however, is in marked contrast to what is commonly observed in other transitional economies where a 'glass-ceiling' effect is evident at higher points on the conditional wage distribution (see Reilly, 1999 and Newell and Reilly, 2001).

The separation of the data points between the male and female sub-samples is statistically justified on the basis of Wald test values for both the mean and quantile regression models for all three years.[10] The estimation of separate wage equations allows for the implementation of the various gender pay gap decomposition methodologies both at the mean and selected quantiles. In reviewing the estimates reported in tables 3a to 3c, the contraction in the gender pay gap between 1993 and the later years is again evident. In all years, the greater part of the gender pay gap is attributable to unequal treatment with respect to gender. However, in contrast to the results reported in tables A2 to A4, which uses an intercept shift to capture gender, the treatment effects appear stable across the selected quantiles of the conditional wage distribution. This finding is invariant to which wage structure is assumed in the absence of unequal treatment.

There is a substantial contraction in the average gender pay gap over time. The raw gender pay gap contracted by 0.14 log points between 1993 and 2002, which represents almost a halving of the gap.[11] The contraction in the gender pay gap over these two years is also evident at selected points on the conditional wage distribution, though it is more pronounced at the top rather than at the bottom end of the distribution (see tables 4a to 4c). In fact, the change in the overall gender difference between 1993 and 2002 is poorly determined at the 10th percentile. The quantile gender pay gaps between 1993 and 2002 are decomposed using both expressions (14) and (15). The change in observable characteristics at the 10th percentile and changes in observable gender differentials account for most of the con

[10] The Wald results are available on request.

[11] This contraction was examined in more detail using the procedure suggested by Juhn, Murphy and Pierce (1991). The greatest part of the reduction is assigned to the unobservables that improved the percentile ranking of the average Vietnamese female in the male residual wage distribution. This may reflect the fact that Vietnamese women poorly qualified in terms of both observables and unobservables selectively withdrew from wage employment over the time period reviewed here.

traction. This suggests that the narrowing gender pay gap at the bottom end of the distribution might again be attributable to the selective withdrawal from the Vietnamese labour market of the more poorly qualified woman in terms of observable characteristics. At the top end of the wage distribution the gender pay gap contracted by 0.19 log points over these two years with changes in observable gender differentials and wage structure exerting an important narrowing role regardless of whether (14) or (15) is used to undertake the decomposition. The change in unobservables appears important in explaining the contraction in the gap over time at the 90th percentile. The reduction in unequal treatment of men and women appears an important driver for the reduced gender pay gap at the 25th, the median and 75th quantiles. Thus, the underlying narrative regarding the contraction of the gender pay is sensitive to the selected point on the conditional wage distribution.

5. Conclusions

The *Doi moi* reforms have had a significant impact on the labour market in Vietnam and have acted to reduce gender wage disparities in the wage employment sector. The average gender pay gap in this sector halved between 1993 and 2002 with most of the reduction achieved by 1998. There is thus some evidence that in the last four years the average gap has been characterised by a degree of stability. It is difficult to isolate the factors responsible for this contraction but the selective withdrawal from wage employment of poorly qualified Vietnamese women, in terms of both observable and unobservable characteristics, is flagged as one possible source for this phenomenon (see footnote 11). Hunt (2002) assigned much of the improvement in the relative wage position of East German women post-unification to the selective withdrawal from the labour market of the most poorly qualified. However, although our empirical evidence is consistent with this notion, a definitive inference on this matter would require a more detailed analysis of the Vietnamese case than the one offered here.

A contribution of this paper has been the examination of the degree to which the gender pay gap varies across the conditional wage distribution. The decompositions suggest that, in contrast to many transitional economies, the gender pay gap attributable to the treatment effect is relatively stable across the conditional wage distribution. In comport with the mean regression findings, there has also been a contraction in the gender pay at most selected points of the wage distribution with the observed effect most pronounced at the top end of the distribution. The change in unobservables appears important in explaining the contraction in the gap over time at the 90th percentile which is again resonant of our findings for the mean regression. However, the reduction in unequal treatment of men and women only appears an important driver for the reduced gender pay gap in the middle part of the conditional wage distribution.

We believe our analysis provides an informative portrait of the gender pay gap over time in the wage employment sector but this sector only comprised a quarter of those at work in Vietnam by 2002. It should be stressed, therefore, that this study thus offers only a partial insight into the effect of the *Doi moi* reforms on women and the labour market more generally in Vietnam. The sizeable contraction in the gender wage gap among the wage employed is a welcome feature of the transformation process. However, this finding should not be over-emphasized and some perspective is clearly required here. For instance, our analysis did not examine the impact of the reform process on other important employment sectors (e.g., the self-employed or those employed in the informal sector) or the implications for those women discouraged from retaining links with the formal labour market. The impact of enterprise re-structuring, the re-shaping of social safety nets and child-care facilities, and the changing demands on female non-market time may exert more important influences on the quality of women's lives in Vietnam in the near future than the evolution of the gender pay gap in the wage employment sector. These issues clearly merit further investigation in order to more fully document and understand the changing position of women in the Vietnamese labour market.

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Table 1: Labour Force Participation and Unemployment

	1993	**1998**	**2002**
Labour force participation (%)	82.31	80.51	83.44
Male participation	84.49	81.56	84.26
– Rural	87.28	85.09	86.17
– Urban	74.65	73.14	78.07
Female participation	80.38	79.55	82.64
– Rural	82.95	84.72	86.05
– Urban	71.58	67.62	72.04
Unemployment rate (%)	4.39	3.93	8.59
Male unemployment rate	5.8	5.81	9.77
– Rural	3.63	4.03	8.31
– Urban	9.62	8.18	12.93
Female unemployment rate	3.41	2.36	7.55
– Rural	2.97	1.94	7.38
– Urban	4.3	2.82	7.83
Structure of employment (%)			
Employment in agriculture	64.06	54.91	52.45
– Male	61.28	51.10	49.30
– Female	66.64	58.51	55.57
Wage employment	17.78	22.92	27.64
– Male	22.45	28.45	34.33
– Female	13.44	17.69	21.04
Self-employment and others	18.16	22.18	19.90
– Male	16.27	20.46	16.37
– Female	19.92	23.81	23.39

Source: author's calculations from the VLSS 1992/93; VLSS 1997/98; and VHLSS 2004;

Notes:

a. Labour force consists of those aged from 15 to 60 years old;

b. Employment is identified as having jobs over the past 7 days before the surveys; unemployment is defined as those in the labour force, who was not working over the past 7 days before the surveys, but was looking for a job;

c. Employment outcomes are classified based on primary employment; 'others' include those who are employed by household businesses and household enterprises. In principles, these 'others' should be included in the category of 'wage employment'. However, as earning data on these 'others' were reported as average earning levels of all employees working in the respective household businesses (including household members). Thus, these earning data are not reliable.

Table 2: The Structure of Wage and Gender Way Gap, 1993-2002

	1993			1998			2002		
	Male	**Female**	**F/M ratio**	**Male**	**Female**	**F/M ratio**	**Male**	**Female**	**F/M ratio**
Nominal hourly wage rates	1.9570	1.4810	0.7568	3.2514	2.8493	0.8763	4.2698	3.7629	0.8813
	(1.097)	(0.909)		(2.198)	(2.212)		(2.963)	(2.783)	
Wage by sector									
– Private sector wage	1.9796	1.4184	0.7165	3.1517	2.4796	0.7868	3.6878	3.0366	0.8234
– Public sector wage	1.9063	1.5623	0.8195	3.4314	3.3223	0.9682	5.4758	4.7764	0.8723
Rural vs. urban									
– Urban wage	2.0281	1.5148	0.7469	3.8020	3.2130	0.8451	5.2800	4.4854	0.8495
– Rural wage	1.9018	1.4409	0.7576	2.7463	2.4040	0.8754	3.5940	3.1525	0.8772
Mean wages by education levels									
– Lower secondary and below	1.9073	1.4949	0.7838	2.9678	2.3573	0.7943	3.4872	2.8798	0.8258
– Upper secondary education	2.0815	1.4488	0.6961	3.4535	3.1607	0.9152	4.5288	4.0319	0.8903
– Higher education	1.8551	1.4818	0.7988	4.2169	3.8665	0.9169	5.9858	5.1836	0.8660
Mean wages by regions									
– Northern Mountains & Midland	1.4537	0.9756	0.6711	2.5901	2.5271	0.9757	4.2361	4.1997	0.9914
– Red River Delta	1.6616	1.2791	0.7698	3.0607	3.0101	0.9835	3.9873	3.6582	0.9175
– North Central Coast	1.6014	1.1925	0.7447	2.7194	2.4063	0.8849	3.8449	3.5605	0.9260
– South Central Coast	1.6666	1.4101	0.8461	2.7974	2.2986	0.8217	4.1830	3.5604	0.8512
– Central Highlands	2.3414	1.4188	0.6060	2.8478	2.7256	0.9571	6.3600	5.5126	0.8668
– Southeast	2.4413	1.8275	0.7486	4.2492	3.3726	0.7937	4.5040	3.6758	0.8161
– Mekong River Delta	2.1149	1.5275	0.7223	2.9165	2.5215	0.8646	4.0131	3.1849	0.7936

