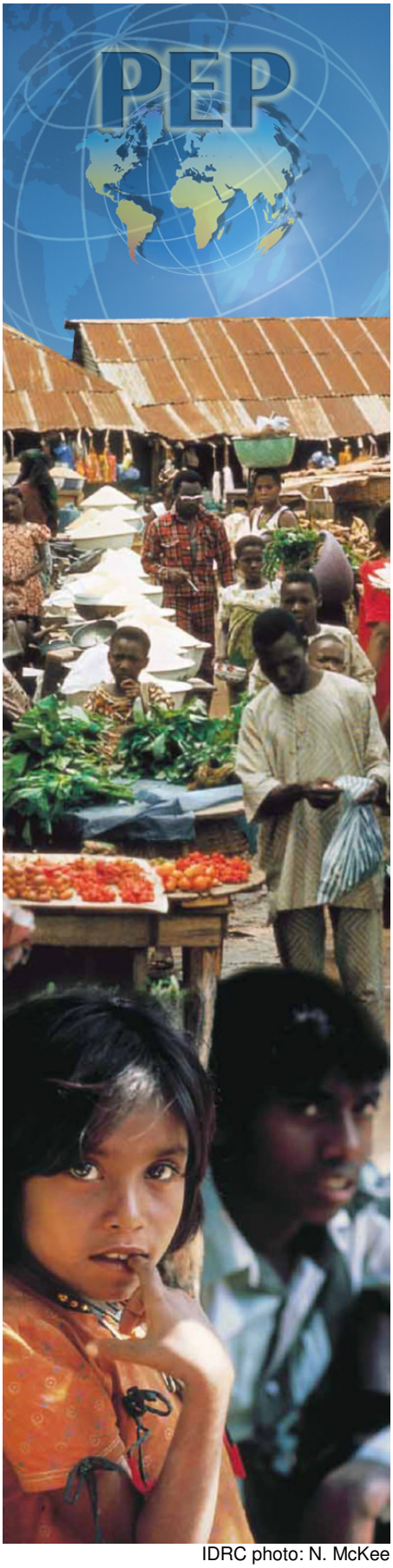

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Glass Ceilings, Sticky Floors or Sticky Doors? A Quantile Regression Approach to Exploring Gender Wage Gaps in Sri Lanka

Dileni Gunewardena
Darshi Abeyrathna
Amalie Ellagala
Kamani Rajakaruna
Shobana Rajendran

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Dileni Gunewardena (University of Peradeniya, Peradeniya, Sri Lanka)
dilenig@pdn.ac.lk
Darshi Abeyrathna (University of Peradeniya, Peradeniya, Sri Lanka)
darshipa@yahoo.com.
Amalie Ellagala (University of Peradeniya, Peradeniya, Sri Lanka.)
amalie@eureka.lk
Kamani Rajakaruna (University of Peradeniya, Peradeniya, Sri Lanka
kamanirajakaruna@yahoo.com
Shobana Rajendran (University of Peradeniya, Peradeniya, Sri Lanka)
shobir@pdn.ac.lk

Abstract

Recently developed counterfactual techniques that combine quantile regression with a bootstrap approach allow for the interpretation of lower quantiles of the 'simulated unconditional wage distribution' as if they related to poor people. We use this approach to analyse gender wage gaps across the wage distribution in Sri Lanka using quarterly labour force data from 1996 to 2004. Male and female wages are equal at the overall mean, but differ greatly between public and private sectors and across the wage distribution. We find that differences in the way identical men and women are rewarded in the labour market *more than* account for the difference in wages throughout the distribution. We find evidence of wider wage gaps at the bottom of the distribution in both sectors (indicative of "sticky floors"), but little evidence of larger gaps at the top of the distribution ("glass ceilings"). Conditional wage gaps increase when controls for occupation, industry and part-time employment status are included, consistent with females selecting into occupations that better reward their characteristics. Policies that address gender bias in wage setting - especially in the low and unskilled occupations - are indicated, while policies that address gender bias in hiring and in workplace practices are likely to be more appropriate than policies that seek to improve womens' productivity-enhancing characteristics in reducing the gender wage gap.

Keywords: gender gap, glass ceilings, sticky floors, quantile regression, public sector
JEL Classification: J16, J31, J71, J40

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1. Introduction

Sri Lanka is foremost among countries that have made considerable advances in gender equity, especially in relation to education access and health outcomes.[1] Gender equality is enshrined in the 1978 constitution as a fundamental right, and Sri Lanka has ratified all four key conventions that promote gender equality at work.[2] Yet, despite rising female labour force participation since the 1990s, it is reported that Sri Lankan women face "glass ceilings" and "brick walls" in the labour market (Wickramasinghe and Jayatilaka, 2005, 2006).[3]

Standard analyses of the mean gender wage gap in Sri Lanka indicate that the gap is quite small, but little or none of it is due to differences in productive characteristics between men and women. Rather, the entire gap is attributed to differences in returns to characteristics (Aturupane 1996, Gunewardena 2002, Ajwad and Kurukulasuriya 2002).[4] This is not surprising, given the relatively high human capital endowments of Sri Lankan women. However, little is known about the degree to which the gender wage gap varies across the distribution and the reasons for such.

The application of quantile regression techniques (Koenker and Basset 1978) to many areas in economics, including labour, public, and development economics (Fitzenberger, Koenker and Machado 2001, Koenker and Hallock 2001) has led to a new approach to the examination of 'glass ceilings.' Glass ceilings are generally understood to mean that "women do quite well in the labour market up to a point, after which there is an effective limit on their prospects" (Albrecht *et al*. 2003). Thus, larger wage gaps, conditional on covariates *at the top of the wage distribution* are said to be consistent with the existence of 'glass ceilings', while pay gaps that widen at the bottom of the conditional distribution, are termed 'sticky floors,' or "glass ceilings at the ground floor" (Arulampalam *et al.* 2005, Albrecht *et al.* 2003, de la Rica *et al.* 2005).

The glass ceiling phenomenon can be manifested as the inequitable rationing of 'good' jobs, which are in short supply (Pendakur and Pendakur 2007). Typically, this is understood to mean that when there are two or more groups of unequal status in the labour market, the subordinate group will have earnings distributions which look similar to the

[1] Higher life expectancy for women (than men) was achieved in the late 1960s, maternal mortality is low, parity in primary school enrolments and higher female secondary school enrolment was evident by the 1990s. Female enrollment in tertiary education however, is only 69 percent of male enrollment which is lower than in many medium human development index countries (UNDP 2000).
[2] Equal Remuneration Convention, Convention on Discrimination, Convention on Workers with Family Responsibilities, and Convention on Maternity Protection.
[3] Wickremasinghe and Jayatilaka use these terms to refer to the observation that men and women tend to be employed in different occupations and women tend to occupy the lower rungs.
[4] See Table 1 for a summary of the results of these studies.

dominant group over ordinary jobs, but are comparatively thin over high-paying jobs. In their study of glass ceilings for ethnic minorities in Canada, Pendakur and Pendakur (2007) argue that, given that one can rarely control for all characteristics relevant to the potential productivity of workers such as raw ability or intelligence, glass ceilings may manifest themselves in any part of the distribution. The main thrust of their argument is that "good jobs" will exist for all types of workers, including those with high ability, and those with low ability. In Sri Lanka for example, being a doctor, lawyer, engineer or accountant would be a good job for workers with high raw ability, while being a clerk or peon in a government office would be a good job for workers with median raw ability, because these jobs pay well, conditional on productivity-related covariates. Many women may not have access to these jobs, because they are rationed.

The phenomenon of 'sticky floors' may also occur because the wage distribution reflects labour market segmentation, with informal jobs occupying the lower end of the distribution (Pianto, Pianto and Arias 2004). In this scenario, sticky floors are really 'sticky doors' in the sense that they reflect the presence of barriers against access to 'good jobs' for disadvantaged groups.[5] We do not test if sticky floors are sticky doors in this paper, but we do examine if (1) the sticky floor phenomenon is purely a composition effect of relatively low paying jobs for women in the private sector with relatively higher paying jobs in the public sector, and (2) if sticky floors are related to occupational categories.

The 'sticky floors' phenomenon may occur for other reasons. Even in regulated labour markets with anti-discrimination legislation, sticky floors may occur because "only the more articulate and better educated are willing to take legal action against breaches of the law", because men are initially appointed at a higher starting salary (rung) within a particular scale, or because women at the bottom have less bargaining power compared to men due to family commitments or social custom (Arulampalam *et al.* 2006).

The approach used in these studies is descriptive, and does not provide tests for whether a glass ceiling - or sticky floor - exists. However, knowing where in the wage distribution unexplained gender wage gaps lie, and how their magnitude varies throughout the distribution, can help to better understand gender discrimination in the labour market and to design more effective policies to reduce or eliminate it. Policies designed to address discrimination have both equity and efficiency gains. The equity gains will be even higher if analysis reveals gender disparities to be larger at the bottom of the distribution. Empirical analysis of the gender-poverty nexus suffers from the fact that much of the data used to analyse poverty is aggregated at the level of the household, subsuming any intra-household

[5] I am grateful to Robin Naylor for suggesting this line of investigation, and the term 'sticky doors'. Wickremasinghe and Jayatilaka (2005) use the term 'brick walls' to describe a similar concept.

gender inequality. Where data is available, e.g. relating to health and education outcomes, analyses of gender inequalities find that they are greater among the poor (World Bank 2001). Similar analyses of wage inequalities among the poor in developing countries have yet to be conducted although wage data, which are collected at the level of the individual, allow for gender specific analysis. Counterfactual analysis based on quantile regression makes such an analysis possible. As Sakellariou (2004) points out, the generation of more country studies using this approach 'will allow the emergence of stylized facts of gender discrimination in labour markets'. This paper makes one of the first contributions to this literature from a developing country's perspective.[6, 7]

Several approaches to examining wage distributions can be seen within the new "glass ceiling" literature. Some, like Pendakur and Pendakur (2007), examine conditional quantiles, but constrain returns to productive characteristics to be the same for all groups. Others have extended the use of quantile regressions to counterfactual analysis along the lines of the standard Oaxaca-Blinder decomposition (Mueller 1998, Garcia *et al.* 2001, Fortin and Lemieux 2000, Gosling *et al.* 2000, Machado and Mata 2005). Studies like Albrecht *et al.* (2003) combine both approaches.

The extension of quantile regression to Oaxaca-Blinder type decomposition analysis employs various methods for evaluating earnings gaps. Early studies typically used the mean of the covariates distribution (Mueller 1998, Garcia *et al.* 2001), the average characteristics around a symmetric neighbourhood of every quantile (Bishop, Luo and Wang 2005) or an auxiliary regression-based framework (Gardeazabal and Ugidos 2005, Hyder and Reilly 2006). More recently, Machado and Mata (2005) developed a method whereby the entire conditional distribution of covariates is derived. This method has since been used to explore the existence of glass ceilings and floors in relation to gender-wage gaps in Europe (Arulampalam *et al.* 2006) and in transition economies (Ganguli and Terell 2005, Pham and Reilly 2006).

This paper examines whether the Sri Lankan labour market is characterized by 'sticky floors' and/or 'glass ceilings', using quantile regression analysis and applies the

[6] The only other study of gender earnings gaps in a developing country that uses the particular approach (Machado-Mata decomposition) we follow in this paper that we are aware of is by Pham and Reilly (2006) for Vietnam. Their study does not conduct a disaggregated analysis for public and private sectors, as ours does. It also suffers from the lack of data on actual experience, relying instead on a measure of potential experience, which can lead to misleading results, especially in the case of females who may have intermittent labour force participation.

[7] It is important to note that differences in returns to a given characteristic in the upper vs. lower quantiles of a distribution should not be interpreted as if they were capturing differences between rich and poor people (Deaton 1997:82-83). However, the counterfactual approach employed here uses simulations to derive the unconditional wage distribution that is consistent with the conditional wage distribution and distribution of the characteristics, thereby making it possible to interpret lower quantiles of the 'simulated unconditional wage distribution' as if they related to poor people.

Machado-Mata (2005) extension of the conventional Blinder-Oaxaca (1973) decomposition of the gender-wage gap to Sri Lankan quarterly labour force data for the 1996-2004 period. The Sri Lankan case is instructive as an example of a developing country labour market where women have high productive characteristics, relative to males. The aim of the paper is to determine whether wage gaps, conditional on covariates, vary across the distribution. Quantile regression techniques are used to control for individual characteristics, and counterfactual decomposition methods are used to analyse the size and components of the gaps over the entire wage distribution. The analysis is conducted separately for the public and private sectors.

The paper is structured as follows. Section 2 provides a background on female labour market characteristics in Sri Lanka. Section 3 describes standard methods of decomposing earnings differentials and the use of counterfactual distributions within the quantile regression approach. Section 4 describes the data and discusses raw wage distributions, while section 5 presents and discusses decomposition results. Section 6 concludes with policy implications and suggestions for future research.

2. Background on Sri-Lanka

Females in Sri Lanka enjoy higher life expectancy than males, high literacy in comparison with similar countries, parity in primary school enrolments, and higher secondary school enrolments than males. Some of these favourable indicators were achieved almost four decades ago.[8] However, it is only in the last two decades that female labour force participation and female employment have risen to levels even moderately approaching those of men. A shift from a late broad-peak pattern (peaking at age 45-59 in the 1940s and 1950s) to an early peak pattern (ages 20-29), is evident since 1971 (Kiribanda 1997) and the female share in the labour force increased from 22 percent in 1946 to 25 percent in 1970 and 1980, to 35 percent in 1995, after which it has remained stable. These rates are considerably higher than in other South Asian economies, but lower than in most East Asian and Transition economies (World Bank 2001).

Much of the early expansion (until the late 1970s) in female labour force participation is attributed to female labour supply factors of rising literacy and educational attainment (Kiribanda 1981) as well as to the expansion of the services sector "dominated by teaching, health care, clerical and finance related occupations [which] provided more and new types of employment considered acceptable to women" (Kiribanda 1997). It should be noted that the state sector dominated all of these areas, and thus, much of this early impetus to female

[8] Female life expectancy overtook male life expectancy in the late 1960s; female literacy was as high as 83 percent in 1981.

employment came from the public sector.

