

# Employment Choices and Wage Differentials: Evidence on Labour Force Data Sets from Pakistan

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## Abstract

The segmented labour market theory explains the existence of public-private wage differentials. We investigate the employment choices and wage differentials of the Pakistani labour market. The quantile regression approach is used to assess the wage differentials. We conclude that wage differentials exist across wage distribution and that it varies across levels of education, occupation and regions. An individual with a higher education is more likely to choose the public sector. Low skilled workers in lower quantile earn less in the private sector than their counter parts in the public sector. The wage gap in the public and private sectors becomes narrower at the high end of the distribution, but remain significant over time. Higher educated and low-skilled occupations are relatively better paid in both sectors, while workers with lower education qualifications have much better opportunities in the public sector. Moreover, wage differentials have increased over time across the wage distribution during the post reform period. The results highlight the various employment choices and characteristics for policy makers in addressing the wage differentials.

Keywords: Wage differentials, Employment choice, Public and Private sector, Pakistan

JEL classification

C21, C34, J22, J31

## 1. Introduction

The segmented labour market theory explains the existence of public-private wage differentials. The growth and profit motives of private sector firms create incentives to set wages proportionate to workers' relative productivity. This motive is usually absent in the public sector. but, there exists a difference in pay, rewards , pensions, on-the-job training programmes, facilities, perks, job security and other benefits. The existence of inter-sectoral wage differentials can create a number of problems for the disadvantaged sector (Aslam and Kingdom, 2012). For instance, *ceteris paribus*, large wage differentials in favour of the private sector may restrict the public sector's ability to attract and retain highly skilled workers, which in turn, will affect the productivity and efficiency of the public sector. Maintaining a degree of wage comparability with the private sector would be difficult due to fiscal, budgetary

allocations and other constraints. On the other side, there is a positive wage differential in favour of the public sector in developing countries, leading to job ‘queues’ and ‘wait unemployment’, given the risk-averse agent’s preferences for long term, stable and well-paid public sector jobs.

The issue of public-private wage differentials has been addressed in numerous studies over time. Historically, the initial studies on developing countries carried out by Fogel and Lewin (1974), Blank (1985) and Gyourko and Tracy (1988) confirmed the existence of wage differentials between the public and private sectors, even after controlling for observable characteristics. Lately, studies that have used the quantile regression framework to estimate differentials. Lucifora and Meurs (2004) have shown that public-private wage differential is sensitive to the choice of quantile. Daoud and Shanti (2016) by using Blinder decompositions in case of Palestine, reports the existence of a higher wage differential for women than men along with a higher wage in favour of the public sector as compared to the private sector. Seeshan (2013) found an increased wage premium over a period of 12 years for public sector employees in Malaysia. They also report that earning of a wage premium is independent of human capital endowments and personal attributes. However, Menezes and Raposo (2014) suggest a positive and significant relationship between wages and labour effort, schooling and experience. Their findings were also that there is no wage differential by size of firms in the Brazilian labour market. In France, United Kingdom and Italy, low skilled public sector workers are paid higher wages as compared to their private sector counterparts, whilst the reverse is true for high skilled workers. Mueller (1998) provides a decomposition of wage differentials at several quantiles of the worker densities in the public and private sectors in Canada. A number of studies were conducted in developed countries such as; Adamchik and Bedi (2000) for Poland, Jürges (2002) and Dustmann and van Soest (1998) for Germany, and Christofides and Pashardes (2002) for Cyprus.

Public-private wage differentials in Pakistan’s labour market have also been assessed by a number of authors using different cross section datasets (Alderman and Kozel, 1989; Ali (1998) Nasir, 2000, 2005; Hyder and Reilly, 2005; Hyder, 2007) and recently, Aslam and Kingdon (2009; 2012), among others (refer section two for details). The results of these studies are based on single point labour force data sets, largely consistent with the studies which are conducted in developing countries. Much has been changed since the Government of Pakistan introduced a set of reforms in the early 1990s, such as deregulation of markets, privatization, trade and liberalization reforms and the limited down-sizing of the public sector by offering several volunteer separation schemes and layoffs with some incentives to the private sector. However, public sector employment still remains the favourite choice as an employment destination for several job-seekers. The public sector comprises over one half of all wage employment in Pakistan. Despite the reforms and re-orientation of the economy, employment preference for the public sector still remains high. This can be attributed to better compensation and other benefits than its counterpart private sector. The wage setting in this sector is likely influencing the wage setting and employment practices in other sectors of the labour market. Higher wages in this sector may create constraints for the private sector to attract better or necessary skills of human capital to fill the vacancies or improve their productivity, since the individuals with better or high demand skills, queue for the public sector jobs.

