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Revisiting Gender Wage Gap In Egypt: Empirical Evidence Using 2018 ELMPS Data

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Abstract

Recent studies across the different countries suggested that the gender wage gap is not constant in terms of magnitude across the wage distribution adding to the fact that the average wage gap provides limited information on female's relative position in the labor market. Employing the micro level data from the Egyptian Labor Force Panel Survey (ELMPS) in 2018, this study investigates the gender wage gap in Egypt across the wage distribution. The quantile regression and the decomposition analysis results in a number of striking results in the Egyptian labor market. The first is that gender wage gap is not constant across the wage distribution. The second is that, wage gap is more pronounced in the lower quantiles indicating a severe sticky floors effect. The third is that, at the right tail of the wage distribution, a minor glass ceiling effect is found. Finally, female workers are more endowed than their male peers across all the wage distribution yet large wage gaps were evident indicating an increasing labor market discrimination towards females especially at the lower segments of the wage distribution.

Contents

I Introduction:

There is a general consensus among researchers that observed labor market outcomes significantly differ by gender across the developing economies. A number of these differences include labor force participation rates, sectoral allocation, occupational choices, unemployment rates, wage distribution as well as the returns of education and experiences (Nazir 2017, Assaad and Kraft 2013). The monetary return, i.e. wage, from performing a certain job is a key indicator of economic well-being and the overall individual's accomplishment. Accordingly, the relative wage structure between men and women is informative of women's progress in the labor market as well as their overall status in the households (El-Hamidi and Said, 2008).

Gender wage parity in the labor market has been extensively studied in the economics literature due to its observable effects not only on women themselves, but also on their children and later generations (Biltagy 2018, Said 2019). Hence, Gender wage gap asserts women's disadvantage in earned income relative to their male counterparts in the labor market. Even though many policies have been implemented in Egypt to address the gender wage gap, the issue still persists even in the most developed countries. If the cause of gender wage disparity is well-understood, policies can be designed to target the root causes of the problem, eliminating the drivers for the gender wage gap (Nizar 2017).

The cause of gender wage differential has not been fully agreed upon in the literature. Different theories have evolved to explain the gender differences in labor market outcomes (Blue and Khan, 2008). On one hand, some theories have attributed the existence of group differences in occupations, wages, and employment to skills differences and preferences rather than discrimination against women. The preferences & human-capital models are

extensively used in most of the existing literature on race and gender wage disparities (Marini 1989; England 1992; Tomaskovic-Devey 1993; Petersen and Morgan 1995; Cotter et al. 1997; Huffman and Velasco 1997; Nelson and Bridges 1999; Reskin 2000; Tomaskovic-Devey and Skaggs 2002;Blue and Khan 2008; Cha and Weeden 2014; Biltagy 2018). In this case, discrimination is believed to be the residual difference between men and women in the labor market outcomes that cannot be explained by these factors i.e. preferences and human capital. On the other hand, economic models that tackle discrimination can be divided into two main classes; firstly, competitive models in which economic agents act individually. Secondly, collective models in which group decisions are made against another group: usually a majority and a minority group. However, the competitive model for discrimination has been the main stream theoretical framework that economists relayed on to explain discrimination (Becker, 1993).

The most common methodological approach in the literature that attempt to measure gender wage gap consists of decomposing the wage gap into a part attributable to differences in the vector of workers characteristics and another part attributable to differences in the monetary returns associated to each of these characteristics using the estimates for the expectation of the conditional wage distribution of both groups i.e. males and females. However, this methodology is more or less limited in the sense that it considers the information provided by conditional means exclusively and ignoring the differences along the different distribution segments, and this could lead us to conclude that the magnitude of the wage gap and the weights of the factors that make it up are constant and consistent along the whole spectrum of the wage scale (Garcia et al 2001). Stemming from the influential work of Juhn et al (1993), recent examples in the literature address this issue by analyzing differences between quantiles of the wage densities of not only men versus women but also different countries or different points in time for a given

population. Examples of such studies include Mueller (1998) for Canada;Dustmann and van Soest (1998) and Melly (2005) for Germany; Nielsen and Rosholm (2001) Aslam and Kingdon (2009) in Pakistan; Christofides and Michael (2013) and Depalo, Giordano, and Papapetrou (2015) in a group of European countries; Azam and Prakash (2015) in India; Kwanda and Ntuli (2018) in South Africa; Miari (2018) in Palestine Gimpelson, Lukiyanova, and Sharunina (2019) in Russia.

Evidence on the gender wage gap in the Middle East and North Africa region (MENA), including Egypt, goes in line with the existing international literature. Two important remarks are worth noting in this regard. Firstly, the evidence reported gender-based occupational segregation in the labor markets (Aktas, and Uysal 2012; Kandil 2009; Kara 2006; El-Hamidi and Said 2008). Secondly, occupational segregation exists when women dominate in certain occupations and men in others, resulting in distorted earnings and efficiency loss (lower productivity). Labor laws, traditions, social pressure and commitment to the family may hinder women from occupying certain jobs that are notorious to be dangerous or require work at night, or even further may discourage women from taking better paid jobs, and thus confining themselves to particular types of employment opportunities. Accordingly, occupational segregation plays a significant role in the size of the gender pay gap in MENA countries (El-Hamidi and Said 2008). Having said that, we can distinguish between “glass ceilings” and “sticky floors”. In some cases, females experience glass ceilings demonstrated by larger gender gaps at the top of the wage distribution. On the other hand, they face sticky floors where gender gaps are relatively higher at the bottom of the wage distribution (Aktas and Uysal 2012; Albrecht et al. 2003)

Therefore, Understanding where the unexplained gender wage gaps occur in the wage distribution, and how their magnitude varies along the distribution, is essential to enhance our compressive understanding of the gender discrimination in the labor market and to design and

implement more effective policies to lessen or eradicate such intricate problem. For instance, policies with the objective to tackle discrimination have both equity and efficiency gains in both the short and long run (Nazir 2017). The equity gains will be even more pronounced if analysis reveals gender disparities to be larger at the bottom of the distribution serving the more marginalized segment of the distribution. Counterfactual analysis based on quantile regression accordingly makes such an analysis possible.

The context of my thesis attempts to investigate the existence of 'sticky floors' and/or 'glass ceilings' in the Egyptian labor market employing the quantile regression analysis. Moreover, it analyzes the main determinants of gender wage discrimination in Egypt using the Egyptian labor market panel surveys (ELMPS 2018) expanding on the existing literature of the Egyptian labor Market (El-Hamidi and Said 2008 and 2005; Arabsheibani 2000; Kandil 2009; Said 2003; Biltagy 2012; Said 2015; Nazir 2017; Tansel et al. 2020). However, the majority of those studies suffer from at least one of the following shortcomings that I shall be addressing in the presented thesis. First, most of the existing studies focus primarily on comparisons at the means level. This doesn't capture significantly important information and may explain the difficulty to reconcile the different estimates obtained in the literature. Although few studies employed quantile estimations to estimate gender wage differentials in addition to the conditional wage distribution (Kandil, 2009; Said 2003, Nazir 2017), this thesis uses more updated datasets to account for recent fast paced developments in the Egyptian labor market especially after the January 25th 2011 revolution. Second, the previous studies paid little attention to the impact of traditions and social pressure on the gender wage gap. Social norms are crucial in framing women's activities. Ideas, norms and values of the society about women's mobility can affect women's decision to participate in the

labor market as well as the wage level they receive (Nazir 2017). Therefore variables capturing where a woman lives should be taken into account in the model.

The presented thesis is an attempt to address these gaps in the literature. I adopt Quantile Regression (QR) to assess female wage gaps across the different points of the conditional wage distribution. In addition to individual and household characteristics, the model applied here will include locational variables to reflect the social aspect of wages that workers receive.

This thesis is organized as follows; Section two provides an overall overview of the Egyptian labor market characteristics. Section three investigates the past literature with much depth. Section four describes the methodology used here. Section five presents some descriptive analysis and the raw gender wage differential. Section six presents the empirical analysis and the estimated results. Section seven covers the policy reflection based on the suggested analysis. Finally, section eight concludes.

ll The characteristics of the Egyptian labor market

This section provides an overview of the Egyptian labor market's characteristics. The Egyptian labor market shares many of its characteristics with the other countries in the MENA region (Assaad, 2014). However, there are a number of salient and interlinked features of the Egyptian labor market. These features can be summarized into five broad aspects: guaranteed public employment until very recently, significantly large public sector, high youth unemployment, low female labor force participation rates, weak formal private sector and the absence of strong collective bargaining unions (Tansel et al. 2020) . Each of these features will be discussed accordingly.

In the 1960s, Egypt introduced an employment guarantee to all youth who obtained a secondary education degree and higher in the public sectors (Assaad 1997). This has created a deep dependency on the government to maintain a steadily increasing job creation rate to cope with the increasing numbers of the secondary, and higher education graduates. However, the "employment guarantee policy" was later suspended in the late 1990s due to the economic liberalization and the active steps from the government to move towards an open economy where the private sector plays an increasing role. The dependency on the public sector as the main employer in the Egyptian economy has led to several distortions in the labor markets; First, and foremost, the public sector failed to maintain a sustainable growth to contain the massive influx of youth entering the labor market. Accordingly, this created long queuing for the graduates to be employed in the public sector which reflected on a high level of graduate unemployment rates, reduced the employment of recent graduates in the private sector and finally, increased the demand

for secondary and high education (Assaad 2014). Even though the job guarantee policy was suspended, the preference towards the public sector employment continues to be strictly preferred in the Egyptian labor market specially by females (Barsoum 2016). The socioeconomic preference of the labor in Egypt has been altered toward securing a public sector job even more than securing a formal private sector one (Assaad and Krafft 2014; 2020).

The overall preference of youth for public-sector employment is partially driven by the perception of social connection or "Wasta" in Arabic to obtain a job in the private sector. While only 11% of youth who have obtained their jobs in the public sector by asking their family or friends for help, around 45% of those with jobs in the private sector obtained them through family connections and friends (World Bank 2014). Similarly, 75% of the Egyptian workers agree that connections (wasta) are essential to secure a job in the private sector (El-Kogali and Krafft 2020).

Delving into unemployment structure in Egypt, it is clear that the labor force in Egypt suffers from a high unemployment rate. Overall the unemployment rate is estimated to be 11.7 percent in 2017 while for females it was 23% compared to the 8.2% for males (ILO 2020). The distribution of the unemployed is skewed towards the youth; over 75% of the unemployed were between the ages of 15 and 29 years. The problem of youth unemployment is very critical due to the fact that youth constitute around a quarter of the total labor force. Additionally, Egypt does not only have one of the highest youth unemployment rates overall, but also one the highest gender gaps in youth unemployment. In 2017, the male youth unemployment was estimated to be 25.7% while, on the other hand, the female youth unemployment rate was 38.3% (ILO 2020). Furthermore, the unemployment rates are very prominent among the highly educated segment of labor; unemployment rates increase with education and it is very high among those who are highly

educated for both genders (Assaad & Krafft 2015). This comes in line with the premise of the queuing phenomenon in the public sector (Assaad 2014).

Women have a very low participation rate in Egypt as it is also the case in the other MENA countries. In 2017, only 22 percent of females actively participated in the labor market compared to around 67 percent for their males' counterparts (ILO 2020). Despite the increase in females' educational attainment, females' participation rates have remained consistently low over time. This phenomenon prevails across other MENA countries as well and is commonly referred to as the "gender paradox" (Assaad, Hendy, Lassassi and Yassin, 2020; World Bank, 2013). In fact, educated females' participation rate in the labor force fell in the 2000s which is attributed to the shrinking public employment opportunities as well as the suspension of the guaranteed employment policy in the late 1990s (Assaad & El-Hamidi 2009; Assaad 2014). As less and less public sector opportunities were available, educated females initially joined the ranks of unemployed, and later the majority dropped out of the labor force rather than take up informal employment. This has contributed directly to the falling female participation rates and in particular among educated females. Lastly, women working in the public sector continued their careers after marriage. However, those working in the private sector quit their jobs once they are married (Assaad & El-Hamidi 2009; Hendy 2015).

The informal sector is large in the Egyptian economy while the formal private sector is relatively small in terms of the numbers of workers (Tansel 2020). Informal employment can be defined to include wage earners who are not formally covered by social security or those who don't hold a formal legal contract. Gatti et al. (2014) indicated the existence of a substantial informal sector in Egypt and reported that around 45 percent of workers work in the informal sector during the period 2000-2007 with an estimated average of 35 percent of the total GDP being unrecorded

in the relevant period. Based on the ELMPS of 2012, only 10% of the males sample were formal employers while 15% were employed in the informal sector. Most of the job creations in the Egyptian economy are driven by informal small sized businesses (Assaad, Hendy, Lassassi and Yassin 2020). Hence, the formal private sector fails to accommodate all those seeking jobs (Tansel 2020).

For females, however, this informal-centric economy has resulted in high unemployment rates with eventual exit from the labor force (Assaad 2014). The introduction of the 2004 Labor Law established more flexibility in employment relations which is believed to increase informal employment. Yet, this same law has also contributed to the formalization of some jobs (Wahba & Assad 2017). There is therefore no conclusive evidence regarding the impact of the 2004 law as some studies reported a trend towards an increase in private sector formalization (Said 2009),while other studies have shown that it has led to an increase in informal employment (Wahba & Assaad 2017; World Bank 2014). Labor legislation has a huge impact primarily on the public sector employees as well as the wage workers in the formal private sector. While the Egyptian Labor Law may seem rigid on paper by the internationally recognized standards, the law enforcement remains a challenging aspect in the Egyptian labor market (Angel-Urdinola & Kuddo 2011; Lohmann 2010). Trade Union memberships and collective bargaining prevalence in the private sector is still very marginal within the Egyptian economy (Angel-Urdinola & Kuddo 2011). The collective bargaining coverage was estimated to be 3.5 percent in 2008 (ILO, 2020). Even with the introduction of the Minimum Wage Law in 1984 which was adjusted twice in 2012 and 2014, it is still effective on the public sector and not on the private sector. (Tansel, 2020).

lll Literature review:

3.1 Method review for quantile regression and the standard OLS approach:

The literature review is focused primarily to reflect the past studies that have addressed the main characteristics of the Egyptian labor market. The most prominent factor that affects the gender wage gap is the evidence on public-private sector earnings gap. There is extensive literature showing empirical evidence on the public and/or private sector earnings' gap. These include Ehrenberg and Schwarz (1986), Bender (1998), Gregory and Borland (1999) and Lausev (2014). Bender provides a comparison between developed and developing countries. The recent analysis by Lausev (2014) considers the transition by countries and compares them to developed countries.