Source: author's calculations from the VLSS 1992/93; VLSS 1997/97; and VHLSS 2004;

Notes:

a. hourly wage rate includes all payments in cash and kinds;

b. 'public sector' also include those who worked in public services sectors;

c. 'lower secondary school and others' include those with educational attainment level from lower secondary to no education (this grouping is justified as there is almost no systematic differences in mean wages of those with these educational levels;

d. F/M ratio is the common measure used to summarize the female position in the labour market, which is calculated as the ratio of average female hourly pay to its average male counterpart;

e. standard deviations of selected continuous variables are in parentheses

Table 3a: Decomposition Results at Mean and Quantiles, 2002

	10th	25th	50th	75th	90th	Mean
Actual wage gap	0.2453***	0.1934***	0.1538***	0.1093***	0.1097***	0.1503***
	(0.015)	(0.012)	(0.011)	(0.013)	(0.019)	(0.009)
Oaxaca-Blinder						
Female characteristics[f]						
Explained effect	-0.0391***	-0.0256***	-0.0402***	-0.0330***	-0.0301***	-0.0241***
	(0.005)	(0.005)	(0.005)	(0.006)	(0.007)	(0.005)
Unexplained effect	0.2051***	0.1711***	0.1650***	0.1577***	0.1406***	0.1744***
	(0.017)	(0.012)	(0.011)	(0.012)	(0.016)	(0.009)
Unobservable effect	0.0794	0.0479	0.0289	-0.0154	-0.0008	0.0000
Male characteristics[♣]						
Explained effect	-0.0455***	-0.0457***	-0.0565***	-0.0274***	-0.0677***	-0.0346***
	(0.006)	(0.006)	(0.006)	(0.007)	(0.008)	(0.006)
Unexplained effect	0.2115***	0.1912***	0.1814***	0.1521***	0.1782***	0.1849***
	(0.014)	(0.010)	(0.010)	(0.010)	(0.013)	(0.008)
Unobservable effect	0.0794	0.0479	0.0289	-0.0154	-0.0008	0.0000

Table 3b: Decomposition Results at Mean and Quantiles, 1998

	10th	25th	50th	75th	90th	Mean
Actual wage gap	0.1971***	0.1480***	0.1461***	0.1159**	0.1551**	0.1474***
	(0.038)	(0.024)	(0.023)	(0.047)	(0.056)	(0.022)
Oaxaca-Blinder						
Female characteristics[f]						
Explained effect	0.0500***	-0.0133	-0.0493***	-0.0541***	-0.0415**	-0.0162
	(0.016)	(0.011)	(0.011)	(0.013)	(0.016)	(0.011)
Unexplained effect	0.1112**	0.1894***	0.1817***	0.1756***	0.1580***	0.1636***
	(0.043)	(0.028)	(0.027)	(0.032)	(0.041)	(0.022)
Unobservable effect	0.0359	-0.0280	0.0137	-0.0006	0.0386	0.0000
Male characteristics[♣]						
Explained effect	-0.0080	-0.0048	-0.0579***	-0.0652***	-0.0304	-0.0370***
	(0.016)	(0.014)	(0.013)	(0.016)	(0.024)	(0.013)
Unexplained effect	0.1692***	0.1808***	0.1903***	0.1867***	0.1469***	0.1844***
	(0.030)	(0.020)	(0.021)	(0.026)	(0.035)	(0.017)
Unobservable effect	0.0359	-0.0280	0.0137	-0.0006	0.0386	0.0000

Table 3c: Decomposition Results at Mean and Quantiles, 1993

	10th	25th	50th	75th	90th	Mean
Actual wage gap	0.3311***	0.3167***	0.2968***	0.3056	0.3031***	0.2897***
	(0.080)	(0.041)	(0.037)	(0.035)	(0.050)	(0.029)
Oaxaca-Blinder						
Female characteristics[f]						
Explained effect	0.0470	0.0552**	-0.0052	0.0179	-0.0011	0.0273*
	(0.029)	(0.021)	(0.017)	(0.018)	(0.017)	(0.016)
Unexplained effect	0.2245***	0.2460***	0.3312***	0.2850***	0.2519***	0.2624***
	(0.065)	(0.044)	(0.035)	(0.040)	(0.056)	(0.030)
Unobservable effect	0.0596	0.0155	-0.0292	0.0027	0.0523	0.0000
Male characteristics[♣]						
Explained effect	0.0280	0.0100	-0.0506**	-0.0084	0.0371	-0.0077
	(0.029)	(0.024)	(0.018)	(0.020)	(0.030)	(0.017)
Unexplained effect	0.2435***	0.2912***	0.3766***	0.3113***	0.2138***	0.2974***
	(0.046)	(0.034)	(0.028)	(0.031)	(0.045)	(0.024)
Unobservable effect	0.0596	0.0155	-0.0292	0.0027	0.0523	0.0000

Notes:

a. ***, **, and * refers to the variables of which the estimated coefficients are statistically significant at level of 0.01; 0.05; and 0.1 respectively;
b. standard errors are in parentheses;
c. ^{f}: using expression (3) for mean regression model and expression (10) for quantile regression models;
d. ♣: using expression (4) for for mean regression model and expression (11) for quantile regression models.

Table 4a: Temporal Decomposition of the Gender Pay Gap: Quantile Regression Approach, 1993-2002

	10th	25th	50th	75th	90th
Actual changes in differential	-0.0858	-0.1233***	-0.1430***	-0.1962***	-0.1934***
	(0.081)	(0.042)	(0.038)	(0.038)	(0.053)
Female characteristics[ff]					
Change in Observable Gender Differentials	-0.0308*	-0.0341***	-0.0458***	-0.0265**	-0.0566***
	(0.016)	(0.003)	(0.006)	(0.007)	(0.017)
Change in Observable Characteristics	-0.0678***	-0.0473***	0.0156***	0.0492***	0.0612***
	(0.003)	(0.003)	(0.002)	(0.002)	(0.005)
Change in Wage Structure	-0.0183	-0.0324***	-0.0238**	-0.0732***	-0.0546***
	(0.014)	(0.006)	(0.009)	(0.006)	(0.010)
Change in Unequal Treatment	0.0114	-0.0475***	-0.1305***	-0.1008**	-0.0546
	(0.062)	(0.016)	(0.035)	(0.047)	(0.055)
Change in Unobservables	0.0198	0.0379	0.0415	-0.0450	-0.0887
Male characteristics[♣♣]					
Change in Observable Gender Differentials	-0.0628***	-0.0098**	-0.0630***	-0.0983***	-0.1357***
	(0.005)	(0.005)	(0.002)	(0.003)	(0.004)
Change in Observable Characteristics	-0.0358***	-0.0716***	-0.0139***	-0.0330***	0.0072
	(0.011)	(0.007)	(0.005)	(0.009)	(0.013)
Change in Wage Structure	-0.0108	-0.0480***	0.0571***	-0.0476***	-0.0856***
	(0.017)	(0.008)	(0.011)	(0.006)	(0.010)
Change in Unequal Treatment	0.0038	-0.0784**	-0.1813***	-0.1263***	-0.0428
	(0.018)	(0.029)	(0.012)	(0.031)	(0.044)
Change in Unobservables	0.0198	0.0845	0.0581	0.1089	0.0635