In this context, studying the wage differential issue of public and private labour market dynamics of Pakistan is very important for a number of reasons; the wage determination process within the two sectors is distinct. Both sectors have different motives as the public sector largely operates with the political and legal context. On the other hand, the private sector

firms have different profit maximization strategies and create different incentives to set the wages commensurate with the workers relative productivity. A higher public sector wage bill emanating from the existence of such a public sector wage premium places an additional burden on government expenditure and may require diversion of resources from other critical areas. In Pakistan, particularly after the 1990s liberalization process, it was expected that wage equality may improve as a consequence of the expansion of the private sector. It was also envisaged that the conditions of employees may be improved as a result of opening up of the economy and that private sector employees may fare better than their counterparts in the public sector. The post liberalization period has witnessed significant differences in returns to accumulated form of human capital both in the public and private sectors. The extent to which changes in skills requirement has attracted the employment choices in the post reform period, need to be examined. These considerations compelled the researchers to compare the wage differentials in both of the sectors over time.

The rest of the paper is structured as follows. Section two presents the literature review on the issue of public-private employment choice and wage differentials. Section three contains the details of the methodological framework. Data requirements, sources and limitations are discussed in Section four. Section five is dedicated to the presentation and discussion of our empirical findings alongside the main conclusions of the study.

## **2. Literature Review**

A large number of insightful studies have been conducted on labour market situations in different parts of the world, including Asian or Pakistani contexts. Barring a few, they suffer from methodological limitations such as the use of dummy variables of Oaxaca-Blinder decomposition technique in standard wage equations to measure public private wage differentials, and the switching regression model to determine the employment choices. The studies vary to some degree, the most often noticed variations being in their estimation techniques, sample sizes, specification of models and identification strategies. We have tried to review these studies in chronological order.

Adamchik and Bedi (2000) used data from Labour Force Survey (LFS) for 1996 on Poland to estimate public private wage differentials using a switching regression model. The private sector was found to have an earning advantage with a male university graduate earning 28 percent more in the private sector compared to his public sector counterpart. In UK, Henley and Thomas (2001) have shown that the public sector remains an important source of employment despite its share falls comparatively to private sector. The results suggest the existence of positive and significant differentials with considerable variation across regions. Another study by Bell et al. (2007) examined the size of public-private sector wage differentials across geographical areas in the UK over time. Their estimates suggest that historically high wage premia was due to the bargaining structure in the public sector and these premia are declining over time. Nielsen and Rosholm (2001) used quantile regression to investigate the determinants of wages in Zambia and also analysed their effects at different points in wage distribution over time. Their findings suggest that a return to education is higher in the private sector than the public. The public sector lacks competitiveness in wage setting, and the skills are not usually rewarded at the market price. Gong and van Soest (2002) carried out an analysis of wage differentials and transitions between formal and informal sectors in urban Mexico by using panel data from Mexico's Urban Employment Survey. The authors found that education increases the wages in both sectors, but has a much stronger effect in the formal sector. Christofides and Pashardes (2002) used a probit model to account for the double selection

problem of choice between self and paid employment, and employment in the public and private sector. The authors also found the presence of the selection effect in the wage equation for women, who obtain employment in the public sector and accept lower wages than similarly qualified male individuals in the population. Jürges' (2002) estimation of the 13 waves of GSOEP is consistent with findings from other countries (Mueller, 1998; Gong and van Soest, 2002; Melly 2002; Nielsen and Rosholm, 2001). The raw public-private wage gap decreased as wage distribution moved up. Male workers at the lower tail of the wage distribution earned around 5 to 10 percent more in the public sector than in the private sector compared to workers who were at the upper tail of the wage distribution who earned up to 12 percent less. On the other side, female workers earned more in the public sector than in the private.

Another study by Bender and Elliott (2002), using data from Social Change and Economic Life Initiative Survey for 1986, applied the Oaxaca decompositions technique and found that there are substantial differences in wage structures between the two sectors, and that job attributes play an important role in accounting for wage differences between the two sectors. The public sector pay gap in France, Great Britain and Italy was investigated by Lucifora and Meurs (2004). Using quantile regressions, the authors found that the wage differential is not constant throughout the quantiles, and is sensitive to the quantile selection.

Falaris (2004) showed that potential work experience and higher education reduced the probability of being employed in the private sector and ethnic Bulgarians are also less likely to be employed in the private sector. Jovanovic and Lokshin's (2004) analysis is suggestive of substantial wage differentials between the state and private sector, as the gap between private and state sectors wages is 14.3 percent for males and 18.3 percent for females. Melly (2005) stratified the wage premium by the level of education, experience and in different occupations. OLS estimation shows that in the public sector wages are 8 percent lower for male workers, although it is substantially higher for females by about 9 percent. Glinskaya and Lokshin (2005) investigated the wage differential between the public and private sectors as well as workers' decisions to join a particular sector. Estimation of OLS and sector selection shows that the wage differentials between workers in the public and private-formal and private-informal sectors are significantly high and positive. Bargain and Melly (2008) found that men are underpaid in the public sector while women are overpaid; comparing the estimates with raw wage differential reveals that the trend in the wage gap is unchanged for both men and women. Disney and Gosling (2008) by-passed the issue of identification strategy in identifying workers selection control. Their analysis shows that, over time, public private wage differentials are not different from zero. Cai and Liu (2008) found that sectoral effects are negative and significant for male workers and are significantly positive for female workers after controlling for observed individual and job characteristics. The results indicate that contribution of returns differences to the wage gap is only -0.05 for male workers, indicating that male workers earn 5 percent less in the public sector than in the private sector.