Earlier studies on estimating the public-private earnings' differentials are based on estimating separate private and public sector wage equations by employing the standard Ordinary Least Squares (OLS) model controlling for the observed individual characteristics (Tansel 2020). In the developing countries, Lindauer and Sabot (1983) used OLS technique to understand the sectoral based gender wage gap. However, such studies ignored the non-random selection of workers to the private and public sectors. The suggested approach to accommodate this selection problem is to use a two-step estimation procedure; firstly, the endogeneity problem is addressed in the sector choice. Secondly, public and private wage equations are estimated (Tansel, 2014). Several studies used this two-step procedure on both developing and developed countries. Van Ophem (1993) in the Netherlands, Lassibille (1998) in Spain and Dustmann and van Soest (1998) in Germany. A number of studies on developing countries include Van der Gaag and Vijverberg (1988) in Côte D'ivoire; Terrell (1993) in Haiti, Assaad (1997) and Biltagy (2014) in Egypt and, Tansel (2005) in Turkey . The findings of these studies generally indicated that the public sector premium becomes marginal or completely disappears when the sector selection is accounted for

using the OLS estimation method. However, it is worth noting that these studies only examined the average wage differential across public and private sectors. The shortcoming of such approach is that it conceals the heterogeneity across the different segments of the wage distribution and accordingly provides a misleading picture about the public-private wage gap.

In order to minimize the shortcomings of the standard OLS approach, more recent studies used quantile regression methods to examine the public–private wage differential at different points of the wage distribution including Mueller (1998) in Canada; Dustmann and van Soest (1998) and Melly (2005) in Germany; Nielsen and Rosholm (2001) in Zambia. A general finding of the quantile regression analysis is the public sector wage compression at the lower end of the wage distribution. The premium is higher at the lower end of the wage distribution and diminishes across the wage distribution. Another stream of the literature exploited the panel feature of the data due to its recent availability. They explored the public–private wage gap taking into account both observed and unobserved individual characteristics as well as sector selection both at the mean and across the different segments of the wage distribution. The literature using the panel data approach has developed in two strands. One group of studies distinguished between endowments in skills (explained effect) and their remuneration (unexplained effect) both at the mean and at different quantiles levels. Some of these studies include Aslam and Kingdon (2009) in Pakistan; Christofides and Michael (2013) in a group of European countries; Azam and Prakash (2015) in India; Depalo, Giordano, and Papapetrou (2015) in euro-area countries; Kwanda and Ntuli (2018) in South Africa; Miari (2018) in Palestine and Gimpelson, Lukiyanova, and Sharunina (2019) in Russia. A general conscience finding of such decomposition technique is the higher endowment effects in the upper part of the wage distribution while higher returns to endowments are observed in the lower part of the wage distribution (Tansel 2020).

3.2 Sectorial differences and informality:

Focusing our attention on the gender gap in the public-private settings- in most developed countries- there is evidence of significant public sector premium which is higher for women (Vella 1993 and Cai and Liu 2011 in Australia; Hospido and Moral-Benito 2016 in Spain) with a few exceptions. The exceptions are public sector penalties found for France (Giordano et al. 2015; Lucifora and Meurs 2006), for Germany (Dustmann and van Soest 1998; Melly 2005), for Norway (Christofides and Michael, 2013) and for Australia (Siminsky 2013). Bargain and Melly (2008) found penalty for men and premium for women in France both of which were attributed to selection and diminished when unobserved worker specific heterogeneity was taken into account. Said (2004) investigated the determinants of male and female pay in the public and private sectors. The results highlighted the significance of job security as a major factor determining the existence of queues for public sector jobs in Egypt. The findings suggest that there are significant differences between public and private sector choice decisions and earning structures in Egypt generally, and across the different genders as well.

The role of informality in labor markets have also been extensively examined. Work informality refers to the type of employment that is not "covered by formal arrangements", including employment without secure formal work contracts and work benefits (ILO, 2002). There are two competing views of developing countries' labor markets with relatively large informal sectors. The traditional view discussed, for instance, by Fields (1975) and Dickens and Lang (1985) implies that the labor market is segmented along formal and informal fronts and that workers enter informal employment to escape unemployment because they are rationed out of the regulated formal sector. As a result, they earn less than what they could earn in the formal sector. The presence of trade unions and regulations such as minimum wage and collective bargaining

keeps formal sector wages above market-clearing levels. In contrast, more recent studies support the competitive view of the labor market where the presence of any wage gap between formal and informal sectors is attributed to compensating factors differentials prevailing in one sector or the other (Tansel et al. 2019). Castells and Portes (1989) supported the structuralist approach by arguing that the informal sector is a feature of capitalist economy that is exploited by the formal sector. Furthermore, they argue that informality has an exclusionary mechanism that supply the economy with cheap labor at the expense of their labor rights.

3.3: Female participation rates and unemployment:

The low female participation rate in the MENA region has also been analyzed in a number of studies. Much of the literature has focused on the supply side with emphasis on the role of social norms (Assaad,Hendy, Lassassi and Yassin 2020). Clark et al. (1991) found a significant effect of the culture, social norms, religion and ethnic heterogeneity on women's decision to participate in the labor market. Hayo and Caris (2013) also found women from relatively traditional families in the region breach their identities when taking a job. In their analyses, they conclude that this identity as shaped by Islam and cultural traditions significantly affects women's labor decisions. Yet, in the MENA region, traditions are relatively more infulential than Islam in lowering female labor force participation (Assaad, and Hendy, Lassassi and Yassin 2018).

The social pressure leads to female overcrowding in certain professions that are socially acceptable by the society and accordingly shutting down major segments in the labor market on the face of women, especially those who have attained higher education levels. This is consistent with the staggering high unemployment rates among women in general and more specifically among the highly educated ones as well as the wage penalty they experience in the Egyptian labor market (Assaad and El-Hamidi 2009; Assaad, Hendy, and Yassine 2014). Hendy (2015 and 2020)

used the Egyptian Labor Market Panel Survey (ELMPS) over the years of 1998, 2006 and 2012 to investigate the low female participation rate and found that female participation rates declined overtime especially for educated women.

3.4: The global outlook of gender wage gap:

The gender wage gap in the labor market has also been a key aspect in the literature. Blau and Kahn (2017) estimated the wage gap in the American labor market using the Michigan Panel Study of Income Dynamics for the period 1980–2010. The authors found that the wage gap decreased significantly during the relevant period. The results showed that the human capital characteristics and other non-cognitive skills and abilities played a marginal role in explaining the gender wage gap. To the contrary, occupation and industry effects, differences in gender roles and discrimination effects are the most relevant factors that can explain the gender earnings gap. Yasin, Chaudhry, and Afzal (2010) Analyzed the gender employment positions and wage differentials in Pakistan. They examined the determinants of the gender wage discrimination in Pakistan using descriptive and regression analysis based on the cross-sectional data of Pakistan labor force survey. The authors concluded that illiteracy, poor and low levels of education as well as low vocational, technical and professional competencies are important characteristics of the labor market participants in Pakistan. The results of the empirical analysis showed that dissimilarity in the attainment of jobs is a remarkable phenomenon across males and females. It also proved that some socio-economic and cultural constraints hinder the participation of females. This is consistent with the findings of Assaad and Hendy (2015) analyzing the Egyptian labor market. Moreover, the results confirmed that women were not different in their productivity from men and without discrimination; in fact, women could earn more compared to men in some particular cases.

Haas (2006) found the male-female wage ratio is 1.11 in Switzerland. And this is by far the greatest equity found. This implies that males receive 1.11 times as much as women. The greatest inequality is yet found to be in Egypt with male-female wage ratio 3.84, Implying that men make almost quadruple the wages of women. This study examined the relationship between the gender wage gap and the economic development of a country measured by the GDP per capita. The study used the United Nations Human Development Index(HDI) as a more comprehensive measure of development. The main conclusion suggests that the decrease of gender wage gap is not expected to be achieved until countries reach Development levels close to 0.80 on HDI.

Other studies examined the prediction of Becker (1971) that the market competition will eliminate market discrimination, as the discriminatory firms will face higher costs and in the long run will go out of business. Neumark & Troske (2002) found that firms which hire more women than men slightly perform better than firms which have a high male female ratio. Also Black and Strahan (2001) found similar results with the American banking system.

Mincer and Polachek (1974) highlighted the importance of work experience in explaining the gender wage gap. Their conclusion was that females tend to anticipate shorter work lives, so they invest less training and education, which results consequently in a lower experience level compared to men. This result is consistent with Becker (1985). Even after controlling for most of the variables that are explained by the Human capital approach, there exists a large portion that is unexplained.

Biltagy (2019) examined gender wage determents in the Egyptian labor market and found that the gender wage gap was 25% and 21% in 2006 and 2012 respectively. The study found that part of the gap was explained by the fact that females are less likely to obtain high-paying jobs

than men. Additionally, another component of the gender wage differential was a result of the unobservable factors, such as non-cognitive skills and psychological characteristics.

3.5: The demand side of the labor market:

The demand side of the labor market has not received that much attention. However, some studies explored the demand side of the gender wage gap problem. Assad (2007) indicated that the main reason Egyptian employers are reluctant to hire women is the widespread perception that women have a relatively lower attachment to the workforce compared to their males counterparts. Female workers have a high turnover rate especially after marriage and maternity, which makes them poorer prospects for training; their absenteeism rates are high, and they are often unwilling to work long hours. Such low commitment to the workforce is a direct result of social norms that make the home women‘s primary domain of responsibility emphasizing on the concept of “home keepers”. This applies to both married and unmarried women and the situation for married women is further compounded by the fact that their wage work is seen as totally incompatible with marriage needs, which is why many women exit the labor force after marriage. Moreover, women are more geographically constrained than men. Their place of residence is generally determined by either parents or husbands so that they are not able to adjust where they live to where the jobs are (Moghadam, 1998).

However, firm-related factors which influence female employability chances in Egypt have received less attention in the literature. Low female employment could be explained by demand-side factors that are more associated with the employer’s preferences and characteristics (Pissarides et al., 2005). For instance, Fakih and Ghazalian (2015) found that the MENA‘s manufacturing firms which contributed to exporting activities have relatively higher proportions

of female workers by 3.9 percentage points on average compared to non-exporting firms, ceteris paribus. Assaad and Arntz (2005) revealed that export-oriented industries, which account for the feminization of employment in other countries, appear not to favor female employment in Egypt by much. Al-Azzawi (2014) also investigated the effects of trade liberalization on female employment and found that exporting related industries are more likely to hire female workers than those which engage in local related selling.

3.6: Occupational segregation and the feminist approach:

The feminist approach highlights the link between occupational segregation and the overall gender wage gap. Among the different forms of employment segregation by gender (occupational, industry, by firm type, or labor contract), occupational segregation has yet received the greatest attention in the feminist literature (Catherine Hakim 1979; Heidi Hartmann 1979; Sylvia Walby 1986; Barbara F. Reskin and Patricia A. Roos1990; Rosemary Crompton and Kay Sanderson 1990; Jill Rubery, Colette Fagan, and Friederike Maier 1996). Occupational segregation is hence regarded as the outcome of gendered socialization processes, constraints on women's employment. This originates from the domestic division of labor and welfare-state policies based on the breadwinner model and the housekeeper of the family economy, and employment discrimination. All of the above factors results in gender differences in human capital investment, occupational choices, skills, and the availability for low-paid work. The problem of occupational segregation involves both the underutilization of women's skills and productivity potentials, as women are concentrated in lower skilled jobs, and the undervaluation of women's labor supply through a lack of recognition or low monetary valuation of the skills used in women's jobs (Sara Horrell, Jill Rubery, and Brendan Burchell 1989, 1990).

Gender differences in skills and productivity-related endowments, discrimination, and segregation are not the only determinants of the gender-based pay gap. Gender relations are integral to the wage-setting process and institutions (Figart, Mutari, and Power 2002).Having said that, during the last fifteen years, a growing literature highlighted that the wage structure may explain international differences in the size of the gender pay differential (Francine D. Blau and Lawrence M. Kahn 1992, 2000, 2001). There are three dimensions of the wage structure that are likely to influence the gender pay gap: the size and ranking of wage differentials by industry, occupation, the system of job grading, type of organization, and the form of payment systems (Jill Rubery et al. 1997).

IV Methodology:

Earlier studies in the literature on earnings differentials focused on estimation at the mean level of the earnings distribution. There may be important differences along the earnings distribution due to intrinsic heterogeneity in jobs or the overall characteristics of the labor market. This is partially ignored when only the wage gap at the mean is considered (Aktas and Uysal, 2012). By construction, using OLS regression method to study the gender wage gap focus on the mean of the wage distribution where the marginal returns to different variables are estimated only at the mean level. Nevertheless, the effects of those covariates can differ along the conditional wage distribution. Recently, researchers accounted for the heterogeneity that may exist along the earnings distribution by using the quantile regression technique in various contexts (Tansel 2020). Hence, This study adopts a quantile regression model as introduced in the earlier work of Koenker and Bassett (1978) to estimate the conditional wage distribution along the different distribution segments across the different genders.

Quantile regression accordingly is more flexible than OLS and can accommodate studying the effects of the vector of covariates on the whole conditional distribution of the dependent variable. This is particularly useful when studying the gender wage gaps because, as data suggests, gender-based differentials usually involve more than just that males, *on average*, earn more than females (Nazier 2017).