Table 4b: Temporal Decomposition of the Gender Pay Gap: Quantile Regression Approach, 1993-1998

	10th	25th	50th	75th	90th
Actual changes in differential	-0.1340	-0.1687***	-0.1507***	-0.1897***	-0.1480*
	(0.088)	(0.047)	(0.043)	(0.059)	(0.075)
Female characteristics[ff]					
Change in Observable Gender Differentials	-0.0099	0.0335***	-0.0109	-0.0188***	-0.0832***
	(0.035)	(0.007)	(0.008)	(0.005)	(0.015)
Change in Observable Characteristics	-0.0215	-0.0622***	0.0156***	0.0387***	0.0612**
	(0.021)	(0.015)	(0.004)	(0.007)	(0.029)
Change in Wage Structure	-0.0428**	-0.0583***	-0.0345***	-0.0649***	-0.0546***
	(0.017)	(0.007)	(0.011)	(0.006)	(0.012)
Change in Unequal Treatment	-0.1034	-0.0901**	-0.1158***	-0.0800**	-0.0108
	(0.108)	(0.036)	(0.037)	(0.037)	(0.058)
Change in Unobservables	0.0436	0.0085	-0.0051	-0.0647	-0.0607
Male characteristics[♣♣]					
Change in Observable Gender Differentials	-0.0620**	0.0351*	0.0445***	0.0371***	0.1502***
	(0.023)	(0.019)	(0.006)	(0.009)	(0.025)
Change in Observable Characteristics	0.0306*	-0.0639***	-0.0080	-0.0171	-0.0715*
	(0.015)	(0.021)	(0.013)	(0.014)	(0.039)
Change in Wage Structure	-0.0413**	-0.0520***	-0.0217*	-0.0565***	-0.1246***
	(0.019)	(0.009)	(0.013)	(0.008)	(0.012)
Change in Unequal Treatment	-0.1050***	-0.0964***	-0.1330***	-0.0884	0.0047
	(0.022)	(0.024)	(0.044)	(0.074)	(0.037)
Change in Unobservables	0.0436	0.0085	-0.0325	-0.0647	-0.1067

Table 4c: Temporal Decomposition of the Gender Pay Gap: Quantile Regression Approach, 1998-2002

	10th	25th	50th	75th	90th
Actual changes in differential	0.0482	0.0454*	0.0077	-0.0066	-0.0454
	(0.041)	(0.027)	(0.026)	(0.049)	(0.059)
Female characteristics[ff]					
Change in Observable Gender Differentials	-0.0280***	-0.0551***	-0.0398***	-0.0017	-0.0365***
	(0.006)	(0.005)	(0.004)	(0.007)	(0.013)
Change in Observable Characteristics	-0.0169**	-0.0690***	-0.0141***	0.0492***	0.0612***
	(0.006)	(0.004)	(0.002)	(0.002)	(0.014)
Change in Wage Structure	-0.0049	0.0567***	-0.0219***	-0.0149**	-0.0546**
	(0.015)	(0.018)	(0.009)	(0.007)	(0.026)
Change in Unequal Treatment	0.1218*	0.0368*	-0.0071	-0.0267**	0.0192
	(0.062)	(0.019)	(0.007)	(0.013)	(0.024)
Change in Unobservables	-0.0238	0.0759	0.0906	-0.0123	-0.0347
Male characteristics[♣♣]					
Change in Observable Gender Differentials	-0.0234**	-0.0858***	-0.0468***	-0.1347***	-0.2529***
	(0.009)	(0.006)	(0.003)	(0.003)	(0.011)
Change in Observable Characteristics	-0.0214**	-0.0382***	-0.0072**	-0.0038	-0.0167**
	(0.011)	(0.004)	(0.003)	(0.005)	(0.007)
Change in Wage Structure	0.0532***	0.0450*	0.0180	0.0083	0.0060
	(0.015)	(0.024)	(0.012)	(0.010)	(0.022)
Change in Unequal Treatment	0.0638*	0.0486***	-0.0470	-0.0499	0.0480
	(0.035)	(0.012)	(0.099)	(0.057)	(0.073)
Change in Unobservables	-0.0238	0.0759	0.0906	0.1736	0.1702

Notes:

a. ***, **, and * refers to the variables of which the estimated coefficients are statistically significant at level of 0.01; 0.05; and 0.1 respectively;
b. standard errors are in parentheses;
c. ff: using expression (14) in the text;
d. ♣♣: using expression (15) in the text.

APPENDIX

Table A1: Description of Variables and Summary Statistics

Variables	Brief discription	1993 samples			1998 samples			2002 samples		
		Pooled	Male	Female	Pooled	Male	Female	Pooled	Male	Female
Hourly real wage (ln)	Hourly wage rate adjusted by CPI and regional price index	0.3920	0.5056	0.2159	0.9372	0.9947	0.8498	1.2093	1.2669	1.1165
		(0.629)	(0.612)	(0.616)	(0.613)	(0.614)	(0.603)	(0.623)	(0.601)	(0.644)
Married	= 1 if married, 0 otherwise	0.5427	0.5927	0.4651	0.5606	0.6151	0.4776	0.6154	0.6445	0.5684
Age	Age (years)	30.307	30.589	29.870	32.119	32.660	31.298	32.604	33.091	31.819
		(10.55)	(10.44)	(10.71)	(10.66)	(10.65)	(10.63)	(10.63)	(10.61)	(10.61)
Age squared	Age squared (years)	1029.7	1044.6	1006.7	1145.3	1180.1	1092.53	1176.1	1207.68	1125.2
		(718.5)	(720.6)	(715.1)	(741.1)	(753.8)	(718.5)	(737.3)	(743.9)	(723.7)
Illiteracy	= 1 if no schooling, 0 otherwise	0.2013	0.1954	0.2105	0.0404	0.0403	0.0406	0.1215	0.1115	0.1378
Primary education	= 1 having primary education, 0 otherwise	0.2688	0.2872	0.2404	0.2181	0.2123	0.2268	0.2284	0.2415	0.2074
Lower secondary	= 1 having lower secondary education, 0 otherwise	0.2342	0.2404	0.2248	0.3521	0.3707	0.3237	0.2400	0.2674	0.1958
Upper secondary	= 1 having upper secondary education, 0 otherwise	0.0926	0.0862	0.1024	0.1977	0.1976	0.1978	0.1282	0.1245	0.1343
Higher education	= 1 having higher education, 0 otherwise	0.2030	0.1908	0.2219	0.1918	0.1791	0.2111	0.2818	0.2552	0.3247
Health	= 1 if having a treatment at hospital over the past 4 week	0.0284	0.0220	0.0384	0.0407	0.0305	0.0563	0.0395	0.0341	0.0482
Kinh	= 1 if belonging in the Kinh majority	0.8929	0.8807	0.9118	0.9018	0.9020	0.9015	0.9389	0.9433	0.9319
Private	= 1 if being employed in the public sector	0.6414	0.6908	0.5647	0.6108	0.6434	0.5613	0.4922	0.5213	0.4453
Public	= 1 if being employed in the private sector	0.3586	0.3092	0.4353	0.3892	0.3566	0.4387	0.3518	0.4787	0.5547
Urban	= 1 if living in urban areas	0.4785	0.4367	0.5434	0.5071	0.4785	0.5505	0.4227	0.4008	0.4579
North Mountains & Midland	= 1 if residing in North Mountains & Midland	0.0937	0.0862	0.1053	0.0650	0.0637	0.0671	0.1169	0.1178	0.1154
Red River Delta	= 1 if residing in Red River Delta	0.1907	0.1991	0.1778	0.1754	0.1867	0.1581	0.2328	0.2450	0.2131
North Central Coast	= 1 if residing in North Central Coast	0.0597	0.0642	0.0526	0.0929	0.0969	0.0869	0.0801	0.0882	0.0669
South Central Coast	= 1 if residing in South Central Coast	0.1255	0.1358	0.1095	0.1484	0.1595	0.1316	0.1454	0.1542	0.1312
Central Highlands	= 1 if residing in Central Highlands	0.0106	0.0128	0.0071	0.0164	0.0136	0.0207	0.0815	0.0739	0.0937
Southeast	= 1 if residing in Southeast	0.2632	0.2459	0.2902	0.2995	0.2760	0.3353	0.1180	0.1059	0.1375
Mekong River Delta	= 1 if residing in Mekong River Delta	0.2566	0.2560	0.2575	0.2023	0.2036	0.2003	0.2254	0.2150	0.2422
Quarter 1	= 1 if interviewed in 1st quarter	0.1573	0.1367	0.1892	0.2624	0.2510	0.2798	0.2436	0.2426	0.2453
Quarter 2	= 1 if interviewed in 2nd quarter	0.2811	0.2899	0.2674	0.3008	0.2999	0.3022	0.2677	0.2656	0.2711
Quarter 3	= 1 if interviewed in 3rd quarter	0.2225	0.2358	0.2020	0.2811	0.2858	0.2740	0.2536	0.2506	0.2584
Quarter 4	= 1 if interviewed in 4th quarter	0.3391	0.3376	0.3414	0.1557	0.1633	0.1440	0.2351	0.2412	0.2252
Number of observations		1793	1090	703	3045	1837	1208	17063	10531	6532

Notes: These mean figures are computed without controlling for any characteristics; standard deviations of continuous variables are in parentheses.