Bargain and Kwenda's (2009) results confirm the stylized fact that workers in the formal sector have better observed characteristics. The wage distribution patterns were similar across countries and most of the wage gap vanishes at the top end of distribution. Kelly et al.'s (2009) results showed that the public sector premium has increased from 14 percent to 26 percent between 2003 and 2006. Depalo and Giordano's (2010) results reveal that the public sector premium for women is between 13 and 17 percent while for men it is equal or less than 7 percent. Popli (2013), who investigated gender bias in wage differentials in Mexico, found evidence of labour market discrimination against women. Cheng, Hugo and Yuan (2013), by

using survey data, demonstrated the existence of rural-urban divides with regard to wage discrimination. Zhang et. al. (2016) reported that wages and job security were important factors to avoid unemployment risk choices. Lavetti and Schmutte (2016), by applying fatality rates on Brazil labour market data to correct the job mobility and wage differentials. Their results suggest that standard models of wage differentials are misspecified.

While looking at the studies conducted on sectoral wage differential in Pakistan, Ali (1998) suggested that wages are determined by political considerations rather than productivity. Gunderson (1979) also confirmed that Public sector wages are largely determined through political processes, instead of productivity considerations. Nasir (2000) suggested that human capital variables are a major determinant of wages and that the wage premium is quite high for married workers in the private sector whereas no premium was found in the public sector. Decomposition of wages indicates that the wage premium in the public sector is mainly due to better human capital and other endowments. Nasir (2005) confirmed that employees in the public sector enjoy higher wages as compared to other sectors. Wages in the private sector are determined by demand and supply conditions of the labour market. The author further confirms that the wage differential gets worse in the private informal market. Lack of legal protection in the informal sector makes workers vulnerable and easily exploited. Hyder and Reilly (2005) concluded that public sector workers in Pakistan tend to have both higher average wages and education than in the private sector. Hyder (2007) used labour force survey data of 2001-02 in the post reform period to confirm that public sector employment is still viewed as a preferable destination. The attraction is because of a number of factors such as better pay, working conditions and fringe benefits such as pension and medical benefits. A study by Aslam and Kingdon (2009) found that the raw wage differentials between the public and private sectors in gross wages was more than 1.5 times as high for male and more than three times as high for female workers. Aslam and Kingdom (2012) quantified the large wage gap in the public and private sector using the wages data available from 2004-05. They report that government employees earned on average 137\$ more in the public sector as compared (90\$) to jobs in the private sector. The wage differential is higher for women (110\$ to 36\$) in the public sector. This wage differential in favour of public sector employees is due to observed and unobserved worker characteristics. A number of authors confirm existence of unexplained part of public private wage differentials (see for example, Bender, 1998; Gunderson, 1978, 1979).

### 3. Methodology

#### *Public-private wage differential*

The basic methodological approach involves estimation of earnings regression for public and private sector employees using cross sectional pooled data for a worker's sector of employment, written as:

$$\ln w_i = \alpha + \sum_{j=1}^J \beta_j X_{j,i} + \delta \text{sectordummy}_i + \varepsilon_i \quad (1)$$

Where  $X$  is the vector of the individual, household and job characteristics; sector dummy is the dummy variable holding a value of '1' if the individual is working in the private sector and a value of '0' for the public sector. Apart from the basic public-private wage differentials estimated by equation 1, it is also interesting to investigate the public-private wage gap at

different points of the conditional wage distribution and to do so; we employ quantile regression models of Koenker and Bassett (1978). Following Buchinsky (1998), the  $\theta^{th}$  ( $0 < \theta < 1$ ) conditional quantile of the distribution of the (log) wage  $w$ , conditional on a vector of covariates  $x$  can be specified as:

$$Q_{\theta}(w|x) = x\beta(\theta) \quad (2)$$

The above equation assumes a linear relationship between the population's conditional quantile of  $w$ ,  $Q_{\theta}(w|x)$ , and the covariates  $x$ . For a random sample of  $(w_i, x_i)$  for  $i=1, \dots, N$ , equation (1) becomes:

$$\ln w_i = x_i\beta(\theta) + \varepsilon_{\theta i}, \text{ with } Q_{\theta}(\varepsilon_{\theta i}|x) = 0 \quad (3)$$

where  $\varepsilon_{\theta i}$  is the error term of the  $\theta^{th}$  conditional quantile. Quantile regression assumes that  $\varepsilon_{\theta i}$  for the  $\theta^{th}$  conditional quantiles error term equals zero. For a given  $\theta \in (0,1)$ ,  $\beta(\theta)$  can be estimated by

$$\hat{\beta}(\theta) = \arg \min \frac{1}{N} \sum_{i=1}^N (w_i - x_i\beta)(\theta - 1(w_i \leq x_i\beta)) \quad (4)$$

Where  $\beta(\theta)$  is estimated separately for each  $\theta \in (0,1)$ . A single equation for estimation of wage differential including dummy variable requires minor modification of equation (3):

$$\ln w_i = \alpha(\theta)P_i + x_i\beta(\theta) + \varepsilon_{\theta i}, \text{ with } Q_{\theta}(\varepsilon_{\theta i}|P_i, x_i) = 0 \quad (5)$$

where  $P_i$ , a dummy variable equals '1' if individual  $i$  works in the private sector and '0' if otherwise;  $x_i$  is a vector of other variables that is expected to affect wages, such as experience, education and occupation. The coefficients of quantile regression can be interpreted as the rates of return to the respective characteristics at the specific quantile of the conditional wage distribution (Buchinsky, 1998; Koenker, 2005).

