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ORIGINAL PAPER

Gender Wage Gap Among Couples and the Role of Parenthood Across the Wage Distribution in Turkey

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Abstract
The gender wage gap and the penalty of parenthood on wages are still major economic and sociological problems, especially in developing economies. This study aims to fill the void in the literature by analyzing the gender wage gap among couples and the role of parenthood across the unconditional wage distribution in the Turkish labor force. In accordance, 1198 families which include working-married-couples with and without children from the Turkish Household Budget Statistics survey data for 2018 are examined via unconditional quantile regression and decomposition methods. The findings provide insights into three problems of the labor force gender wage gap among couples, the role of parenthood on wages, and the variation of them across the wage distribution. The findings reveal a gender wage gap among couples and the gap is wider for the lower-paid employees. Lower-paid females face a wider motherhood wage penalty whereas fatherhood is mostly insignificant on the males' wages. However, interestingly, fatherhood becomes a significant wage penalty for the highest-paid males.

Keywords Gender wage gap · Parenthood · Wage distribution · Unconditional quantile regression · Decomposition · Turkey

JEL Classification J16 · J31 · C21

Introduction

Female employment is one of the most examined topics in the literature since female employees are considered the weaker segment of the labor market. The strict gender norms that originate from the conventional social and cultural values of a society can be considered the main reason for it. These social and institutional settings support males must work and be the breadwinner of the household whereas females should stay home and take care of the family. Most of the studies in the literature (e.g., Avellar & Smock, 2003; Baum, 2002; Budig & England, 2001; Waldfogel, 1998) reveal females still face serious risks in the labor force, and these risks are higher for mother employees. Although some countries may lower discrimination against females, a significant part of the countries, especially in the emerging market economies, females still face occupational segregation, motherhood, and marriage wage penalties.

Motherhood is the most cited reasons for earning less than nonmother female and male employees. Motherhood causes employment breaks such as maternity leave and reduces experience, job effort, and productivity because of child-caring and some of the mother employees may be having to work in part-time or mother-friendly jobs (Budig & England, 2001). Since fatherhood does not cause employment breaks and less experience unlike in motherhood, males do not have to drop out of school early or work less after being a father, unlike females. On the contrary, fatherhood motivates males to work more and be productive more because of the idea of being the breadwinner of the household (Hodges & Budig, 2010). Furthermore, employers prefer father employees more than childless male employees because of the cultural structures of masculinity, fatherhood, and breadwinning (Connell, 1995). This structure of the labor force may lead to a gender wage gap among couples along with parenthood status. When a couple has a child, the mother may be having to long employment breaks and work in mother-friendly

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part-time jobs whereas the father, on the contrary, works more and starts being more productive.

Although there are numerous papers about gender-based wage inequalities in the forms of male–female, mother-nonmother, and father-nonfather in the United States and European countries, to the best of our knowledge Turkey remains not well-examined as them. However, analyzing gender-based economic and sociological problems such as wage gaps may lead to identifying the source of problems in the labor force and may provide better gender-egalitarian policies to them.

As a developing country, Turkey has a conventional household structure and inequality in employment rates, wages, educational attainment, etc. are still significant socio-economic problems. As an indirect result of the strict gender norms and conventional culture in Turkey, wives do not have to work because of the considered duties of housework and childcare however, they can work if they prefer in jobs that are more mother-friendly and flexible. On the opposite, husbands must work their entire life and they must be more productive after being a father because of the considered duty of being the breadwinner of the house. These situations may cause or deepen the gender wage gap among couples in the Turkish labor force and it is critical to identify the gender wage gap structure and the role of parenthood on wages. The gender wage gap among couples and the role of parenthood on wages may differ across the wage distribution. Since the wage inequalities may differ for the different income-segment employees, recent studies in the literature (e.g., Budig & Hodges, 2010; Cooke, 2014; England et al., 2016; Glauber, 2018) focus on the variation of the gender-based wage inequalities across the wage distribution.

Based on the explanations, this study addresses the following three research questions: (1) Is there a gender wage gap among Turkish couples? (2) What is the role of parenthood on their wages? (3) Do the gender wage gap among couples and the role of parenthood differ across the wage distribution? In order to answer the first research question, we have estimated the extended wage equation for both male and female employees and decomposed the results. We have added a parenthood binary variable to investigate the role of parenthood on males' and females' wages. Lastly, we have adopted unconditional quantile regression to examine the differences in the wage gap and the parenthood effect across the wage distribution since unconditional quantile regression allows for the comparison of the effects between the groups and can capture the inequality between the groups (Firpo et al., 2009).

The contribution of this study to the literature is to estimate the wage equation for couples to determine whether there is wage inequality among them and trace the role of parenthood status on wages in the Turkish labor force. To the best of our knowledge, no study has focused on the gender wage gap in families along with the parenthood status in the Turkish labor force before. Analyzing the gender wage gap in families by adopting robust statistical methods may lead to developing procedures and policies in a way of wage equality.

This study contains five main sections. The following section builds an institutional background by reviewing previous studies. The next section explains methodological issues such as the dataset, the wage model, regression, and decomposition methods used in this study. The findings section is structured into five sub-sections as descriptive statistics, findings from unconditional quantile regression, findings from the decomposition method, robustness analyses, and the limitations of the study. The last section concludes remarks and provides policy recommendations.

Literature Review and Institutional Background

The next sub-sections contain a brief review of previous studies for different samples about female and male wages, the role of motherhood and fatherhood on wages, and the gender wage gap among couples. The last sub-section presents a framework of the Turkish labor force in the context of the gender-based wage gap and the role of parenthood.