Koenker Hallock (2001) indicated that much of applied statistics can be viewed as an elaboration of the linear regression model and associated estimation methods of least squares. In beginning to describe the quantile regression techniques, Mosteller and Tukey (1977, p. 266) remark in their influential text:

*"What the regression curve does is give a grand summary for the averages of the distributions corresponding to the set of x's. We could go further and compute several different regression curves corresponding to the various percentage points of the distributions and thus get a more complete picture of the set. Ordinarily this is not done, and so regression often gives a rather incomplete picture. Just as the mean gives an incomplete picture of a single distribution, so the regression curve gives a corresponding incomplete picture for a set of distributions." (*Mosteller and Tukey (1977, p. 266)

Quantile regressions therefore are an extension of the standard least squares estimation of conditional mean models to estimate a group of models of conditional quantile functions. Typically the default is the Median Regression Estimator or commonly known as Least Absolute Deviations (LAD) estimator. The objective of the LAD model is to minimize a sum of absolute errors (Koenker and Hallock 2001 and Gunewardena et. al 2008). And as a result offering a more detailed examination of the conditional wage distribution. In contrast to the OLS, the QR methods are preferred for a number of reasons; Firstly, they initially have a higher degree of robustness in estimation as it is less sensitive to be affected by outliers (Koenker and Bassett 1978). Secondly, it can detect and correct (in combination with bootstrap methods) for heteroskedastic distributional forms (Deaton 1997). Finally, similar to the OLS technique, where mean conditional distribution the log wage is of worker i is modeled as the dependent variable conditional on the vector of covariates, quantile regression gives exactly the same results but across the different percentiles of the conditional distribution.

4.1. Model Specification:

A new emerging empirical literature regarding quantile regression asserts that the wage distribution need a more in depth analysis than just considering the marginal impact of covariates only at the mean level of the conditional wage distribution. Hence, the quantile regression model bridges the lack of such complex analysis upon examining the determinants of wage. Koenker and Bassett (1978) provided a new approach to analyze the whole segments of the wage distribution which provides a more comprehensive picture of the covariate effects on wage. Accordingly, the first part of the analysis will follow the same empirical approach for modeling the wage distribution across the different quantiles.

Firstly, let $\{y_i\,|i = 1,2\ldots.,n)$ to be a random sample of the logarithmic transformation of wage in an n size population and a corresponding distribution function$F$. For all θ within the interval (0, 1) the θ^{th} quantile of the log (wage) distribution can then be defined as any given number $\xi_\theta \in \mathbb{R}$ that satisfies the following equation:

$$F_Y(\xi_\theta^{-}) = P(Y \leq \xi_\theta) \leq \theta \leq P(Y \leq \xi_\theta) = F_Y(\xi_\theta)$$

Accordingly, the quantile function can be written as follows:

$$Q_Y(\theta) = F_Y^{-1}\ in\ f\{y|F_Y(y) \geq \theta\}, \forall\ \theta\ 0 < \theta < 1$$

The estimated empirical quantile regression function is:

$$\hat{Q}_Y(\theta) = \hat{F}_Y^{-1}\ in\ f\left\{y\middle|\frac{(y_i \leq y}{n} \geq \theta\right\}, \forall\ \theta\ 0 < \theta < 1$$

Koneker and Bassett (1978) suggested an optimized version for this procedure that makes the quantile in question is the unique solution to the following optimization problem:

$$\hat{Q}_Y(\theta) = \underset{\xi_\theta}{argmin}[\Sigma_{i\in\{i:y_i\geq\xi_\theta\}}\,\theta|\,y_i - \xi_\theta| + \Sigma_{i\in\{i:y_i\geq\xi_\theta\}}(1-\theta)|y_i - \xi_\theta|$$

The suggested new approach is then more convenient to determine the empirical quantiles with an extended regression settings. Accordingly, we can define $X = \{x_{ij}|i = 1,2,\dots,n, j = 1,2,\dots,k\}$ to be the covariate matrix in this given sample, which includes the constant, a dummy variable for gender, level of education, experience and a vector of other work related covariates such as job sector, informality, firm size... etc. Therefore, the θ^{th} quantile of the conditional log (wage) distribution can be written in the form of $Q_\theta(y_i|X)$ and expressed as follows:

$$Q_\theta(y_i|X) = x_i'\beta(\theta), \theta \in (0,1)$$

Following the same optimization approach suggested by Koenker and Bassett (1978), we can then obtain a vector of $\beta(\theta)$ the θ^{th} quantile regression coefficients and x_i' is then the i^{th} row in the X matrix. For any given $\theta \in (0,1)$, the estimated quantile regression estimators of $\beta(\theta)$, $\hat{\beta}(\theta)$ is the solution set of the following minimization problem:

$$\hat{\beta}(\theta) = \underset{\beta_\theta}{argmin}[\Sigma_{i\in\{i:y_i\geq x_i'\beta(\theta)\}}\,\theta|\,y_i - x_i'\beta(\theta)| + \Sigma_{i\in\{i:y_i\geq x_i'\beta(\theta)\}}(1-\theta)|y_i - x_i'\beta(\theta)|$$

$$= \underset{\beta_\theta}{argmin}[\Sigma_i\,\rho_\theta(y_i - x_i'\beta(\theta))$$

Therefore, the θ^{th} quantile of the yielded quantile regression estimators of $\beta(\theta), \hat{\beta}(\theta)$can be obtained by minimizing the means of the asymmetrically weighted absolute errors given a θ weight for the positive errors and $(\theta - 1)$ for the negative errors.

The estimated quantile regression coefficients can be interpreted similar to the ordinary least square estimators. We first consider the partial derivatives of the θ^{th} quantile of the

conditional log (wage) distribution given a vector X of covariates with respect to one of the repressors. So, $\partial Q_\theta(y_i|X)/\partial X_{ij}$ is the partial derivative that represents the marginal change at the θ^{th} quantile of y_i due to the ceteris paribus effect of the j^{th} variable x_{ij}. Finally, confidence intervals and standard errors for the quantile regression estimated coefficients can hence be estimated using the asymptotic standard errors for the estimators or by the bootstrapping approach (Koneker and Halock, 2000). Koneker and Basset (1978) introduced the asymptotic theory that is based on the independently and identically distributed errors (i.i.id.). However, realistically, when the errors are not independently and identically distributed, the estimators can be obtained re-sampling methods which commonly named bootstrapping.

The final step is the decomposition of effects on means wage between both genders and across all the quantiles of the wage distribution. Following the traditional decomposition approach developed by Oaxaca and Blinder (1973) , Machado and Mata (2005) introduced a new decomposition method that analyzes the effects on mean wages employing quantile regression and the bootstrapping approach. This decomposition approach is based on, as a first step, the estimation of the conditional wage distribution running quantile regressions. Secondly, we estimate the wage's marginal density function Machado and Mata (2005) utilized the integral theorem in statistics: if U is a uniformly distributed random variable on [0,1], then we can obtain $F^{-1}(U)$ follows the distribution of F. Hence, if $\theta_1, \theta_2, \dots, \theta_m$ are randomly selected from a uniform distribution (0,1), the m estimates obtained from the conditional quantile regressions at a given $X, \{x_i'\hat{\beta}(\theta_i)\}_{i=1}^m$ will create a random sample from the estimated conditional distribution. The steps of the decomposition procedure can be summarized as follows:

1. Generate a randomly drawn sample of size m from $U[0,1]$: $\theta_1, \theta_2, \dots, \theta_m$.

2. For all the data set and each $(\theta_i)_{i=1}^m$ estimate $Q_{\theta_i}(y|X)$ to obtain *m* estimates of the quantile regression estimated coefficients $\hat{\beta}(\theta_i), i = 1,2, \dots m.$

3. To generate a random sample of a given size *m* with replacement from the vector of covariates, denoted by $\{\tilde{x}_i\}_{i=1}^m$

4. Finally we obtain $\{\tilde{y}_i = \tilde{x}_i{}'\hat{\beta}(\theta_i)\}_{i=1}^m$ as a random sample of size *m* from the desired distribution.

The proposed decomposition technique allows to examine two counterfactual wage distributions, males' and females'. To reveal the gender wage differential, we need to simulate the marginal wage distribution that would have prevailed for females given all covariates had been distributed as males'. This procedure can hence be run as follows:

1. Generate a randomly drawn sample of size m from $U[0,1]$: $\theta_1, \theta_2, \dots, \theta_m$.

2. For all the data set and each $(\theta_i)_{i=1}^m$ estimate the quantile regression coefficients as: $\hat{\beta}^{females}(\theta_i), \hat{\beta}^{males}(\theta_i), i = 1,2, \dots., m,$ for all females and males respectively.

3. To generate a random drawn samples of size m with replacement from the given vector of covariates denoted by $\{\tilde{x}_i{}^{females}\}_{i=1}^m$ and $\{\tilde{x}_i{}^{males}\}_{i=1}^m$.

4.$\{\hat{y}_i^{female} = \hat{x}_i^{female'}\hat{\beta}^{female}(\theta_i)\}_{i=1}^m$ and $\{\hat{y}_i^{male} = \hat{x}_i^{male'}\hat{\beta}^{male}(\theta_i)\}_{i=1}^m$ are randomly drawn samples of a given size m from the marginal wage distributions.

5. Finally, we generate a random sample from the counterfactual distribution. $\{\hat{x}_i^{male'}\hat{\beta}^{female}(\theta_i)\}_{i=1}^m$ is then can be defined a random sample from the conditional wage distribution that would have prevailed among women if all the vector of the given covariates had been distributed as males'.

The final step can be repeated to generate another counterfactual density by reversing the roles of males and females. Hence we can obtain two counterfactual densities: (1) the female log wage that would have prevailed if females were given male's characteristics but receiving their own wages. And (2) the density that would prevail if women had their own characteristics but were paid similar to their male counterparts (Albrecht, et al., 2003).

The decomposition of the differential between the quantiles of the males and females wage distribution is then given by the follow equation:

$$X^{male}\hat{\beta}^{male}(\theta) - X^{female}\hat{\beta}^{female}(\theta) = (\tilde{X}^{male} - \tilde{X}^{male})\,\hat{\beta}^{female}(\theta) + \tilde{X}^{male}[\hat{\beta}^{male}(\theta) - \hat{\beta}^{female}(\theta)$$

The first component of the equation can be interpreted as the contribution of the covariates to the wage gap and the second component is the contribution of the coefficients to the wage differential between the θ^{th} quantile of the male conditional wage distribution and the θ^{th} quantile of the female conditional wage distribution.

4.2. Data and Sample Selection:

The suggested analysis will utilize the Egyptian Labor Market Panel Survey (ELMPS) published in 2018 from 2006 to 2018 by the Center Agency for Public Mobilization and Statistics (CAPMAS) in cooperation with the Economic Research Forum (ERF) (OMADI, 2018). ELMPS has been the most comprehensive publicly available Egyptian labor market survey in the past twenty years. The ELMPS survey is composed into three main sections; the first section is dedicated to the head of the household in which information about the demographics is collected. The second section is dedicated to the individual-level questions in which information about education, experience, parental background, detailed employment, job characteristics and earnings is collected. The third, and the final, section is dedicated to the household's income sources. The ELMPS follow up on the same households that were previously interviewed in the past survey iterations in 2012, 2006 and in 1998. The final sample includes 15,746 households and 61,231 individuals. The Survey interviews an additional 2000-3000 households in each survey wave to maintain representativeness of the overall sample.

The ELMPS is a wide-ranging, nationally representative panel survey that covers different topics such as parental background, education ,migration and remittances, time use, marriage patterns and costs, fertility, housing, access to services, residential mobility, women's decision making and empowerment, job dynamics, household enterprises and farms, savings and borrowing behavior, unemployment and earnings in typical labor force surveys.

V Descriptive Analysis:

The overall sample obtained in the ELMPS 2018 round was 61,230 observations. After focusing on only the wage workers who have non zero wage and within the age group of 16-65 . Self-employed, employers and any observation that received wage was added in the inclusion criteria. The refined sample was 7,804 observations. Table (1) shows the gender distribution in the selected sample. Males and females represented roughly 81% and 19% of the wage worker sample aged …., respectively. These ratios are consistent with the past rounds of surveys and similar analysis from Nizar (2017) and Tansel (2020).

TABLE (1): Gender distribution of wage workers aged 16-65 in the obtained sample

Sex	Freq.	Percent	Cum.
Males	6337	81.20	81.20
Females	1467	18.80	100.00
Total	7804	100.00	-

Focusing on covariate differences between males and females, table (2) shows the educational attainment by gender. Overall, females have higher educational attainment for the upper educational classes: post-secondary education, university and postgraduate education. The most striking observation is the fact that female university degree holders, on average, are twice as many compared to their male counterparts with 44% of females attaining a university degree compared to 20% of the males' sample. The glass ceiling effect is very prominent in that case since women are more likely to outperform men in terms of educational attainment, yet they still witness a significant wage gap. On the other hand, roughly 40% of males hold a vocational degree compared to 29% among females.

TABLE (2): The distribution of wage worker of age (16-65) across the different educational levels.

	Educational Attainment (9 Categories, age 6+)										
Sex	**Illiterate**	**Reads & Writes**	**Primary**	**Preparatory**	**General secondary**	**Vocational secondary**	**Post-secondary institute**	**University**	**Post-graduate**	**Total Perc.**	**Total**
Males	11.63	6.28	6.91	6.28	3.05	39.88	3.79	20.88	1.31	100	6337
Females	6.48	1.57	1.77	3.00	2.66	29.52	6.88	44.38	3.75	100	1467
Total	10.66	5.39	5.95	5.66	2.97	37.93	4.37	25.29	1.77	100	7804

Table (3) describes the covariates of distributions across genders. On the aggregate level, males on average earn a monthly income of 3009.4 EGP, while females earn 2133.7 EGP. The overall gap is 876 EGP which is equivalent to 28% income wage differential between males and females. However, examining the wage differential across the different quantiles indicates that the gender wage gap is not constant across the income distribution. In fact, the wage gap diminishes as we move up in the income distribution; starting from the 25th to the median until the 75th percentile, the proportion of the wage differential drops to 15%, 17%, 12% respectively. Astonishingly though, on the very right tail of the distribution, the gender wage gap increases to 19% on the 99th percentile which indicates a glass ceiling effect.