However, until the mid 1980s, female labour force expansion was also accompanied by rising unemployment. Female unemployment rates derived from the censuses of 1971 and 1981 were over 30 percent. With the liberalisation of the economy in 1977, GDP growth rates rose sharply in the 1980s, and labour force participation rates rose concomitantly, growing at 4.1 percent in the first half of the decade and 3.3 percent in the second half of the decade - the highest observed since 1946. The bulk of this growth came from the phenomenal increases in female labour participation - 9.8 and 6.0 percent in each half of the 1980s, compared to male growth rates of 1.7 and 1.8 percent (Kiribanda 1997). Unlike in previous decades, these growth rates in labour force participation were also accompanied by the highest ever growth rates in female employment - 13 percent per year in the early 1980s, compared to an overall 5 percent per year in the same period.

The increase in the female share in the labour force from 26 percent in 1981 to 35 percent in 1995 was similar to trends in Singapore, Malaysia and Indonesia during the 1970s (World Bank 2001). No doubt some of the factors behind the rise in female labour force participation in Sri Lanka were similar to those in East Asia in the 1970s - the "surge in job opportunities for women, following the establishment of a large number of export-oriented industries in the country's Free Trade Zones and elsewhere", as well as the settlement of several thousands of families in newly opened agricultural lands following the completion of the Mahaweli River Diversion Scheme (Kiribanda 1997). The opening of opportunities for labour migration, mainly to countries in the Middle East, and the increase in home-based activities that has taken place in export industries in the last few years (Jayaweera *et al.* 2000) were other contributing factors.

What is apparent from these patterns of female employment is that "employment opportunities for women" in the early era were either in the public sector or the formal private sector, and therefore within a formal structure of wages and salaries. Disparity in wages was unlikely unless the actual jobs done by men and women were different. Any gender discrimination in these jobs would take the form of segregation within broad occupational categories, or of women not being promoted - or choosing not to be promoted. These were jobs that were available to women with education, and some mobility, as many of them would be in the country's urban centres, and would place those women who obtained these jobs in the upper part of the wage distribution.

However, one could argue that the distribution of "female" jobs in the early era was bi-modal. A large proportion of the employed female population at the time was working in agriculture either in tea or rubber plantation estates, as labourers/unskilled workers, or in the

paddy sector, mainly as unpaid family workers. These sectors continued to have higher than average female labour force participation rates, although they have been falling at a faster rate than in other sectors (Central Bank 2005b). About 40 percent of female employment in the middle of the 1990s was in agriculture, although a shift from agriculture to services was evident by the mid-2000s (Central Bank 2005b).[9]

On the other hand, the second wave of "female jobs" that were created by the opening of the economy were mainly in the Sri Lankan private sector (formal and informal) – or in private households overseas. Wages in these jobs were largely unregulated. Goonesekere (1998) points out that while the gender equality clause in the Constitution (Article 12) confers a fundamental right to be treated without discrimination in any State action, it is considered to cover only the public sector, unless the State has a responsibility under law to regulate private sector activity. Despite the latter clause, there has been no agreement on this, and "no case has yet been decided to support such an action against management in the private sector" (Goonesekere 1998).

Many of the "female" employment opportunities created since the 1980s were those typically found in the lower end of the distribution, and did not necessarily require a high level of education, though all of them were characterized by the need for mobility (jobs in the export industries were in the urban centers, agricultural employment in settler areas involved the mobility of the entire household, and jobs overseas required international migration). Although almost three quarters of employment in the export-oriented Board of Investment (BOI) industries was female, these were concentrated in semi-skilled, unskilled and trainee positions, while less than one third of supervisory (technical) and a little over one fourth of administrative positions were filled by women (BOI 1996). Similarly, the vast majority of female migrant workers overseas were in jobs at the lower end of the wage distribution.[10] The number of (typically low-income) females temporarily migrating to work as domestic workers (housemaids) was larger than the total number of males migrating in any category (Sri Lanka Bureau of Foreign Employment 2002).

There is evidence that many of the newer jobs are not covered by anti-discriminatory regulations. Guneratne (2002) points out that white collar jobs in the private sector are not covered by regulations, and although minimum wages that do not discriminate between males and females in blue-collar jobs are set by Wages Boards organized under the Wages Board Ordinance (Chapter 165), a study of industries in the Export Processing Zones has cited differential wages among male and female workers for the same task. Moreover, in the

[9] Note however that we do not include the agriculture sector in our analysis, because earnings determination in this sector is quite different from earnings determination in other sectors.
[10] Note that information on their wages is not available in the Quarterly Labour Force Survey (QLFS) and they are thus not included in this analysis.

tobacco and cinnamon trades, discriminatory wages are applied to men and women at present (Guneratne 2002).

Jayaweera *et al.* (2000) note that while the Wages Boards cover workers in subcontracted industries, there is a wide discrepancy between the law and the reality. Although Wages Boards determine remuneration and working hours which extend also to contracted labour, weak enforcement and indifference at all levels directly expose workers to market forces. Women are especially vulnerable, as they constitute the majority of workers in the semi-formal and informal sectors of the economy (Jayaweera *et al.* 2000). In their study of those engaged in the coir industry and in agricultural work among Mahaweli settlers, Jayaweera and Sanmugam (1998) note that the working conditions of the coir workers are unsatisfactory and they do not have the legal protection given to those in the formal sectors. They are not covered by laws and regulations regarding minimum employment age employment, working hours, occupational health and safety, guarantees of minimum wages, or equal remuneration for equal work.

Despite the improvement in aggregate labour market conditions for females in the 1980s and 1990s, there is also evidence of stagnating real wages. For example, in a study of agricultural wages in the Central Province, Gunatilaka (2003) found that (female) real wages in the tea sector in Kandy and Nuwara Eliya districts and in the paddy sector in the Matale and Nuwara Eliya districts stagnated, and increased only in the paddy sector in the Kandy district. Moreover, there was little evidence of wage and labour movements in one market affecting wages in the other, leading Gunatilaka to conclude that there was considerable spatial market segmentation, which could be attributed to "high travel costs, lack of information about casual employment opportunities in neighbouring districts, or institutional barriers.

On the other hand, especially where female workers are concerned, family ties and responsibilities, as well as issues of safety may constrain the distance that they can travel in search of work." (Gunatilaka 2003). Interestingly, Gunatilaka (2003) finds evidence of integration across occupations/labour markets within districts, but segmentation between districts. Workers in the tea sector in Nuwara Eliya who are paid less than those in the tea sector in Kandy, do not move to Kandy. On the other hand, there was evidence that rising masonry wages for unskilled males influenced female wages in the paddy sector in the same district. Evidence from other parts of the country indicates that the "shortage" of male labour supply in rural areas (because of recruitment into the army) has led to a well-documented substitution of females in hitherto male agricultural tasks, which involve the use of agricultural machinery such as tractors (Manuratne 1999).

The favourable labour market conditions of the 1980s appear to have stabilised in the 1990s. The female share in the labour force fluctuated from 31 percent to 37 percent in the 1996-2004 period. Although female unemployment rates declined continuously in the 1990s, they have gradually increased since 2001.[11] The proportion of females who are employees has remained roughly constant, though fluctuating, over the period. However, the proportion of female public sector employees has declined from being about a quarter of all employed females (including self-employed and unpaid family workers) to being a quarter of all female employees.[12] The proportion of unpaid family workers has declined, which is indicative of the increased opportunities for paid work outside of the home that have become available to women in Sri Lanka over the last twenty years.

The study focuses on the decade beginning in the mid-1990s. Evidence from household survey data indicates that the 1995-2002 period was one of increased growth with rising inequality (DCS 2004, World Bank 2007). The picture that emerges from analysis is that of a stylised dual economy-type situation with growth taking place predominantly in the manufacturing sector and the western provinces, with the other sectors and regions lagging behind (World Bank 2007). Little is known about the extent to which women shared in the fruits of the uneven growth, and the extent to which gender inequality contributed to overall inequality during this period. One might expect that export sector-driven growth would have had a positive effect on female employment and wages. At the same time, regional disparities are likely to exacerbate gender disparities, the relative immobility of women translating into their inability to migrate to make use of opportunities and higher wages in the developing regions, as noted by Gunatilaka (2003).

3. Conceptual framework

The conventional method of measuring discrimination developed independently by Blinder (1973) and Oaxaca (1973) assumes that, in the absence of discrimination, the estimated effects of individuals' observed characteristics are identical for each group. The mean wage gap can be decomposed as follows:

$$\ln w^m - \ln w^f = \mathbf{X}^{*f}(\boldsymbol{\beta}^m - \boldsymbol{\beta}^f) + (\mathbf{X}^{*m} - \mathbf{X}^{*f})\boldsymbol{\beta}^m \qquad (1)$$

where w is a measure of earnings such as the hourly wage; $\mathbf{X}$ is a vector of earnings

[11] Note however, that despite the rapid increase in female employment in the 1980s and 1990s, the female unemployment rate has remained twice as high as the male unemployment rate from the mid 1980s (21 percent, compared with 11 percent for males) through the 1990s to the current time, and unemployment rates for highly educated women are more than double those for similarly educated men.

[12] This is partly due to the increase in private sector employment following the growth of the manufacturing sector during this period, and partly due to a reduction in public sector hiring as part of fiscal discipline measures.

characteristics for the *i*th individual and **β** is a vector of coefficients; the asterisks on the **X** vectors denote *mean* characteristics. The first term on the right hand side is the portion due to differences in coefficients ($\boldsymbol{\beta}^m - \boldsymbol{\beta}^f$) , evaluated at the same set of average earnings-generating characteristics ($\mathbf{X}^{*f}$), in this case the female, and the second term the portion of the gap attributed to differences in average earnings-generating characteristics ($\mathbf{X}^{*m} - \mathbf{X}^{*f}$).

The decomposition may also be expressed in terms of average male characteristics ($\mathbf{X}^m$) as follows:

$$\ln w^m - \ln w^f = \mathbf{X}^{*m}(\boldsymbol{\beta}^m - \boldsymbol{\beta}^f) + (\mathbf{X}^{*m} - \mathbf{X}^{*f})\boldsymbol{\beta}^f \qquad (2)$$

Equation (1) and (2) may be written in several alternative ways depending on the assumptions made about the "true" wage structure in the absence of discrimination. Neumark (1988) points out that the two specifications derive from distinct theoretical assumptions about the underlying discriminatory behaviour. Using the male wage structure as the underlying (discrimination-free) structure implies that women are actively discriminated *against*, while the assumption that the female wage structure is the 'true' structure implies that all discrimination is "in *favour of* men". Reimers (1983) and Cotton (1988) proposed reference wage structures that are weighted averages of the empirical wage structures of males and females.[13] Neumark (1988) proposed the use of a weighting matrix derived from the Becker (1971) model of discriminatory tastes, which Oaxaca and Ransom (1994) show is identical to their solution when the weighting matrix **Ω** is defined as $(\mathbf{X}'\mathbf{X})^{-1}(\mathbf{X}'^m\mathbf{X}^m)$ where **X** and $\mathbf{X}^m$ are the matrices of characteristics in the pooled sample and in group *m,* respectively.

This method focuses on the average wage gap, which follows from the conventional approach of estimating Mincerian wage equations by least squares methods, which yields estimates of the effects of covariates on the mean of the conditional wage distribution.

However, the effects of covariates can vary along the conditional wage distribution. Quantile regression (QR) analysis introduced by Koenker and Basset (1978) is more flexible than OLS and allows one to study the effects of a covariate on the whole conditional distribution of the dependent variable. This is particularly useful in the analysis of gender wage gaps, because, as Sakellariou (2004) points out, "gender-earnings differentials entail much more than the fact that men, on average, earn more than women."

Quantile regressions are a natural extension of classical least squares estimation of conditional mean models to the estimation of an ensemble of models for conditional quantile functions - of which the central special case is the median regression estimator or Least

[13] Reimers (1983) proposed equal weights for male and female structures, Cotton (1988) proposed weights equal to the relative group size.

Absolute Deviations (LAD) estimator that minimizes a sum of absolute errors (Koenker and Hallock 2000). In contrast to OLS, QR is less sensitive to outliers, and may be more efficient than OLS when the error term is non-normal, and may have better properties than OLS in the presence of heteroscedasticity (Deaton 1997). As in ordinary least squares regression, where the mean of the distribution of the dependent variable, say log wage of worker *i*, y_i is modeled conditional on the regressors X_i, where X_i is a vector of covariates representing individual characteristics, quantile regressions yield models for different percentiles of the distribution. The θth quantile of y_i conditional on X_i is given by

$$Q_\theta (y_i|X_i) = X_i\beta_\theta , \theta \in (0,1) \qquad (3)$$

where the coefficient β_θ is the slope of the quantile line giving the effects of changes in X on the θth conditional quantile of y.

As shown by Koenker and Basset (1978), the quantile regression estimator of β_θ solves the following minimization problem:

$$\beta_\theta = argmin \left[\sum_{i:y_i \geq X_i\beta} \theta \left| y_i - X_i \beta \right| + \sum_{i:y_i < X_i\beta} (1-\theta) \left| y_i - X_i \beta \right| \right] \qquad (4)$$

Coefficients of quantile regressions are interpreted in the usual way. Standard errors are bootstrap standard errors.

Extending quantile regression analysis to decompose wage gaps requires a decision as to where on the covariates distribution the gaps are evaluated. Mueller (1998) and Garcia *et al.* (2001) use coefficients from the quantile regressions, but evaluate wage gaps by combining them with the means of the covariates distributions, which is problematic as the mean covariates are unlikely to be representative of covariates at each θth conditional quantile of y. Other approaches include using the average characteristics around a symmetric neighbourhood of every quantile (Bishop, Luo and Wang 2005) or deriving covariates from an auxiliary regression-based framework (Gardeazabal and Ugidos 2005, Hyder and Reilly 2006).

Machado and Mata (2005) propose a method whereby the entire conditional distribution of covariates is derived. Their method combines quantile regression with a bootstrap approach. Formally, it involves 6 steps.

1. Generate a random sample of size n from a $U[0,1]$: $u_1 \ldots, u_n$.[14]
2. Estimate n male and female coefficients separately from male and female samples: $\beta_{ui}{}^m, \beta_{ui}{}^f$; $i = 1, \ldots n$.

[14] In our case, n=5000.