Female Wages and Motherhood

There is a wide literature about female employees' earnings (see Anderson et al., 2002; Budig et al., 2012; England et al., 2016; Kahn et al., 2014; Killewald & Bearak, 2010; Mincer & Polachek, 1974; Taniguchi, 1999; among others). A robust literature provides evidence of earnings inequality and the motherhood penalty (Budig & England, 2001; Budig & Hodges, 2010; Cooke, 2014; Cukrowska-Torzewska & Matysiak, 2020; Harkness & Waldfogel, 1999; Joshi et al., 2020). These studies examine the wage inequality between mother-nonmother and male–female employees. Most of them provide evidence about the motherhood wage penalty that exists in most countries. Budig and England (2001) analyze the wage penalty for mothers in the United States and find a wage penalty for mothers and penalties are larger for married females than for unmarried females. Harkness and Waldfogel (1999) investigate the family wage gap in Australia, Canada, the United Kingdom, the United States, Germany, Finland, and Sweden and reveal females pay a wage penalty for motherhood, and this penalty changes across the countries. Budig and Hodges (2010) and Cooke (2014) analyze the motherhood penalty in the United States, Australia, and the United Kingdom across the wage distribution and report motherhood penalty is larger among lower-paid

females than higher-paid females. Cukrowska-Torzewska and Matysiak (2020) run a meta-analysis and reveal motherhood wage penalty exists, and the gap is around 3.6–3.8% in the labor force.

Housework and childcare are still considered only female responsibilities in some cultures. Therefore, females may be having trouble accessing education and drop out of school early or work less after being a mother to engage in chores and childcare. For instance, Joshi et al. (2020) provide evidence from a British cohort about the gender wage gap widening especially during childrearing years. According to Waldfogel (1998), the main reason for this is the institutional setting that does not include the family structures such as maternity leave and childcare in the labor force. Even though some institutional settings include these structures, they also contain disproportionate and disadvantageous differences, especially in the paternity and maternity leaves for males and females. Hence, mothers face more risks such as occupational discrimination, motherhood and marriage wage penalties, employment breaks, and less experience, therefore mother employees earn less than nonmother female and male employees.

Male Wages and Fatherhood

Although there are numerous studies about females' earnings and the motherhood wage penalty, males' earnings and the role of fatherhood are the subjects of relatively limited studies (Cukrowska-Torzewska & Lovasz, 2020; Glauber, 2008, 2018; Gornick, 2004; Hodges & Budig, 2010; Killewald, 2012; Lundberg & Rose, 2002). Lundberg and Rose (2002) analyze the fathers' wages in the United States and find that fatherhood significantly increases wages and interestingly the increase is higher in response to the birth of sons than to births of daughters. Gornick (2004) collects the findings of the studies examining the economic gender inequality in industrialized countries by using Luxembourg Income Study data and finds that motherhood weakens the females' earnings whereas fatherhood does not have an important negative effect on earnings. Hodges and Budig (2010) investigate the dynamics of the fatherhood premium and reveal white, married, head-of-the-household, college graduate, managerial worker males receive the largest fatherhood premium in the United States. Glauber (2018) analyzes the variation of the fatherhood premium across the wage distribution and finds that the fatherhood premium began to increase in the late 1990s and in the early 2010s fatherhood premium is larger for the employees in the higher-income segments. Cukrowska-Torzewska and Lovasz (2020) use 26 European Union countries and reveal males receive a fatherhood wage premium and which increases the gender wage gap.

Gender Wage Gap in Families

The motherhood wage gap, fatherhood wage premium, paternity and maternity leaves, sharing of the household labor, the differences in to access proper education between boys and girls, occupational segregation, the glass ceiling effect, and gender norms may cause or deepen the wage gap among married couples. There are limited studies on the gender wage gap among couples (Dotti Sani, 2015; Kaufman & Uhlenberg, 2000; Lundberg & Rose, 2000). Kaufman and Uhlenberg (2000) point out the influence of parenthood on the work effort of married males and females and find that married fathers tend to work more hours per week than non-father employees. The results confirm that fatherhood motivates males to work more and be productive more because of the idea of being the breadwinner of the household. Dotti Sani (2015) analyzes the within-couple wage inequality in European countries with different institutional settings and finds that motherhood negatively affects females' share of earned income in most countries. Since females have employment breaks because of motherhood whereas males tend to work more hours per week and earn more than females. Nevertheless, it is not the only reason for the gender wage gap among couples. Occupational segregation, discrimination, the glass ceiling effect, and the strict gender norms in the labor force are some of the other reasons for the gender wage gap among couples. Therefore, females may be having more difficulty than males obtaining jobs.

A Gender-Based Framework of The Turkish Labor Force

According to the Human Development Report 2019 of the United Nations Development Programme, Turkey's Gender Inequality Index (GII) rank is 66 with a GII value of 0.30 out of 166 countries, in 2018 (United Nations, 2019). As the low rank of GII shows, females still try to gain gender equity. World Bank development indicators of the Turkish labor force show that while the female employment-to-population ratio is 29.4%, the male employment-to-population ratio is 65.70% in 2018. Females face more risks than males in being involved in the labor force, as a reason for the gender rules and norms. Even if they can manage to work, they may be having to work more mother-friendly and flexible jobs because employers may treat female employees differently due to their status set by gender norms.

There are cultural norms in Turkey that encourage people to marry and have children at an early age. According to the marriage indicators of the Turkish Statistical Institute (TurkStat), males' and females' first marriage ages are 27.8 and

24.8 in 2018, respectively. The average first marriage ages are younger than in the United States and most European countries. According to the fertility statistics of TurkStat, the average fertility rate is 2 in 2018. The government states that the fertility rate should be higher and supports the younger people to have at least 3 children in order to increase the young population of Turkey.

Even though the supportive politics about marrying and having children, the institutional structure does not cover paternity leave for males as much as maternity leave for females. The paternity and maternity leave set by the Turkish Ministry of Labour, Social Services, and Family are 5–10 days for males and 4 months for females. Also, female employees have the right to unpaid 6 months more maternity leave after 4 months and have breastfeeding leaves (seven and a half hours a week) for 1 year. Although long maternity and breastfeeding leave provides social security for female employees, employers evaluate the maternity and breastfeeding leave as a prolonged loss of the workforce. However, short paternity leave does not pose a significant loss of the workforce from the perspective of employers. Since long maternity leaves lead females to not take a place in the labor force, for instance, Cukrowska-Torzewska (2017) suggests that simply accessible and affordable childcare, and not having extended maternity leave is the efficient work-family policy.