The wage analysis presented in table (3) suggests a more in depth understanding of how women perform across the different segments of the income distribution in the Egyptian labor market. It is evident that the gender wage gap is very severe in the lower tail of the income distribution while the magnitude decays rapidly after the 25th percentile. This can steer the attention to the female workers who are centered below the 10th percentile as the gender wage gap is significantly larger than those who are centered above that 10th percentile threshold with an estimated gap of 40% for the lower 10th percentile.

With respect to educational attainment, females outperform males, on average, across all the different income quantiles. Surprisingly, women have almost double the schooling years until the 10th percentile. However, as suggested earlier, this is the segment that sufferers the most from a significant wage gap. Adding to Hendy (2015), the MENA female educational paradox can be

observed as well on the gender wage gap. This is because women who are the most educated compared to men, suffer the most from the wage differential.

On the other hand, males tend to outperform women in terms of overall work experience. On the 10th percentile of the income distribution, men, on average, have 67% more experience than women. Even though this percentage drops as we move along the distribution, still in the 99th percentile the experience gap is almost 22% in favor of men. Lastly, the amount of domestic work hours spent by females, on average, are roughly 28 hours on weekly bases compared to 3 hours on weekly bases by males. The magnitude of the difference is very pronounced in the central portion of the distribution as females' median domestic hours spent are roughly 27 fold those spent by their male counterparts.

TABLE (3): Summary statistics across the wage distribution: N mean p1 p10 p25 p50 p75 p99 by(sex)

Sex: Female	**N**	**Mean**	**1st Perc.**	**p10**	**p25**	**Median**	**p75**	**99th Perc.**
Monthly Wage	1467	2133.7	125	600	1150	1666.7	2333.3	10500
Years of School	1467	6.5	1	4	6	7	8	9
Experience	1430	14.4	0	1	5	12	23	38
Male								
Monthly Wage	6337	3009.4	250	1000	1386.7	2000	2700	13000
Years of School	6337	5.3	1	1	4	6	7	9
Experience	5974	16.8	0	3	8	15	24	48
Wage Ratio (Male/Female)		**1.41**	**2**	**1.66**	**1.20**	**1.20**	**1.15**	**1.23**

Table (4) examines the distribution of males and females in the public and private sector across the different quantiles of the income distribution. At first sight, females are heavily centered in public jobs; nearly 70% of the female working employees are employed in the public sector. The distribution of female workers across the different quantiles is almost constant ranging from 11.78% to 17.14% throughout the first till fourth quintile respectively. However, this ratio marginally decreases on the highest quintile reaching 8.92%. Male workers however, are much less inclined to work in the public sector consistently across all the relevant wage distributions.

The highest concentration for male workers in the public sector is observed on the fourth quintile while the lowest is in the first quintile with proportions of 10% and 5% respectively.

On the other hand, the distribution of female workers in the private sector is heavily centered in the first quantile with a ratio of 18%. Having said that, the ratio sharply decreases as wage earned increases with an average of 4.5%, 3.5%, 2.4% and 1.5% for the second, third, fourth and fifth quantiles respectively. One important thing to note is that women are heavily centered in the lower quantile of the wage distribution which implies that the distribution of female wage is right tailed. Contrary to the female income distribution, male workers tend to have a more symmetrical wage distribution across the different segments of income.

Table (4): Wage workers distribution by sector and sex

Quantile **Females**	Economic sector of prim. job		
	Public	Private	Total
1	41.37	58.63	100.00
2	75.57	24.43	100.00
3	82.27	17.73	100.00
4	87.72	12.28	100.00
5	86.84	13.16	100.00
Total	70.44	29.56	100.00

Males	Public	Private	Total
1	26.76	73.24	100.00
2	27.08	72.92	100.00
3	33.96	66.04	100.00
4	42.70	57.30	100.00
5	43.42	56.58	100.00
Total	35.18	64.82	100.00

VI Empirical Results:

In this section the estimates from the quantile regression and the decomposition of the gender wage gap are presented. Following the approach presented by Albrecht et al. (2003), for the various specifications, a series of standard OLS pooled for both males and females as well as for each gender will be estimated. Secondly, a series of quantile regressions will be performed on the different quantiles of the wage distribution for both males and females controlling for individual and firm characteristics across the various points of the male and female wage distributions. Lastly, a wage gap decomposition will be estimated following the introduced approach by Machado and Mata (2005) that analyzes the effects of covariates on mean wages employing quantile regression and the bootstrapping approach standard. This approach is an extension to the standard Oaxaca and Blinder (1973) approach but with more flexibility to run the decomposition analysis across quantiles.

6.1 Pooled Ordinary Least Square Estimation:

Table (5) presents the OLS estimates for the pooled data as well as for each gender separately controlling for the years of schooling[1], experience, urban status, region and marital status. Overall, the pooled OLS estimates are statistically significant for the years of schooling, experience, regions except the upper and Lower Egypt in rural areas and finally divorced and widowed(er) for the marital status. This can be partially explained by the fact that these groups are heavily underrepresented in the final sample used. It is very clear that years of schooling and work experience affect the wage earnings potential almost identically. For every additional year of

[1] Years of schooling are controlled for to estimate the standard Mincer (1958) earning equation. This approach is more convenient to estimate the marginal effect by a school year. One possible limitation to this approach is the possible non-linear relation between log wage and years of school. Other studies relay on categorical variable for education to carry out similar estimation procedure such as (Psacharopoulos & Patrinos, 2004; Salehi-Isfahani et al., 2009)

schooling or work experience, the worker on average is expected to receive 3% higher wage controlling for the other wage parameters. On the other hand, the region that workers live in seems to have the largest effect on the wage potential. It seems very disadvantageous for a worker to be residing anywhere outside of greater Cairo. The largest disadvantaged group are those who live in urban areas of upper and Lower Egypt with expected wages to be roughly 28% and 26% less than those who work and reside in Greater Cairo. This geographical effect is very pronounced in terms of the magnitude and it is statistically significant. Finally, marital status seems to affect the wage potential by 7.5%, on average, in favor of married workers.

[Table 5 is about here]

6.2 Ordinary Least Square Estimation by Gender:

Steering our attention to the gender based wage equation, females tend to have higher returns to schooling and experience, on average, compared to their male counterparts. Females expect to receive 5% and 4% returns to schooling and experience compared to 3% and 2% for males. Urban status is statistically significant in the estimated OLS model and it has a large effect on their wage earnings. In fact, female workers who live in rural areas are expected to receive 32% less wage, on average, compared to the female workers with the same characteristics who live in urban areas. Interestingly, widowed women are estimated to receive higher wages on average than their male counterparts with 21% and 12% respectively compared to single workers. However, the most intriguing observation from the OLS estimation is the constant estimates because women are expected to receive a log monthly wage of 6.3 versus 7.17 for males. This represents the wage received if all the controlled variables are equal to zero. It can be interrupted that this difference is simply the price tag of being a woman. Finally, the model for estimating the wage equation for females tend to capture the heterogeneity of wages more efficiently than the males' model with R

squared coefficients 0.24 and 0.082 respectively even though the sample size for males is almost 5 folds compared to the female's sample size. This indicates that the individual characteristics are more relevant in explaining the wage earnings potentials of females more than males.

6.3 Ordinary Least Square Estimation Including Firm Characteristics:

Table (6) presents the findings of the OLS regression pooled and by gender after controlling for firm related characteristics such as the firm's size, formality and the economic sector. All the coefficients estimated are statistically significant 95% confidence level except for urban lower and Upper Egypt as well as the martial status. There are a number of observations that can be inferred from the estimated models; Firstly, the marginal effect of the firm size on wage is more evident for female workers across all the different firm sizes compared to their male counterparts. Female workers are expected to receive, on average, a range of 33% and 30% higher wage for the firm sizes 5-9 workers and 100 plus workers, respectively, compared to the base group who work in firm sizes that are 1-4 workers. Putting this in comparison with the male workers, it is clear that the magnitude is less evident throughout all the different firm sizes. In fact, moving from a firm size of 1-4 workers to a firm size 5-9 workers has only 6% additional effect on the expected wage received by males while for the same firm size females are expected to receive 33% more wage on average.

[Table 6 is about here]

The effect of job formality on the expected monthly wage for females is significantly higher than for male workers. On average, females who have formal jobs are expected to receive 29% higher wages compared to those who have informal jobs. The magnitude of job formality is

less severe for males as male workers who have formal jobs are expected to receive, on average, 18% higher monthly wages compared to those who have informal jobs. On the other hand, the economic sector seems to impact the earnings potential for males positively for workers who work in the private sector compared to those who work in the public sector by 11% on average. For female workers however, the results are not statistically significant to reach a generalizable conclusion about the effect of the economic sector on wage earnings. Finally, the overall model estimating the female wage equation still manages to explain the heterogeneity in the log monthly wage received after controlling for the firm related characteristics.

6.4 Quantile Regression Estimation of the Conditional Wage Gap:

Table (7) presents the quantile regression estimates for both the pooled samples and across genders separately. Firstly, the conditional wage gap across the different segments across the wage distribution is not constant and significantly differs from the standard OLS estimates which justifies using the quantile regression approach. For both the higher and lower tails of the distribution there seems to be a penalty for female workers as in the 10th percentile women are expected to receive 35% less wage than their male counterparts while on the 90th percentile, women on average are expected to earn 30% less wage compared to the male workers. This result affirms that women face both sticky floors and glass ceiling effects in the Egyptian labor market.

[Table 7 is about here]

The findings presented by the estimated model can then answer the central question of the presented thesis. Do women suffer from sticky floors or glass ceiling effects in the Egyptian labor market? First, we need to specify the definition of both the glass ceiling and sticky floors. Glass

ceiling phenomena can be defined when the wage gap between two groups in the 90th percentile is larger than the 75th percentile or the median. While sticky floors can be defined by the fact that the wage gap between two groups in the 10th percentile is larger than the estimated gap for all the subsequent quantiles (Nizar, 2017). Having said that, it is clearly inferred that female workers in Egypt suffer from both sticky floors and glass ceiling effects. The findings of the quantile regression estimates are consistent with the previous findings from Nizar (2017) with the 2014 ELMPS survey round. Hence, female workers in the Egyptian labor market are penalized along the different quintiles of the wage distribution with higher severity along the end tails of the wage distribution.

So far the pooled quantile regression provided some information on the conditional wage gap, however, it is imperative to understand the ceteris paribus effect for the vector of covariates across gender to have a better understanding of what makes the largest effect for both genders not only on the means level, but also across the different portions of the wage distribution. Overall, women across all the different quantiles tend to have higher returns to schooling with 5% (at the 10th percentile) compared to the 2% for males within the same wage group. What is worth mentioning is the coefficients of the experience squared variable; Generally, the squared variable is introduced to the model to indicate diminishing returns i.e. for every additional year of experience, the expected increase in wage increases at a lower rate. A negative sign indicates the diminishing returns criteria which is clearly the case in the estimated model for males. However, females and across all the different quantiles exhibit a positive sign for the experience squared variable even though coefficients are close to null. This indicates that the higher the experience women have, the higher their expected returns on their wage. In other words, women exhibit an

increasing rate of return while men exhibit a diminishing return to experience. All the coefficients are statistically significant at 99% confidence level.

Urban status, on the other hand, penalizes male workers with larger magnitude compared to women. On average, men in the higher quantiles tend to be severely penalized with roughly 70% lower expected income (at the 90th percentile) compared to the benchmark group who work in the urban areas. While for women the magnitude for the urban status effect is less intense with the highest effect still to be found among the higher 90th percentile by an estimated marginal effect of 36% percent compared to the urban female workers. Along the center of the distribution, both males and females exhibit relatively similar patterns for urban status ceteris paribus effect.

Steering our attention to the regional effects, male workers who live in region (2) (Alexandria, Suez, and Canal cities) tend to have less penalty compared to those who live in Cairo as we move along the wage distribution. On average, male workers are expected to receive 20% and 6% less wage at the 10th and 90th percentile respectively. While females exhibit relatively higher penalties compared to those who live in the Greater Cairo area with the highest magnitude of 30% (at the 10th percentile) and 21% (at the 90th percentile). The results for the female model on Region (2) are, however, statistically significant at 90% confidence level. For region (3) (Urban Lower Egypt) female penalty increases steadily along the wage distribution with the highest magnitude of 36% (at the 90th percentile) compared to the female workers who live in Greater Cairo. Still, male workers exhibit lower coefficient across all quantiles in the relevant region. Interestingly, for male workers who live in Region (5,6) (Rural Lower and Rural Upper), the estimated model suggests that there is a rewarding effect for this group to be working within the relevant regions compared to Greater Cairo as we move higher along with the wage distribution. In fact, male workers are expected to receive 43% and 56% higher wages on average

(at the 90th percentile) across the relevant regions respectively compared to the benchmark group. The model however, failed to generate statistically significant results for the relevant regions for females due to the limited numbers of female workers who reside within these regions with the inclusive sample criteria.

Marital status are statistically significant for both married female and male workers for the 75th and 90th percentiles. Married female workers tend to have approximately double the marginal effect on monthly wage compared to their male counterparts (at the 90th percentile) with singles to be the reference group reaching 20% and 10% respectively. The estimated results for the remaining marital status group are not statistically significant and hence it will be hard to reach representative conclusions about the aforementioned groups.

In terms of firm characteristics, first, all the different segments of the wage distribution, women exhibit higher payoffs as firm sizes increase compared to their male counterparts. This indicates that firm size plays a significant role in female's earnings potential compared to male workers across all the wage distribution. The firm size effect is almost double in the lower tail part of the distribution for females compared to males with estimated 35% and 45% for the female group and 15% and 30% for the male group for firm sizes 5-9 and 100+ respectively. It is worth noting that the firm size 100+ has the highest marginal effect on the wage earning potential for females across all quantiles compared to the reference group of female workers who work in the firms with an average workers of 1-4.