3. Generate for each sample, a random sample of size *n*, with replacement, from the covariates X, denoted by $\{X_i^m\}^n{}_{i=1}$ and $\{X_i^f\}^n{}_{i=1}$

4. $\{X_i^m \beta^m\}^n{}_{i=1}$ and $\{X_i^f \beta^f\}^n{}_{i=1}$ are random samples of size *n* from the marginal wage distributions of *y* consistent with the linear model defined by (3).

5. Generate a random sample of the counterfactual distribution. $\{X_i^m \beta^f\}^n{}_{i=1}$ is a random sample from the wage distribution that would have prevailed among females if all covariates had been distributed as in the male distribution.

In order to simplify the comparison with the Blinder-Oaxaca decomposition, we present the decomposition of the quantiles of the simulated wage distribution as follows, where (5), analogous to (1) uses the female characteristics and the male earnings structure as the reference, while (6) analogous to (2) is based on male characteristics and the female wage structure.

$$Q_\theta (y^m) - Q_\theta (y^f) = [Q_\theta (X_i^f \beta^m) - Q_\theta (X_i^f \beta^f)] + [Q_\theta (X_i^m \beta^m) - Q_\theta (X_i^f \beta^m)] + \text{residual} \quad (5)$$

$$Q_\theta (y^m) - Q_\theta (y^f) = [Q_\theta (X_i^m \beta^m) - Q_\theta (X_i^m \beta^f)] + [Q_\theta (X_i^m \beta^f) - Q_\theta (X_i^f \beta^f)] + \text{residual} \quad (6)$$

The first term on the right hand side is the contribution of the coefficients, and the second term is the contribution of the covariates to the difference between the θth quantile of the male wage distribution and the θth quantile of the female wage distribution. The residual term comprises the simulation errors which disappear with more simulations, the sampling errors which disappear with more observations, and the specification error induced by estimating linear quantile regression (Melly 2005).[15] We assume that the linear quantile model is correctly specified.[16]

4. Data description and raw wage distributions

4.1 Description of data

The data used in this study are from the Quarterly Labour Force Surveys (QLFS) conducted by the Department of Census and Statistics.[17] The survey covers the whole island, except the Northern and Eastern provinces which are the two most severely affected by the armed conflict with the separatist Liberation Tigers for Tamil Eelam (LTTE) movement.[18] The survey schedule is administered to approximately 4,000 housing units per

[15] Note that the first two terms on the right hand side in (5) and (6) add up to the same total, which can be easily seen as, $Q_\theta (X_i^m \beta^m) - Q_\theta (X_i^f \beta^f)$.

[16] This is equivalent to defining $Q_\theta (y^m) = Q_\theta (X_i^m \beta^m)$ and $Q_\theta (y^f) = Q_\theta (X_i^f \beta^f)$ then the residual terms in equation 5 and 6 are zero by construction.

[17] Links to the QLFS survey schedule and recent Annual Reports are available at http://www.statistics.gov.lk/samplesurvey/index.htm

[18] The 2003 survey included the Eastern province and the 2004 survey includes both provinces except Mullaitivu and Killinochchi districts in the Northern Province; for comparability households in the Northern and Eastern provinces are excluded from the 2003 and 2004 samples.

quarter. The sample is selected using a two-step stratified random sampling procedure with no rotation, and a new random sample is drawn each quarter.[19]

This study focuses on changes from the beginning to the end of the 1996-2004 period.[20] We select two periods: for the first (beginning) period unit records from the 3rd and 4th quarters of the 1996 QLFS were combined with all four quarters of the 1997 QLFS, while for the second (ending) period records from all quarters of 2003 were combined with the 1st and 2nd quarters of 2004.[21]

The sample is selected to include all individuals between the ages of 18 and 58, who were employees in their main occupation of work, who were "usually employed" in the previous 12 months,[22] and who had worked at least one hour in the week prior to when the survey was administered.[23] We exclude individuals who were self-employed or worked with or without pay for a family-operated farm or business, as well as agricultural workers and any individuals who were currently attending a school or educational institution. In addition, we excluded individuals who claimed to usually work less than 20 or more than 70 hours a week.[24] The sample includes formal and informal sector employees, but the data does not permit us to identify formality, i.e. no sample separation is possible. We also exclude households in the 2003/2004 samples that are from the Northern and Eastern provinces, in order to maintain comparability with the 1996/97 sample.[25] Finally, our sample contains only those individuals with nonmissing observations on all the regressors. The selected sample comprises a total of 9,834 individuals in the first period and 10,594 individuals in the second period.

Thirty one percent of the pooled sample in both years were female. This is somewhat larger than corresponding female shares of wage employees of 20 percent in Egypt in 1990 (Said 2003) and of 24 - 29 percent in Chile in the 1990-1998 period (Montenegro 2001) but smaller than those of 38 - 40 percent in Vietnam in the 1993-2002 period (Pham and Reilly 2006), and 48 percent in urban China (Bishop, Luo and Wang 2005). Thirty six to thirty eight percent of public sector employees and 28 percent of private sector employees were female,

[19] Note that the QLFS is not a panel.
[20] The choice of time period is constrained by the availability of data. Although Sri Lankan labour force data has been collected in quarterly surveys from 1990, the sampling frame and questionnaire were changed, making surveys conducted before the 3rd quarter in 1996 incomparable with those conducted after.
[21] Since the sub-samples of observations in 1996 and 2004 are approximately half the size of the other annual sub-samples, they were combined with the annual samples of 1997 and 2003.
[22] Defined (by the DCS) as those who worked for 26 weeks or more during the previous 12 months.
[23] The latter definition corresponds to the DCS definition of those currently employed.
[24] These restrictions are imposed to limit the sample to workers with labour force attachment, and to address any potential problems of misreporting, especially of hours worked. As a result of the relatively high lower bound on hours worked, the sample may underrepresent part time workers.
[25] See footnote 18.

compared to the corresponding figures of 12 percent and 3 percent in Pakistan in 2001/02 (Hyder and Reilly 2007). In Egypt, in 1990, 33 percent of government, 14 percent of public enterprise, 21 percent of private sector employees were female (Said 2003).

Thirty seven percent in 1996/97 and 32 percent in 2003/04 of the total sample of employees were public sector employees, while the corresponding percentages in the female sample were 43 percent and 41 percent for 1996/97 and 2003/04 respectively.

We conduct the analysis separately for public and private sectors. Gender earnings differentials could differ between these sectors for a variety of reasons. Compliance with equal pay legislation is more likely in the public sector, and wage structures and promotion schemes are less likely to leave room for individual variation. On the other hand, the public sector is subject to political constraints and not to profit constraints, and any (tastes for) discrimination is more likely to persist. Alternatively, whether public sector wage premiums (if any) are enjoyed by males or females may be determined by the respective strength of their voice within the public sector.

The definition of earnings underlying the gender wage gap used throughout this paper is *the log of hourly wages from the main occupation* where hourly wages is calculated as earnings in the last month from the main occupation divided by the hours usually worked (at the main occupation) in a month calculated as 30/7 multiplied by the hours usually worked in a given week.[26] Nominal values are converted to real terms using the Sri Lanka Consumer Price Index (SLCPI) with a base period of 1995-1997 (Central Bank of Sri Lanka 2005a).[27]

Schooling is defined into seven categories following an ISCED-based[28] categorisation: no schooling (reference category), sub-primary, completed primary, completed lower secondary, completed O/L, completed A/L and post-secondary; experience is years of experience in the current occupation; age is included separately and is measured in years. Formal and informal training are included as dummy variables, with no training as the reference category. Also included are dummy variables for marital status (1 if currently married), part-time status (defined as usually working less than 35 hours a week) and ethnicity (Tamil, Moor and other, with Sinhala as the reference category). Regional dummy variables were included for six of the seven provinces for which data was available, with the

[26] Although the questionnaire includes a question on the rupee value of compensation in kind, this information is not coded into the raw data tapes. Although roughly 7 percent of the sample said they engaged in a secondary occupation, only 1/10th of that number reported any earnings from it.

[27] The SLCPI is the price index officially used in updating the poverty line, and is based on a national consumption basket and includes price information from all districts of the country, unlike the previously used Colombo Consumer's Price Index (CCPI).

[28] ISCED stands for International Standard Classification of Education. For details see http://www.unesco.org/education/information/nfsunesco/doc/isced_1997.htm

Western province as the reference.

Seven major categories of occupations (ISCO88) are also included. The reference category of senior officials and professionals corresponds to high skilled white-collar jobs while the second and third categories of technicians and associate professionals and clerks correspond to low-skilled white collar jobs. The last four categories are typically low-skilled occupations: sales and service workers, craft and related workers and plant and machine operators, and those in elementary occupations. Four industrial groups are included. They are (1) mining and construction (reference category); (2) manufacturing; (3) electricity water and gas, wholesale and retail trade, and the hospitality industries of hotels and restaurants and the infrastructure (transport, communication) and finance sectors; and (4) services, including health, education and defence.

Selectivity issues

Female labour force participation in Sri Lanka was about 31 percent in the reference period which is less than half that of males, and female unemployment in the same period was over twice that of males. This raises concerns of selectivity bias which can be present in the labour force participation choice as well as in the form of selection into wage employment. However, female wage employment was approximately 60 percent of all female employment, while female public sector employment was approximately 27 percent of female wage employment.

Selectivity-correction techniques for mean regression are well-known, although accurate empirical estimation is often difficult owing to issues relating to identifying instruments or exclusion restrictions. We explore selectivity within the mean regression framework and find no evidence of a selection effect into wage employment for males or females.[29] We find some evidence for selectivity into public sector wage employment, while evidence for selectivity bias in the private wage sector sample differs according to the method used.[30]

The techniques to correct for selectivity bias in quantile regression models are less well known and there is little consensus regarding the most appropriate correction procedure. Buchinsky (2001) suggests an approach that adapts Newey (1999) to approximate the selection term by a higher order series expansion which is Albrecht *et al*. (2004) and also by Tanuri-Pianto, Pianto and Arias (2004), in their analysis of informal sector employment in Bolivia. However this method leads to identification problems relating to the wage regression intercept term. Hyder and Reilly (2006) circumvent this by inserting the

[29] This is similar to the results of Rama (2003) who used QLFS data from 1995.
[30] For a detailed presentation of the selectivity correction, please see Gunewardena *et al.* 2007.

simple selection term into the quantile regression models, but acknowledge that this is an inexact correction for selection bias.

Given the absence of selectivity bias in our pooled sample estimates, the ambiguous evidence for bias in private sector estimates and the relatively small difference in selectivity corrected public sector wage gap estimates in our mean regression models, as well as the lack of sufficiently good instruments to represent a labour market participation decision in our sample, the trade-off in using potential instead of actual experience in the selectivity corrected model, and the added complications that arise in correcting for selectivity bias in quantile regression models, we decide to proceed without a selection correction procedure in either the mean or quantile regression models. Other studies with similar constraints that make the same judgement call include de la Rica, Dolado and Llorens (2007), Pham and Reilly (2006), Newell and Reilly (2001), Montenegro (2001), Said (2003) and Sakellariou (2004).

Furthermore, as de la Rica *et al.* (2007) argue, selectivity correction would only be necessary if one wished to make inference about *all* women of working age rather than just those in the given sample(s). We reiterate therefore, that our public and private sector results should be interpreted as being *conditional on the selected samples*. We also acknowledge that in the absence of selectivity correction, the coefficients in our regressions are biased estimates of *returns* to covariates. Thus, although we use the term 'returns to endowments,' we do so knowing that they are the returns to endowments of the given samples, and cannot be applied to the working age population in general.

Descriptive statistics

The gap in mean log hourly wages was 0.026 (2.6 percent of male wages) and 0.044 (4.3 percent of male wages) in 1996/97 and 2003/04, respectively. However, the gap in 1996/97 was insignificantly different from zero at the 5 percent level, while in 2003/04 the gap was significant at the 1 percent level. These are unusual results, with few parallels in the empirical literature. In a survey of mean gender wage gaps for over 90 country/year observations, gaps of less than 5 percent were found only in Argentina in 1995, and Costa Rica in 1989, while in Chile in 1996 the gap was 1 percent in favour of females (World Bank 2001).[31] More recently, Sakellariou (2004) reports an insignificant male-female gap in the log of monthly earnings in the Philippines in 1999. In Arulampalam *et al.*'s study, mean log wage gaps in eleven European countries ranged from 0.06 (Italy) to 0.25 (Britain). By way of comparison, the log wage gap in urban China in the 1990s was 0.22 (Bishop *et al.* 2005)

[31] World Bank (2001) reports that hourly female wages in Chile in 1996 were 101 percent of hourly male wages. However, in the original source for the Chilean results, Montenegro (2003) reports hourly female wages to be 93 percent of hourly male wages in that year and 96 percent for 1998.

while in Vietnam mean log wage gaps declined from 0.29 in 1993 to 0.15 in 2002 (Pham and Reilly 2006).

However, disaggregation by sector reveals mean log wage gaps to be very different in the private and public sectors. In the public sector wage gaps evaluated at mean log hourly wages indicate female hourly wages to be as much as 16 percent higher than male hourly wages in 1996/97, and 13 percent higher in 2003/2004. This is an unusual, possibly unique, result, but is not completely unexpected, given the relatively high productive characteristics of females and the potential selection of higher quality females into pubic sector employment. The only similar result in the literature is that of the public sector in Italy, where public sector mean male log wages are not significantly different from mean female log wages (Arulampalam *et al.* 2006).[32] In the private sector, the mean log wage gap is 19 percent in 1996/97 and 22 percent of male wages in 2003/04.[33]

Summary statistics of the data are presented by sector and year in Table 2 and 3 indicate that females have an advantage in endowments of productive or earnings-generating characteristics. A greater percentage of females had A/Level and post-secondary education compared to males in both sectors (and the proportion of females with post-secondary education in the private sector increases significantly between 1996 and 2004).[34] While there is no gender gap in formal training in the private sector, females have an advantage (40 percent higher proportion) in formal training in the public sector, most likely reflecting the training received by teachers (and, to a lesser extent, nurses). While males and females in the public sector are older than those in the private sector, the male-favouring gender age gap is considerably larger (4 years) in the private sector.