Imbalanced paternity and maternity leaves, supportive politics on marrying at early ages and having at least 3 children, cultural norms, and strict gender rules may cause or deepen the wage gap among couples for Turkish employees. The Director of the International Labour Office of Turkey states that identifying the source of the problems in the Turkish labor force correctly may lead to providing better radical solutions for the gender wage gap, penalties, and income inequalities (International Labour Organization, 2018). However, to the best of our knowledge, there is no study of the literature to cover the wage gap among couples and the role of parenthood on wages in Turkey, even though significant gender-based differences in the labor force. This paper aims to fill that void and is the first study to examine the wage gap among couples and the role of parenthood on females' and males' wages across the wage distribution in the Turkish labor force.

Methodology

Data

In this study, we examine the wage gap among couples along with parenthood by analyzing the Turkish Household Budget Statistics (HBS) in 2018. TurkStat which is the official Turkish Government Agency on statistics collects the national-level HBS data every year for the household sample in Turkey to provide information about the socio-economic structures, living levels, consumption patterns of the households, and test the validity of the socio-economic policies. HBS data was conducted by the two-stage stratified cluster sampling method with the same regulations since 2014. In order to adopt the most available recent data while conducting this research, we analyze the HBS data for 2018.[1] HBS data is one of the most examined data when analyzing the labor force structure of the Turkish labor market and was administered to 15,551 households in Turkey in 2018. Since HBS data provides information on ages both below and above 15 in households in Turkey, it enables us to determine the child/children in the households and examine the effect of parenthood status on wages. Therefore, HBS data is determined as the most convenient data in order to address the main research questions of this study.[2] In this study, we restrict the sample to working-married couples to analyze the wage inequality among couples. The couples who did not work in the survey year and/or did not report positive income for that year were excluded. Therefore, the sample contains 1,198 working-married women between the ages of 20 and 67 and 1198 working-married men between the ages of 22 and 71.

Wage Model

In order to examine the wage gap among couples and the role of parenthood on wages, the extended wage equation for male and female employees is defined as:

$$\begin{aligned} q_\theta\left(log(wage)_i\right) =& \alpha_\theta + \beta_\theta Parenthood\ Status_i \\ &+ \sum_{j=1}^{7} \gamma_{j\theta} Sociodemographic\ Factors_{ij} \\ &+ \sum_{j=1}^{8} \lambda_{j\theta} Job\ Characteristics_{ij} + \varepsilon_{i\theta}, \end{aligned} \tag{1}$$

[1] The only available and comparable HBS data is from 2014 to 2018 while we conduct this research. Since in these four years, there were neither political nor policy changes in terms of gender in labor economics in Turkey, we believe that the results would be likely to be similar to the results of 2018.

[2] Another micro data regarding the labor force structure of Turkey conducted by TurkStat is the Labor Force Statistics (LFS) data. However, since LFS data does not provide information on individuals aged below 15, it fails to determine the child/children in the households. Furthermore, while LFS data collect the age information in different ranges starting from 15, HBS data reveal the exact age of the individuals starting from 0. Thus, HBS data enables us to address our research questions and conduct a robustness analysis which we explain in the next sections.

where the wage is the monthly logarithmic wages. Following Tansel (2005), the wages are calculated by summing cash earnings (i.e., the net annual income excluding retirement, social security deduction, and taxes), bonuses (i.e., the bonus income of employed individuals such as premiums, tips, or holiday allowance in certain periods of the year), and income value in kind (i.e., the income from service, public transportation, electricity, gas, water, discount on telephone bills, travel services, meals, daycare fees, clothing, food, beverages, etc.). From the yearly wages which are determined by summing these determinants, the monthly wages are derived. The monthly wages are deflated by the monthly Consumer Price Index (CPI) in 2017. In the final model, the natural logarithm of the real monthly wages. θ represents the θth quantile and takes value between 0 and 1. α is the constant term,ε is the error term, and β is the coefficient of the vector of the parenthood status binary variable. γ s and λ s represent the coefficient matrices of the socio-demographic factors and job characteristics explanatory variables sets, respectively. The wage equations are estimated for each quantile of the explanatory variables denoted by θ.

The parenthood status variable is a binary variable that takes value 1 if the male and female employees are fathers or mothers. According to previous studies that examine the United States and European countries, motherhood has a negative effect on female employees' earnings whereas fatherhood, in contrast, has a premium on male employees' earnings. In order to determine the impacts of being parents on female and male employees' wages of couples, the extended wage equation of this study contains the parenthood status binary variable. By adding this explanatory variable, we can determine the role of parenthood on Turkish couples' wages and answer the second research question.

The socio-demographic factors and job characteristics explanatory variable sets represent the control variables. The socio-demographic factors are the education level binary variables (e.g., being illiterate, compulsory education, high school, associate, bachelor's, and postgraduate degrees), age, and the square of the age. The job characteristics variable set includes nine occupation types classified by the International Standard Classification of Occupations of the International Labour Organisation (ISCO:08) (International Labour Organization, 2016). By following the ISCO:08, occupation 1 represents the managers, occupation 2 represents professionals, occupation 3 represents technicians, and associate professionals, occupation 4 represents clerical support workers, occupation 5 represents services and sales workers, occupation 6 represents market-oriented skilled forestry, fishery, and hunting workers, occupation 7 represents craft and related trades workers, occupation 8 represents plant and machine operators and assemblers, and occupation 9 represents elementary occupations.