Table A2: Pooled Regression Model, 1993

	Mean	Q10	Q25	Q50	Q75	Q90
Male	0.2774**	0.3125***	0.3157****	0.3060***	0.2990***	0.2814***
	(0.029)	(0.048)	(0.037)	(0.035)	(0.032)	(0.053)
Married	-0.0828**	-0.0656	-0.0721	-0.0517	-0.1565***	-0.1327**
	(0.035)	(0.075)	(0.056)	(0.039)	(0.039)	(0.061)
Age	0.0313***	0.0577***	0.0330***	0.0180*	0.0160*	0.0094
	(0.009)	(0.018)	(0.011)	(0.011)	(0.009)	(0.013)
Age squared	-0.0004***	-0.0008***	-0.0005***	-0.0002	-0.0002	-0.0001
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Primary education	0.0200	0.0053	-0.0455	0.0505	0.0518	0.0870
	(0.044)	(0.081)	(0.051)	(0.043)	(0.040)	(0.064)
Lower secondary	0.0279	0.0082	0.0408	0.0972**	0.0417	0.0886
	(0.048)	(0.094)	(0.065)	(0.042)	(0.049)	(0.077)
Upper secondary	0.0694	0.0682	0.0743	0.1244**	0.0745	0.1851*
	(0.059)	(0.112)	(0.094)	(0.064)	(0.080)	(0.103)
Higher education	0.0638	0.1332	0.0972	0.0764	0.0178	0.0709
	(0.057)	(0.107)	(0.070)	(0.057)	(0.073)	(0.099)
Health	-0.0588	-0.0767	-0.1175	-0.0169	-0.0613	-0.0422
	(0.074)	(0.180)	(0.077)	(0.086)	(0.085)	(0.131)
Kinh	0.0104	0.0461	0.0934**	0.0245	0.0074	0.0278
	(0.048)	(0.120)	(0.048)	(0.049)	(0.045)	(0.081)
Private	0.0742**	0.1214*	0.1038*	0.0102	-0.0065	0.0274
	(0.039)	(0.072)	(0.059)	(0.040)	(0.046)	(0.062)
Urban	0.0471**	0.1341**	0.0280	0.0428**	0.0388	0.0722
	(0.023)	(0.064)	(0.042)	(0.021)	(0.042)	(0.055)
North Mounts. & Midland	-0.5818***	-0.6725***	-0.7831***	-0.7297***	-0.4883***	-0.3436***
	(0.056)	(0.086)	(0.077)	(0.076)	(0.069)	(0.131)
Red River Delta	-0.5018***	-0.7225***	-0.5585***	-0.5571***	-0.3774***	-0.3502***
	(0.045)	(0.087)	(0.064)	(0.056)	(0.060)	(0.092)
North Central Coast	-0.4967***	-0.7544***	-0.4770***	-0.4638***	-0.4631***	-0.3646***
	(0.064)	(0.163)	(0.085)	(0.073)	(0.061)	(0.139)
South Central Coast	-0.4569***	-0.5527***	-0.5032***	-0.5421***	-0.4035***	-0.3282***
	(0.048)	(0.100)	(0.064)	(0.056)	(0.069)	(0.085)
Central Highlands	-0.1689*	-0.1687	-0.2932**	-0.1968	-0.0765	-0.1601
	(0.095)	(0.166)	(0.152)	(0.180)	(0.137)	(0.111)
Mekong River Delta	-0.2343***	-0.4082***	-0.2884***	-0.2240***	-0.1287***	-0.1242*
	(0.042)	(0.088)	(0.054)	(0.043)	(0.047)	(0.072)
Interviewed in 1st quarter	0.0353	0.0963	0.0213	0.0976*	0.0036	0.0206
	(0.043)	(0.074)	(0.069)	(0.054)	(0.057)	(0.077)
Interviewed in 2nd quarter	0.0210	0.0305	0.0276	0.0219	0.0200	0.0138
	(0.035)	(0.077)	(0.045)	(0.042)	(0.045)	(0.062)
Interviewed in 3rd quarter	0.0249	0.0432	0.0318	0.0258	0.0163	0.0197
	(0.043)	(0.075)	(0.056)	(0.048)	(0.057)	(0.072)
constant	-0.2498	-1.3289***	-0.4906**	0.0177	0.2694*	0.6616***
	(0.161)	(0.343)	(0.206)	(0.195)	(0.152)	(0.191)
R^2	0.2014	0.1416	0.1491	0.1372	0.1242	0.0868
Number of observation	1793	1793	1793	1793	1793	1793

Notes:

a. ***, **, and * refers to the variables of which the estimated coefficients are statistically significant at level of 0.01; 0.05; and 0.1 respectively.

b. Standard errors are in parentheses. The OLS standard errors are based on Huber (1967) and the quantile regression model estimates are based on bootstrapping with 200 replications.