Similarly, the gender gap in occupational experience is much larger (75 percent) in the private sector. A smaller proportion of females are married compared to their male counterparts, and the disparity is more evident in the private sector. The great majority of females in the private sector (over 60 percent) are employed in manufacturing (with a significant decline in share between 1996/97 and 2003/04) while in the public sector they are mainly (over 80 percent) engaged in the services sector (particularly education and health).[35] However, while males in the public sector are distributed across occupations, public sector females predominate in the professions (close to 50 percent, mainly as teachers) and in the

[32] The only other studies in the literature that conducted a sectorally disaggregated analysis are Ganguli and Terrell (2005), and Kee (2006) where mean wage gaps of both sectors are significantly different from zero.
[33] Mean gender wage differences within both sectors are all significant at the 1 percent level.
[34] The female advantage in secondary and post-secondary education endowments was also observed in the data from the Philippines, Chile, Vietnam, and the Ukraine (Sakellariou 2004, Montenegro 2003, Pham and Reilly 2006 and Ganguli and Terrell 2005).
[35] Over 80 percent of public sector males are also engaged in the service sector.

occupational categories of associate professionals and clerks (40 percent).[36] The majority of private sector males and females work in two occupational categories: craft and related workers and elementary occupations. Over 40 percent of private sector females are in this category (which includes textile and garments trades workers) compared to 30 percent of males, while over 35 percent of males are engaged in elementary occupations compared to 25 percent of females. Thus, mean characteristics provide an indication that mean wage results are likely to be explained by better female endowments.

We now consider the entire raw wage distribution. Figure 1 provides a visual summary of pooled, public and private sector raw wage distribution in 1996/97 and 2003/04. The first panels in Table 4 and Table 5 provide magnitudes of the raw gap at the 10th, 25th, 50th, 75th and 90th percentiles for the same samples. These are given as percentages of the male wage in Table 6. The first panel in Figure 1 indicates that overall, male and female wage distributions are very different.[37] The male distribution lies "within" the female distribution, and is characterised by a higher density function around the mode, and a lower dispersion. At the lower quantiles of the distribution, males enjoy an earnings advantage over females, *while at the 75th and 90th percentiles, the advantage is enjoyed by females*.[38] The raw gaps range from 0.22 log hourly wages (20 percent of the male wage) in 2003/04 and 0.15 (14 percent) in 1996/97 at the 10th percentile, to a negative (female-favouring) gap of 0.15 (16 percent) in the 90th percentile in both periods. These results are striking, though similar to those reported by Sakellariou (2004) for the Philippines in 1999.[39]

Disaggregation by sector indicates that the falling wage gap with women earning more than men at the higher end of the distribution is largely explained by the sectoral composition of the pooled wage distribution (Second and third panels of Figure 1). The female public sector wage distribution lies almost entirely to the right of the corresponding male wage distribution, while the female private sector wage distribution lies to the left of the private sector male wage distribution. We are not aware of any other studies/countries where higher female wages are indicated throughout the public sector distribution.[40] We suspect

[36] This is consistent with results of the 1998 Census of Public and Semi-Government Employees which indicate that relatively few females are employed in the lower-paying occupational categories in the public sector (Elementary occupations, Machine Operators and Related workers, Craft and Related Workers and Sales and Service workers) (Department of Census and Statistics 2001).
[37] The density functions in Figure 1 were estimated using an Epanechnikov kernel estimator.
[38] Wilcoxon rank-sum tests indicated that for all sectors and years, male and female distributions were significantly different from each other. Tests of differences between periods indicated that distributions were different except in the case of private sector females.
[39] Although the mean raw wage gap for Chile was similar in magnitude to ours, the Chilean raw wage distribution is characterised by gaps that *increase* throughout the wage distribution (Montenegro 2003).
[40] Neither Sakellariou (2004) nor Montenegro (2003), whose pooled results are very similar to ours, disaggregate their samples by sector, and thus we do not know if similar results might have been found in the Philippines and in Chile.

this result may be due to the better endowments of women in the public sector relative to men, as well as the gender composition of occupations in the public sector, where women work mainly in the professional, technical, and clerical occupations. It is also consistent with the selection of 'higher quality' women into public sector wage employment.[41]

Table 4, 5 and 6 provide the magnitude of sectoral raw wage gaps at the 10th, 25th 50th 75th and 90th percentiles, indicating negative (female favouring) raw wage gaps throughout the public sector and positive (male favouring) raw wage gaps throughout the private sector in both periods.[42] Sectoral raw gaps display considerable variation along the distribution as well. Public sector raw wage gaps decline (become more negative or female-favouring) until about the median and then rise marginally (become less negative), while private sector wage gaps display a more complex behaviour. In 1996/97, they fall initially (between the 10th and 25th quantiles), but rise thereafter (upto the 75th quantile) and then decrease (90th quantile). In 2003/04, they show the same pattern at the lower quantiles, rising between the 25th and 50th quantile, but then fall continuously thereafter). Figure 2 through 3 depict the raw gaps (dashed-dotted line)[43] which are calculated at every 5th percentile.

The change in the mean raw gender wage gap from 1996/97 to 2003/04 was quite small - from an insignificant gap in 1996/97 to a very small overall gap of 4.3 percent of the male wage in 2003/04. This indicates that the gender wage gap has not contributed in a major way to the increase in inequality during this period. This is not unusual. In urban China, for example, the gender wage gap increased by one percentage point during a period of 25 percent increase in earnings inequality (Bishop, Luo and Wang 2005) while in Vietnam gender disparities *decreased* during a period of relatively high inequality (Pham and Reilly 2006).

Sectoral changes within Sri Lankan wage employment indicate that private sector gender wage gaps increased from 19 to 22 percent, while public sector gender wage gaps fell from 16 to 13 percent of the male wage. Further disaggregation indicates the largest increases to be at the 25th and 50th percentile of the private sector which rose from 17 and 18 percent to 22 and 23 percent of the male wage gap, driving the increase in the pooled wage gap at the 10th and 25th percentiles which rose from 14 and 10 percent to 20 and 15 percent of the male wage gap. The magnitude of these changes is not considerable,

[41] See footnote 36 for more information on public sector occupational categories. Note that we draw inference only for the existing public sector wage employees' sample, and not for all women of working age.
[42] These differences are statistically significant at the 1 percent level.
[43] Note that the raw gaps shown in Figure 3 and 5 are the same as those shown in Figure 2 and 4, respectively.

indicating that changes in wage inequality among men and women did not play a large part in the changes in overall income inequality that were observed during this period. However, it is a cause for concern that the divergence in wages occurred at the point where gender wage gaps are largest.

To summarise, raw wage gaps indicate that women fare worse than men at the bottom of the pooled distribution, while women appear to fare better than men at the top of the pooled distribution. Sectoral disaggregation indicates that this is entirely driven by women doing better than men throughout the public sector and worse than men in the private sector. At this point, we surmise that this is because women in the public sector are better endowed relative to men, compared with the private sector. Changes over time indicate a moderate worsening of the wage gap at the bottom of the pooled distribution.

5. Decomposition results

In order to decompose the differences in raw wage distribution into differences in coefficients (returns) and in characteristics (attributes), the Oaxaca and Blinder decomposition and the Machado and Mata decompositions are applied to estimates derived from mean and quantile regression. Two specifications are used. In the first specification, the vector of regressors includes age and occupational experience (both in quadratic form), dummy variables for education, whether any (formal/informal) training is received, ethnicity, marital status, and region. The second specification also included dummy variables for part-time status, seven occupational categories and four industrial categories. Goodness of fit statistics are similar to results reported in similar studies (Pham and Reilly 2006, Ganguli and Terrell 2005, Bishop, Luo and Wang 2005).[44]

Decomposition results are summarized in the second and third panels of Table 4 (1996/97) and 5 (for 2003/04), and presented graphically in figues 2 and 3 for 1996/97, and in Figure 4 and 5 for 2003/04. The 'estimated' wage gap presented in the second and third panels of the tables and as the solid line in the figures is the 'unexplained' wage gap, or the part that remains once covariates are controlled for i.e., the component of the wage gap decomposition due to differences in 'returns' to endowments. It is presented in both its forms, i.e. evaluated at male characteristics [$X_m(\beta_m - \beta_f)$] and at female characteristics [$X_f (\beta_m - \beta_f)$]. For OLS, this is the standard Blinder-Oaxaca decomposition, evaluated at mean characteristics. For the quantiles, the results are obtained following the procedure used by Machado and Mata (2005). Note that the interpretation of the estimated wage gap when evaluated at male (female) characteristics is the difference between the actual male (female)

[44] Please see Gunewardena *et al.* 2007, Appendix 2, tables A2.1-A2.12 for a detailed presentation of the results.

wage distribution and the male (female) wage distribution if males (females) were paid like females (males), or alternatively, if females (males) had the identical characteristics as males (females), but were still paid like females (males). In addition to the point estimate of the estimated wage gap, the 95 percent confidence interval for the point estimate and the raw gap are also presented in the figures for ease of comparison.

Results based on model 1: excluding controls for part-time status, occupation and industry

The results based on the specification which excludes controls for part-time status, occupation and industry are discussed first. This is our preferred model because part-time status, occupation, and industry are choice variables that are arguably endogenous.[45]

Mean conditional gaps

The first column in both Table 4 and 5 gives the Oaxaca-Blinder decomposition, and indicates that once characteristics are controlled for, the estimated (unexplained) mean wage gap is positive (male- favouring), even where the raw gap was negative. These results are similar to Montenegro (2003) for Chile and Sakellariou (2004) for the Philippines. The (unexplained) estimated gap is smaller in the public sector than in the private sector. These are similar to Arulampalam *et al.*'s (2006) results for nine out of eleven European countries and Kee's (2006) results for Australia, and in contrast to Ganguli and Terrell's (2005) results for Ukraine. The figures in the second panel of Table 6 give the proportion of the raw gap that is due to differences in returns as a percentage. [46] This indicates that in the pooled sample, over 100 percent of the gap (in fact, 340 percent of it) is due to the existence of "discrimination:" in the absence of "discrimination", females would earn more than males. These results are consistent with (though of a larger magnitude than) previous results for Sri Lanka (Ajwad and Kurukulasuriya 2002, and Gunewardena 2002) and similar to Blau and Kahn's (2003) results for UK (1985-1994), New Zealand (1991-94), Bulgaria (1992-93), Israel (1993-94), Poland (1991-94) and Slovenia (1991-94); to Glinskaya and Mroz's (2000) results for the Russian Federation (1994) to Birdsall and Behrman's (1991) results for Brazil (1970) to Psacharapoulos and Tzannatos' (1992) results for Chile (1987), Honduras (1989), Jamaica (1989) to Meng and Miller's (1995) results for China in 1985, to Horton's (1996) results for the Philippines (1978 and 1988)[47] and to Montenegro's (2003) results for Chile (1992-1998).

When the sample is disaggregated by sector, almost 100 percent of the private

[45] One could argue that the way in which discrimination operates is in the tracking of females into low paying occupations and industries or part-time work, and that therefore any estimates that control for these factors would then underestimate discrimination.
[46] This is calculated on the assumption that the residual in (5) and (6) is zero.
[47] Cited in World Bank (2001), Appendix 3, p. 301-306.

sector gap is due to the difference in coefficients, which is similar to Blau and Kahn's (2003) results for Ireland (1988-90, 1993-94) the United States (1985-94), the Czech Republic (1992, 1994), the Democratic Republic of Germany (1990-93), Hungary (1988-94), the Russian Federation (1991-94) and Psacharopoulos and Tzannatos' (1992) results for Venezuela (1989).

On the other hand, the female-favouring gap in the public sector, like that in the pooled sample, is more than entirely explained by the difference in characteristics (i.e. females have more favourable characteristics at the mean than male).

Estimated wage gaps across the distribution

The second to sixth columns of tables 4 and 5 (panel 2) and the solid line in figures 2 and 4 provide the results of the Machado-Mata decomposition.

The estimated wage gap in both years is positive at every quantile in the pooled distribution, indicating that females are underpaid (or males are overpaid) throughout the distribution.[48] Moreover, it lies clearly above the raw wage gap over a large part of the distribution (Figure 2 and Figure 4).[49] Table 6 indicates that over 100 percent of the positive (male-favouring) raw wage gap (from the 10th percentile to the median) is unexplained, while the negative (female-favouring) raw wage gap in the upper part of the distribution is largely explained by better female endowments.[50] *This indicates that women have better characteristics throughout the earnings distribution and, in the absence of discrimination, would have earned more than men.* These results are similar to Arulampalam *et al.*'s (2006) results for Belgium, Finland, France, Italy and Spain, Montenegro's (2003) results for Chile and Sakellariou's (2004) results for the Philippines.[51]

While public sector results are similar in this last respect to pooled sample results[52], in the private sector the estimated wage gap coincides almost entirely with the raw wage gap (right-most panels of Figures 2 and 4) indicating that close to 100 percent of the wage gap is unexplained. *This indicates that women in the private sector have similar characteristics to men, and in the absence of discrimination women would have earned the same as men.* These results are similar to Arulampalam *et al.*'s (2006) disaggregated results for Belgium, France, Ireland and Spain, where estimated public sector wage gaps are higher than raw

[48] Except at the 90th percentile, when evaluated at male characteristics, in 1996/97.
[49] Above the 40th percentile of the pooled distribution.
[50] Except in the case of the raw median wage gap in 1996/97 where only 72 percent and 96 percent are explained.
[51] Note however that negative (female-favouring) raw gaps are observed only in the Philippines (Sakellariou 2004) and Chile (Montenegro 2003).
[52] The estimated wage gap is larger than the raw wage gap up to the 85th percentile of the public sector distribution.

wage gaps, while in the private sector raw wage gaps lie within the confidence intervals of the estimated wage gaps.

While the estimated wage gap is positive throughout the pooled and private distributions, in the public sector it remains negative (female-favouring) at the median and at the 75th percentile. Thus, although the estimated wage gap is smaller (in absolute terms) than the raw wage gap, indicating that a large part of the female-favouring wage gap is due to better female characteristics (Tables 4 to 6), there remains an unexplained component of the gap that disadvantages males at the median and above.[53]

The results described above are robust to the choice of whether gaps are evaluated at male or female characteristics. However, magnitudes of estimated gaps differ between these sets of estimates. In both years, a slightly larger proportion of the gap *at the bottom of each distribution is unexplained* when we use the female structure (male characteristics) than the male structure (female characteristics). Breunig and Rospabe (2005) obtain a similar result in their analysis of wages in France and interpret it as indicating that there are likely to be more unobservable factors that influence women's choice of work than men's. However, the opposite is true at the top of the Sri Lankan wage distribution, in 1996/97, indicating, by the same logic, more unobservable factors influencing men's choice of work than women's. This result challenges conventional thinking about selection as an issue related to females only, indicating as it does that there are unobservables that affect men's choice of work as well. Disparities in magnitude of estimates are much smaller in 2003/04, indicating that selection is less of an issue in 2003/04.