Unconditional Quantile Regression

We adopt unconditional quantile regression to analyze the couple wage differentials and the role of parenthood on couples' wages across the wage distribution in order to answer the third research question of this study. Unconditional Quantile Regression (UQR) proposed by Firpo et al. (2009) estimates the effect of explanatory variables on the unconditional quantiles of a dependent variable. Therefore, UQR makes it possible to analyze the different relationships between the variables and it provides more detailed results among different groups in the sample. UQR is based on the Recentered Influence Function (RIF) and can be defined for Eq. (1) as

$$RIF\left(y;q_\theta\right) = q_\theta + \frac{\theta - I\left[y \le q_\theta\right]}{f_y\left(q_\theta\right)}, \tag{2}$$

where y represents the logarithmic monthly wages. q_θ is the θth quantile of the unconditional distribution of y, $f_y\left(q_\theta\right)$ is the density function of y at the θth quantile, and I is the indicator variable (Firpo et al., 2009). The residuals are assumed to be continuous and differentiable. The RIF is calculated from a transformation of the original dependent variable. Basically, UQR replaces the dependent variable with the transformation of the dependent variable. Hence, RIF provides to observe the effects of each explanatory variable on the transformed dependent variable. UQR does not assume that every observation at the θth quantile has the same observed characteristic. Furthermore, it allows us to estimate the effects of other characteristics on the θth quantile of overall distribution and calculates the coefficient of explanatory variables regardless of the other explanatory variables. Following the previous studies (e.g., Cooke, 2014; England et al., 2016; Glauber, 2018) and considering the advantages of UQR, it may be the preferable method for this study to interpret generalized coefficients.

Decomposition

The decomposition methods are well-suited and -used method to examine the differences among sub-groups. After estimating the wage models separately for males and females, the differences are decomposed in this study. The decomposition method is first proposed to the economics literature separately by Blinder (1973) and Oaxaca (1973) in the same year. The Blinder-Oaxaca decomposition method is a statistical method that provides for comparing and decomposing the differences in the labor force between the groups such as gender, race, and occupation. By constructing a counterfactual distribution that shows females' wages in the hypothetical situation if they had received the same returns to their controlled characteristics as males,

the decomposition method divides the wage differences among males and females into two components: covariate and structure effects. Basically, the covariate effect reveals the difference in wages between males and females originating from the characteristics differences. Therefore, it shows the observed or explained part of the gender wage differences. On the other hand, the structure effect reflects the unobservable or unexplained part of the wage differences which is mostly attributable to discrimination in the labor market (Firpo et al., 2018). In order to provide more information about the differences across the distribution, Blinder-Oaxaca decomposition has been adapted to the quantile regression methods. Since this study adopts the RIF-based UQR method to estimate the wage models for males and females with the explained advantages, we employ the RIF-based decomposition method to analyze the gender wage gap among couples and answer the first research question of this study.

Findings

Descriptive Statistics

Table 1 reports the mean statistics and ratios of the dependent and explanatory variables.

According to Table 1, the male employees' average real monthly wage from the primary job is 3206.71 Turkish Liras (665$, based on the average exchange rate of the year 2018) in 2018. Table 1 shows that the female employees' average real monthly wage from the primary job is 2,136.23 Turkish Liras (443$, based on the average exchange rate of the year 2018) in 2018. The statistics indicate that husbands earn 66.61% more than wives.

The ratio of the parenthood status variable shows that most of the couples are parents with a ratio of 81.46. This high ratio is related to the traditions of the Turkish household structure such as being under pressure to marry at an early age and to be parents at an early age and the supportive politics of the government about having at least three children.

According to the ratios of the education binary variables, 44.49% and 48.67% of the male and female employees are either illiterate or have only compulsory education. The statistics are consistent with the other studies. For instance, Tansel (2002) finds that especially, in the Southeastern region of Turkey, girls begin to drop out of school around the third grade. Also, 22.45% of the male employees have a high school degree whereas only 17.61% of the female employees graduated from high school. Schooling is one of the most significant determinants of wages and in this sample, husbands are more educated than wives. Improving the access of girls to education everywhere in Turkey leads them to employ better-paid and qualified jobs in the future.

Table 1 Descriptive statistics by gender

	Male	Female
Monthly wages[a]	3206.71	2136.23
Log(wages)[a]	7.82	7.21
Age[a]	41.39	38.12
Parenthood status	81.47	81.47
Illiterate	1.67	5.43
Compulsory education	42.82	43.24
High school	22.45	17.61
Associate degree	7.02	7.43
Bachelor's degree	21.45	22.03
Postgraduate degree	4.59	4.26
Occupation 1	7.35	4
Occupation 2	15.28	19.61
Occupation 3	8.09	4.68
Occupation 4	6.76	9.85
Occupation 5	16.27	21.7
Occupation 6	5	4.09
Occupation 7	13.02	7.01
Occupation 8	16.62	4.76
Occupation 9	11.61	24.3
No. of Obs	1198	1198

[a] indicates a continuous variable. Others are binary variables

This may help to reduce the wage gap between female and male employees in the labor force.

The ratios of occupation variables show that while most of the female employees work in unqualified jobs, the male employees work as plant and machine operators or assembler staff. Females may be having trouble accessing the education that is suitable for their skills and education or they may be having to work in part-time or mother-friendly jobs after being married or a mother because of the housework and childcare. This may cause them to work in insecure and low-paid jobs. The occupation 1 binary variable shows that 7.35% of the male employees work as a manager whereas only 4% of the female employees work in occupation 1. Occupational segregation, the glass ceiling effect, and the strict gender norms may cause female employees to have trouble working in jobs that are predominantly by males such as occupations 1, 3, 7, and 8.

Unconditional Quantile Regression Findings

In this study, we estimate the extended wage equation for male and female employees by using the UQR for the quantiles 0.10, 0.30, 0.50, 0.70, and 0.90 which are denoted by Q10, Q30, Q50, Q70, and Q90, henceforth. Table 2 presents the results of the OLS and UQR for male and female employees. In addition, Table 2 presents the results of

diagnostics tests such as White (1980) and Ramsey (1969) to examine the validity of the assumptions.

According to the test statistics of White (1980), the null hypothesis is rejected at a 1% significance level for both males and females. Since the White (1980) test indicates the presence of heteroscedasticity, we have calculated the robust standard errors for OLS. The null hypothesis of the Ramsey (1969) test cannot be rejected at any reasonable level and there is no functional specification error in the wage models. While estimating the extended wage model via the UQR method, we have received significant test results regarding there being significant differences over quantiles for the variables, by employing the methodology of Rios-Avila (2020). These results are available upon request.