Table A3: Pooled Regression Model, 1998

	Mean	Q10	Q25	Q50	Q75	Q90
Male	0.1711***	0.2193***	0.1823***	0.1622***	0.1257***	0.1446***
	(0.021)	(0.033)	(0.024)	(0.024)	(0.026)	(0.046)
Married	-0.0140	-0.0206	-0.0377	-0.0118	0.0268	-0.0234
	(0.027)	(0.055)	(0.033)	(0.033)	(0.032)	(0.048)
Age	0.0363***	0.0494***	0.0513***	0.0261***	0.0081	0.0226**
	(0.007)	(0.013)	(0.010)	(0.008)	(0.010)	(0.011)
Age squared	-0.0004***	-0.0007***	-0.0007***	-0.0003**	0.0000	-0.0002
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Primary education	0.0105	-0.0167	0.0179	0.0196	0.0401	0.0542
	(0.053)	(0.083)	(0.061)	(0.049)	(0.047)	(0.073)
Lower secondary	0.0494	0.0042	0.0231	0.0644	0.1239**	0.1386*
	(0.054)	(0.089)	(0.063)	(0.054)	(0.053)	(0.076)
Upper secondary	0.2039***	0.1486*	0.1331*	0.1930***	0.2565***	0.3149***
	(0.059)	(0.089)	(0.074)	(0.059)	(0.066)	(0.095)
Higher education	0.3868***	0.2730***	0.2726***	0.3702***	0.4941***	0.5830***
	(0.061)	(0.090)	(0.069)	(0.068)	(0.072)	(0.093)
Health	-0.0202	-0.1380	-0.0930*	-0.0066	-0.0396	0.0225
	(0.051)	(0.124)	(0.056)	(0.055)	(0.060)	(0.106)
Kinh	0.0397	0.0145	0.0790*	0.0283	0.0310	0.0248
	(0.036)	(0.050)	(0.045)	(0.040)	(0.038)	(0.064)
Private	0.0538**	0.0930**	0.0720**	0.0002	0.0210	0.0466
	(0.028)	(0.043)	(0.032)	(0.029)	(0.034)	(0.050)
Urban	0.1077***	0.0315	0.0386	0.0746**	0.1062***	0.1654***
	(0.024)	(0.042)	(0.032)	(0.030)	(0.032)	(0.052)
North Mounts. & Midland	-0.3813***	-0.3926***	-0.3731***	-0.3574***	-0.4715***	-0.3137***
	(0.042)	(0.073)	(0.065)	(0.044)	(0.059)	(0.085)
Red River Delta	-0.3893***	-0.5562***	-0.4293***	-0.3707***	-0.3321***	-0.2462***
	(0.035)	(0.070)	(0.045)	(0.038)	(0.040)	(0.063)
North Central Coast	-0.4488***	-0.5409***	-0.4207***	-0.4647***	-0.4531***	-0.3696***
	(0.042)	(0.071)	(0.061)	(0.041)	(0.055)	(0.081)
South Central Coast	-0.3314***	-0.2559***	-0.2886***	-0.3154***	-0.3624***	-0.3824***
	(0.030)	(0.050)	(0.045)	(0.039)	(0.036)	(0.051)
Central Highlands	-0.1754**	0.0213	-0.1117	-0.1416***	-0.3019***	-0.3133**
	(0.077)	(0.230)	(0.088)	(0.054)	(0.068)	(0.139)
Mekong River Delta	-0.2462***	-0.2002***	-0.2551***	-0.2371***	-0.2588***	-0.2568***
	(0.030)	(0.046)	(0.036)	(0.036)	(0.040)	(0.053)
Interviewed in 1st quarter	-0.0077	-0.0683	-0.0670	-0.0224	0.0273	0.0342
	(0.035)	(0.065)	(0.045)	(0.039)	(0.038)	(0.059)
Interviewed in 2nd quarter	0.0228	0.0160	-0.0202	0.0142	0.0327	0.0310
	(0.033)	(0.065)	(0.042)	(0.035)	(0.039)	(0.051)
Interviewed in 3rd quarter	0.0049	0.0477	0.0356	0.0176	0.0544	0.0284
	(0.034)	(0.069)	(0.042)	(0.036)	(0.035)	(0.051)
constant	0.1298	-0.5157**	0.3307*	0.3525**	0.7901***	0.7750***
	(0.135)	(0.244)	(0.177)	(0.169)	(0.158)	(0.202)
R^2	0.1798	0.0843	0.0821	0.1044	0.1360	0.1598
Number of observation	3044	3044	3044	3044	3044	3044

Notes: see Table A2

Table A4: Pooled Regression Model, 2002

	Mean	Q10	Q25	Q50	Q75	Q90
Male	0.1783***	0.2026***	0.1940***	0.1643***	0.1354***	0.1279***
	(0.009)	(0.018)	(0.012)	(0.009)	(0.010)	(0.016)
Married	-0.0703***	-0.0754***	-0.0780***	-0.0664***	-0.0494***	-0.0756**
	(0.012)	(0.023)	(0.014)	(0.013)	(0.014)	(0.021)
Age	0.0365***	0.0613***	0.0417***	0.0305***	0.0280***	0.0201***
	(0.003)	(0.006)	(0.003)	(0.003)	(0.004)	(0.006)
Age squared	-0.0004***	-0.0008***	-0.0005***	-0.0003***	-0.0003***	-0.0002*
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Primary education	0.0782***	0.1356***	0.1092***	0.0800***	0.0593***	0.0575***
	(0.015)	(0.029)	(0.019)	(0.017)	(0.019)	(0.025)
Lower secondary	0.1074***	0.1645***	0.1456***	0.1128***	0.0911***	0.0627**
	(0.016)	(0.029)	(0.020)	(0.018)	(0.019)	(0.026)
Upper secondary	0.2882***	0.2711***	0.2662***	0.2655***	0.2959***	0.3530***
	(0.019)	(0.034)	(0.022)	(0.022)	(0.025)	(0.036)
Higher education	0.5304***	0.5043***	0.5243***	0.5342***	0.5547***	0.5645***
	(0.018)	(0.030)	(0.022)	(0.021)	(0.022)	(0.028)
Health	-0.0581***	-0.0194	-0.0630**	-0.0653***	-0.0607***	0.0919**
	(0.023)	(0.048)	(0.031)	(0.026)	(0.022)	(0.042)
Kinh	0.0979***	0.1147**	0.0393*	0.0713***	0.0730***	0.1102***
	(0.020)	(0.047)	(0.022)	(0.021)	(0.018)	(0.030)
Private	0.0498***	0.1328***	0.0921***	0.0260**	0.0026	0.0023
	(0.011)	(0.021)	(0.015)	(0.013)	(0.012)	(0.017)
Urban	0.1074***	0.1025***	0.1025***	0.0758***	0.0970***	0.1578***
	(0.011)	(0.021)	(0.014)	(0.012)	(0.012)	(0.019)
North Mounts. & Midland	-0.1621***	-0.1767***	-0.1627***	-0.1914***	-0.1925***	-0.1844***
	(0.018)	(0.033)	(0.025)	(0.021)	(0.021)	(0.032)
Red River Delta	-0.1879***	-0.2222***	-0.1825***	-0.2183***	-0.2088***	-0.1753***
	(0.015)	(0.028)	(0.019)	(0.016)	(0.018)	(0.023)
North Central Coast	-0.2325***	-0.2697***	-0.2434***	-0.2662***	-0.2346***	-0.1708***
	(0.019)	(0.035)	(0.025)	(0.019)	(0.025)	(0.041)
South Central Coast	-0.0791***	-0.0683**	-0.0447**	-0.1086***	-0.1230**	-0.1170***
	(0.015)	(0.031)	(0.020)	(0.016)	(0.020)	(0.026)
Central Highlands	0.1761***	0.0333	0.1441***	0.1830***	0.2454***	0.2988
	(0.021)	(0.038)	(0.029)	(0.025)	(0.027)	(0.032)
Mekong River Delta	-0.0632***	-0.1263***	-0.0577***	-0.0870***	-0.0545***	0.0091
	(0.015)	(0.031)	(0.019)	(0.018)	(0.018)	(0.023)
Interviewed in 1st quarter	-0.0367***	-0.0536**	-0.0524***	-0.0516***	-0.0282**	0.0137
	(0.012)	(0.023)	(0.016)	(0.014)	(0.013)	(0.022)
Interviewed in 2nd quarter	0.0097	0.0110	-0.0108	-0.0037	0.0028	0.0303
	(0.012)	(0.021)	(0.015)	(0.013)	(0.013)	(0.018)
Interviewed in 3rd quarter	0.0284**	0.0415	0.0413	0.0281	0.0006	0.0311
	(0.012)	(0.039)	(0.035)	(0.023)	(0.013)	(0.019)
constant	0.0378	-0.5012***	-0.3196***	0.2230***	0.5552***	0.8659***
	(0.056)	(0.103)	(0.064)	(0.055)	(0.064)	(0.097)
R^2	0.2419	0.0991	0.1157	0.1515	0.1735	0.1724
Number of observation	17063	17063	17063	17063	17063	17063