What light do the decompositions shed on the observed divergence in raw wages at the bottom of the distribution between 1996/97 and 2003/04? Here, the results differ depending on whether male or female structure (or conversely, characteristics) is used. If women were paid like men, the increase in raw wage gaps at the bottom of the pooled distribution and at the 25th and median of the private sector distribution could be attributed to difference in returns to endowments, whereas if men were paid like women, the increase in raw wages could be attributed to changes in endowments.

Finally, does the QR-based decomposition provide more information than mean decomposition? What can we conclude about the existence of sticky floors and/or glass ceilings? Figure 2 and 4 indicate that OLS underestimates the conditional wage gap at the bottom of the pooled distribution and overestimates it at the top. There is clear evidence of a falling wage gap throughout the distribution, when the estimated wage gap is evaluated at male characteristics, and evidence of a falling gap up to the median when evaluated at

[53] Note that this feature is not captured by the Blinder-Oaxaca decomposition of wages at the mean.

female characteristics. Thus, there appears to be 'sticky floors' for women in the Sri Lankan wage employment market, i.e the wage gap between otherwise identical men and women is greater at the bottom of the wage distribution.

However, is this 'sticky floor' simply a manifestation of a 'sticky door' i.e. is it completely explained by sectoral stratification, where the public sector wage distribution lies above the private sector wage distribution? If this were so, we would expect public and private sector-estimated wage gaps to be flat across their respective distributions. Rather, we find that in the public sector, the quantile regression-based decomposition clearly provides more information about the distribution of the conditional wage gap than the OLS-based decomposition, while in the private sector, the result differs between years. In 2003/04 (Figure 4) the quantile regression estimates of the conditional wage gap do not significantly differ from the conditional mean wage gap, except around the 10th percentile (when evaluated at male characteristics), whereas in 1996/97 (Figure 2) there is a difference between QR and OLS estimates of the unexplained gap below the 30th percentile and above the 80th percentile, when evaluated at male characteristics and between the 20th and 30th percentiles and above the 65th percentile, when evaluated at female characteristics.

Among developing county studies, the result of falling wage gaps in the conditional distribution is also reported for Vietnam in the 1993-2002 period (Pham and Reilly 2006) and over most of the distribution for the Philippines in 1999 (Sakellariou 2004) although not for Montenegro (2003), where conditional wage gaps rise throughout the distribution.

Results based on model 2: including controls for part-time status, occupation and industry

Duncan and Duncan (1955) dissimilarity (D) indices for Sri Lanka for this period, based on an aggregated categorization of ten occupational categories, indicate that 15 to 20 percent of women (or men) have to change occupations in order to equalize female and male occupational distributions. When the number of categories is more finely disaggregated into 39 categories, the D index increases to 44 percent (Gunewardena *et al.* 2006). This suggests that occupational differences may explain gender wage gaps.

So we include controls for part-time status, occupation and industry to examine to what extent they explain the wage gap and present the results in panel 3 in tables 4 and 5, and in figures 3 and 5. Many of the results discussed previously do not change after introducing controls for part-time status, occupation and industry: (1) women continue to be underpaid (men overpaid) throughout the overall distribution; (2) estimated wage gaps continue to be larger than the raw in the pooled and public sector distributions, indicating that in the absence of discrimination women would earn more than men, *even after controlling for occupation, industry and part-time status;* (3) in the private sector distribution,

estimated wage gaps are equal to raw wage gaps, indicating that in the absence of discrimination women would earn the same as men, *even after controlling for occupation, industry and part-time status;* (4) the explanation for the increase in raw gaps at the bottom of the distribution is similar to that when controls are not used;[54] and (5) pooled and public sectors continue to indicate a 'sticky floor' although the conditional mean gap provides a good estimate of the conditional wage gap across the distribution only in the 2003/04 sample when evaluated at female characteristics.

However, unexplained (estimated) wage gaps *are larger when occupation, industry and part-time status are controlled for, than when they are excluded*.[55] The magnitude of increase is sufficiently large that the negative estimated wage gaps in the upper part of the distribution in the public sector become positive. These results are consistent with the idea of females selecting into occupations and industries, and choosing hours of work that reward their characteristics better, and is not consistent with the more commonly observed explanation of occupational segregation where females are tracked into lower paying occupations and industries. These results are unusual; for eg. Arulampalam *et al.* (2006) find that either the results do not change, or 'glass ceilings' disappear, when controls for occupation and industry are included. Albrecht *et al.* (2003) find that controlling for occupation substantially reduces the gender gap throughout the wage distribution. Sakellariou finds that "women are heavily favoured in their returns to …occupation across the entire earnings distribution", which is consistent with a narrowing of the wage gap when occupational controls are included.[56] Thus, it appears that while Sri Lankan women are able to chose occupations (industries, flexibility of status) in which their (better) characteristics are rewarded better, *within these broad occupational categories or occupations* they continue to be underpaid. The larger disparity within, rather than between, occupations is explained by the fact that men hold the jobs that pay better within these occupations (industries) e.g. while 71 percent of school teachers and garment industry employees are female, only 21 percent of school principals are women, and only 26 percent of employees in adminstration in the garment industry are women (Department of Census and Statistics 2001, Sri Lanka Bureau of Foreign Employment 2002).

[54] It would be attributed to difference in returns to endowments, whereas if men were paid like women, the increase in raw wages would be due to changes in endowments.
[55] Except in the private sector, 10th percentile in 1996/97 and 90th percentile in 2003/04.
[56] Arulampalam *et al.* (2006) and Albrecht *et al.* (2003) conduct a similar exercise to ours, comparing sets of estimates with and without occupational controls, while Sakellariou has a single set of estimates that include occupational dummies and his conclusion is based on the coefficients on these variables. Albrecht *et al.* (2003) find their results are robust to the inclusion of 107 occupational dummies. Our results may be due to the fact that we use fewer controls: 7 occupational categories and 4 industrial categories, but this is roughly comparable to the level of aggregation in Arulampalam *et al.* (2006).

When we include controls for occupation, industry and part-time status, a larger proportion of the gap is unexplained when we use the female structure (male characteristics) than the male structure (female characteristics) *throughout all three distributions*, indicating that there are likely to be more unobservable factors that influence women's choice of work *within* broad occupational and industrial categories than men's.

Table 7 provides a summary of the results in terms of sticky floors and glass ceilings. We use two alternative conditions to define a 'glass ceiling': if the 90th percentile estimated wage gap is larger than that at the 75th percentile or that at the 50th percentile, by 4 percentage points.[57] 'Sticky floors' are defined in three ways: if the 10th percentile estimated wage gap is larger than every other single estimated wage gap, the 75th percentile estimated wage gap, or the estimated wage gap at the median, by 4 percentage points. Columns 7 and 14 in Table 7 indicate the range of the estimated wage gap across the distribution and columns 6 and 13 indicate whether the profile of the estimated wage gap is monotonically increasing or decreasing along the distribution.

The table indicates that none of the distributions are monotonically increasing in the estimated wage gap, and only the pooled distribution - evaluated at male characteristics - is monotonically decreasing. However, by the other three definitions used, there is clear evidence for a 'sticky floor' in the 2003/04 data, robust to either model specification and to whether male or female characteristics are used to evaluate the gap in the absence of discrimination. In the public sector too, there is evidence of a sticky floor in both years. In the private sector, a sticky floor is evident in 2003/04, only when the weakest definition (10th percentile greater than the median) is used, evaluated at male characteristics, but there is stronger evidence for a sticky floor in 1996/97. In both public and private sectors, there is also some evidence of a 'glass ceiling', when estimated wage gaps are evaluated at female characteristics in 1996/97. Thus, it appears that sticky floors predominate in the Sri Lankan wage market for women, and are not simply a manifestation of occupational segregation or sectoral stratification (sticky doors).

6. Conclusions, policy implications, limitations of the study and future work

This paper analyses changes in gender wage gaps throughout the wage distribution in Sri Lanka using individual data from the Quarterly Labour Force Surveys (QLFS) and a quantile regression approach for the two end-points of the 1996-2004 period. The analysis is conducted separately for the public and private sectors as well as on a pooled sample.

[57] The value of 4 percentage points is derived from the confidence intervals in our results. At four points, any such differences are statistically significant at the 5 percent level of significance.

The gap in mean log hourly wages was 0.026 (2.6 percent of male wages) and 0.044 (4.3 percent of male wages) in 1996/97 and 2003/04, respectively. However, there are large differences in unconditional mean gender wage gaps across sectors, with a mean female private sector wage that is approximately 80 percent of the mean male wage, and, somewhat unexpectly, a public sector mean female wage that was 13-16 percent higher than the public sector mean male wage.

Results on unconditional wage gaps at the 10^{th}, 25^{th}, 50^{th}, 75^{th} and 90^{th} quantiles indicate that the mean gender wage gap hides a large variation in the gap across the distribution, and that these gaps are very different in the public and private sectors. Unconditional wage gaps throughout the wage distribution in the public sector favour women and range from an 8 to 9 percent lower male wage in the tails of the distribution to a 17 to 20 percent lower male wage in the middle of the distribution. Unconditional private sector wage gaps are largest at the bottom (male wages are 31 percent higher than female wages) and smallest at the top (male wages are 23 percent higher than female wages).

Changes over the 1996/97-2003/04 period indicated the largest increase in unconditional wage gaps to have occurred at the bottom of the wage distribution, where unconditional wage gaps are largest.

Counterfactual decompositions based on quantile regression show that women are underpaid (and men overpaid) at every quantile in the wage distribution, that in the absence of 'discrimination' women would earn more than men in the pooled and public sector distributions, and that 'discrimination' accounts for the entire wage gap in the private sector. This indicates that despite better characteristics, women are disadvantaged in the labour market.

The female advantage in the public sector raw wage distribution gives way to a significant male advantage in the conditional wage distribution, when occupation, industry and part-time status are controlled for. Conditional wage gaps are smaller (though still larger than unconditional wage gaps), and public sector wage gaps in the upper part of the distribution remain negative, when these choice variables are excluded from the regressors, which is consistent with a scenario where females select into occupations where their characteristics are rewarded better, and is not consistent with the concept of occupational segregation.

There is evidence of a 'sticky floor' in the public sector, and in the pooled distribution, for both periods and model specifications. The private sector estimated wage gap is largely constant over the distribution in 2003/04, but there is evidence for both sticky floors (evaluated at male characteristics) and 'glass ceilings' (evaluated at female characteristics)

in 1996/97. There is also some evidence to support the existence of a glass ceiling in the public sector in 1996/97 when evaluated at female characteristics.

Interpretations of these results are conditional on the selected sample we have used, but we put forward some tentative explanations for our results and suggest policy recommendations. Firstly, we see that in all three samples, and for most of the distribution, conditional wage gaps were larger than unconditional wage gaps. Two explanations are possible. One is the existence of discrimination, either "for" men, or actively "against" women.[58] The other relates to model specification. Suppose our model suffers from omitted variable bias; for example, we do not account for raw ability. For this to result in an overestimate of the conditional wage gap, ability would have to have a skewed distribution - men would have to have more of it and women less of it. This is clearly an untenable argument.

However, a less implausible version of the argument might define ability to include those characteristics that enable men to compete better in the labour market, particularly in a society such as Sri Lanka's where women have less mobility and a greater responsibility for child-rearing (which restricts them from working late hours, travelling on the job, moving to towns where jobs are better paying, etc.). Ability may also be defined as lacking the characteristics that enable a good "fit" into the workplace—in a society where "most formal organizations are masculine in nature" (Wickramasinghe and Jayatilaka 2006). These factors lead to women being paid less for a variety of reasons (they do not get hired into better paying jobs, they are overlooked for promotion, alternatively they self-select into convenient, but low paying jobs, etc.). If this explanation was accurate, it would support Wickramasinghe and Jayatilaka's (2006) assertion that "public expenditure on education is underutilized due to gender bias and stereotyping of women".

Thus, important policy options must include not merely the standard policies to improve women's productive characteristics (which in current day Sri Lanka would refer to increasing women's human capital in technical fields where they still lag behind at the tertiary education level) but policies that promote gender equity in hiring, and in the workplace (eg. Day-care centers and crèches at the work place, introduction of parental leave, compliance with maternity regulations) which in turn will reduce time spent out of the labour force by women. In this regard, we value the contribution made by the "Guidelines for Company Policy on Gender Equity/Equality" promoted by the ILO/EFC.[59] However, policy

[58] The size of the conditional wage gap evaluated at men's characteristics does not differ significantly from women's characteristics indicating that either of these types of discrimination could be at work.
[59] Several of these policies are promoted in ILO/EFC (2005).

options would need to step out of the marketplace and into the household in order to enable women to access the "omitted variables" that keep them in low-paying jobs.

The second important finding of this study is that there are 'sticky floors,' i.e. larger conditional wage gaps at the bottom of the distribution, in all three samples. This is important from equity, efficiency and poverty-reduction perspectives. Strategies to reduce poverty and break the link between gender and poverty tend to be concentrated on improving access to credit and information for self-employed females. While this is undoubtedly important, we believe this study has shown that gender wage disparities hurt the poor the most. Thus, policies that address gender disparities at the bottom of the distribution are needed. A directly applicable policy recommendation would be "to rectify existing gender-based anomalies in the wages of employees in manual labour and subcontracting" (ILO/EFC 2005).