The coefficients of the parenthood binary variable from UQR provide evidence about the presence of the motherhood wage penalty for the lower-wage segments whereas the fatherhood wage penalty for the highest-wage segment in the Turkish labor force after controlling socio-demographic factors and job characteristics. Figure 1 illustrates the effect of parenthood on wages across the wage distribution for males and females.

As Table 2 and Fig. 1 clearly show, there is a motherhood penalty in the Turkish labor force, especially for the employees for those who are at the lower quantiles of the wage distribution. Similar to the findings of Budig & England (2001) and Harkness & Waldfogel (1999), the motherhood wage penalty exists in the Turkish labor force like other economies such as Australia, Canada, the United Kingdom, the United States, Germany, Finland, and Sweden. As discussed above, female employees are considered the weaker segment of the labor force. Female employees may be approaching equality in developed economies, but mother employees still face serious risks in both developed and emerging economies. Turkey is one of the emerging market economies and female employees still face serious risks. Females have more trouble than males such as getting a proper education, have more trouble obtaining jobs that are suitable for their education and skills, and earning less than males for equal jobs. Moreover, when they become wives and mothers, they may be having to drop out of their education because of the duties of housework and childcare. Therefore, the motherhood penalty is valid for Turkish female employees. This penalty is higher for the employees for those who are in the lower-income segment because their education level is lower and they are most likely working in elementary jobs that are more unsecured. In addition, the lower-paid female employees may have to drop out of the labor force because they may not afford childcare services. Similar to the studies such as Budig and Hodges (2010) and Cooke (2014) for the United States, Australia, and the United Kingdom, the motherhood penalty is larger among lower-paid females than among higher-paid females in the Turkish labor force.

Table 2 and Fig. 1 also show that fatherhood does not have a significant effect on male employees' wages. However, interestingly, fatherhood becomes significant and a penalty for male employees who are in the highest-income segment. Most likely, male employees who are in the highest-income segment have a higher education degree and they may be taking place in childcaring as much as their wives. In other words, fathers with higher wages may be more educated and have more gender-egalitarian views. Therefore, as in female employees, fatherhood causes a wage penalty for male employees. In contrast to the results of Glauber (2018) obtained for the United States, this study provides evidence about fatherhood causes a wage penalty for the high-paid males in the Turkish Labor force. The reason for our different results may be the different policies and household structures between the United States and Turkey. In the United States, maternity and paternity leaves are 12 weeks while maternity leave is 4 months and paternity leave is 5–10 days in Turkey. This imbalanced maternity and paternity leaves might be one of the reasons for the difference in the effect of fatherhood on wages. Since paternity leave is too short for Turkish male employees, the fathers at the upper quantiles of the wage distribution might be having longer paternity leave than the government provides and this might negatively affect their wages. Another reason might be the differences in simply accessible and affordable childcare facilities in the United States and Turkey. As mentioned earlier, there are no free childcare facilities for children under the age of 6 in Turkey. The private childcare facilities for these children are not easily accessible and affordable for individuals. The wages of the higher-wage segment fathers who prefer to enroll their children in childcare facilities before compulsory education might be affected by the expensive childcare facility fees.

According to the coefficients of the education levels, the impacts of compulsory education, high school, associate, bachelor's, and postgraduate degrees at the 30th, 50th, and 70th quantiles of earnings distribution are higher for the female employees than the male employees except for the 10th quantile. Furthermore, the differences between male and female employees' returns to the education levels are higher at the lower quantiles of the wage distributions. These results show that returns to education are higher for female employees than males and these results are similar to the other papers analyzing the Turkish Labor force such as Guris and Caglayan (2012). The coefficients of the age variable show that age has a more significant impact on female employees' wages than on male employees. However, the impact of age on the lowest quantile of the wage distribution is higher for male employees than for female employees with coefficients of 45.94% and 24.35%, respectively.

Occupation binary variables show that the impacts of the occupation types differ across the wage distribution and the male and female employees. Some of the occupation types