Notes: see Table A2

Table A5: Male and Female Regression Models, 1993

	MALE SAMPLE						FEMALE SAMPLE					
	Mean	**Q10**	**Q25**	**Q50**	**Q75**	**Q90**	**Mean**	**Q10**	**Q25**	**Q50**	**Q75**	**Q90**
Married	-0.1151***	-0.1482*	-0.1522**	-0.0450	-0.1422**	-0.1462**	-0.0590	-0.0134	-0.0251	-0.0308	-0.0506	-0.1442
	(0.052)	(0.090)	(0.076)	(0.055)	(0.065)	(0.077)	(0.051)	(0.084)	(0.068)	(0.057)	(0.075)	(0.104)
Age	0.0335***	0.0748***	0.0334**	0.0241	0.0110	0.0023	0.0248*	0.0905***	0.0230	0.0157	0.0305*	0.0122
	(0.013)	(0.023)	(0.016)	(0.016)	(0.014)	(0.016)	(0.013)	(0.028)	(0.018)	(0.018)	(0.017)	(0.025)
Age squared	-0.0005**	-0.0012***	-0.0005**	-0.0002	-0.0001	0.0000	-0.0003*	-0.0012***	-0.0003	-0.0002	-0.0004	-0.0003
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Primary education	0.0632	0.0078	-0.0489	0.1065*	0.0738	0.1583*	0.0605	0.0031	-0.0914	-0.0366	0.0007	-0.0364
	(0.055)	(0.124)	(0.060)	(0.058)	(0.058)	(0.085)	(0.068)	(0.131)	(0.102)	(0.073)	(0.081)	(0.135)
Lower secondary	0.0305	0.0739	0.0271	0.1129*	0.0517	0.0866	0.0135	0.0079	0.0621	0.0190	0.0440	0.1716
	(0.060)	(0.144)	(0.078)	(0.062)	(0.069)	(0.086)	(0.078)	(0.151)	(0.123)	(0.070)	(0.096)	(0.144)
Upper secondary	0.1109	0.0698	0.0357	0.1221*	0.1539	0.2031*	0.0254	0.0754	0.0642	0.0133	0.0960	0.1175
	(0.076)	(0.176)	(0.118)	(0.076)	(0.111)	(0.119)	(0.095)	(0.158)	(0.131)	(0.108)	(0.120)	(0.191)
Higher education	0.1080	0.0997	0.1282	0.1406*	0.0842	0.0921	0.0113	0.1267	0.1487	0.1891	0.0007	0.0532
	(0.076)	(0.180)	(0.097)	(0.076)	(0.105)	(0.120)	(0.086)	(0.159)	(0.128)	(0.097)	(0.116)	(0.144)
Health	-0.0073	-0.0577	0.0925	-0.0082	-0.0846	-0.0559	-0.0632	-0.1134	-0.2051	-0.0772	-0.0069	-0.0231
	(0.109)	(0.270)	(0.142)	(0.126)	(0.165)	(0.146)	(0.095)	(0.193)	(0.129)	(0.135)	(0.136)	(0.178)
Kinh	0.0362	0.0915	-0.0434	-0.0592	0.0195	0.0966	0.1099	0.0859	0.0727	0.1186	0.0326	0.3198**
	(0.060)	(0.154)	(0.063)	(0.057)	(0.066)	(0.080)	(0.077)	(0.131)	(0.122)	(0.089)	(0.134)	(0.155)
Private	0.1925***	0.2353**	0.2647***	0.1272**	0.0776	0.0321	-0.1135**	-0.0630	-0.1556*	-0.1727***	-0.1320*	-0.0866
	(0.054)	(0.117)	(0.076)	(0.050)	(0.076)	(0.081)	(0.053)	(0.102)	(0.087)	(0.058)	(0.074)	(0.084)
Urban	0.0811**	0.2322***	0.0459	0.0558	0.0351	0.0662	0.0052	0.0296	0.1613**	0.0881	0.0776	0.0585
	(0.043)	(0.083)	(0.054)	(0.046)	(0.058)	(0.056)	(0.052)	(0.101)	(0.077)	(0.062)	(0.073)	(0.106)
North Mounts. & Midland	-0.5131***	-0.6285***	-0.6857***	-0.6394***	-0.4191***	-0.3788***	-0.6647***	-0.6609***	-0.8629***	-0.7676***	-0.5817***	-0.4728**
	(0.078)	(0.114)	(0.114)	(0.107)	(0.091)	(0.141)	(0.082)	(0.110)	(0.101)	(0.119)	(0.129)	(0.223)
Red River Delta	-0.4667***	-0.5914***	-0.4621***	-0.5440***	-0.3857***	-0.3384***	-0.5684***	-0.9104***	-0.7240***	-0.4995***	-0.3981***	-0.2981**
	(0.059)	(0.112)	(0.087)	(0.068)	(0.085)	(0.092)	(0.073)	(0.126)	(0.119)	(0.102)	(0.090)	(0.143)
North Central Coast	-0.4728***	-0.4991**	-0.4193***	-0.4816***	-0.4663***	-0.5438***	-0.5475***	-0.8386***	-0.5850***	-0.5330***	-0.3845***	-0.4063**
	(0.085)	(0.213)	(0.090)	(0.089)	(0.073)	(0.182)	(0.099)	(0.171)	(0.202)	(0.139)	(0.117)	(0.181)
South Central Coast	-0.4565***	-0.6384***	-0.4438***	-0.5298	-0.4311***	-0.3151***	-0.4414***	-0.5845***	-0.4568***	-0.5499***	-0.2910**	-0.1093
	(0.060)	(0.128)	(0.081)	(0.075)	(0.084)	(0.099)	(0.082)	(0.170)	(0.095)	(0.084)	(0.133)	(0.168)
Central Highlands	-0.0981	0.1353	-0.1930	-0.1659	-0.0853	-0.1919	-0.3484	-0.4069	-0.6225	-0.4162	-0.1104	0.0321

	MALE SAMPLE						FEMALE SAMPLE					
	Mean	**Q10**	**Q25**	**Q50**	**Q75**	**Q90**	**Mean**	**Q10**	**Q25**	**Q50**	**Q75**	**Q90**
	(0.095)	(0.140)	(0.136)	(0.163)	(0.158)	(0.151)	(0.229)	(0.327)	(0.402)	(0.398)	(0.397)	(0.451)
Mekong River Delta	-0.1972***	-0.3842***	-0.2220***	-0.2182***	-0.1236**	-0.1125*	-0.3016***	-0.4494***	-0.3410***	-0.2743***	-0.1576*	-0.1866*
	(0.054)	(0.124)	(0.070)	(0.058)	(0.062)	(0.068)	(0.066)	(0.113)	(0.093)	(0.066)	(0.100)	(0.118)
Interviewed in 1st quarter	0.0319	-0.0667	0.1202	0.0704	0.0271	0.1270*	0.0355	0.0599	0.0775	0.0671	0.0147	-0.1273
	(0.061)	(0.151)	(0.103)	(0.070)	(0.084)	(0.075)	(0.062)	(0.094)	(0.093)	(0.088)	(0.078)	(0.135)
Interviewed in 2nd quarter	0.0231	0.0330	0.0278	0.0197	0.0216	0.0172	0.0151	0.1488	0.0181	0.0192	0.0146	0.0591
	(0.043)	(0.087)	(0.056)	(0.051)	(0.055)	(0.065)	(0.060)	(0.111)	(0.091)	(0.067)	(0.078)	(0.113)
Interviewed in 3rd quarter	0.0215	0.0320	0.0247	0.0215	0.0166	0.0202	0.0333	0.0499	0.0390	0.0310	0.0254	0.0276
	(0.053)	(0.137)	(0.079)	(0.065)	(0.073)	(0.086)	(0.070)	(0.119)	(0.100)	(0.075)	(0.093)	(0.138)
constant	-0.2106	-1.4328***	-0.4461*	0.1289	0.5274**	0.8888***	0.1708	-1.6742***	-0.0597	0.4047	0.2373	1.1259**
	(0.233)	(0.454)	(0.276)	(0.282)	(0.233)	(0.249)	(0.223)	(0.503)	(0.329)	(0.280)	(0.321)	(0.444)
R^2 or Pseudo R^2	0.1643	0.1380	0.1224	0.1134	0.1003	0.0785	0.1877	0.1689	0.1468	0.1321	0.0995	0.0791
Number of observation	1090	1090	1090	1090	1090	1090	703	703	703	703	703	703

Notes:

a. ***, **, and * refers to the variables of which the estimated coefficients are statistically significant at level of 0.01; 0.05; and 0.1 respectively.

b. Standard errors are in parentheses. The OLS standard errors are based on Huber (1967) and the quantile regression model estimates are based on bootstrapping with 200 replications