However, less obvious policy applications of the sticky floor result from these policies. For example, there is ample evidence that female wages among the lowest paying occupations (eg. Domestic servants) have risen in the last two decades in response to labour supply shortages arising from the removal of restrictions on overseas employment. Any attempt to restrict female migration for employment overseas would only serve to worsen wage offers for women in the local market. As such, we view the recent bill that seeks to prevent women with young children (below the age of five) from going overseas for employment as a retrogressive step. Similarly, any form of labour market restriction such as the controversial Termination of Workers Act (TEWA) is likely to exert a downward pressure on women's wages at the bottom of the distribution by encouraging firms that would potentially hire these women to remain informal.[60]

Finally, our study finds evidence that is consistent with women selecting into "better paying" occupations. Our descriptive statistics revealed that most women in the public sector were clerks, teachers and nurses, while most women in the private sector with slightly better educational qualifications were in the textile and garment trades, as opposed to being constrained to work in elementary occupations. While these women are paid less than their male counterparts within these occupations and industries (because the school principals and factory supervisors continue to be males) they are nevertheless better paid than women in other occupations and industries. This has implications for the impact on the wage gap following public sector downsizing and the expected contraction in the garment industry following the ending of the quota.

The limitations of our study are highlighted in the previous discussion. We do not correct for selectivity bias or address endogeneity issues. Moreover, the 'segregation' of

[60] Vodopivec (2006) shows that TEWA has a restrictive effect on firm size.

women into a few occupations and the inability to control for jobs (i.e. principals vs. teachers and supervisors vs. factory workers) indicate the lack of a common support between the male and female wage distributions. While we are aware that the literature on matching functions uses non-parametric methods to address this issue (Nopo 2004, Djurdjevic and Radyakin 2005) we consider this to be outside the scope of this study, and refer to such as areas for future research.

Although several of our results were different from those typically found in similar studies of labour markets in developed countries, we found similarities with studies conducted using data from Chile (Montenegro 2003) and the Philippines (Sakellariou 2004). We agree with Sakellariou (2004) that the generation of more country studies to form a larger body of empirical evidence can confirm or contradict the results we have found as having general applicability.

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Table 1: Decomposition of the Gender Wage Gap in Sri Lanka, 1985-2000

Study	Data Source and Year	Sample size	Size of Gender Wage Gap	Baseline	Dependent variable, Specification	(% of wage gap)	
						Unexplained	Explained
Gunewardena 2002	Labour Force and Socioeconomic survey 1985/86	Urban employees only OLS Sample, Males=4155, Females=1656;	32%	Female	Hourly Wages, OLS	104	-4
					Hourly Wages, Fixed Effects	136	-36
		Fixed Effects Sample, Males=1450, Females=548	35%	Female	Earnings, OLS	102	-2
					Earnings, Fixed Effects	130	-30
	Household Income and Expenditure Survey 1991	Urban employees only OLS Sample, Males=4120, Females=1744; Fixed Effects Sample, Males=1431, Females=578	25%	Female	Earnings, OLS	117	-17
					Earnings, Fixed Effects	130	-30
Aturupane 1997	Pooled data from Quarterly Labour Force Surveys of 1994	Males = 4882 Females=2169	14%	Male	Earnings	61	39
				Female	Earnings	51	49
Ajwad and Kurukulasuriya 2002	Sri Lanka Integrated Survey 1999/2000	Males = 1184 Females = 763	16%	Male Female	Hourly Wages, Sinhalese	98 102	2 -2
		Males = 68 Females = 33	5%	Male Female	Hourly Wages, Tamil	380 -240	-280 340
		Males = 63 Females = 21	16%	Male Female	Hourly Wages Moor	279 -430	-179 530
		Males =25 Females=10	-54%	Male Female	Hourly Wages, Other	48 -20	52 120
		Males = 1184 Females = 763	15%	n.a.	Overall	n.a.	n.a.

Table 2: Descriptive Statistics, Public and Private Sectors, 1996/97

Variable	Public				Private			
	Male		Female		Male		Female	
	Mean	S. D.	Mean	S. D.	Mean	S. D.	Mean	S. D.
Hourly earnings (Rs.)	25.024	15.620	29.221	20.270	17.242	12.793	13.880	10.089
Log of hourly earnings	3.069	0.543	3.215	0.578	2.678	0.585	2.466	0.560
No schooling	0.007	0.085	0.005	0.073	0.021	0.144	0.039	0.194
Sub-primary	0.043	0.202	0.014	0.119	0.185	0.389	0.109	0.312
Completed Primary	0.108	0.311	0.021	0.144	0.230	0.421	0.142	0.349
Completed lower secondary	0.224	0.417	0.065	0.247	0.309	0.462	0.335	0.472
Completed GCE O/L	0.344	0.475	0.335	0.472	0.181	0.385	0.243	0.429
Completed GCE A/L	0.193	0.394	0.396	0.489	0.063	0.243	0.118	0.323
Post-secondary	0.081	0.274	0.163	0.370	0.011	0.104	0.012	0.111
Formal training	0.255	0.436	0.335	0.472	0.131	0.338	0.131	0.337
Informal training	0.033	0.178	0.010	0.099	0.100	0.300	0.043	0.203
No training	0.712	0.453	0.655	0.475	0.769	0.422	0.826	0.379
Age	38.138	9.602	37.014	8.995	34.203	10.261	29.706	9.299
Occupational experience	11.333	8.401	10.973	8.166	7.938	7.361	4.637	4.936
Part time status	0.083	0.276	0.298	0.457	0.043	0.204	0.050	0.219
Married	0.765	0.424	0.699	0.459	0.649	0.477	0.346	0.476
Sinhala	0.936	0.245	0.927	0.260	0.804	0.397	0.874	0.332
Tamil	0.035	0.184	0.040	0.197	0.104	0.305	0.095	0.293
Moor	0.025	0.155	0.032	0.176	0.086	0.280	0.020	0.139
Other	0.005	0.069	0.001	0.028	0.007	0.085	0.011	0.106
Western	0.356	0.479	0.337	0.473	0.454	0.498	0.498	0.500
Central	0.147	0.354	0.160	0.367	0.161	0.367	0.139	0.346
Southern	0.155	0.362	0.155	0.362	0.111	0.314	0.095	0.293
North Western	0.100	0.301	0.109	0.312	0.105	0.307	0.105	0.306
North Central	0.099	0.299	0.078	0.269	0.043	0.202	0.043	0.203
Uva	0.062	0.241	0.062	0.240	0.037	0.188	0.031	0.174
Sabaragamuwa	0.081	0.273	0.099	0.298	0.090	0.286	0.089	0.285
Mining and Construction	0.038	0.192	0.013	0.113	0.257	0.437	0.026	0.159
Manufacturing	0.033	0.179	0.021	0.144	0.259	0.438	0.677	0.468
Electricity, Gas & Water, Trade , Hospitality, Transport, Communication & Finance	0.269	0.444	0.116	0.321	0.349	0.477	0.126	0.332
Services	0.659	0.474	0.850	0.358	0.136	0.343	0.172	0.377
Senior Officials, Managers, Professionals	0.163	0.370	0.521	0.500	0.027	0.163	0.040	0.195
Technicians and Associate professionals	0.152	0.359	0.140	0.347	0.042	0.200	0.036	0.187
Clerks	0.151	0.358	0.244	0.429	0.061	0.240	0.114	0.318
Sales and Service Workers	0.196	0.397	0.028	0.165	0.143	0.350	0.065	0.247
Craft and Related Workers	0.073	0.260	0.019	0.137	0.320	0.466	0.456	0.498
Plant and Machine Operators and Assemblers	0.089	0.285	0.002	0.039	0.155	0.362	0.087	0.281
Elementary Occupations	0.176	0.381	0.047	0.212	0.252	0.434	0.202	0.402
Sample size	2320		1317		4431		1766	

Table 3: Descriptive Statistics, Public and Private Sectors, 2003/2004

Variable	Public				Private			
	Male		Female		Male		Female	
	Mean	S. D.	Mean	S. D.	Mean	S. D.	Mean	S. D.
Hourly earnings (Rs.)	27.750	17.524	30.934	14.914	18.366	15.483	14.501	11.603
Log of hourly earnings	3.185	0.513	3.310	0.523	2.737	0.572	2.490	0.579
No schooling	0.004	0.061	0.005	0.072	0.024	0.153	0.036	0.187
Sub-primary	0.043	0.203	0.018	0.132	0.169	0.375	0.129	0.335
Completed Primary	0.078	0.269	0.015	0.123	0.216	0.412	0.135	0.342
Completed lower secondary	0.241	0.428	0.078	0.268	0.336	0.472	0.331	0.471
Completed GCE O/L	0.273	0.446	0.220	0.414	0.159	0.366	0.170	0.376
Completed GCE A/L	0.246	0.431	0.484	0.500	0.082	0.275	0.176	0.381
Post-secondary	0.114	0.317	0.180	0.384	0.014	0.117	0.022	0.148
Formal training	0.233	0.423	0.349	0.477	0.127	0.333	0.135	0.341
Informal training	0.017	0.129	0.013	0.111	0.067	0.250	0.035	0.185
No training	0.750	0.433	0.638	0.481	0.806	0.395	0.830	0.376
Age	39.981	9.363	39.404	8.861	34.658	10.627	31.899	10.506
Occupational experience	13.392	8.619	12.895	8.383	8.786	8.019	5.359	5.911
Part time status	0.087	0.282	0.271	0.444	0.058	0.234	0.065	0.246
Married	0.843	0.364	0.777	0.416	0.664	0.472	0.426	0.495
Sinhala	0.936	0.245	0.928	0.259	0.825	0.380	0.882	0.323
Tamil	0.037	0.189	0.035	0.183	0.100	0.300	0.090	0.286
Moor	0.025	0.157	0.035	0.183	0.068	0.252	0.026	0.159
Other	0.001	0.038	0.003	0.054	0.008	0.087	0.003	0.055
Western	0.279	0.449	0.253	0.435	0.352	0.478	0.381	0.486
Central	0.131	0.338	0.137	0.344	0.131	0.338	0.138	0.345
Southern	0.158	0.365	0.184	0.387	0.145	0.352	0.138	0.345
North Western	0.136	0.343	0.138	0.345	0.136	0.342	0.129	0.335
North Central	0.120	0.325	0.098	0.297	0.054	0.225	0.054	0.225
Uva	0.085	0.279	0.088	0.284	0.053	0.224	0.040	0.196
Sabaragamuwa	0.091	0.287	0.102	0.303	0.129	0.335	0.122	0.327
Mining and Construction	0.014	0.118	0.000	0.000	0.215	0.411	0.020	0.141
Manufacturing	0.022	0.147	0.021	0.142	0.251	0.434	0.614	0.487
Electricity, Gas & Water, Trade, Hospitality, Transport, Communication & Finance	0.144	0.351	0.086	0.281	0.333	0.471	0.142	0.349
Services	0.820	0.385	0.893	0.309	0.201	0.401	0.223	0.416
Senior Officials, Managers, Professionals	0.170	0.375	0.456	0.498	0.024	0.154	0.046	0.209
Technicians and Associate professionals	0.192	0.394	0.204	0.403	0.056	0.229	0.066	0.249
Clerks	0.131	0.338	0.213	0.409	0.053	0.225	0.106	0.308
Sales and Service Workers	0.189	0.392	0.040	0.195	0.089	0.284	0.081	0.274
Craft and Related Workers	0.062	0.242	0.015	0.123	0.279	0.448	0.389	0.488
Plant and Machine Operators and Assemblers	0.068	0.251	0.005	0.072	0.136	0.343	0.057	0.232
Elementary Occupations	0.188	0.391	0.067	0.250	0.363	0.481	0.255	0.436
Sample size	2129		1360		5129		1976	

Table 4: Raw and estimated wage gaps, 1996/97

	Mean	Percentile				
Raw gap		10th	25th	50th	75th	90th
Pooled	*0.026*	0.152	0.102	0.122	-0.128	-0.145
	(0.014)	(0.019)	(0.015)	(0.016)	(0.006)	(0.019)
Public	-0.146	*0*	-0.127	-0.237	-0.223	-0.104
	(0.019)	(0.021)	(0.028)	(0.024)	(0.030)	(0.033)
Private	0.212	0.288	0.188	0.201	0.251	0.236
	(0.016)	(0.034)	(0.025)	(0.006)	(0.023)	(0.030)
Estimated wage gap model 1						
Male Characteristics						
Pooled	0.105	0.219	0.151	0.088	0.032	*0.021*
	(0.012)	(0.024)	(0.014)	(0.014)	(0.016)	(0.021)
Public	*0.027*	0.175	0.087	-0.034	-0.059	*-0.03*
	(0.019)	(0.022)	(0.016)	(0.014)	(0.016)	(0.018)
Private	0.201	0.328	0.24	0.198	0.176	0.121
	(0.018)	(0.024)	(0.016)	(0.012)	(0.014)	(0.017)
Female Characteristics						
Pooled	0.110	0.162	0.142	0.117	0.071	0.055
	(0.011)	(0.023)	(0.017)	(0.016)	(0.018)	(0.022)
Public	*-0.001*	0.081	*-0.002*	-0.042	-0.026	*0.001*
	(0.016)	(0.021)	(0.015)	(0.013)	(0.012)	(0.015)
Private	0.182	0.178	0.152	0.183	0.223	0.238
	(0.015)	(0.023)	(0.014)	(0.010)	(0.014)	(0.022)
Estimated wage gap model 2	OLS	10%	25%	50%	75%	90%
Male Characteristics						
Pooled	0.188	0.261	0.224	0.186	0.149	0.116
	(0.018)	(0.021)	(0.015)	(0.014)	(0.016)	(0.022)
Public	0.142	0.259	0.2	0.093	0.042	0.045
	(0.033)	(0.019)	(0.014)	(0.013)	(0.015)	(0.017)
Private	0.224	0.292	0.247	0.235	0.24	0.217
	(0.025)	(0.025)	(0.015)	(0.012)	(0.013)	(0.018)
Female Characteristics						
Pooled	0.178	0.185	0.174	0.185	0.136	0.138
	(0.012)	(0.022)	(0.015)	(0.017)	(0.020)	(0.022)
Public	0.089	0.147	0.088	0.057	0.074	0.086
	(0.017)	(0.021)	(0.015)	(0.013)	(0.013)	(0.017)
Private	0.211	0.180	0.173	0.199	0.250	0.255
	(0.016)	(0.022)	(0.015)	(0.011)	(0.014)	(0.023)

Note: Estimated wage gaps are the coefficients component of the wage gap decomposition, evaluated at male [X_m (β_m - β_f)] and female [X_f (β_m - β_f)]characteristics. For OLS, this is the standard Blinder-Oaxaca decomposition, evaluated at mean characteristics. For the quantiles, the results are obtained using the Machado-Mata decomposition (2005). Standard errors are given in parentheses. Except for the coefficients in *italics,* all coefficients are significantly different from zero at the 5 percent level of significance. Estimated gaps are given for two model specifications. Both models included age, occupational experience, dummy variables for education, whether any (formal/informal) training received, ethnicity, marital status, region (7 provinces). Model 2 also included dummy variables for part-time status, 7 occupational categories and 4 industrial categories.