#### *Public-private sector employment choice*

By closely following and appreciating the theoretical and empirical contribution of Adamchik and Bedi (2000), we have attempted to highlight the importance of wage differentials in determining the choice of a particular sector by a worker. By following Van der Gaag and Vijverberg (1988) and assuming that the expected benefits of a particular job of a particular sector are equal to the wage differential between the two sectors (public/private), worker  $i$  will only join the private sector if the expected benefits of choosing this sector would be higher than the cost, i.e.,

$$\ln W_{1i} - \ln W_{2i} > X_i\beta + \varepsilon_{si} \quad (6)$$

Where  $W_{1i}, W_{2i}$  are the private and public sector wages respectively, and  $X_i$  is a vector of worker characteristics such as education, age, experience, and regional indicators which affect the probability of securing a private sector job. This could also include factors such as time of entry into the labour market. Lastly,  $\varepsilon_{si}$  is a  $N(0, \sigma_s^2)$  sector selection equation error term in the above equation 6. Moving further, subsequent to the sector choice, we assume that there are two wage equations:

$$\ln W_{1i} = Z_i\gamma_1 + \varepsilon_{1i} \quad (7)$$

$$\ln W_{2i} = Z_i\gamma_2 + \varepsilon_{2i} \quad (8)$$

Where in the above,  $Z_i$  is a vector of number of wage determining variables; and  $\varepsilon_{1i}, \varepsilon_{2i}$  are random residual terms assumed to be  $N(0, \sigma_1^2), N(0, \sigma_2^2)$ . Substituting these wage equations into above equation (6), the private sector selection criterion in terms of a reduced form probit model is represented as follows:

$$I_i^* = K_i\alpha - \varepsilon_i \quad (9)$$

$K$  in the above includes all exogenous variables in both  $Z$  and  $X$  and  $\varepsilon_i$  is a composite error term. In this case, if  $I_i^* > 0$ , worker  $i$  chooses and works in the private sector. The two wage equations mentioned above and the probit equation which is termed as the switching regression in fact defines the model. Depending upon the assumption that  $(\varepsilon_1, \varepsilon_2, \varepsilon)$  are  $N(0, \Sigma)$ , Maximum Likelihood estimates of the model comprising of equations (7-8) are obtained in the empirical estimation.

## Data Requirements, Sources and Limitations

Household Integrated Economic Survey (HIES) and Labour force survey (LFS) data sets were used for analysis. The LFS based cross-sectional data used in our study covers the period between 1990/91 and 2017/18 and depends on the use of each of the equations provided in the previous section. Basic variables are defined in Table 1.

[Insert table 1 about here]

Some descriptive statistics of wage distribution (see table 2) show that individuals in the private sector earn less than those in public sectors except in the year 1990, and that the gap has widened over the years as in 2017/18.

[Insert table 2 about here]

## 4. FINDINGS

The quantile regression approach was used to assess the public-private wage differential. The results are reported in Table 3. We have used dummy variables with the standard OLS technique - consistent with a number of studies, such as Mueller (1998), Gong and van Soest (2002), Melly (2002), Jürges (2002) and Hyder and Reilly (2005), that public-private wage differentials could vary substantially across the wage distribution.

[Insert table 3 about here]

The results suggest that private sector workers earn 11.1 percent on an average which is less than their counterparts in the public sector. The private sector employees were earning 5 percent more than their public sector counterparts back in the early 1990s, but their share is gradually declining over time, whereas, the private sector employees were earning 35 percent less than their public sector counterparts. The results of a quantile regression approach suggest that an employee working in the private sector earns 16.4 percent less at a lowest quantile, while this share decreases to 6.8 percent at the highest quantile. Selected year results suggest that in 1990-91, private sector pay premium ranges from 9.1 percent to 3.9 percent, at the lowest

and highest quantile, respectively. The private sector pay premium turned negative by 2017/18 as private sector employees earned 50 percent less than their counterparts in the public sector at the lowest quantile and their share decreased to 14.2 percent at the highest quantile. These results are consistent with Hyder and Reilly (2005). They found that public sector employees earn on average 37 percent more than the private sector workers (ranges from 56 percent, at the lowest quantile, to 18 percent, at the highest quantile). Hyder (2007), Nasir (2000) and Aslam and Kingdon (2009) have also reached the same conclusion that public sector employees earn higher wages than their private sector counterparts.

Figure 1 shows the estimates of quantile 10, 50, 90 over the survey years. For comparison, the OLS estimate is also shown. All the estimates are significant at 95% confidence interval.

