

Unequal Pay at Every Level: Educational Disparities in the Gender Wage Gap across the Wage Distribution in Türkiye

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Abstract

This study examines the gender wage gap at different points of the wage distribution in Türkiye, highlighting how its patterns differ across education groups. Using unconditional quantile decomposition on nationally representative labor force microdata, the analysis presents that while the overall gender wage gap appears moderate, it conceals substantial disparities among workers with different education levels. Among those with at most a high school education, women earn 20 to 25 percent less than comparable men across the distribution, whereas among university graduates, the gap narrows in the middle but widens again in the upper quantiles. Observable characteristics explain only a small share of these differences, while the remaining unexplained portion may reflect a range of factors, including unobserved productivity-related characteristics or differential returns to similar characteristics across genders, particularly at the lower and upper ends of the wage distribution.

Keywords: gender, wage gap, decomposition analysis, wage distribution, education

JEL Classification: C21, J31, J71

DOI: <https://doi.org/10.31577/ekoncas.2026.07-08.04>

Article History: Received: June 2025 Accepted: October 2026

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Introduction

The gender wage gap is a persistent and heavily studied indicator of labor market inequality, reflecting systemic barriers to women's full participation in the labor market. It remains one of the most salient indicators of gender-based disparities in labor markets, despite notable progress in female educational attainment, employment participation and the implementation of equal pay legislation. Evidence from both developed and developing countries underscores women continue to face unequal pay, limited access to high wage occupations, and lower returns to similar qualifications and experience compared to men. In high income economies, studies show that women continue to earn less than men across the wage distribution despite gains in education and labor force participation (Blau and Kahn, 2017; Arulampalam et al., 2007; Fortin et al., 2017). Similarly, research from middle-income and developing contexts, including Latin America, South Asia, and Türkiye, finds that a substantial portion of the wage gap remains unexplained by observable characteristics, pointing to persistent structural and institutional inequalities (Gaddis and Pieters, 2017; Panizza and Zhen-Wei Qiang, 2005; Liu, Meng and Zhang, 2000; Ilkkaracan and Selim, 2007; Tekgüç et al., 2017; Rios-Avila et al., 2024; Duman, 2023). These patterns are consistent with the wage gap being shaped not only by differences in human capital, such as education or experience, but also by gendered labor market structures and discriminatory wage-setting practices.

The gender wage gap is commonly attributed to two components: first, differences in productive characteristics such as education, experience, and occupation; and second, an unexplained residual often associated with discriminatory practices and institutional biases. While rising educational attainment has narrowed gender gaps in many developed economies, unequal returns to education, occupational segregation, and the disproportionate burden of unpaid care work on women continue to drive wage disparities (Goldin, 2014; Kleven et al., 2019; Degirmenci, 2022). These disparities also appear more volatile over time, suggesting that women with lower education levels face heightened labor market vulnerability, which is likely driven by precarious employment conditions, informal work arrangements, or occupational segregation into lower-paying roles. (Christofides et al., 2013). These persistent patterns undermine the achievement of equal access to employment, fair pay, and leadership opportunities. Building on these insights, the paper examines whether gender wage inequality varies systematically across the wage distribution, a pattern that is often associated with heterogeneity in wage-setting and labor market segmentation.

The Oaxaca-Blinder decomposition framework has long been used to analyze wage disparities, but its focus on mean wage differentials can hide the heterogeneity along the wage distribution (Blinder, 1973; Oaxaca, 1973). This limitation

is particularly relevant in emerging economies such as Türkiye, where labor markets are highly segmented, and gender inequality is reinforced by both institutional structures and sociocultural norms (Gündüz-Hoşgör and Smits, 2008; Ilkcaracan, 2012; Degirmenci and Ilkcaracan, 2014). According to recent data from the World Bank (2018), female workers in Türkiye earn approximately 17% less than men on average, and much of this gap remains unexplained by observable characteristics. Furthermore, women face structural disadvantages in accessing full-time, formal, and high paying positions, while their labor force participation remains among the lowest in the OECD. These features of the labor market imply that education may be an important determinant of both access to quality employment and the structure of gender wage differentials. Given these dynamics, examining the gender wage gap separately by educational attainment helps clarify whether distributional patterns differ between workers with a high school education or less and university graduates.

The primary objective of this paper is to explore how the gender wage gap in Türkiye varies across the wage distribution and differs by educational attainment. Instead of limiting the analysis to average wage differences, the paper examines how gender-based wage disparities change at different points of the wage distribution, allowing for a more nuanced view of inequality. The analysis focuses in particular on comparing workers with a high school education or less to university graduates, and on assessing how the relative roles of explained and unexplained components of the wage gap vary across these groups and along the wage distribution.