Table A6: Male and Female Regression Models, 1998

	MALE SAMPLE						FEMALE SAMPLE					
	Mean	**Q10**	**Q25**	**Q50**	**Q75**	**Q90**	**Mean**	**Q10**	**Q25**	**Q50**	**Q75**	**Q90**
Married	-0.0038	-0.0472	-0.0350	-0.0263	-0.0398	-0.0171	-0.0040	-0.0885	-0.0695	-0.0258	-0.0070	-0.0364
	(0.037)	(0.070)	(0.047)	(0.038)	(0.049)	(0.060)	(0.038)	(0.062)	(0.050)	(0.043)	(0.060)	(0.078)
Age	0.0358***	0.0695***	0.0519***	0.0295***	0.0093	0.0236*	0.0158	0.0252	0.0265**	0.0170	-0.0078	-0.0132
	(0.010)	(0.017)	(0.011)	(0.011)	(0.013)	(0.015)	(0.012)	(0.021)	(0.014)	(0.014)	(0.016)	(0.017)
Age squared	-0.0004***	-0.0010***	-0.0007***	-0.0004**	0.0000	-0.0002	-0.0001	-0.0003	-0.0003	-0.0002	0.0003	0.0004*
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Primary education	0.0195	0.0410	0.0047	0.0041	0.0155	0.0244	0.0985*	0.0180	0.0645	0.0531	0.1465*	0.2985***
	(0.069)	(0.280)	(0.070)	(0.071)	(0.060)	(0.104)	(0.062)	(0.127)	(0.082)	(0.085)	(0.082)	(0.098)
Lower secondary	0.0320	0.0181	0.0476	0.0212	0.1094	0.1987*	0.1486**	0.0392	0.1080	0.1239	0.1983**	0.2919***
	(0.070)	(0.277)	(0.070)	(0.076)	(0.075)	(0.115)	(0.064)	(0.115)	(0.092)	(0.084)	(0.079)	(0.110)
Upper secondary	0.1725**	0.1269	0.1512**	0.1570*	0.2162**	0.3003**	0.3017***	0.1207	0.2077**	0.2713***	0.4010***	0.6451***
	(0.075)	(0.274)	(0.076)	(0.084)	(0.088)	(0.126)	(0.076)	(0.133)	(0.100)	(0.094)	(0.109)	(0.131)
Higher education	0.3563***	0.2289	0.2917***	0.2824***	0.4905***	0.6043**	0.4709***	0.3415	0.3853***	0.4543	0.5681***	0.8801***
	(0.079)	(0.287)	(0.085)	(0.086)	(0.098)	(0.126)	(0.079)	(0.135)	(0.107)	(0.094)	(0.102)	(0.156)
Health	-0.0285	-0.0298	-0.1264**	-0.0941	-0.1032	-0.0415	-0.0036	-0.0640	-0.0444	-0.0783	-0.0408	-0.0012
	(0.072)	(0.163)	(0.066)	(0.061)	(0.093)	(0.144)	(0.063)	(0.155)	(0.095)	(0.077)	(0.079)	(0.107)
Kinh	0.0619	0.0237	0.0418	0.1048**	0.1064**	0.0289	0.0373	0.0199	0.0502	0.0333	0.1299*	0.1667*
	(0.044)	(0.082)	(0.051)	(0.052)	(0.052)	(0.078)	(0.057)	(0.077)	(0.069)	(0.074)	(0.071)	(0.095)
Private	0.1902***	0.2717**	0.2499***	0.1393***	0.1044**	0.1746***	-0.1562***	-0.1482**	-0.1859***	-0.1513***	-0.1119**	-0.0452
	(0.035)	(0.064)	(0.042)	(0.040)	(0.041)	(0.060)	(0.042)	(0.063)	(0.053)	(0.045)	(0.053)	(0.078)
Urban	0.1549***	0.0138	0.0772**	0.1272***	0.1479***	0.2645***	0.0514	0.0031	0.0291	0.0021	0.0118	0.1171*
	(0.030)	(0.050)	(0.039)	(0.036)	(0.040)	(0.064)	(0.036)	(0.062)	(0.050)	(0.047)	(0.052)	(0.064)
North Mounts. & Midland	-0.4110***	-0.4037***	-0.4309***	-0.4193***	-0.4953***	-0.3865***	-0.3745***	-0.2948**	-0.3914***	-0.3591***	-0.3650***	-0.3858***
	(0.056)	(0.089)	(0.068)	(0.077)	(0.069)	(0.084)	(0.063)	(0.116)	(0.095)	(0.064)	(0.126)	(0.120)
Red River Delta	-0.4076***	-0.5431***	-0.4585***	-0.3674***	-0.3674***	-0.2869***	-0.3730***	-0.5613***	-0.3909***	-0.3331***	-0.3206***	-0.1871
	(0.043)	(0.085)	(0.063)	(0.047)	(0.055)	(0.068)	(0.059)	(0.131)	(0.072)	(0.073)	(0.090)	(0.126)
North Central Coast	-0.4884***	-0.6937***	-0.4983***	-0.5224***	-0.4750***	-0.3329***	-0.4254***	-0.4076***	-0.4101***	-0.4183***	-0.5086***	-0.4088**
	(0.055)	(0.096)	(0.064)	(0.057)	(0.063)	(0.095)	(0.062)	(0.108)	(0.086)	(0.056)	(0.091)	(0.165)
South Central Coast	-0.3583***	-0.3034***	-0.3106***	-0.3265***	-0.3971***	-0.4139***	-0.3171***	-0.2140***	-0.3033***	-0.3421***	-0.3395***	-0.4031***
	(0.039)	(0.074)	(0.050)	(0.045)	(0.053)	(0.066)	(0.047)	(0.072)	(0.061)	(0.062)	(0.065)	(0.078)
Central Highlands	-0.3901***	-0.4844	-0.1594	-0.2929***	-0.3934***	-0.4279***	-0.0893	0.1639	0.0129	-0.1314*	-0.2265**	-0.3538***

	MALE SAMPLE						FEMALE SAMPLE					
	Mean	**Q10**	**Q25**	**Q50**	**Q75**	**Q90**	**Mean**	**Q10**	**Q25**	**Q50**	**Q75**	**Q90**
	(0.101)	(0.312)	(0.158)	(0.089)	(0.095)	(0.114)	(0.071)	(0.151)	(0.098)	(0.078)	(0.106)	(0.127)
Mekong River Delta	-0.2716***	-0.2372***	-0.2480***	-0.2496***	-0.2618***	-0.2853***	-0.2336***	-0.1108*	-0.2131***	-0.2541***	-0.3209***	-0.2856***
	(0.038)	(0.063)	(0.049)	(0.044)	(0.052)	(0.072)	(0.044)	(0.068)	(0.061)	(0.046)	(0.057)	(0.081)
Interviewed in 1st quarter	0.0532	0.1640**	0.0783*	0.0365	0.0618	-0.0057	-0.0037	0.0064	0.0163	-0.0010	-0.0615	-0.0229
	(0.037)	(0.076)	(0.048)	(0.044)	(0.047)	(0.065)	(0.040)	(0.062)	(0.057)	(0.043)	(0.051)	(0.079)
Interviewed in 2nd quarter	0.0157	0.1284	0.0745	0.0544	0.0295	-0.0717	0.0195	-0.0842	-0.0350	0.0831	0.0344	0.1220
	(0.038)	(0.086)	(0.051)	(0.044)	(0.045)	(0.068)	(0.043)	(0.072)	(0.061)	(0.058)	(0.057)	(0.079)
Interviewed in 3rd quarter	0.0223	0.1112	0.0878*	0.0279	-0.0068	-0.0591	-0.0098	-0.0386	-0.0057	0.0067	0.0033	0.0440
	(0.044)	(0.094)	(0.052)	(0.047)	(0.055)	(0.079)	(0.057)	(0.093)	(0.067)	(0.071)	(0.074)	(0.099)
constant	0.2139	-0.8223*	-0.3305*	0.3446*	0.9122***	0.9086***	0.5369***	-0.0816	0.1315	0.5906***	1.1966***	1.2660***
	(0.183)	(0.428)	(0.201)	(0.212)	(0.219)	(0.294)	(0.191)	(0.371)	(0.245)	(0.222)	(0.283)	(0.280)
R^2 or Pseudo R^2	0.1780	0.1023	0.0857	0.0956	0.1399	0.1669	0.2175	0.1097	0.1003	0.1258	0.1469	0.1932
Number of observation	1848	1848	1848	1848	1848	1848	1210	1210	1210	1210	1210	1210