Table 5: Raw and estimated wage gaps, 2003/04

	Mean	Percentile				
Raw gap		10th	25th	50th	75th	90th
Pooled	0.044	0.221	0.167	0.074	-0.124	-0.149
	(0.013)	(0.020)	(0.014)	(0.014)	(0.018)	(0.024)
Public	-0.125	-0.091	-0.172	-0.207	-0.188	-0.079
	(0.018)	(0.030)	(0.024)	(0.024)	(0.022)	(0.030)
Private	0.244	0.293	0.267	0.249	0.22	0.22
	(0.015)	(0.021)	(0.017)	(0.013)	(0.014)	(0.019)
Estimated wage gap model 1						
Male Characteristics						
Pooled	0.151	0.25	0.197	0.147	0.084	0.049
	(0.012)	(0.021)	(0.015)	(0.013)	(0.015)	(0.021)
Public	0.006	0.146	*0.016*	-0.056	-0.074	-0.042
	(0.018)	(0.019)	(0.015)	(0.012)	(0.013)	(0.017)
Private	0.244	0.293	0.268	0.249	0.22	0.222
	(0.016)	(0.021)	(0.016)	(0.013)	(0.014)	(0.019)
Female Characteristics						
Pooled	0.150	0.252	0.207	0.138	0.063	0.064
	(0.011)	(0.021)	(0.015)	(0.014)	(0.017)	(0.019)
Public	*0.008*	0.042	-0.029	-0.047	-0.026	*0.022*
	(0.016)	(0.020)	(0.014)	(0.011)	(0.012)	(0.015)
Private	0.248	0.257	0.251	0.252	0.242	0.249
	(0.014)	(0.022)	(0.013)	(0.011)	(0.014)	(0.021)
Estimated wage gap model 2						
Male Characteristics						
Pooled	0.205	0.312	0.258	0.207	0.143	0.085
	(0.017)	(0.022)	(0.015)	(0.012)	(0.017)	(0.023)
Public	0.134	0.273	0.178	0.101	0.051	0.053
	(0.021)	(0.020)	(0.014)	(0.012)	(0.014)	(0.017)
Private	0.25	0.331	0.297	0.271	0.231	0.188
	(0.023)	(0.022)	(0.016)	(0.014)	(0.013)	(0.018)
Female Characteristics						
Pooled	0.202	0.278	0.241	0.187	0.106	0.120
	(0.011)	(0.023)	(0.016)	(0.016)	(0.019)	(0.021)
Public	0.070	0.097	0.032	0.026	0.035	0.087
	(0.016)	(0.021)	(0.013)	(0.011)	(0.012)	(0.014)
Private	0.266	0.278	0.264	0.260	0.255	0.235
	(0.015)	(0.022)	(0.014)	(0.012)	(0.012)	(0.021)

Note: Estimated wage gaps are the coefficients component of the wage gap decomposition, evaluated at male [X_m (β_m - β_f)] and female [X_f (β_m - β_f)]characteristics. For OLS, this is the standard Blinder-Oaxaca decomposition, evaluated at mean characteristics. For the quantiles, the results are obtained using the Machado-Mata decomposition (2005). Standard errors are given in parentheses. Except for the coefficients in *italics,* all coefficients are significantly different from zero at the 5 percent level of significance. Estimated gaps are given for two model specifications. Both models included age, occupational experience, dummy variables for education, whether any (formal/informal) training received, ethnicity, marital status, region (7 provinces). Model 2 also included dummy variables for part-time status, 7 occupational categories and 4 industrial categories.

Table 6: Gender gap as % of male gap and percentage raw gap unexplained, 1996/97 & 2003/04

	Gaps as a percentage of male wages						*Unexplained as a % of raw*					
	Average	*10%*	*25%*	*50%*	*75%*	*90%*	*Average*	*10%*	*25%*	*50%*	*75%*	*90%*
					1996/97							
Raw Gap												
Pooled	2.6	14.1	9.7	11.5	-13.7	-15.6	100	100	100	100	100	100
Public	-15.7	0.0	-13.5	-26.7	-25.0	-11.0	100	100	100	100	100	100
Private	19.1	25.0	17.1	18.2	22.2	21.0	100	100	100	100	100	100
Estimated wage gap model 1												
Male characteristics												
Pooled	10.0	19.7	14.0	8.4	3.1	2.1	403.8	144.1	148.0	72.1	-25.0	-14.5
Public	2.7	16.1	8.3	-3.5	-6.1	-3.0	-18.5	-	-68.5	14.3	26.5	28.8
Private	18.2	28.0	21.3	18.0	16.1	11.4	94.8	113.9	127.7	98.5	70.1	51.3
Female characteristics												
Pooled	10.4	15.0	13.2	11.0	6.9	5.4	423.1	106.6	139.2	95.9	-55.5	-37.9
Public	-0.1	7.8	-0.2	-4.3	-2.6	0.1	0.7	-	1.6	17.7	11.7	-1.0
Private	16.6	16.3	14.1	16.7	20.0	21.2	85.8	61.8	80.9	91.0	88.8	100.8
Estimated wage gap model 2												
Male characteristics												
Pooled	17.1	23.0	20.1	17.0	13.8	11.0	723.1	171.7	219.6	152.5	-116.4	-80.0
Public	13.2	22.8	18.1	8.9	4.1	4.4	-97.3	-	-157.5	-39.2	-18.8	-43.3
Private	20.1	25.3	21.9	20.9	21.3	19.5	105.7	101.4	131.4	116.9	95.6	91.9
Female characteristics												
Pooled	16.3	16.9	16.0	16.9	12.7	12.9	684.6	121.7	170.6	151.6	-106.3	-95.2
Public	8.5	13.7	8.4	5.5	7.1	8.2	-61.0	-	-69.3	-24.1	-33.2	-82.7
Private	19.0	16.5	15.9	18.0	22.1	22.5	99.5	62.5	92.0	99.0	99.6	108.1
					2003/04							
Raw Gaps												
Pooled	4.3	19.8	15.4	7.1	-13.2	-16.1	100	100	100	100	100	100
Public	-13.3	-9.5	-18.8	-23.0	-20.7	-8.2	100	100	100	100	100	100
Private	21.9	26.7	22.7	23.0	22.1	20.1	100	100	100	100	100	100
Estimated wage gap model 1												
Male characteristics												
Pooled	14.0	22.0	17.9	13.7	8.1	4.7	343.2	112.7	118.0	198.6	-68.5	-32.2
Public	0.6	13.6	1.6	-5.8	-7.7	-4.3	-4.8	-160.4	-9.3	27.1	39.4	53.2
Private	21.7	25.4	23.5	22.0	19.7	19.9	98.8	94.2	103.9	95.0	88.0	98.7
Female characteristics												
Pooled	13.9	22.4	18.6	12.9	5.9	6.0	340.9	114.5	123.4	186.5	-49.2	-41.6
Public	0.8	4.1	-2.9	-4.8	-2.6	2.2	-6.4	-46.2	16.9	22.7	13.8	-27.8
Private	22.0	22.7	22.2	22.3	21.5	22.0	100.4	82.6	97.3	96.2	96.8	110.7
Estimated wage gap model 2												
Male characteristics												
Pooled	18.0	26.8	22.7	18.9	13.4	8.1	452.3	141.2	154.5	282.4	-116.1	-57.0
Public	7.4	23.9	16.3	9.6	5.0	5.2	-61.6	-300.0	-103.5	-48.8	-27.1	-67.1
Private	22.7	28.2	25.7	23.7	20.6	17.0	104.0	106.4	115.1	103.4	92.4	82.7
Female characteristics												
Pooled	18.3	24.3	21.4	17.1	10.1	11.3	459.1	125.8	144.3	252.7	-85.5	-80.5
Public	6.8	9.2	3.1	2.6	3.4	8.3	-56.0	-106.6	-18.6	-12.6	-18.6	-110.1
Private	23.4	24.3	23.2	22.9	22.5	20.9	107.7	89.4	102.3	99.2	102.0	104.4

Table 7: Summary of results, Sticky Floors and Glass Ceilings

	Part Time, Occupation and Industry excluded							*Part Time, Occupation and Industry included*						
	Glass ceiling measured by[1]		*Sticky floor measured by*[2]			*Profile of estimated wage gap along distribution*	*Range of estimated wage gap (%)*	*Glass ceiling measured by*[1]		*Sticky floor measured by*[2]			*Profile of estimated wage gap along distribution*	*Range of estimated wage gap (%)*
	90-75 diff	*90-50 diff*	*10-all*	*10-25 diff*	*10-50 diff*			*90-75 diff*	*90-50 diff*	*10-all*	*10-25 diff*	*10-50 diff*		
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]
Pooled														
2003/04														
Male			✓	✓	✓	Decreasing	5-25			✓	✓	✓	Decreasing	9-31
Female			✓	✓	✓		6-25			✓	✓	✓		12-28
1996/97														
Male			✓	✓	✓	Decreasing	2-22					✓		12-26
Female					✓		6-16							4-26
Public														
2003/04														
Male			✓	✓	✓		-7-15			✓	✓	✓		5-27
Female			✓	✓	✓		-5-4					✓		3-10
1996/97														
Male			✓	✓	✓		-3-18			✓	✓	✓		4-26
Female	✓	✓		✓	✓		-3-3			✓	✓	✓		6-15
Private														
2003/04														
Male					✓		22-29							19-33
Female							25-26							24-28
1996/97														
Male			✓	✓	✓		12-33			✓	✓	✓		22-29
Female		✓					15-24		✓					17-26

[1] A 'glass ceiling' is defined to exist if the 90th percentile wage gap is higher than the reference wage gap by at least 4 points.
[2] A 'sticky floor' is defined to exist if the 10th percentile wage gap is higher than the reference wage gap by at least 4 points.

Figure 1: Kernel density functions, pooled, public and private, 1996/7 and 2003/2004

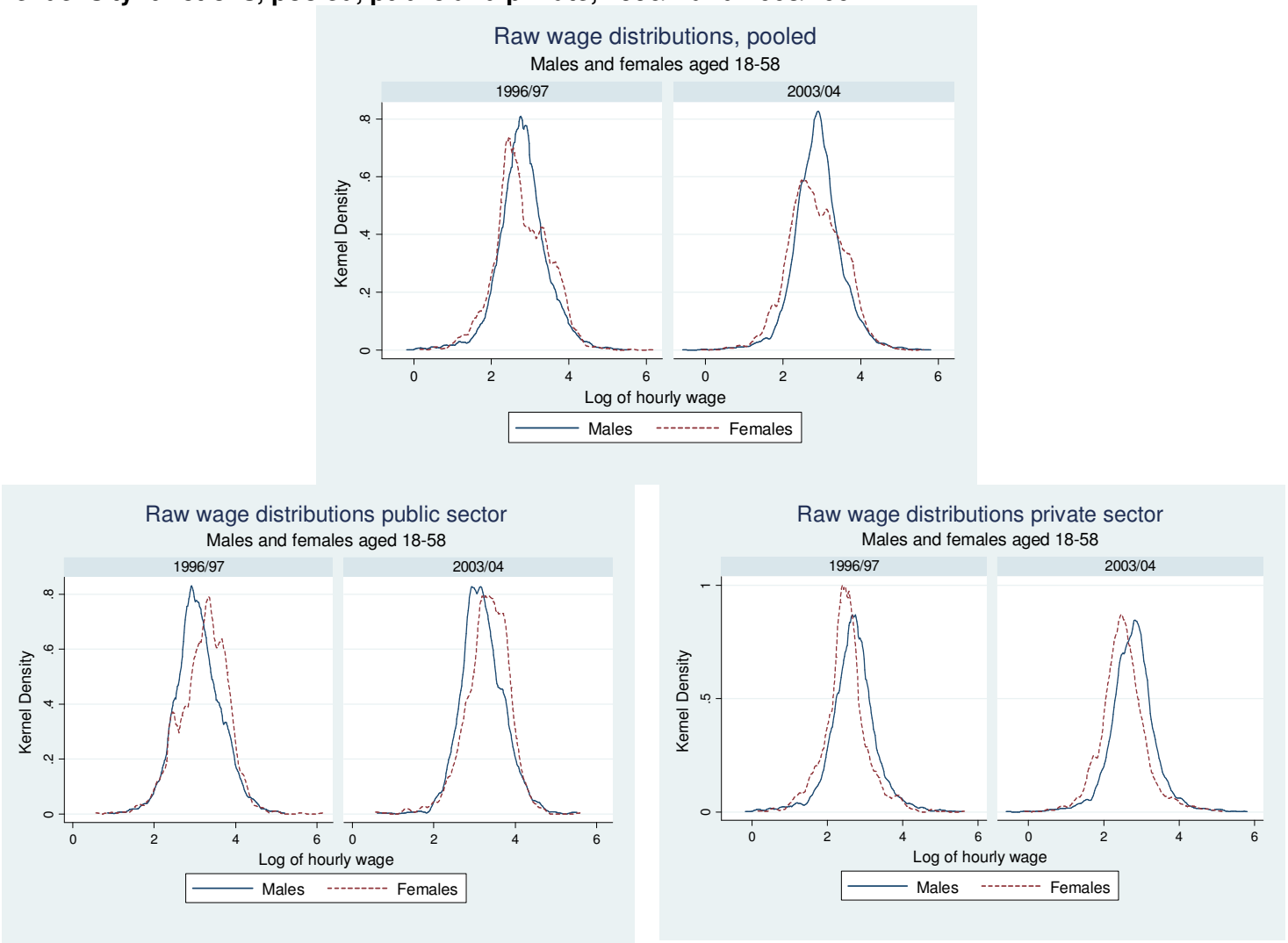
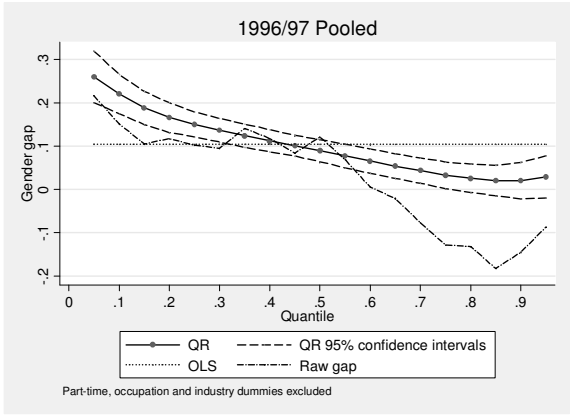
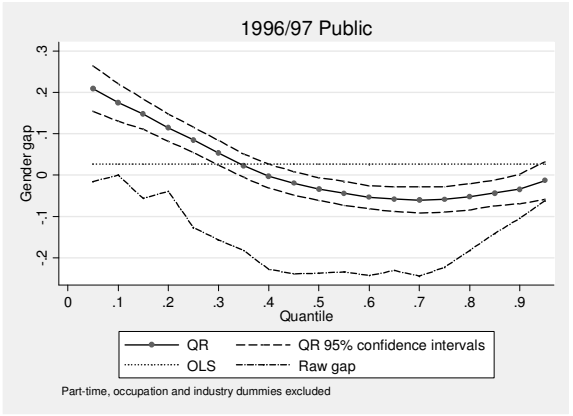
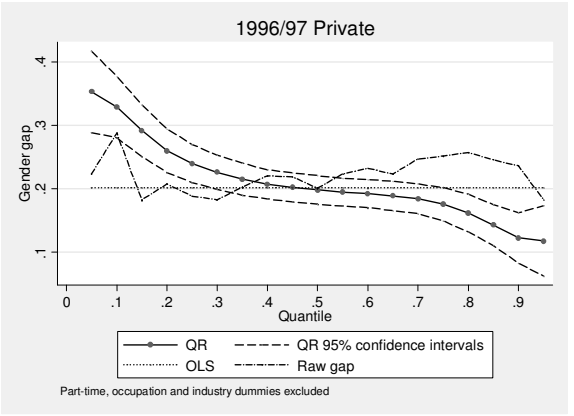
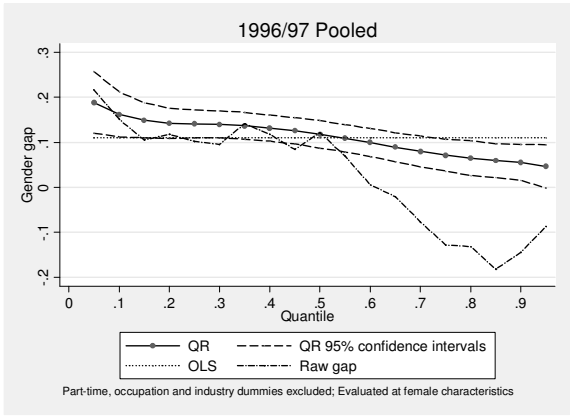