The level of job formality seems to have a major impact on the female earnings potentials especially on the lower tail of the wage distribution. On average, females who are employed within the formal sector, have roughly 40% more wage earnings potential compared to those who work in the informal sector (at the 10th percentile). Contrary to the relatively positive high effect of job

formality on women, men who are employed in the formal sector face a wage penalty as they only expect to receive 15% higher monthly wage, on average, compared to those who work in the informal sector. On the other hand, male workers at the right tail of the wage distribution tend to have higher effects of job formality. For instance, male workers who are employed within a formal job have, on average, 24% higher wage earnings compared to those who are employed within the informal sector at the 90th percentile. The estimated model, however, doesn't provide statistically significant results for the females for both the 75th and 90th percentiles for the effect of job formality.

In terms of the job economic sector, the model succeeds in providing significant results for all the quantiles for males and only at the 10th and 25th percentile for females. Focusing our attention to those within the 10th and 25th percentile across both genders, it is evident that females suffer from a severe penalty upon deciding to switch from public to private jobs. In fact, women who are in the private sector expect, on average, to receive 28% less wage compared to women who are within the public sector (at the 10th percentile). On the other hand, the labor market favors males who face the same decision to switch from the public to private sector. For instance, male private workers, on average, have 12% higher income potential than those who are employed in the public sector (at both the 10th and 90th percentiles). The male economic sector premium is more favorable at the tails of the wage distribution while on the mid-section the estimates are 11%, 9% and 9% for the 25th, 50th and 75th percentiles respectively.

Finally, analyzing the constant estimated coefficients can provide a plausible understanding of how female workers do in the Egyptian labor market when the vector of controlled variables are equal to zero. This simply shows how females perform in comparison to males by simply being only a "woman" versus a "man". In the lower tail of the wage distribution,

females face the highest penalty for simply just being a *woman* as the constant coefficient difference between males and females is 0.92 in favor of men. The magnitude of the coefficient difference diminishes as we move along the wage distribution reaching the minimum difference of 0.46 (at the 90th percentile). The findings of this particular part, indicate a potential biased preference to men at the lower end of wage distribution i.e. discrimination against women which paves the way to further understanding of decomposing the wage gap to its observed and unobserved components.

6.5 Wage Gap Decomposition Estimation:

Thus far, we have dealt with the OLS and quantile regression estimates to understand the ceteris paribus effect of the different covariates on the log monthly wage earnings potential not only across the genders on the means level, but also across the different quantiles of the wage distribution. Now we turn our attention to decompose the observed gender wage gap into two separate components: the first part is the one that occurs due to the characteristic differences between males and females in the labor market such as educational attainment, experience..etc. The second part is the difference associated with the coefficients between males and females. This part is commonly attributed to as "the discrimination effect". In essence it measures the rate of return that women would have received in the labor market given that they were men for controlling for specified variables.

[Table 8 is about here]

Table (8) presents the decomposition results using Machado and Mata (2005) decomposition technique which is the extension of Oaxaca and blinder (1973) standard approach in gap decomposition estimations. The extension of Machado and Mata (2005) allows more

flexibility for the treatment of distributional differences along the wage equation by decomposing the gender wage gap on the percentile level. The decomposition is performed sequentially for the 99 percentiles. Differences in log monthly wages between men and women are decomposed according to characteristics and coefficient differences. In the first step, 100 quantile regressions are estimated and following this, the standard errors are bootstrapped with the estimated confidence intervals.

The decomposition of the gender wage gap confirms the existence of the sticky floors and glass ceiling effects as well; however the latter is less pronounced in the Egyptian labor market. The raw wage gap in the 10th percentile is estimated to be roughly 38% in favor of men. The overall wage gap tends to decrease along the wage distribution to reach an absolute minimum in the 80th percentile and then resume to widen again in the 90th percentile. It is worth noting that across all the wage distribution, women are endowed with higher characteristics compared to their male counterparts. This endowment effect on characteristics is the highest on the very lower segments of the wage distribution yet these are the segments that suffer the most from a high gender wage differential. On average, female workers are endowed with higher levels of human capital characteristics that would reflect an 11% higher wage in the 10th percentile compared to the male workers. Even though the endowment effect is prominent in the lower segments of the wage distribution, it tends to diminish when women are within the higher portions of the wage distribution reaching 7.5% in the 80th percentile.

On the other hand, the most alarming result of this analysis is the fact that women who are mostly endowed in the labor market with human capital skills are the ones that are mostly discriminated against in the labor market. These women are typically among the very left tail of the distribution and typically are within low income groups who need the most support. The

discrimination effect against female workers in the 10th and 20th percentiles are 49% and 32% respectively. Having said that, the intriguing aspect is the fact that if women and men have similar human capital skills, these estimates will jump even higher indicating a very aggravated Phenomena in the Egyptian labor market towards women in the very low earning groups. Hence, we can infer that the sticky floors effect among women in the Egyptian labor market is mostly attributed to the discrimination effect towards them. Moving from the 30th percentile forward, the discrimination effect is almost constant along the wage distribution with an average of 24%. This is almost 50% less in magnitude than the 1st quantile. The negative coefficient in the estimated results implies that despite the fact that women were given men's human capital characteristics but earning their own wages, they would still earn less than their male counterparts across all the wage distribution. Moreover if women would be compensated like their male counterparts, they would earn more wage at all the quantiles of the wage distribution. Hence, the wage differential in all quantiles of the distribution is due to the differences in compensations between males and females for their labor market characteristics, rather than differences between their characteristics. Furthermore this effect diminishes throughout the wage distribution, with an evident distinction as we move from the lower tail to the upper tail. This indicates the existence of an intense sticky floor effect in the Egyptian labor market. Even though the characteristics have an opposite effect on the gender wage gap, the effects of coefficients across all of the wage distribution amplifies the observed gender gap. While the glass ceiling effect still prevailes marginally in the very higher portion of the wage distribution, it is still less problematic compared to the sticky floors effect in the Egyptian labor market.

VII Policy Discussion:

The Egyptian labor market, as shown, is not a very favorable environment that promotes egalitarian opportunities between males and females. Females in fact are prone to be marginalized severely in the labor market generally, but more specifically on the segment of the earnings distribution that is notoriously very low. Although labor market characteristics differences between men and women have not only diminished throughout the time, women continue to earn substantially less than men (Tansel, 2018). Furthermore, women exhibit very low participation rates as well as high unemployment rates. Young Egyptian women seeking work, thus, face considerable structural challenges in securing a job opportunity. The key challenges females face include the high domestic labor, cost of childcare, negative attitudes towards females in the workplace, sexual harassment, the unease of geographical mobility, persistent high wage gaps and finally the systematic discrimination against women in the labor market. Furthermore, the issue is even more problematic due to the absence of the law enforcement for anti-discriminatory laws against women.

Despite the economic growth that Egypt experienced recently, several factors have still imposed a negative impact on women status in the labor market. First and foremost, the decline of public-sector job offerings which is very favorable for women employees. Second, the limited growth of the private sector job opportunities as well as the inadequate preparation for Egyptian university graduates has not made females very competitive in terms of employment opportunities in Egypt. Third, the concentration of formal private employment in the Greater Cairo area has made women in rural areas marginalized since they suffer the most from geographical mobility

obstacles due to the social norms. Fourth, the large gains in labor market characteristics among women compared to men, have not been matched with better gains in the labor market.

While many policy debates have occurred to address the gender pay gap, they do not yet appear to have lessened the gender wage gap. Rather, they have the adverse potential to exacerbate the wage gap if employers consequently avoid hiring women, or choose to pay women less due to costs incurred covering maternal leave entitlements and more. Given this review of the current Egyptian labor market data on the topic, it is argued that one of the largest contributions to the gender wage gap was found to be gender-based discrimination against women. Thus, despite the array of remedial policy actions, such as anti-discrimination and equal opportunity for both genders, the pay gap has remained and women still endure inferior pay, conditions and prospects.

Policy makers need to increase the incentives for formal private sector to employ more women by implicitly offsetting the increasing discrimination effect among women that is more or less related to higher anticipated marginal costs from firms. Maternity leaves should be funded through the payroll tax systems in which all employees contribute and the burden of the expenses is not directly tied to the firm. Hence, the firm's decisions on the number of females they hire, is not tied by an intertemporal decision of the anticipated expected costs associated with maternity leaves.

The role of unions and collective wage bargaining is still far from any noticeable impact in the Egyptian labor market which limits the ability of female workers, especially those who are entering the labor market, to receive improved wage structures and benefits (Nilsson, 2021). The emprical results from Nilsson (2021) highlights the need for a regulated unions that support and

educate female workers about their rights as well as improve their ability to negotiate higher entery salaries to the labor market. This can help females in two different ways; firstly, induce more women to enter the job market as the level of wages increases. Secondly, limit the wage pay gap that severely exist among the lower segments of the wage distribution, who are typically the youth who are joining the labor market.

Perhaps the most important aspect of gender related policies generally, and on the labor market specifically, is the fact that policies should take the form of a bottom-up approach; policies need to reshape the social norms of society that are linked to how women are perceived overall. National micro level initiatives, such as public service announcements and comprehensive marketing campaigns, can indeed communicate the value of working women. These bottom-up policies can tremendously alter the supply side of female laborers in the Egyptian labor market. On the other hand, a top-down approach is to complement this by incentivizing firms to hire a larger female base of their employees by the various fiscal tools such as tax cuts and subsidies. Lastly, as the suggested analysis have indicated to a large persistent discrimination against women, all the various suggested policies should be complimented by prohibition of any discriminatory behaviors against female works. In fact, the 2003 labor law criminalizes any discriminatory behavior against workers. However, the law enforcement mechanism has not been effective by any means which can be explained by the quantitative results that shows the immense discrimination magnitude against women in the Egyptian labor market. The link between pay and performance is hence required to monitor any paying disparities against women, especially in the wage groups that are within the left tail of the wage distribution.

VIll Conclusion:

The presented thesis investigated the gender wage differential and the prevalence of sticky floors and glass ceiling effects in the Egyptian labor market using the Egyptian Labor Market Panel Survey (ELMPS) published in 2018. The analysis employed the quantile regression approach to further understand the distributional heterogeneity across the different earning groups for both males and females. Additionally, gender wage gap decomposition techniques are performed using the extended version of the standard Oaxaca and Blinder (1973) approach introduced by Machado and Mata (2005).

The findings of the presented thesis asserts the prevalence of gender wage gap across all the quantiles of the wage distribution. Raw wage gaps among the 10th and 20th percentiles of the wage distribution are found to be 38% and 23% respectively indicating the existence of substantial sticky floors for the female workers in the Egyptian labor market. On the other hand, the analysis suggests a mild glass ceiling effect for the higher segments of the wage distribution as the raw wage gap among the 80th and 90th percentiles are 15% and 15.8% respectively. This indicates that women on the top of the wage distribution are performing relatively better than those who are within the left tail of the distribution.

Discrimination against women in the left tail of the distribution is found to be the most significant in terms of the magnitude especially among the first 10th percentile of the wage distribution with an estimated discrimination effect 49%. These women who are concentrated within this segment are typically the young females who struggle to secure a suitable job opportunity. Women on the other hand however, tend to exhibit higher rates of returns to human capital characteristics compared to their male counterparts.

Adding to the previous literature that investigated either the wage gap on the means level or on the quantile level without paying attention to decomposing the wage gap along the conditional quantile distribution, this thesis presented a comprehensive in depth understanding of the gender differences for the wage earning equations and their corresponding difference in their rates of returns, as well as a rigorous decomposition of the gender wage differential across the wage distribution.

However, this study was limited in a number of ways; firstly, the lack of large female samples specially on the right tail of the wage distribution led to some limitations to reach conclusive and generalizable results on the wage equation estimation for the higher quantiles. Secondly, the data did not include much information about female workers who live in rural areas especially in upper and Lower Egypt. These places typically exhibit very different characteristics and hence could reflect on different estimation results. Thirdly, there are no indicative variables that shows how social norms interplay with the female preferences in the labor market and accordingly this is reflected in the unexplained portion of the decomposition estimated coefficients that could overestimate the discrimination effect. Finally, the sample selection bias, as indicated before, can lead to different estimation results if the models are iterated on different subset of the population.

While this thesis helps towards building an in-depth understanding of the distributional earnings potential of both genders, further research is still needed to link these findings with the "puzzle" of the low female participation rates as well as the very high unemployment rates. Additionally, the incorporation of behavioral preferences variables such as risk aversion, competitiveness and intertemporal decision differences between males and females and how this reflects in the labor market decisions still need further investigation.