Table 2 OLS and UQR results

Dependent variable: logarithmic monthly wages												
	OLS		Q10		Q30		Q50		Q70		Q90	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Parent	0.0745 [0.0496]	− 0.2057** [0.0622]	0.3085 (0.2219)	− 0.674** (0.2405)	0.0503 (0.0413)	− 0.2401* (0.1098)	0.0722 (0.0476)	− 0.0796 (0.0582)	0.0655 (0.0522)	0.0267 (0.0642)	− 0.1563* (0.077)	− 0.0621 (0.065)
Socio-demographic factors												
Illiterate (reference)												
Compulsory	0.1476 [0.119]	0.462*** [0.1392]	1.4274 (0.9287)	1.1915† (0.627)	0.1963 (0.1311)	0.593* (0.2311)	0.0992 (0.102)	0.3005*** (0.0583)	0.086† (0.0495)	0.0328 (0.0276)	0.018 (0.02)	− 0.0072 (0.0193)
High school	0.301* [0.121]	0.6865*** [0.1561]	1.7808† (0.9555)	1.0938† (0.6391)	0.3452* (0.1389)	1.1447*** (0.2899)	0.2677* (0.1163)	0.5755*** (0.0945)	0.1607* (0.062)	0.1616** (0.0592)	0.0287 (0.0354)	0.0541 (0.038)
Associate degree	0.4903*** [0.1306]	0.9851*** [0.1714]	1.785† (0.9835)	1.434** (0.6768)	0.4737** (0.1454)	1.3058*** (0.3084)	0.4695*** (0.1407)	0.833*** (0.135)	0.5352*** (0.1224)	0.8317*** (0.145)	0.1103 (0.1058)	0.1667 (0.1308)
Bachelor's degree	0.7134*** [0.1322]	1.1151*** [0.178]	1.809† (0.9592)	1.2165† (0.6968)	0.4863*** (0.1419)	1.4197*** (0.303)	0.6922*** (0.1331)	0.9751*** (0.128)	0.8401*** (0.114)	1.0517*** (0.1402)	0.5035*** (0.1278)	0.4624*** (0.1102)
Postgraduate degree	0.988*** [0.1634]	1.5067*** [0.1869]	1.8536† (0.998)	1.385* (0.6967)	0.5071*** (0.1458)	1.5481*** (0.3118)	0.7141*** (0.1414)	1.103*** (0.1372)	1.0227*** (0.138)	1.2367*** (0.1621)	1.677*** (0.2864)	1.561*** (0.2484)
Age	0.0816*** [0.023]	0.0981*** [0.0259]	0.4594*** (0.1176)	0.2434* (0.1047)	0.0167 (0.015)	0.117*** (0.041)	0.0145 (0.0161)	0.0456* (0.0196)	0.0264 (0.0173)	0.049* (0.0201)	0.041† (0.0217)	0.0531** (0.0187)
Age^2	− 0.0011*** [0.0003]	− 0.0012*** [0.0002]	− 0.0063*** (0.0014)	− 0.003* (0.0012)	− 0.0002† (0.0002)	− 0.0014*** (0.0005)	− 0.0002 (0.0001)	− 0.0006* (0.0001)	− 0.0003 (0.0002)	− 0.0005† (0.0002)	− 0.0004† (0.0002)	− 0.0004* (0.0001)
Job characteristics												
Occupation 1	0.7077*** [0.096]	1.1688*** [0.128]	1.2701*** (0.3796)	1.367*** (0.3607)	0.4632*** (0.0851)	1.0196*** (0.2075)	0.5165*** (0.0985)	0.6908*** (0.1261)	0.6587*** (0.1142)	1.3578*** (0.1474)	0.7898*** (0.1981)	1.1647*** (0.2251)
Occupation 2	0.482*** [0.0986]	0.7635*** [0.1334]	1.2252*** (0.4023)	1.2716** (0.4088)	0.4232*** (0.0853)	0.7304** (0.2194)	0.5503*** (0.0951)	0.504*** (0.1272)	0.5821*** (0.111)	0.9903*** (0.138)	0.452** (0.1541)	0.3864** (0.1251)
Occupation 3	0.511*** [0.0791]	0.6978*** [0.1244]	1.363*** (0.379)	1.3081*** (0.3723)	0.464*** (0.0863)	0.8253*** (0.2326)	0.5575*** (0.1003)	0.5397*** (0.1428)	0.4488*** (0.1049)	0.6438*** (0.1833)	0.2883** (0.1042)	0.1163 (0.1257)
Occupation 4	0.3412*** [0.0798]	0.6556*** [0.1099]	0.31453** (0.3899)	1.3122*** (0.3613)	0.4069*** (0.0931)	0.9167*** (0.207)	0.4942*** (0.1025)	0.5034*** (0.1277)	0.2173† (0.1141)	0.6001*** (0.1221)	− 0.058 (0.0801)	0.0539 (0.0781)
Occupation 5	0.1519* [0.0715]	0.1211 [0.0823]	0.6198 (0.3822)	0.5727† (0.3123)	0.1023 (0.0797)	0.056 (0.2191)	0.1151 (0.072)	− 0.0755 (0.0702)	0.038 (0.0561)	0.0185 (0.047)	0.0237 (0.0365)	0.0223 (0.0183)
Occupation 6	− 0.5437*** [0.1363]	− 1.067*** [0.1801]	− 2.5305*** (0.7384)	− 3.1276*** (0.8717)	− 0.2513** (0.0912)	− 1.4226*** (0.1999)	− 0.0913 (0.0672)	− 0.3299*** (0.0753)	− 0.051 (0.0505)	− 0.0495† (0.0298)	− 0.0533 (0.0348)	0.0007 (0.0158)
Occupation 7	0.2528*** [0.07]	0.003 [0.1638]	0.6698* (0.3749)	− 0.3554 (0.5291)	0.2935*** (0.0794)	0.5284* (0.2278)	0.243** (0.0738)	0.2092† (0.1151)	0.0716 (0.0582)	− 0.0543 (0.058)	0.0074 (0.0156)	− 0.009 (0.0151)
Occupation 8	0.2785*** [0.069]	0.6329*** [0.091]	0.855* (0.3596)	1.3921*** (0.3116)	0.3239*** (0.0756)	1.2365*** (0.2247)	0.2726*** (0.0709)	0.3848* (0.1562)	0.1044* (0.0522)	− 0.0105 (0.0606)	0.0278 (0.021)	0.0262 (0.0175)
Occupation 9 (reference)												
Constant	5.7073*** [0.4486]	4.4099*** [0.5152]	− 3.3284 2.486	− 0.2046 (2.0047)	6.8235*** (0.3356)	3.6669*** (0.8195)	6.9776*** (0.3665)	5.928*** (0.4014)	7.0327*** (0.3877)	5.964*** (0.4155)	7.4284*** (0.4774)	6.8778*** (0.3584)

Table 2 (continued)

Dependent variable: logarithmic monthly wages												
	OLS		Q10		Q30		Q50		Q70		Q90	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Diagnostic statistics and tests												
R^2	0.4507	0.4265	0.2559	0.1371	0.2666	0.273	0.3472	0.3942	0.4244	0.6418	0.3228	0.345
White	225.8 {0.00}	143.66 {0.0002}										
Ramsey reset	2.07 {0.1029}	0.31 {0.8165}										

The numbers in brackets are the bootstrapped standard errors with 1000 repetitions by following Firpo et al. (2009). The numbers in the squared brackets and curly brackets represent the MacKinnon and White (1985) heteroskedasticity− robust standard errors and the probabilities of the test statistics, respectively

$^{\dagger}p < .1$, $^{*}p < .05$, $^{**}p < .01$, $^{***}p < .001$

that the female employees earn more are managers and professionals. These occupation types require more education. Since the returns to education are higher for female employees, the female employees who employ in these occupations earn more than the male employees. As it is seen from the ratios of the occupation types female employees face more difficulties in obtaining jobs in higher positions such as management because of the glass ceiling effect.

Decomposition Findings

Table 3 presents the overall results of the Blinder-Oaxaca RIF-decomposition.