[Insert figure 1 about here]

Over the span of three decades, the public-private sector wage differentials gap has widened, especially at the lowest quantile. A significant decline in private sector wages is evident over time. During this period, the private sector employees' wage differentials have in fact, worsened from -28.1 percent to -50.1 percent at the lowest quantile. The wage gap at the highest quantile is somewhat narrowed down but still a private sector employee earns on average 14 percent less than public sector employees in 2017/18. This difference was only 7.5 percent three decades ago. In other words, the wage differential has almost doubled over the last three decades for both the lowest and highest quantiles at the median regression. Three decades ago, the private sector employees were earning 13 percent less compared to their public sector counterparts, but in 2017/18, they were earning 41.5 percent less, which indicates that the wage differential has indeed increased by almost three fold at the median regression.

#### ***Private sector wage premiums/penalties stratified by educational/qualification attainment***

Since the wage differential may vary across the level of education, the private sector wage differentials are now estimated for five ranges of schooling/qualifications. The observations are stratified in five education groups: *no formal education, primary, intermediate, graduation and post-graduation*. Figure 2 shows the impact of qualification category on private sector wages by quantile. The results suggest that in the private sector, employees with no formal education earn 9 percent less, on average, compared to their public sector counterparts. Estimates for 'no formal education' account for 38 percent of the total sample. Quantile regression estimates suggest the same pattern for four educational categories: the private sector penalty declines towards the higher end of the distribution. Hence, for post-graduation only, the private sector pay premium is 5.4 percent at the 90<sup>th</sup> quantile. Apart from this, all other levels of education have earned no premium by working in the private sector, although it suggests that the private sector reduces the within-group inequality by compressing the wage distribution.

[Insert figure 2 about here]

The comparison of five OLS and quantile estimates suggest that the private sector wage penalties decrease as the educational qualification increases. At the mean, the private sector wage penalties increase from -12% for the primary education group, -27.8% for the intermediate, -21.6% for the graduation, and falls to -9% for the post-graduate group. The picture is somewhat the same at the median. This suggests that the average wage increases with the number of years of schooling and there is an equalizing effect between education groups attached to private sector status. One of the potential reasons for high pay-outs and higher



return to education in the public sector compared to the private sector is the political pressure on the government not to pay low wages to its less skilled employees.

*Private sector pay premium/penalties stratified by regions (provinces)*

The private sector pay premium may also vary across different areas of living and regions (provinces). The differentials are now stratified in four provinces: Punjab, Sindh, KP, and Baluchistan. Punjab is the largest province in terms of population followed by Sindh, KP and Baluchistan. A similar ranking could be made in terms of economic development and job prospects of these four regions. Figure 3 combines the results province-wise and in quantile similar to Figure 2. Barring a few exceptions, equalizing effects of the reduction in negative gradient of penalties were observed in the private sector as compared to the public sector towards at the top end of the wage distribution. The private sector penalties tend to be significant and large at the low quantiles and decrease at high quantiles. Sindh province seems to be an exception. Here, there is no evidence of a substantial change in the coefficient across the conditional wage distribution.

[Insert figure 3 about here]

A comparison of the level of private sector pay penalties across regions approximated by provinces shows that the premium does vary with the provinces. The coefficient of private sector dummy is negative for all the provinces and becomes insignificant only at the last two quantiles for the Baluchistan province. The wage differential also narrowed down in Baluchistan province, as it ranges from -4%, at the lower quantile to -1.6% at the 50<sup>th</sup> quantile results and thereafter becomes insignificant. Punjab province was found to have the highest variation in private sector penalties, which ranges from -20.6%, at the lower quantile, to -8.8%, at the higher quantile and KP province also follows the same trend, having more or less the same differential. These differences between both sectors are explained by the share of the public sector among these provinces. Punjab alone accounts for 40 percent of public sector employment, while Baluchistan accounts for only 15 percent. In comparison, Sindh and KP share 25% and 18.5% of the public sector employment, respectively.

*Private sector wage premiums/penalties in specific occupations*

Figure 4 provides the estimates with OLS and quantile regressions. The compression of the wage distributions by the private sector is evident but not significant all the time, probably because of the reduced number of observations. Concerning the difference between occupations, the results confirm that not only are low-skill occupations better paid in the public sector but that high-skilled occupations such as professionals are better paid in the public sector compared to the private sector. The pay differentials are strongly significant for technicians, service workers and elementary occupations. Both OLS and quantile regression results are consistent. Overall, clerical and service workers suffer less penalties than technicians and professionals in the private sector. The wage differential between the public and private sectors is much narrowed at a higher quantile, as in this case, private sector employees of any occupation earn only 10 percent less compared to their public sector counterparts.

[Insert figure 4 about here]

*Public-private employment choice*

Public-private wage differentials have shown that a substantial wage differential does exist between the two sectors over time, even after controlling for individual, household and job characteristics. We have employed the Heckman selection model to address the issue of

selection. The specification of the selection model is similar to the wage equation. However, in order to enable identification, we have used the number of job holders in the household and their marital status in the switching equation for identification purposes. The estimates of switching regression selection model are presented in Table 4.