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TABLE (5): Unrestricted and across sex OLS regressions for mincer equation:

	OLS Unrestricted	OLS Males	OLS Females
	(1)	(2)	(3)
VARIABLES	Log Total Wage	Log Total Wage	Log Total Wage
Years of School	0.0308***	0.03***	0.05***
	(0.00174)	(0.002)	(0.005)
Work experience from life history	0.0302***	0.02***	0.04***
	(0.00220)	(0.002)	(0.006)
Experience Sqr	-0.000456***	-0.00***	-0.00**
	(0.000)	(0.000)	(0.000)
Urban/Rural = Rural	-0.197	-0.28	-0.32***
	(0.393)	(0.379)	(0.074)
Region = Alx. Sz C.	-0.0966***	-0.08**	-0.19**
	(0.0374)	(0.041)	(0.080)
Region = Urb. Lwr.	-0.257***	-0.27***	-0.26***
	(0.0336)	(0.037)	(0.071)
Region = Urb. Upp.	-0.281***	-0.31***	-0.25***
	(0.0325)	(0.036)	(0.068)
Region = Rur. Lwr.	-0.0150	0.06	0.05
	(0.392)	(0.378)	(0.062)
Region = Rur. Upp.	0.00942	0.07	-
	(0.392)	(0.378)	-
Marital status = 4, married	0.0758***	0.14***	0.18***
	(0.0232)	(0.025)	(0.057)
Marital status = 5, divorced	-0.0640	0.24**	0.11
	(0.0673)	(0.099)	(0.101)
Marital status = 6, widowed(er)	-0.0226	0.12	0.21**
	(0.0586)	(0.113)	(0.087)
Constant	7.012***	7.17***	6.30***
	(0.0374)	(0.041)	(0.089)
Observations	7,453	6,016	1,437
R-squared	0.096	0.082	0.237

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

TABLE (6): Unrestricted and across sex OLS regression for Mincer equation with firm characteristics

	OLS Unrestricted	**OLS Males**	**OLS Females**
VARIABLES	(1) Log Total Wage	(2) Log Total Wage	(3) Log Total Wage
Years of School	0.0237***	0.02***	0.03***
	(0.00197)	(0.002)	(0.005)
Work experience from life history	0.0280***	0.02***	0.02***
	(0.00225)	(0.003)	(0.006)
Experience Sqr	-0.000424***	-0.00***	0.00
	(4.76e-05)	(0.000)	(0.000)
Urban/Rural = 2, Rural	-0.161	-0.25	-0.32***
	(0.385)	(0.371)	(0.076)
Region = Alx. Sz C.	-0.115***	-0.10**	-0.25***
	(0.0375)	(0.041)	(0.079)
Region = Urb. Lwr.	-0.228***	-0.23***	-0.26***
	(0.0338)	(0.038)	(0.071)
Region = Urb. Upp.	-0.261***	-0.29***	-0.27***
	(0.0327)	(0.036)	(0.068)
Region = Rur. Lwr.	-0.0276	0.03	0.07
	(0.384)	(0.370)	(0.061)
Region = Rur. Upp.	0.0136	0.07	
	(0.384)	(0.370)	
Marital status = married	0.0449*	0.09***	0.08
	(0.0237)	(0.026)	(0.058)
Marital status = divorced	-0.149**	0.12	0.03
	(0.0670)	(0.100)	(0.099)
Marital status = widowed(er)	-0.0330	0.07	0.12
	(0.0588)	(0.112)	(0.087)
Size of Firm, Crr. Job (ref. 1-week) = 5-9	0.0765***	0.06**	0.33***
	(0.0276)	(0.028)	(0.091)
Size of Firm, Crr. Job (ref. 1-week) = 10-24	0.127***	0.15***	0.20**
	(0.0293)	(0.031)	(0.085)
Size of Firm, Crr. Job (ref. 1-week) = 25-49	0.142***	0.14***	0.32***
	(0.0333)	(0.036)	(0.086)
Size of Firm, Crr. Job (ref. 1-week) = 50-99	0.124***	0.14***	0.26***
	(0.0352)	(0.039)	(0.088)
Size of Firm, Crr. Job (ref. 1-week) = 6, 100+	0.202***	0.21***	0.30***
	(0.0263)	(0.027)	(0.078)
Formality of prim. job (ref. 3-month) = Formal	0.188***	0.18***	0.29***
	(0.0243)	(0.025)	(0.066)
Economic sector of prim. job (ref. 1-week) = Private	0.147***	0.11***	-0.09
	(0.0231)	(0.025)	(0.061)
Constant	6.815***	7.02***	6.41***
	(0.0510)	(0.055)	(0.133)
Observations	7,126	5,740	1,386
R-squared	**0.119**	**0.112**	**0.274**

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

TABLE (7): Pooled Quantile Regression and across gender

	Pooled					Males					Females				
VARIABLES	q10	q25	q50	q75	q90	q10	q25	q50	q75	q90	q10	q25	q50	q75	q90
Years of School	0.03***	0.03***	0.03***	0.02***	0.02***	0.03***	0.02***	0.02***	0.02***	0.02***	0.05***	0.04***	0.03***	0.03***	0.03**
	(0.004)	(0.002)	(0.002)	(0.002)	(0.002)	(0.004)	(0.003)	(0.002)	(0.002)	(0.003)	(0.010)	(0.008)	(0.005)	(0.006)	(0.012)
Work experience from life history	0.02***	0.03***	0.02***	0.02***	0.02***	0.02***	0.02***	0.02***	0.01***	0.01***	0.02	0.02***	0.01***	0.01**	0.01
	(0.005)	(0.003)	(0.003)	(0.003)	(0.004)	(0.003)	(0.003)	(0.003)	(0.002)	(0.003)	(0.013)	(0.005)	(0.005)	(0.005)	(0.012)
Experience Squared	-0.00***	-0.00***	-0.00***	-0.00***	-0.00***	-0.00***	-0.00***	-0.00***	-0.00***	-0.00***	0.00	0.00	0.00	0.00	0.00
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Urban/Rural = Rural	0.19	-0.10	-0.16	-0.38***	-0.66***	0.19	-0.08	-0.26**	-0.41***	-0.69***	-0.23*	-0.22***	-0.23***	-0.27***	-0.36***
	(0.219)	(0.183)	(0.142)	(0.117)	(0.155)	(0.179)	(0.121)	(0.131)	(0.115)	(0.143)	(0.131)	(0.082)	(0.073)	(0.084)	(0.138)
Region = Alx. Sz C.	-0.22***	-0.15***	-0.10**	-0.09**	-0.09	-0.20***	-0.12**	-0.09**	-0.06*	-0.06	-0.30*	-0.23***	-0.17***	-0.24***	-0.21*
	(0.061)	(0.039)	(0.050)	(0.042)	(0.059)	(0.060)	(0.052)	(0.037)	(0.033)	(0.060)	(0.159)	(0.088)	(0.039)	(0.088)	(0.112)
Region = Urb. Lwr.	-0.13**	-0.16***	-0.20***	-0.26***	-0.29***	-0.19***	-0.18***	-0.22***	-0.27***	-0.29***	-0.09	-0.10**	-0.17***	-0.31***	-0.36***
	(0.055)	(0.026)	(0.029)	(0.036)	(0.055)	(0.051)	(0.041)	(0.027)	(0.033)	(0.046)	(0.125)	(0.045)	(0.042)	(0.078)	(0.136)
Region = Urb. Upp.	-0.24***	-0.24***	-0.23***	-0.27***	-0.24***	-0.30***	-0.29***	-0.26***	-0.29***	-0.23***	-0.11	-0.18***	-0.23***	-0.30***	-0.30**
	(0.050)	(0.037)	(0.034)	(0.041)	(0.057)	(0.052)	(0.032)	(0.030)	(0.040)	(0.050)	(0.097)	(0.065)	(0.053)	(0.074)	(0.132)
Region =Rur. Lwr.	-0.34	-0.07	-0.01	0.14	0.39***	-0.36**	-0.11	0.06	0.17*	0.43***	0.15**	0.06	0.06	0.01	-0.00
	(0.220)	(0.171)	(0.131)	(0.102)	(0.144)	(0.175)	(0.120)	(0.131)	(0.105)	(0.129)	(0.065)	(0.056)	(0.059)	(0.056)	(0.082)
Region =Rur. Upp.	-0.33	-0.08	-0.01	0.21*	0.50***	-0.38**	-0.10	0.08	0.25***	0.56***	-	-	-	-	-
	(0.207)	(0.173)	(0.133)	(0.108)	(0.149)	(0.181)	(0.118)	(0.126)	(0.094)	(0.127)	-	-	-	-	-
Marital status =married	0.05	0.05**	0.07***	0.09***	0.08***	0.07**	0.11***	0.11***	0.10***	0.10***	-0.06	0.02	0.02	0.13***	0.20***
	(0.043)	(0.023)	(0.023)	(0.025)	(0.031)	(0.031)	(0.029)	(0.032)	(0.024)	(0.029)	(0.099)	(0.051)	(0.035)	(0.049)	(0.077)
Marital status =divorced	-0.02	-0.12	0.01	0.02	0.11	0.07	0.15	0.07	0.15**	0.18	-0.12	-0.14	-0.02	0.05	0.06
	(0.096)	(0.090)	(0.067)	(0.064)	(0.127)	(0.123)	(0.102)	(0.125)	(0.066)	(0.144)	(0.157)	(0.088)	(0.090)	(0.108)	(0.215)
Marital status = widowed(er)	0.13	0.11	0.15***	0.18***	0.18	0.21	0.15*	-0.08	-0.07	0.10	-0.08	0.07	0.02	0.17***	0.14
	(0.165)	(0.067)	(0.053)	(0.051)	(0.113)	(0.185)	(0.079)	(0.091)	(0.150)	(0.289)	(0.155)	(0.071)	(0.051)	(0.051)	(0.181)
Size of Firm, Crr. Job = 5-9	0.16***	0.12***	0.10***	0.03	0.03	0.15***	0.08***	0.08***	0.01	-0.01	0.44**	0.35**	0.30***	0.33***	0.31
	(0.047)	(0.025)	(0.024)	(0.022)	(0.027)	(0.044)	(0.027)	(0.026)	(0.022)	(0.029)	(0.196)	(0.175)	(0.091)	(0.118)	(0.206)
Size of Firm, Crr. Job = 10-24	0.24***	0.21***	0.16***	0.11***	0.07	0.29***	0.21***	0.16***	0.11**	0.04	0.34	0.40***	0.22***	0.26***	0.05
	(0.054)	(0.027)	(0.030)	(0.022)	(0.049)	(0.046)	(0.034)	(0.030)	(0.045)	(0.043)	(0.228)	(0.136)	(0.075)	(0.066)	(0.193)
Size of Firm, Crr. Job = 25-49	0.23***	0.20***	0.18***	0.10***	0.02	0.22***	0.17***	0.17***	0.10***	-0.01	0.46***	0.44***	0.30***	0.24***	0.13
	(0.059)	(0.030)	(0.027)	(0.022)	(0.046)	(0.051)	(0.035)	(0.030)	(0.036)	(0.061)	(0.174)	(0.126)	(0.077)	(0.080)	(0.141)
Size of Firm, Crr. Job = 50-99	0.27***	0.24***	0.18***	0.08***	-0.01	0.28***	0.22***	0.16***	0.10***	-0.01	0.47**	0.41***	0.25***	0.16**	-0.12
	(0.059)	(0.032)	(0.022)	(0.024)	(0.054)	(0.071)	(0.044)	(0.037)	(0.030)	(0.068)	(0.203)	(0.120)	(0.079)	(0.079)	(0.147)
Size of Firm, Crr. Job = 100+	0.29***	0.25***	0.21***	0.18***	0.17***	0.30***	0.23***	0.18***	0.17***	0.16***	0.44**	0.45***	0.34***	0.33***	0.13
	(0.049)	(0.016)	(0.019)	(0.024)	(0.035)	(0.048)	(0.032)	(0.028)	(0.030)	(0.037)	(0.198)	(0.111)	(0.079)	(0.063)	(0.144)
Formality of prim. job Formal	0.19***	0.12***	0.10***	0.11***	0.22***	0.15***	0.11***	0.09***	0.12***	0.24***	0.42**	0.27*	0.27***	0.13	0.21
	(0.035)	(0.023)	(0.021)	(0.023)	(0.038)	(0.042)	(0.031)	(0.020)	(0.023)	(0.044)	(0.207)	(0.145)	(0.077)	(0.084)	(0.149)
Economic sector of prim. job = Private	0.04	0.06**	0.07**	0.08***	0.12***	0.12***	0.11***	0.09***	0.09***	0.12**	-0.28*	-0.20**	-0.06	-0.03	0.05
	(0.040)	(0.023)	(0.031)	(0.023)	(0.043)	(0.037)	(0.029)	(0.017)	(0.024)	(0.049)1	(0.147)	(0.097)	(0.071)	(0.044)	(0.137)
Sex = Female	-0.35***	-0.26***	-0.24***	-0.28***	-0.30***	-	-	-	-	-	-	-	-	-	-
	(0.059)	(0.023)	(0.020)	(0.027)	(0.052)	-	-	-	-	-	-	-	-	-	-
Constant	6.11***	6.53***	6.94***	7.40***	7.73***	6.25***	6.63***	7.05***	7.51***	7.76***	5.33***	5.89***	6.41***	6.85***	7.30***
	(0.115)	(0.048)	(0.057)	(0.047)	(0.095)	(0.090)	(0.064)	(0.029)	(0.057)	(0.065)	(0.316)	(0.206)	(0.131)	(0.133)	(0.215)
Observations	7,126	7,126	7,126	7,126	7,126	5,740	5,740	5,740	5,740	5,740	1,386	1,386	1,386	1,386	1,386

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table (8): Decomposition of Gender Wage Differentials by Quantiles