Notes: see Table A5

Table A7: Male and Female Regression Models, 2002

	MALE SAMPLE						FEMALE SAMPLE					
	Mean	**Q10**	**Q25**	**Q50**	**Q75**	**Q90**	**Mean**	**Q10**	**Q25**	**Q50**	**Q75**	**Q90**
Married	-0.0555***	-0.0826***	-0.0804***	-0.0551***	-0.0443***	-0.0560*	-0.0812***	-0.0625*	-0.0688***	-0.0747***	-0.0752***	-0.0936***
	(0.016)	(0.028)	(0.018)	(0.016)	(0.015)	(0.031)	(0.018)	(0.038)	(0.023)	(0.019)	(0.022)	(0.030)
Age	0.0423***	0.0606***	0.0467***	0.0332***	0.0314***	0.0238***	0.0266***	0.0502***	0.0305***	0.0200***	0.0188***	0.0186**
	(0.004)	(0.008)	(0.005)	(0.004)	(0.005)	(0.008)	(0.005)	(0.010)	(0.008)	(0.006)	(0.007)	(0.008)
Age squared	-0.0005***	-0.0008***	-0.0006***	-0.0003***	-0.0003***	-0.0002**	-0.0003***	-0.0007***	-0.0003***	-0.0002*	-0.0001	-0.0001
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Primary education	0.0648***	0.1146***	0.0938***	0.0595***	0.0485**	0.0532	0.0892***	0.1425***	0.0980***	0.0913***	0.0926***	0.0491
	(0.019)	(0.034)	(0.022)	(0.018)	(0.021)	(0.038)	(0.025)	(0.050)	(0.023)	(0.032)	(0.027)	(0.033)
Lower secondary	0.0734***	0.1258***	0.1109***	0.0835***	0.0653***	0.0237	0.1566***	0.1912***	0.1580***	0.1463***	0.1573***	0.1248***
	(0.020)	(0.034)	(0.024)	(0.020)	(0.020)	(0.038)	(0.027)	(0.050)	(0.030)	(0.030)	(0.030)	(0.040)
Upper secondary	0.2319***	0.1997***	0.2031***	0.2022***	0.2556***	0.3218***	0.3742***	0.3494***	0.3244***	0.3472***	0.3938***	0.3712***
	(0.024)	(0.039)	(0.024)	(0.022)	(0.028)	(0.045)	(0.031)	(0.060)	(0.037)	(0.035)	(0.040)	(0.041)
Higher education	0.4787***	0.4469***	0.4707***	0.4757***	0.5140***	0.5156***	0.6012***	0.5363***	0.5783***	0.6066***	0.6280***	0.6132***
	(0.022)	(0.035)	(0.025)	(0.022)	(0.025)	(0.040)	(0.029)	(0.054)	(0.030)	(0.034)	(0.035)	(0.040)
Health	-0.0575**	-0.0176	-0.0418	-0.0656*	-0.0555**	-0.0991*	-0.0597*	-0.0501	-0.0559	-0.0711**	-0.0687*	-0.0785
	(0.030)	(0.053)	(0.038)	(0.039)	(0.029)	(0.059)	(0.035)	(0.052)	(0.047)	(0.033)	(0.036)	(0.056)
Kinh	0.1297***	0.1239**	0.0698***	0.0950***	0.1347***	0.1784***	0.0550*	0.0503	0.0060	0.0305	0.0039	0.0148
	(0.026)	(0.054)	(0.026)	(0.028)	(0.024)	(0.039)	(0.032)	(0.087)	(0.031)	(0.030)	(0.034)	(0.048)
Private	0.1052***	0.1955***	0.1722***	0.0731***	0.0276	0.0348	-0.0161	-0.0172	-0.0216	-0.0089	-0.0255	-0.0550*
	(0.015)	(0.024)	(0.023)	(0.020)	(0.020)	(0.024)	(0.018)	(0.040)	(0.025)	(0.019)	(0.022)	(0.030)
Urban	0.1697***	0.1561***	0.1735***	0.1496***	0.1543***	0.2188***	0.0356**	0.0076	0.0004	0.0057	0.0435**	0.1054***
	(0.015)	(0.026)	(0.024)	(0.019)	(0.020)	(0.022)	(0.017)	(0.043)	(0.022)	(0.019)	(0.020)	(0.026)
North Mounts. & Midland	-0.1783***	-0.1875***	-0.2213***	-0.2336***	-0.1824***	-0.1770***	-0.1385***	-0.0704	-0.1067***	-0.1422***	-0.2289***	-0.2333***
	(0.022)	(0.034)	(0.030)	(0.021)	(0.028)	(0.046)	(0.030)	(0.059)	(0.041)	(0.032)	(0.030)	(0.052)
Red River Delta	-0.1840***	-0.1975***	-0.1965***	-0.2266***	-0.1950***	-0.1680***	-0.2023	-0.2508***	-0.2294***	-0.2266***	-0.2385***	-0.1686***
	(0.018)	(0.032)	(0.025)	(0.020)	(0.022)	(0.037)	(0.025)	(0.058)	(0.032)	(0.027)	(0.027)	(0.036)
North Central Coast	-0.2176***	-0.2427***	-0.2522***	-0.2655***	-0.2003***	-0.1418***	-0.2708***	-0.3127***	-0.2926***	-0.2881***	-0.2847***	-0.2191***
	(0.023)	(0.039)	(0.034)	(0.022)	(0.030)	(0.051)	(0.033)	(0.078)	(0.040)	(0.042)	(0.040)	(0.058)
South Central Coast	-0.0756***	-0.0589*	-0.0713**	-0.1089***	-0.0882***	-0.0866**	-0.0927***	-0.0297	-0.0613**	-0.1218***	-0.1641***	-0.1297***
	(0.019)	(0.034)	(0.030)	(0.021)	(0.027)	(0.039)	(0.025)	(0.050)	(0.031)	(0.023)	(0.030)	(0.041)
Central Highlands	0.1504***	0.0329	0.0964***	0.1495***	0.2278***	0.2726***	0.2059***	0.0569	0.1294***	0.2272***	0.2661***	0.3104***

	MALE SAMPLE						FEMALE SAMPLE					
	Mean	**Q10**	**Q25**	**Q50**	**Q75**	**Q90**	**Mean**	**Q10**	**Q25**	**Q50**	**Q75**	**Q90**
	(0.027)	(0.043)	(0.036)	(0.027)	(0.033)	(0.058)	(0.033)	(0.078)	(0.049)	(0.040)	(0.042)	(0.041)
Mekong River Delta	-0.0626***	-0.1460***	-0.0838***	-0.0841***	-0.0219	0.0192	-0.0558**	-0.0587	-0.0539**	-0.1019***	-0.0867***	0.0244
	(0.019)	(0.035)	(0.028)	(0.021)	(0.024)	(0.033)	(0.024)	(0.046)	(0.026)	(0.028)	(0.024)	(0.036)
Interviewed in 1st quarter	-0.0356**	-0.0563	-0.0309	-0.0504***	-0.0234	0.0406	-0.0322	-0.0330	-0.0346	-0.0548***	-0.0372	-0.0144
	(0.015)	(0.047)	(0.020)	(0.019)	(0.019)	(0.027)	(0.020)	(0.039)	(0.024)	(0.020)	(0.025)	(0.036)
Interviewed in 2nd quarter	0.0175	0.0200	0.0073	0.0064	0.0146	0.0288	-0.0014	0.0149	-0.0132	-0.0307	-0.0227	0.0265
	(0.014)	(0.022)	(0.017)	(0.019)	(0.016)	(0.021)	(0.020)	(0.039)	(0.025)	(0.021)	(0.024)	(0.038)
Interviewed in 3rd quarter	0.0165	0.0318	0.0252	0.0198	0.0026	0.0104	0.0516	0.0126	0.0440	0.0353	0.0178	0.0477
	(0.014)	(0.024)	(0.018)	(0.019)	(0.015)	(0.025)	(0.040)	(0.040)	(0.037)	(0.028)	(0.021)	(0.035)
constant	0.0661	-0.8324***	-0.2588***	0.3044***	0.5855***	0.8873***	0.2487***	-0.6975***	-0.0207	0.4317***	0.7600***	1.0037***
	(0.073)	(0.135)	(0.089)	(0.070)	(0.084)	(0.140)	(0.091)	(0.177)	(0.134)	(0.105)	(0.102)	(0.147)
R^2 or Pseudo R^2	0.2278	0.0887	0.1024	0.1400	0.1680	0.1662	0.2476	0.0919	0.1212	0.1632	0.1818	0.1820
Number of observation	10531	10531	10531	10531	10531	10531	6532	6532	6532	6532	6532	6532

Notes: see Table