For all educational levels, except post-graduation, we found no effects associated with level of education on private sector employment. This indicates that simply acquiring higher education does not increase the chances of employment in the private sector. This also suggests that other features such as quality rather than level of education may be more important in determining private sector employment. The coefficient obtained for female employees is negative but statistically insignificant and therefore cannot be interpreted accurately. The coefficients for provinces were negative as well, indicating that the public sector is the first choice of employment for individuals residing in different regions. The coefficients relating to employment status suggest that all employees working except the reference category preferred to work in the private sector.

Coefficients on occupations and industries indicate a preference for public sector employment, except for sectors such as trade, restaurant and hotels. The number of job holders in the household suggests that the second individual does not mind working in the private sector, while the coefficients on moonlighting suggest that a public sector job is preferred. Overall, the selection model findings are consistent with earlier findings linked with the wage equation (higher education is likely get less paid in private sector). Consistent with the results from developing countries, the benefits provided by the public sector attract a large portion of job seekers for employment.

[Insert table 4 about here]

## 5. Conclusions

We have examined the wage differentials in the post liberalization labour market of Pakistan by using the quantile regression model. Significant wage differentials were observed in segmented public private sectors of labour market at individual, regional, education and occupational level. The estimation of public-private wage differentials across wage distribution suggests that the wage gap does exist in the study period and that this gap becomes narrow at the higher end of the distribution. The wage differential varies across levels of education, occupation and regions. Higher education attracts better pay in both sectors while those having lower education have much better opportunities in the public sector. The same is the case for low-skilled occupations, such as technicians and clerks. However, the high skilled occupations, such as professionals and legislators are also being paid better in the public sector. Over the years, wage differentials have increased across the wage distribution and in 2017/18, at the lower quantile, a private sector employee earned around 50 percent less in general as compared to their public sector counterparts and even at the highest quantiles, a private sector employee earned 14.2 percent less.

The findings suggest that individuals with higher education levels are more likely to choose the public sector as their first choice of employment. Individuals with a high level of education, most likely have employment choice in the public sector. However, the employment destinations of candidates with post-graduation qualifications do not follow this trend, according to Heckmen selection model estimates. Workers in most occupations and industries are also in favour of selecting the public sector for their future employment. Another important

finding was the impact of the family unit on employment choices; if one individual in a family is employed in the public sector, it is likely that other members of the same family will join the private sector.

It is important to recognize these wage differentials, especially in the post-reform labour market in Pakistan. It is also imperative to identify and address various aspects that may impact wage differentials such as individual abilities, preferences, and productivity of workers. Public sector workers need to be compensated based on their human capital endowments. Additional incentives, if granted, should be given to more productive workers. Failure to do so might result in the high mobility of more productive workers in the public sector towards the more lucrative jobs. Further studies are required on the association of gender with employment choices as well as more fine-grained categories of factors that might affect employment choices in the formal and informal sectors.

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**Table 1 Data description of the main variables**

<b>Variables</b>	<b>Data Description</b>
Real wage rates	The natural logarithm of average hourly wages (inflation adjusted)
<b>Individual Characteristics and Family Variables</b>	
Age	Age of individual in years
Experience	Experience of individual in years (calculated as age-completed years of education-6)
Education	Different level of education completed in years
Training	Technical/vocational training.
Gender	Value=1 if individual is male.
Marital status	Categorical variable for four different statuses.
Head of Household	Dummy variable holding value=1 if individual is head of household
Number of brothers and sisters	Unmarried and staying in the house
Number of Children	This can be further divided in to different age like 1 to 3 year, 4 to 6 years and further
Number of house hold age between 16 and 65	Also further divided in to employed and unemployed
Number of house hold age greater then 65	Dummy holding value=0 for unemployed and value=1 for employed
Spouse education	Spouse education in completed years
<b>Job Characteristics</b>	
Annual hours worked	Number of hours worked by an individual (calculated as weekly worked hours * 52)
Type of job	Dummy holding value=0 for white collar job and value=1 for blue collar job which is derived from the occupation individual works in.
Employee status	Categorical variable stating different employment status
Occupation	Categorical variable stating different occupation individual works in
Industry	Categorical variable stating different industry individual works in. further, can be categories according to 2-digit code.
<b>Other variables</b>	
Urban	Dummy holding value=1 if person lives in urban area.
Province	Categorical variable dividing according to residence in one of four particular province (Punjab, Sindh, KP and Baluchistan)
Quarter code	To control the seasonal effects

**Table 2 Hourly wage distribution by gender, sector, province and industry (Rupees)**

	Full Sample		
	Mean	S.D	# of Obs.
<b>Gender</b>			
Male	22.23	33.01	105365
Female	19.17	29.66	11957
<b>Sector</b>			
Public	30.93	48.12	29796
Private	18.85	24.65	87526
<b>Area</b>			
Urban	25.08	37.52	68952
Rural	17.41	23.48	48370
<b>Province</b>			
Punjab	20.46	30.47	55735
Sindh	24.39	38.43	30454
KP	21.04	32.02	19633
Baluchistan	23.96	26.76	11500