Table 3 shows that the differences in wages between females and males are significant and the gender wage gap among couples tends to decrease over unconditional wage distribution. Males have higher wages at every quantile of the wage distribution and the gender wage gap among couples gets wider towards lower-wage segments. Table 3 also reveals that both covariate and structural effects are significant at all quantiles except for the covariate effects at the 10th and 70th. The covariate and structural effects show that most of the gender wage differences are attributed to unexplained or unobserved characteristics. This reveals that a small part of the gender wage gap is explained by the controlled variables in the wage model and an important part of the gender wage gap is attributable to discrimination in the labor market. Not surprisingly, discrimination seems to be higher for the lower-wage segment of females. Both the covariate and structure effects get smaller towards the upper quantiles. The decomposition results are consistent with the UQR results in Table 2 and lower-paid female employees face a wider wage gap and motherhood wage penalty. Further, the decomposition results reveal that lower-paid female employees are exposed to more discrimination.

Robustness Analysis

In order to analyze the sensitivity of the results, we have estimated the model with different measures of the variables. Table 4 presents the estimates of parenthood status with UQR using different measures of different variables such as schooling instead of education level binary variables, experience instead of age, annual logarithmic wage instead of monthly logarithmic wage, and the number of children aged below 6 instead of parenthood status binary variable. Model A in Table 4 indicates the same wage equation explained in Eq. (1) except for the schooling instead of education binary variables. The schooling variable indicates the schooling years according to the education level of the male and female employees. Model B replaces the age and the square of age variables in Eq. (1) with experience and the square of experience variables. Experience represents the potential experience of the employees and is calculated as

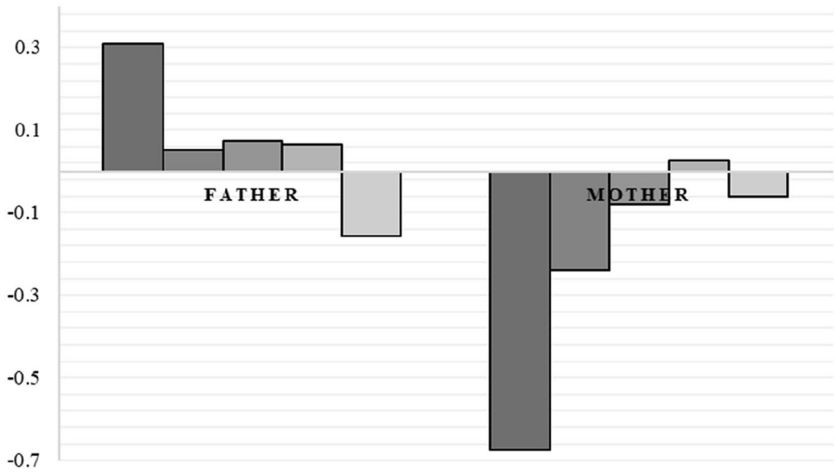

Fig. 1 The role of parenthood on wages. *Source* Authors' calculations from HBS data

Table 3 Blinder- Oaxaca RIF-decomposition by gender

	Q10	Q30	Q50	Q70	Q90
Male	6.9711*** (0.0957)	7.5787*** (0.0154)	7.8304*** (0.0237)	8.191*** (0.0248)	8.5858*** (0.0227)
Female	5.4801*** (0.0833)	6.9338*** (0.0473)	7.4914*** (0.0182)	7.8232*** (0.0541)	8.3442*** (0.025)
Difference	1.4909*** (0.1277)	0.6449*** (0.0495)	0.3389*** (0.0301)	0.3678*** (0.058)	0.2418*** (0.034)
Covariate effect	0.08613 (0.0791)	0.1822*** (0.0496)	0.0734* (0.0309)	0.0335 (0.0395)	0.055* (0.0247)
Structural effect	1.4046*** (0.1411)	0.4626*** (0.0606)	0.2655*** (0.0292)	0.3343*** (0.0458)	0.1868*** (0.0331)

The numbers in brackets indicate the bootstrap standard errors with 1000 repetitions by following Firpo et al. (2018). Detailed decomposition results are available upon request

*$p < .05$, ***$p < .001$

age—the number of schooling – school starting age (i.e. 6). Model C replaces the dependent variable logarithmic monthly wages with logarithmic annual wages. Model D indicates the same model in Eq. (1) except that it replaces the parenthood status variable with a continuous variable number of children aged under 6.

Table 4 also presents the results of Heckman's two-step efficient estimator proposed by Heckman (1979). Heckman states that samples that are not randomly selected (e.g., the working female and male samples who reported positive wages as analyzed in this study) may cause bias as a specification error. Therefore Heckman (1979) offers a two-stage estimator and corrects the bias. In the first stage, this study estimates the probit model that contains working status as a dependent variable and education level binary variables, age, squared age, occupation binary variables, and logarithmic nonlabor income as explanatory variables. By following previous studies such as Budig et al. (2012) and Glauber (2018), we have estimated the selection model with nonlabor income.

Apart from some insignificant differences, the coefficients of parenthood status are similar to those presented in Table 2 regardless of the way parenthood, schooling, experience, and wage are measured. Also, the significance of the parenthood status variable for both males and females is consistent with the UQR results in Table 2. In addition, the results of Heckman's two-step models are similar to the OLS results in Table 2.

After performing the robustness check and controlling the sample selection bias, this study has determined that there is a motherhood wage penalty for female employees, especially for those who are in the lower-wage segment. Also, the motherhood wage penalty becomes higher in the lowest-wage segment. However, fatherhood is insignificant in the males' wages across the wage distribution except for the highest-wage segment. Interestingly, the highest-paid male employees face a fatherhood wage penalty, though not as much as female employees face a motherhood wage penalty.