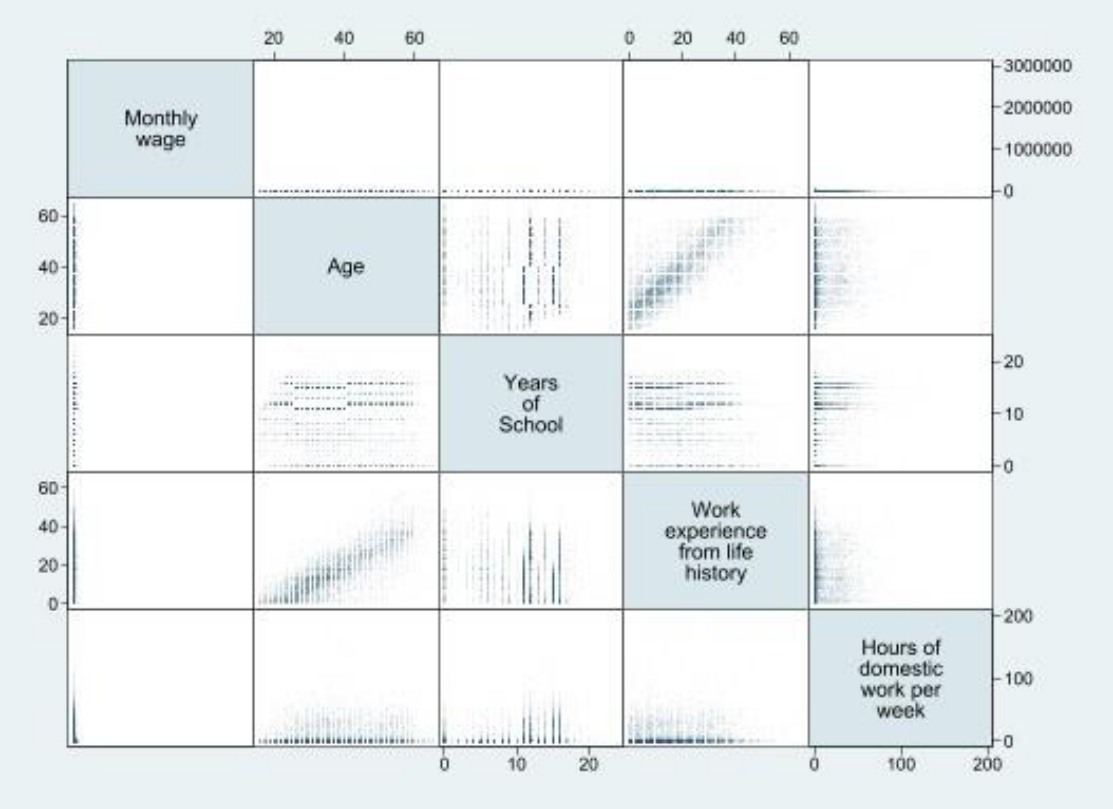
Component	Effects	Std.Err.	t	P>t	[95%Conf.	Interval]
Quantile .1						
Raw difference	-0.379	0.045	-8.360	0.000	-0.468	-0.290
Characteristics	0.112	0.018	6.180	0.000	0.076	0.147
Coefficients	-0.490	0.011	-44.060	0.000	-0.512	-0.469
Quantile .2						
Raw difference	-0.231	0.026	-9.020	0.000	-0.282	-0.181
Characteristics	0.092	0.014	6.750	0.000	0.065	0.119
Coefficients	-0.323	0.009	-37.850	0.000	-0.340	-0.307
Quantile .3						
Raw difference	-0.186	0.018	-10.090	0.000	-0.222	-0.150
Characteristics	0.086	0.012	7.250	0.000	0.062	0.109
Coefficients	-0.272	0.007	-36.610	0.000	-0.286	-0.257
Quantile .4						
Raw difference	-0.172	0.016	-10.540	0.000	-0.204	-0.140
Characteristics	0.083	0.012	7.230	0.000	0.061	0.106
Coefficients	-0.255	0.007	-36.970	0.000	-0.269	-0.242
Quantile .5						
Raw difference	-0.165	0.016	-10.100	0.000	-0.197	-0.133
Characteristics	0.080	0.011	7.100	0.000	0.058	0.102
Coefficients	-0.245	0.007	-36.220	0.000	-0.258	-0.232
Quantile .6						
Raw difference	-0.162	0.016	-10.070	0.000	-0.193	-0.130
Characteristics	0.077	0.011	6.930	0.000	0.055	0.099
Coefficients	-0.239	0.007	-33.870	0.000	-0.253	-0.225
Quantile .7						
Raw difference	-0.158	0.016	-9.700	0.000	-0.190	-0.126
Characteristics	0.074	0.012	6.380	0.000	0.051	0.096
Coefficients	-0.232	0.007	-31.080	0.000	-0.246	-0.217
Quantile .8						
Raw difference	-0.150	0.018	-8.490	0.000	-0.185	-0.115
Characteristics	0.075	0.012	6.070	0.000	0.051	0.100
Coefficients	-0.225	0.008	-28.930	0.000	-0.241	-0.210
Quantile .9						
Raw difference	-0.158	0.022	-7.220	0.000	-0.201	-0.115
Characteristics	0.078	0.016	4.850	0.000	0.047	0.110
Coefficients	-0.237	0.012	-19.570	0.000	-0.260	-0.213

APPENDIX

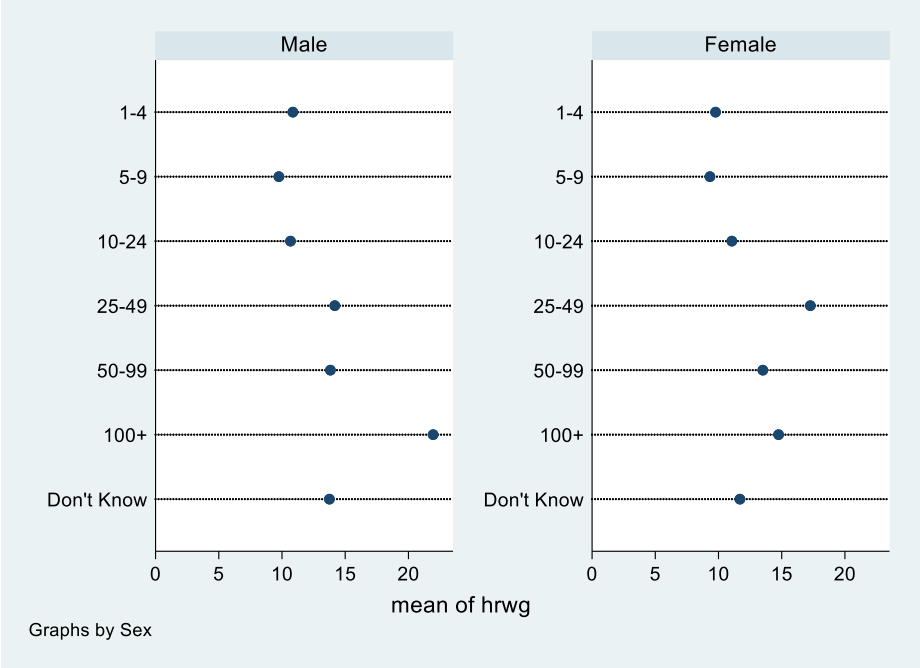
Table 1 A: Matrix of correlations

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
(1) Monthly Wage	1.000													
(2) Urban Status	-0.016	1.000												
(3) Sex	-0.012	-0.124	1.000											
(4) Age	0.005	-0.053	0.063	1.000										
(5) Household Size	0.009	0.094	-0.059	0.218	1.000									
(6) Age	0.005	-0.091	-0.271	0.266	-0.062	1.000								
(7) Years of School	0.005	-0.201	0.207	-0.011	-0.053	0.167	1.000							
(8) Father Edu	0.036	-0.249	0.171	-0.159	-0.136	0.045	0.384	1.000						
(9) Mother Edu	-0.008	0.048	-0.007	0.036	0.103	-0.008	-0.036	-0.153	1.000					
(10)Siblings	-0.015	0.138	-0.035	0.201	0.122	0.037	-0.153	-0.255	0.016	1.000				
(11) Sector	-0.018	0.044	-0.295	-0.381	-0.093	-0.076	-0.359	-0.131	0.010	-0.041	1.000			
(12) Firm Size	0.024	-0.125	0.182	0.190	0.023	0.074	0.316	0.196	0.001	-0.027	-0.488	1.000		
(13) Travel distance	0.011	0.070	-0.098	-0.057	0.010	0.023	0.036	-0.001	0.016	-0.023	0.040	0.169	1.000	
(14) Work Exper.	0.003	0.018	-0.117	0.773	0.200	0.170	-0.182	-0.227	0.004	0.201	-0.236	0.074	-0.055	1.000

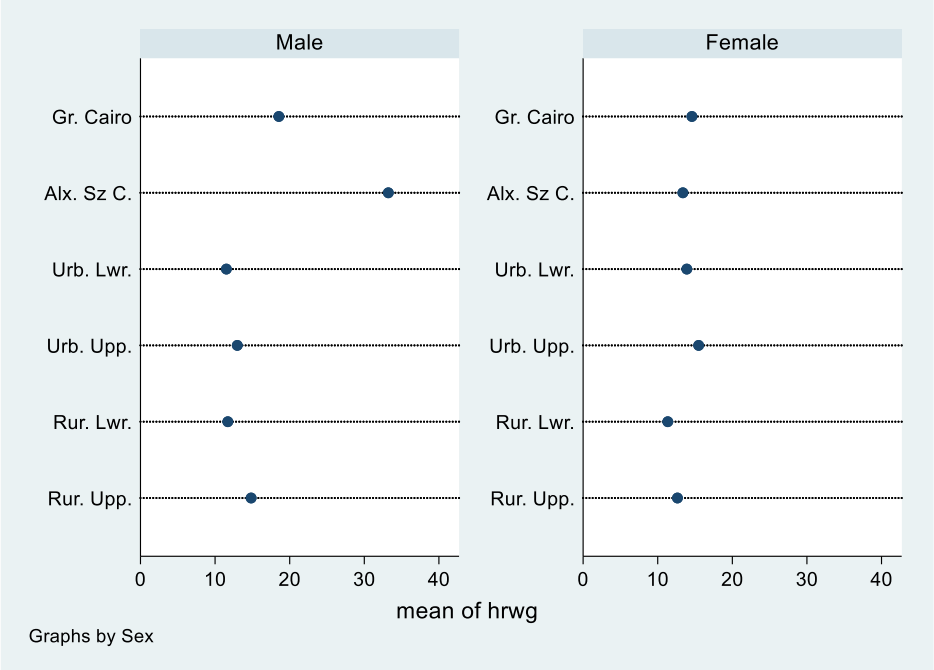
Graph 1 a: Correlation Graph



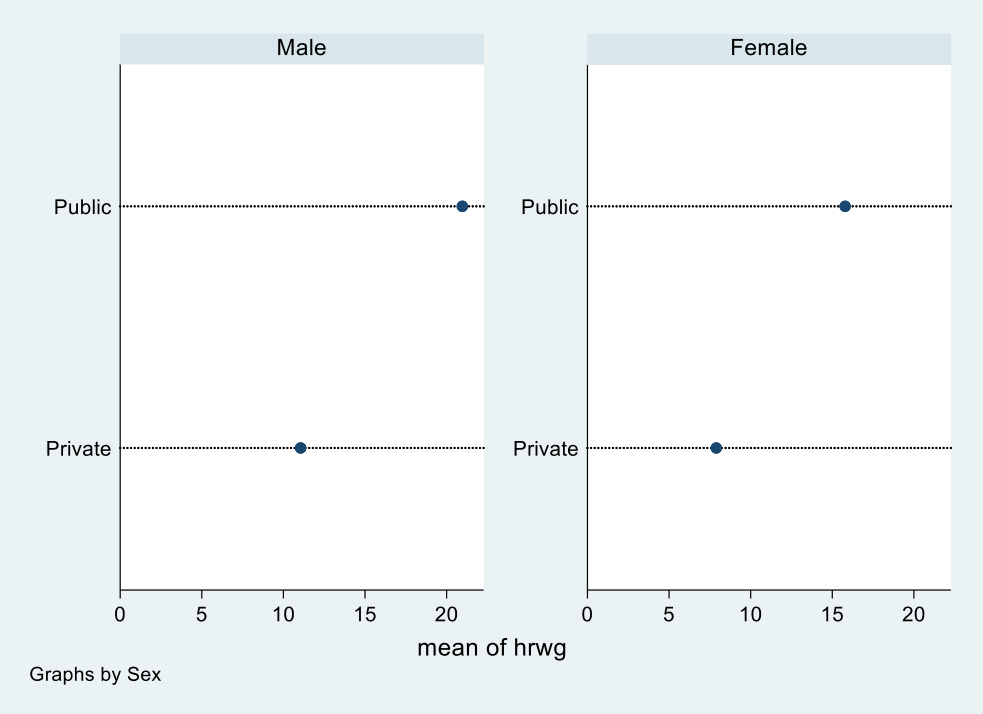
Graph 2a: Dot chart for the mean hourly wage across firm sizes by sex



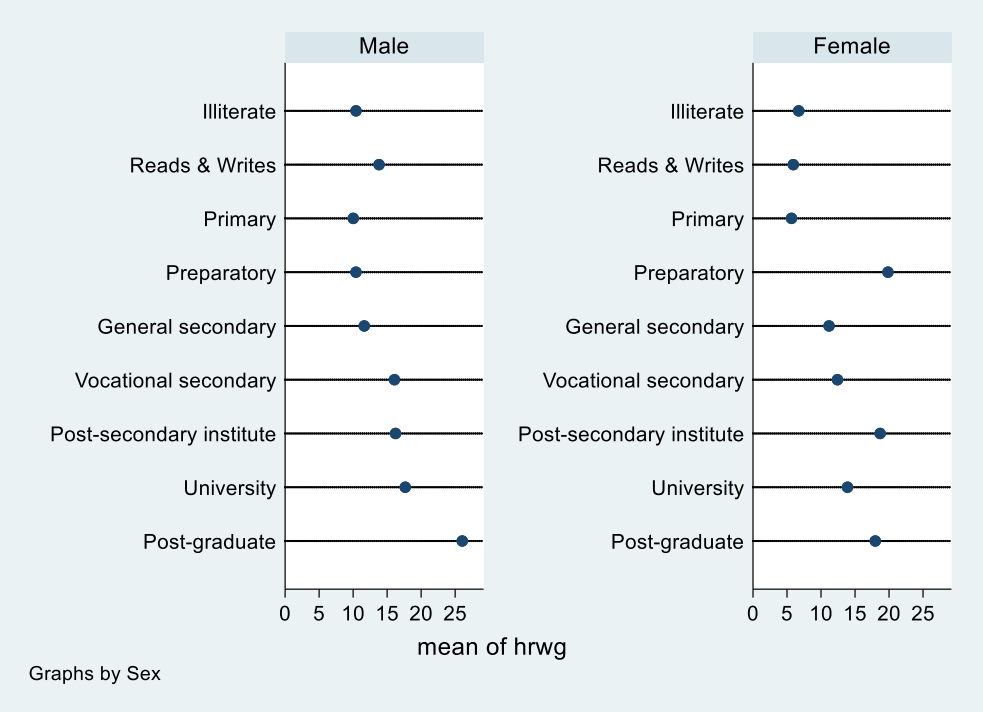
Graph 3a: Dot chart for the mean hourly wage across regions by sex