**Table 3 Estimates of the private sector pay premium for selected years samples**

	Overall		1990-91		1999-00		2017-18	
	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.	Coef.	Std. Err.
OLS	-0.111	0.057	0.050	0.019	-0.211	0.025	-0.352	0.020
Quantile regression estimates								
$\theta=0.10$	-0.164	0.010	0.091	0.028	-0.454	0.041	-0.501	0.030
$\theta=0.20$	-0.140	0.006	0.067	0.016	-0.372	0.018	-0.464	0.021
$\theta=0.30$	-0.125	0.005	0.055	0.016	-0.307	0.022	-0.444	0.017
$\theta=0.40$	-0.112	0.005	0.045	0.013	-0.261	0.016	-0.429	0.016
$\theta=0.50$	-0.107	0.005	0.045	0.011	-0.222	0.017	-0.415	0.015
$\theta=0.60$	-0.103	0.005	0.052	0.014	-0.178	0.015	-0.376	0.012
$\theta=0.70$	-0.095	0.005	0.033	0.014	-0.119	0.021	-0.307	0.015
$\theta=0.80$	-0.085	0.006	<b>0.012</b>	<b>0.015</b>	-0.088	0.020	-0.238	0.018
$\theta=0.90$	-0.068	0.008	0.039	0.020	<b>0.005</b>	<b>0.025</b>	-0.142	0.023

Notes: controlled variable in the wage equations includes education, experience, occupation, marital status, industry and regional dummies. All the reported coefficients are significant at 95% confidence interval except those in bold.

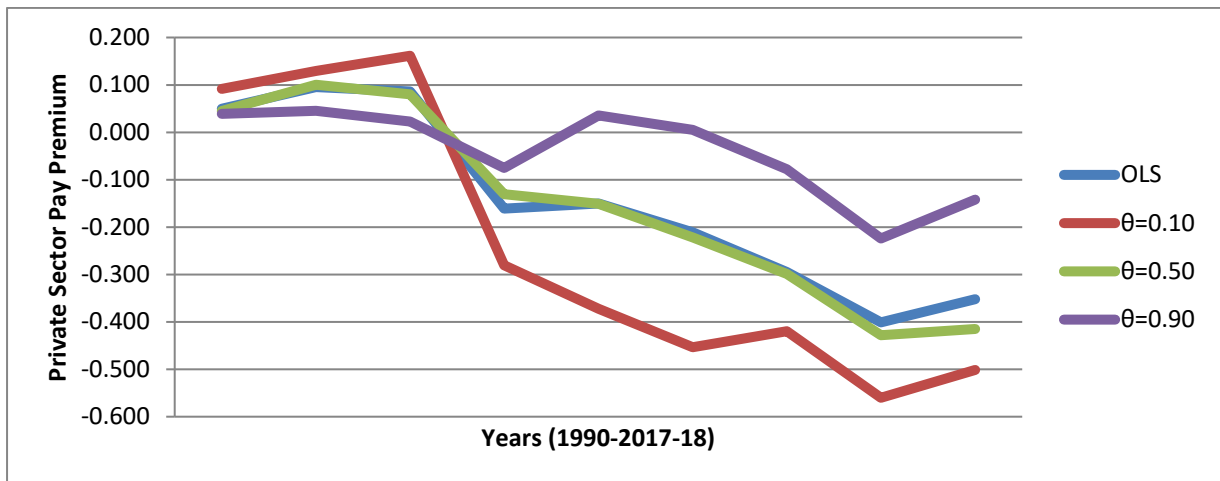
**Table 4 Estimates of the switching equation**

Variable	Coefficients	Std. Errors
Middle (8 years)	-0.0485	0.0193
Matric (10 years)	-0.1875	0.0185
Intermediate (12 years)	-0.3593	0.0239
Non-complete degree (13-15 years)	-0.6046	0.0296
Degree (15 years)	-0.3565	0.0282
Degree in engineering, medicine, computer, agriculture (16 years)	-1.2010	0.0473
Post-graduate (18 years or more)	0.2219	0.0188
Female	<b>-0.0357</b>	0.0202
Sindh	-0.0497	0.0128
KP	-0.0875	0.0142
Baluchistan	-0.3567	0.0177
Casual paid employee	0.4861	0.0175
Paid worker by piece rate or wok performed	0.4012	0.0192
Paid non-family apprentice	0.6784	0.0794
Own account worker (non-agriculture)	3.2375	0.2086
Share cropper	2.8028	0.2142
Professionals	-0.4083	0.0244
Technicians and associate professionals	-0.3420	0.0214
Clerk	-1.0999	0.0306
Service workers and shop and market sales workers	-0.5602	0.0243
Craft and related trades workers	-0.3208	0.0264
Plant and machine operators and assemblers	-0.1395	0.0281
Elementary occupations	-0.6033	0.0247
Mining	<b>0.1393</b>	0.0928
Manufacturing	<b>0.0071</b>	0.0280
Electricity, gas and water	-1.1942	0.0348
Construction	-0.5423	0.0259
Trade, restaurant and hotels	0.5501	0.0394
Transport and Communication	-0.5274	0.0278
Financial Institution	-0.4660	0.0393
Community and social services	-1.0222	0.0258
Number of job holders	0.0352	0.0104
Moonlighting	-0.0500	0.0087