We have also included the interaction terms such as between parenthood status and the number of children,

Table 4 Robustness analyses

	Q10	Q30	Q50	Q70	Q90
Model A					
Male	0.3185 0.2253	0.048 (0.0435)	0.0666 (0.0463)	0.0628 (0.0515)	− 0.1365† (0.0793)
Female	− 0.6793** (0.2415)	− 0.2499* (0.1117)	− 0.0919 (0.0581)	− 0.001 (0.0665)	− 0.0717 (0.071)
Model B					
Male	0.1905 (0.2169)	0.0407 (0.0408)	0.0618 (0.0463)	0.055 (0.0505)	− 0.1577* (0.0747)
Female	− 0.6738** (0.2388)	− 0.2315* (0.1122)	− 0.0842 (0.0605)	− 0.0001 (0.0661)	− 0.089 (0.0671)
Model C					
Male	0.3085 (0.2332)	0.0522 (0.0418)	0.0723 (0.0481)	0.0655 (0.0512)	− 0.1543† (0.0792)
Female	− 0.744*** (0.2201)	− 0.2337* (0.1093)	− 0.0994† (0.0585)	0.0039 (0.064)	− 0.0566 (0.0666)
Model D					
Male	− 0.0719 (0.1204)	− 0.0141 (0.0303)	0.0156 (0.0324)	0.0377 (0.0374)	− 0.1058* (0.0512)
Female	− 0.6013** (0.1992)	− 0.1578† (0.083)	− 0.0625 (0.0408)	0.0412 0.0472	− 0.1058* (0.047)

Heckman's two-step model	
Male	Female
0.0127 (0.0201)	− 0.2075*** (0.0598)

The numbers in brackets are the bootstrapped standard errors with 1000 repetitions. Coefficients belong to the parenthood status variable. Full models are available upon request

†$p < .1$, *$p < .05$, **$p < .01$, ***$p < .001$

parenthood status, and different education levels. However, these interaction terms did not change the results and they do not have a significant effect on wages, so we have omitted them from the regression model.

Limitations of Study

As mentioned in the data sub-section, the HBS data is the only official data conducted by TurkStat in order to examine the effect of parenthood on wages. However, even though the HBS data has been collected since 2002, there is a lack of information if the interviewed households are the same or not every year. Therefore, this study contains a cross-sectional analysis of 2018 rather than a panel analysis. Further, the data does not provide any information about the pre-and post-delivery wages of females. Therefore, the time-variant in females' wages before and after the delivery could not be examined. Although location is a significant factor in wages, because of the lack of data about the location information of the individuals, the effect of location could not be added to the wage model in this study. Lastly, the Turkish government provides child benefits for those under the age of 6 to the parents. If both of the parents are employed, the benefits are given to only one of the spouses. Unfortunately, there is no specific information regarding which parent receives this benefit in the data we used in this study and their effect could not be controlled. However, the benefits provided by the government are considerably low compared to calculated wages. The child benefit is 49.97 Turkish Liras per month in 2018 (10 USD, based on the average exchange rate of the year 2018) which corresponds to only 1.6% of the average male wages while it corresponds to only 2.3% of the average female wages. Although the child benefits provided by the government are considerably low, there might be a small difference in the gender wage gap caused by child benefits.

Conclusion

This study aims to identify the economic and sociological problems such as the gender-based wage gap across wage distribution in the Turkish labor force and provide better radical solutions to them. The empirical findings show that there is a gender wage gap among couples and the gap is wider for lower-paid employees. Further, lower-paid female

employees are exposed to more discrimination in the Turkish labor market and the motherhood wage penalty is still a serious risk for female employees, especially for lower-paid employees. Empirical results also show that fatherhood does not have a significant effect as much as motherhood on wages except for the highest-paid male employees. Interestingly, the highest-paid male employees face a fatherhood wage penalty although this wage penalty is not as much as female employees facing the motherhood wage penalty. The reason for the fatherhood wage penalty for the highest-paid males may be fathers with higher wages may be more educated and have more gender-egalitarian views. These findings may provide insights to the decision-makers to balance the wage penalties of motherhood and fatherhood for the employees in the different income segments.

Improving the education system in the way of gender equality and sharing equal responsibility in household labor may be a good start to reduce the disadvantages for female employees in the labor force. In very recent years, some universities in Turkey have started to add mandatory "social gender equality" lectures to their syllabus. Giving these kinds of lectures in earlier years of education, even in the family, may help to increase gender-equilateral views in society. The generalized institutional structure that includes family structures, and accessible and affordable childcare services may reduce the disadvantages of the motherhood penalty for female employees. A project for 150 kindergartens for 150 neighborhoods in Istanbul, the biggest city in Turkey, was started in 2019 by the local government to expand accessible childcare services and encourage females to participate in the labor force after being mothers. Expanding similar projects in every city of Turkey and making them easily accessible and affordable may play a significant role for mother employees.

Ensuring the companies employ the same rate of female and male employees, making them earn an equal amount for equal work through anti-discrimination policies, awareness campaigns, and job flexibility options may reduce wage inequality in the Turkish labor force. Removing the glass ceiling effect for Turkish female employees may contribute them to getting higher positions and achieving wage equity. Since the wage inequality and motherhood penalty are higher for the lower-income segment of the labor force, new gender-based social policies about the minimum wage, working hours, and anti-discrimination policies for the female and mother employees who are in the lower-income segment may help to reduce the wage inequality and the penalty. This may provide a more secure working life for female employees. By determining the gender wage inequalities among couples and the variation of the parenthood status on wages across the wage distribution, this study may help to develop policies and campaigns to reduce the gender-based disadvantages for the employees in the different wage segments. In light of the findings and the limitations of this study, examining the differences in the gender wage gap and the role of parenthood on wages by increasing the time dimension forward when the data is released and comparing the results might be a future study. Therefore, this study is expected to be a basis by providing the first and most recent evidence on the subject for comparison. Further, since there is no available official panel data on this subject, this study might direct the official agencies to collect panel data regarding the wage structure of the individuals living in Turkey containing information on child/children, benefits, and location.

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Data Availability The data that support the findings of this study are available from the Turkish Statistical Institute but restrictions apply to the availability of these data, which were used under license for the current study, and so are not publicly available. Information on how to obtain it and reproduce the analysis is available from the corresponding author on request.

Declarations

Conflict of interest Ebru Caglayan-Akay and Fulden Komuryakan declared no potential conflicts of interest with respect to the research, authorship and/or publication of this article.

Ethics Approval This study uses secondary data containing no identifying information any of individuals in the survey.

Consent to Participant Not applicable.

Consent for Publication Not applicable.

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