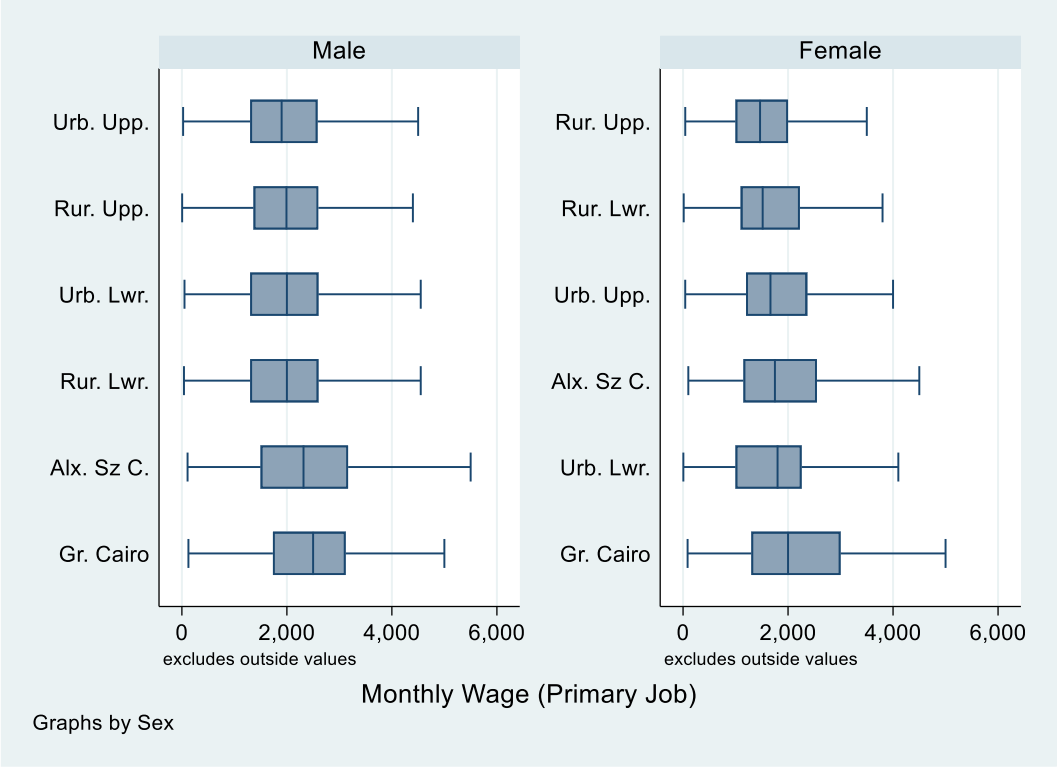
Graph 4a: Dot chart for the mean hourly wage across job sector by sex



Graph 5a: Dot chart for the mean hourly wage across educational levels by sex

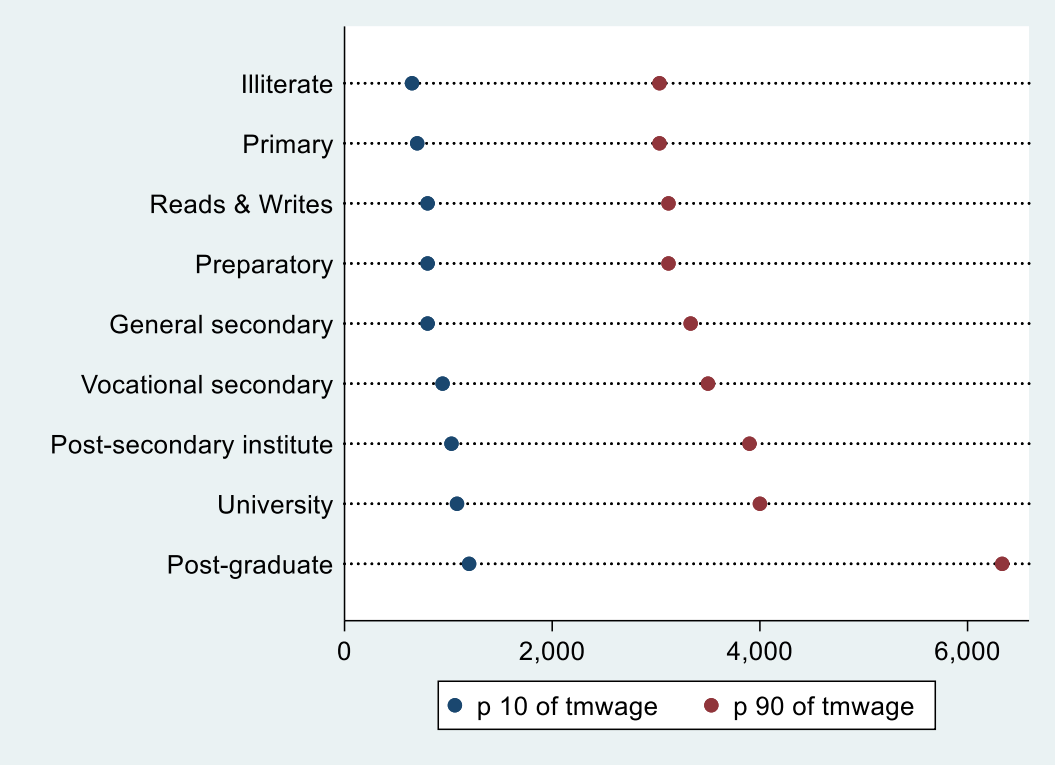


Graph 6 a: Boxplot for the mean monthly wage across regions by sex

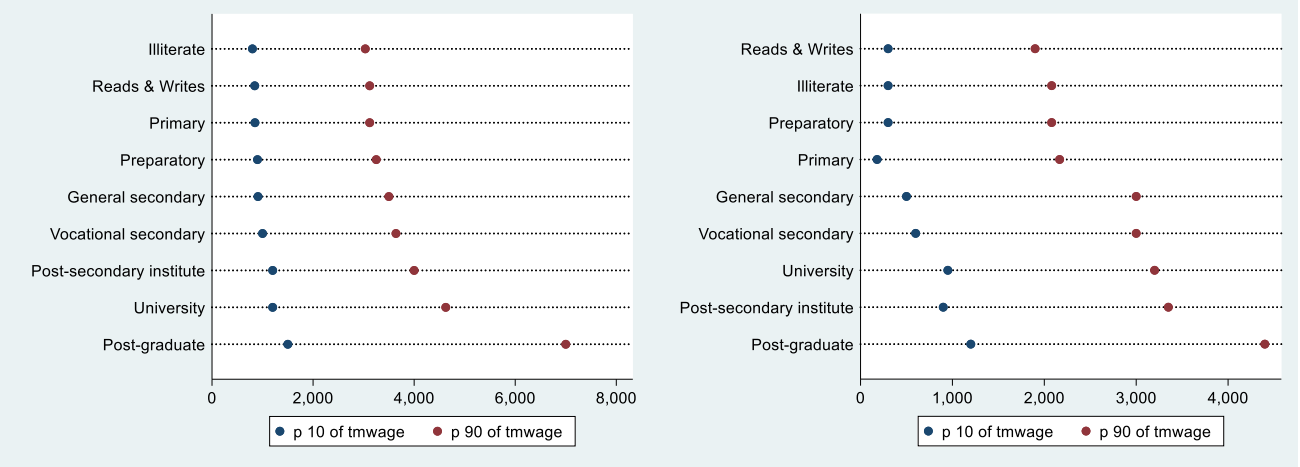


Graph 7 a: Boxplot for the mean monthly wage across economic sectors by sex

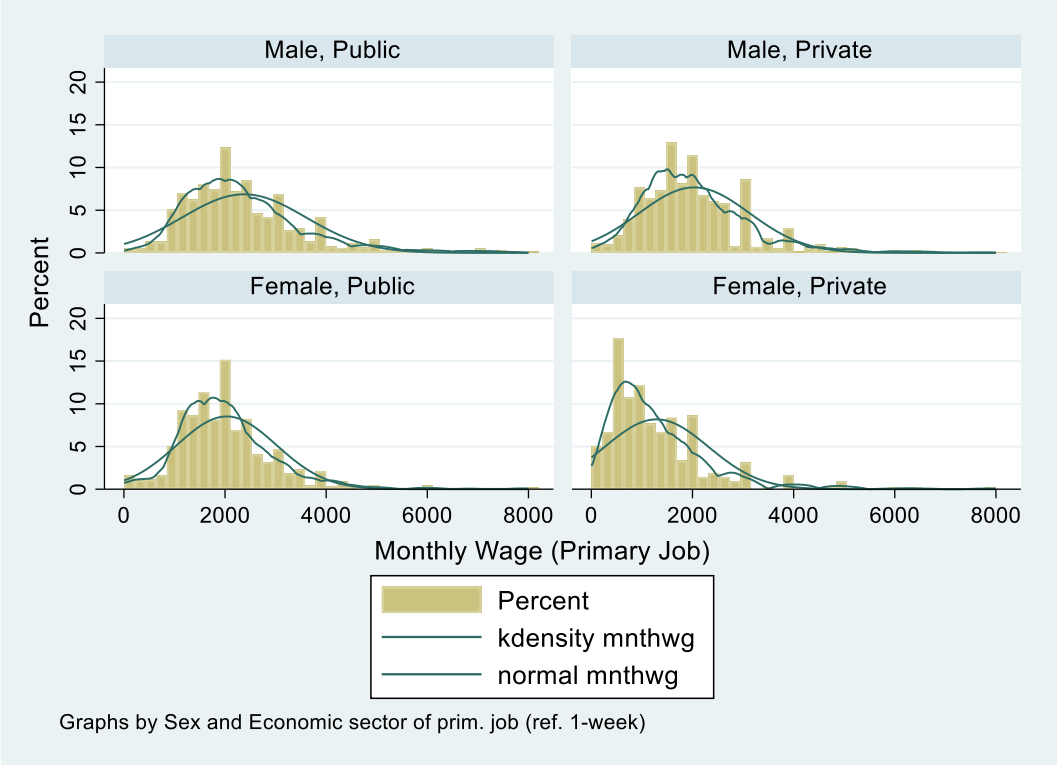
Graph 8 a: Dot chart for the mean monthly wage for the 10th and 90th percentiles across educational levels



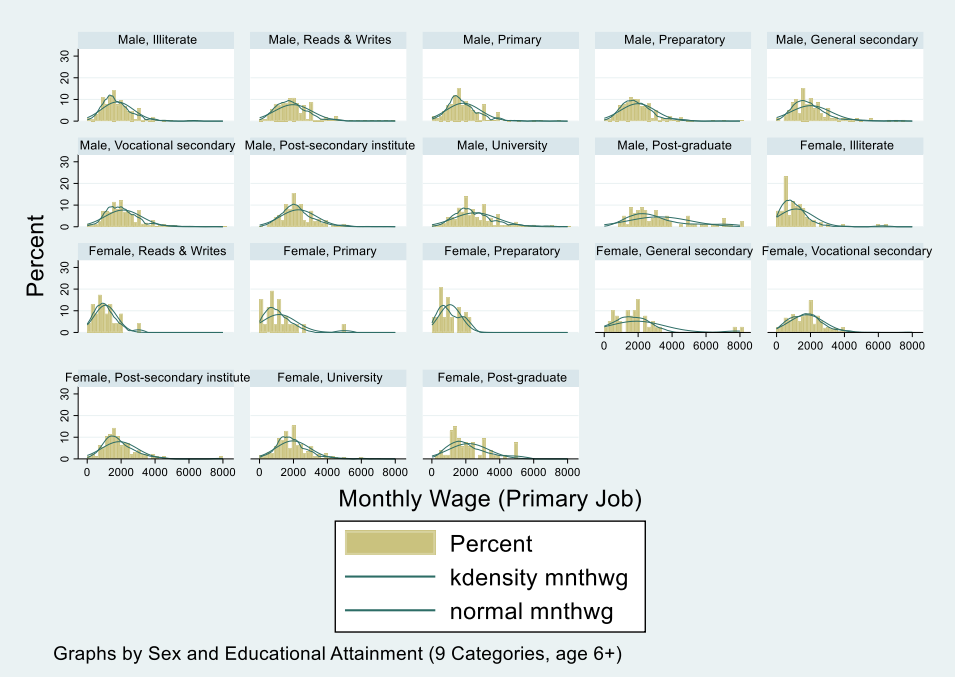
Graph 9 a: Dot chart for the mean monthly wage for the 10th and 90th percentiles across educational levels by sex (males and females respectively)



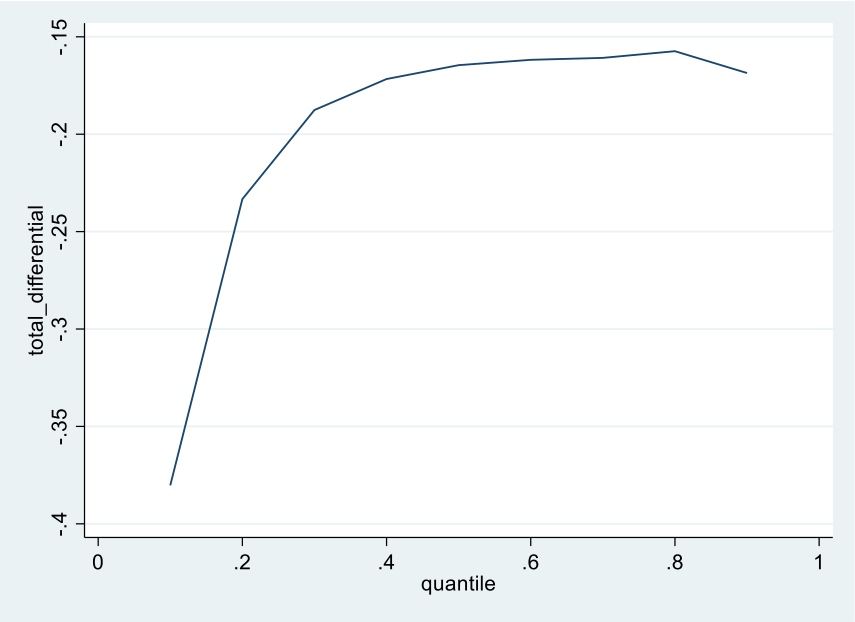
Graph 10 a: Wage distribution for the mean monthly wage for the by Sex and Economic Sector



Graph 11 a: Wage distribution for the mean monthly wage for the by Sex and Economic Sector



Graph 12 a: Total Gender Wage Differential by Quantiles



Graph 13 a: Wage Gap Decomposition by Quantiles