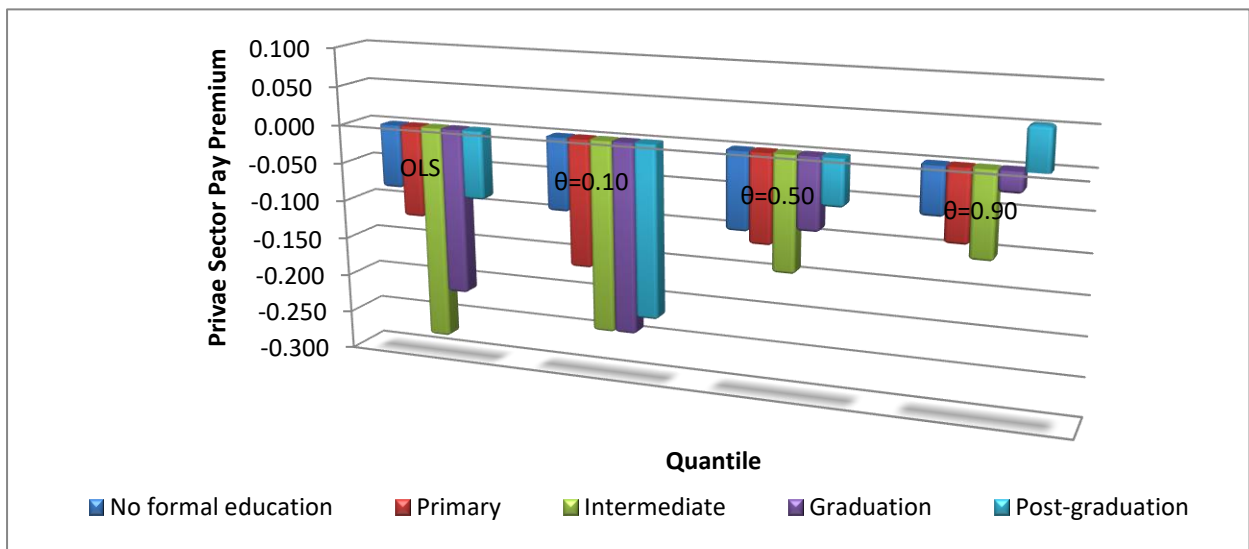
Notes: Apart from figures displayed in bold, all the coefficients are significant at 95% confidence interval.



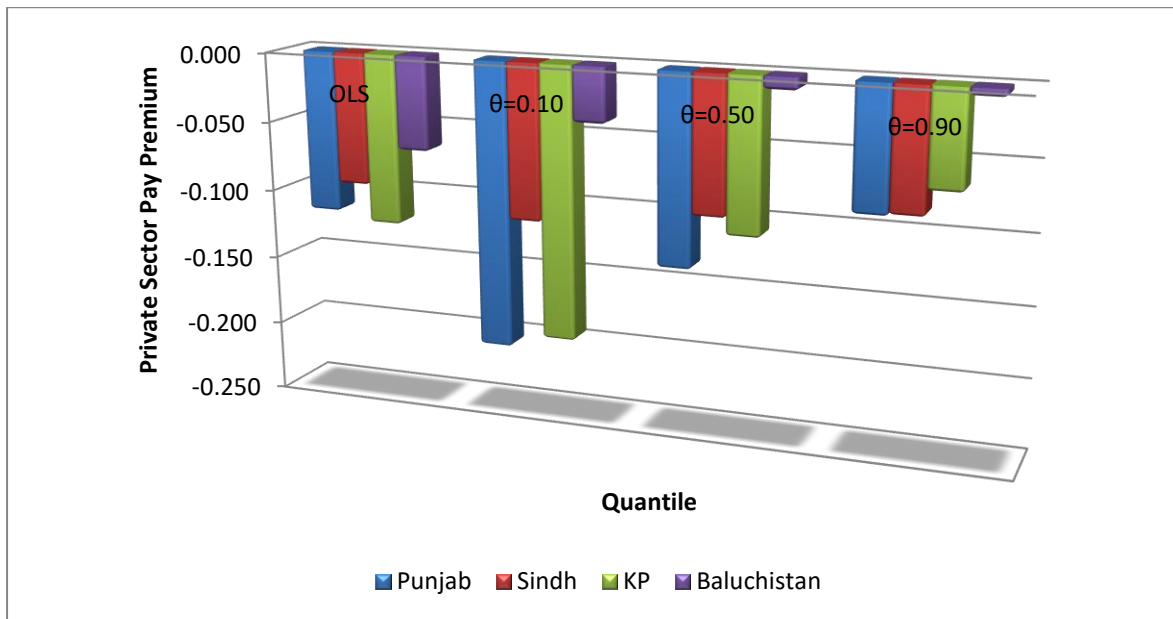
**Figure 1** Estimated private sector wage premiums/penalties over the years



**Figure 2** Private sector wage premiums/penalties stratified by educational attainment



**Figure 3 Private sector wage premiums/penalties stratified by regions (provinces)**



**Figure 4 Occupation-specific estimates of private sector wage premiums/penalties**