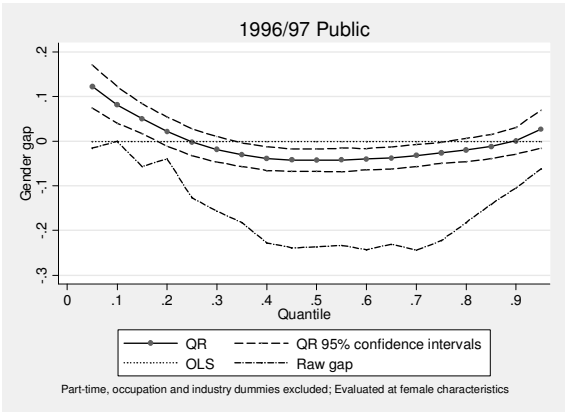
Figure 2: Gender wage gap due to differences in coefficients, part time, occupation and industry dummies excluded, 1996/97











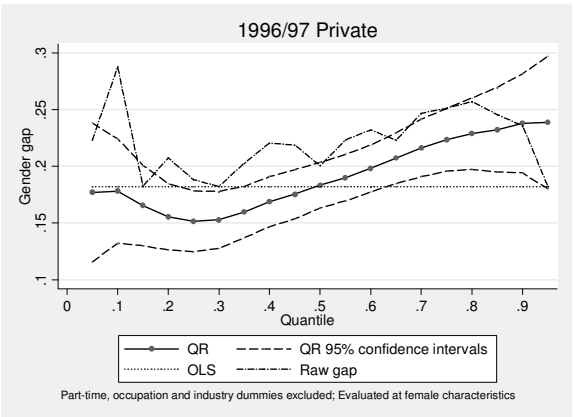
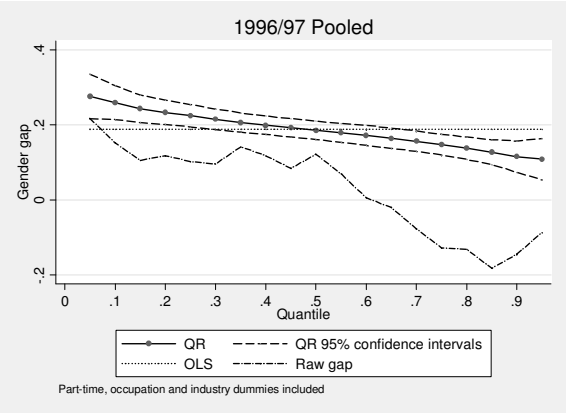
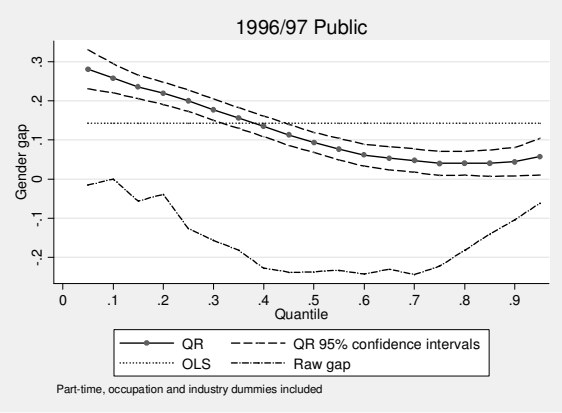
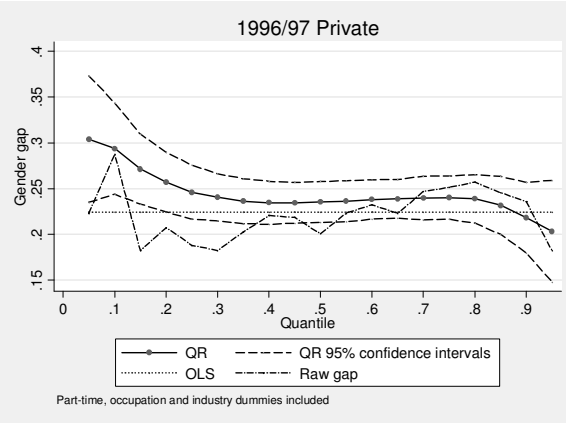
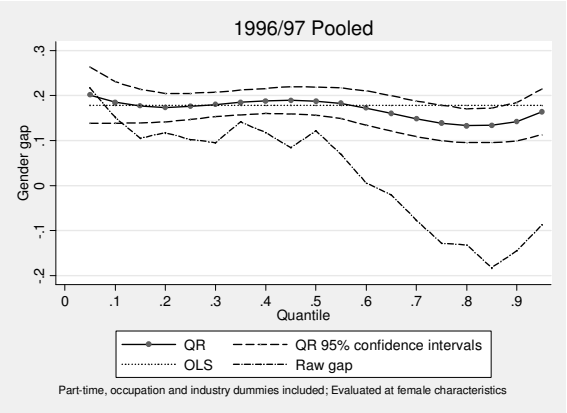


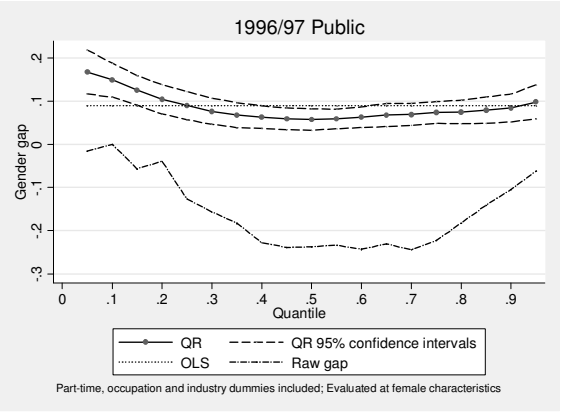
Figure 3: Gender wage gap due to differences in coefficients, part time, occupation and industry dummies included, 1996/97











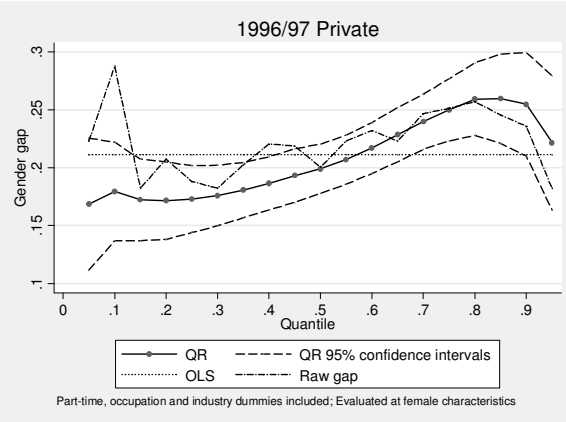
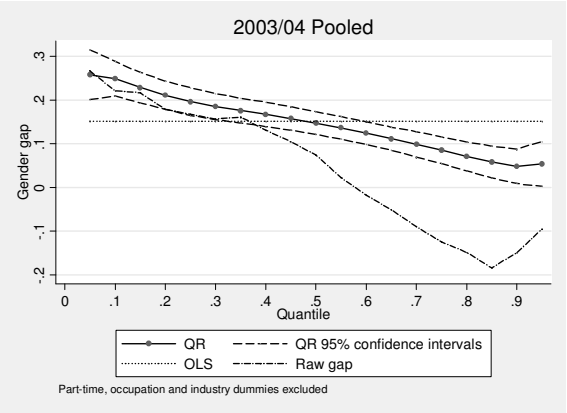
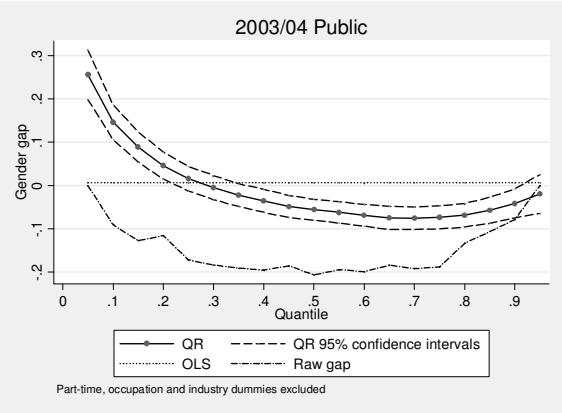
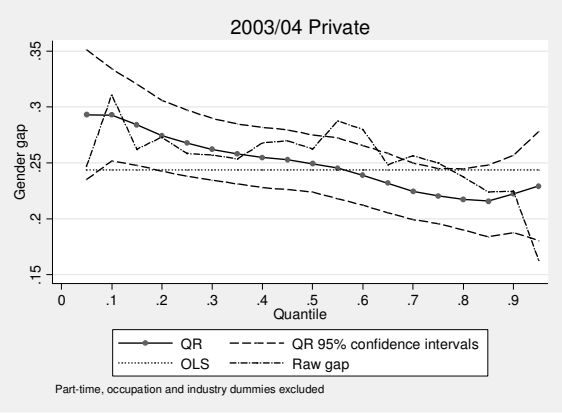
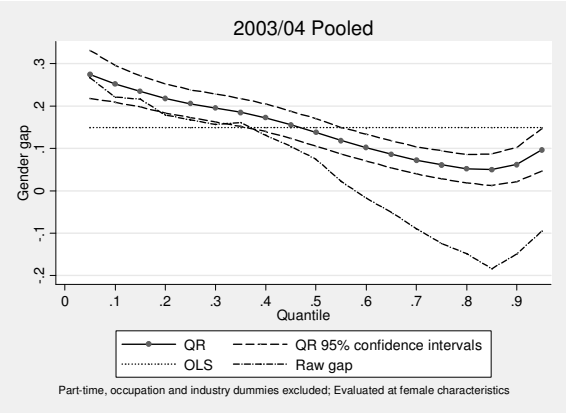


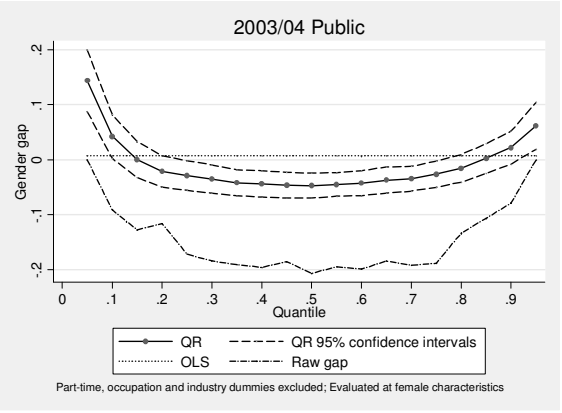
Figure 4: Gender wage gap due to differences in coefficients, part time, occupation and industry dummies excluded, 2003/2004











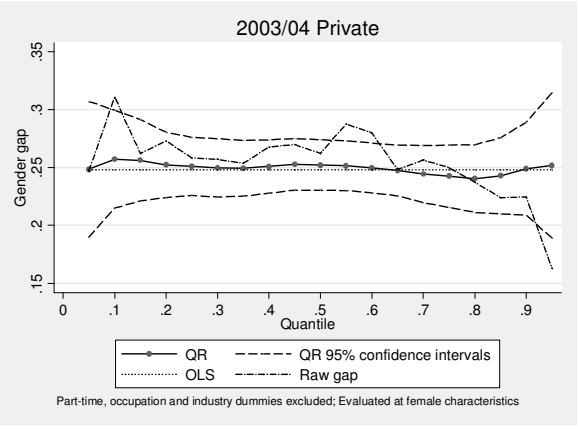


Figure 5: Gender wage gap due to differences in coefficients, part time, occupation and industry dummies included 2003/2004