This paper contributes to the literature in several ways. It moves beyond average wage comparisons by examining how the gender wage gap in Türkiye varies across the wage distribution using unconditional quantile decomposition. It also places particular emphasis on educational differences, analyzing low-educated workers and university graduates separately to capture patterns that are obscured in aggregate analyses. Finally, by decomposing the gender wage gap into explained and unexplained components at different points of the wage distribution, the paper provides insight into the extent to which observable characteristics and broader structural factors shape gender wage inequality.

1. Literature Review

1.1. Conceptual Framework and Determinants of Gender Wage Gap

Understanding the causes of the gender wage gap requires a detailed examination of both theoretical perspectives and empirical findings that have evolved over decades of labor market research. Human capital theory posits that wage differences

arise from gender-based variation in education, work experience, and occupational choices (Becker, 1964). According to this framework, wage differentials between male and female workers are expected to reflect differences in these productivity-related characteristics. Gender wage gaps, from this perspective, arise because women are more likely to experience career interruptions due to childbearing or household responsibilities, accumulate less job tenure, or sort into occupations that offer greater flexibility but lower pay (Mincer and Polachek, 1974). In this view, observed wage inequality is largely a function of individual choice and differing labor market behavior, rather than labor market discrimination.

Early empirical studies from developed countries; Oaxaca (1973) in the United States, Blinder (1973), and subsequent work Dolton and Makepeace (1986) in the UK demonstrated that while human capital factors account for part of the gender wage gap, a significant unexplained component remains. Indeed, these findings provide the foundation for a vast body of research exploring the role of labor market discrimination and institutional factors. In a series of studies beginning in the 1980s, Blau and Kahn (1981; 1992; 1997) further explain persistent gender wage differentials in the United States, showing that the unexplained portion of the gap remained substantial over time, even as educational and labor market characteristics between men and women converged.

As gender gaps in education and labor force participation have narrowed significantly in many countries, traditional human capital explanations have become less sufficient to account for persistent wage differentials. This has led to the emergence of new theoretical approaches that emphasize institutional, behavioral, and structural factors. Some studies focus on gender norms and social expectations, arguing that persistent inequalities are sustained by societal beliefs about gender roles, particularly regarding caregiving responsibilities (Waldfogel, 1997). These norms influence not only women's labor market choices but also employer expectations and workplace practices, reinforcing occupational segregation and limiting career advancement for women, especially after childbirth (Budig and England, 2001; Goldin, 2014; Fuller and Hirsh, 2018).

1.2. Wage Gap Across the Distribution: Beyond the Mean

The earlier gender wage gap studies heavily relied on the mean estimation methods which decompose average wage disparities into explained by observable characteristics and those left unexplained parts. While this framework has been instrumental in quantifying the overall gap, it overlooks how the wage differential may differ across the wage distribution. Early evidence shows that the gender wage gap is not uniform across income levels, prompting researchers to explore distributional heterogeneity in greater detail.

For example, Albrecht et al. (2003) show that the gender wage gap in Sweden was especially pronounced at the top of the wage distribution, even after controlling for education, experience, and occupation. Similarly, Arulampalam et al. (2007) employ quantile regression for 11 European countries and demonstrate that gender wage disparities are not uniform across the earnings distribution, reflecting differing constraints faced by female workers at various points of the wage scale. Subsequent studies, Fortin et al. (2017) for Canada and Christofides et al. (2013) for the EU, demonstrate that both components contribute differently at various quantiles, reinforcing the need to move beyond average effects in the study of gender wage inequality.

1.3. Educational Heterogeneity in the Gender Wage Gap

Analyzing the gender wage gap across educational subgroups is another extension of wage inequality research because women's educational attainment has risen remarkably in many countries. Early studies often assumed uniform patterns across education levels; however, more recent research points to substantial differences in the structure and drivers of the wage gap between low and high educated workers.

For example, Blau and Kahn (1997; 2006) found that the gender wage gap narrowed more significantly among highly educated women in the U.S., while it remained relatively persistent among those with lower levels of education. This divergence is often attributed to greater labor market attachment, stronger bargaining power, and better access to high paying sectors among educated women. In contrast, less educated women are frequently overrepresented in low wage, informal, or care-related jobs with limited opportunities for advancement, making them more vulnerable to wage suppression and structural inequality (Costa-Dias et al., 2021; Duman, 2023).

Further evidence from Europe and Asia reinforces this heterogeneity. Pereira and Martins (2000) examine the relationship between education and wage inequality across fifteen European countries using quantile regression methods. Their analysis reveals that returns to education are not uniform across wage distribution. The returns tend to be higher at the upper quantiles, implying that education contributes to increased wage dispersion within education groups. These results challenge the conventional view that education unambiguously reduces inequality and highlight the importance of considering within group heterogeneity when analyzing wage structures. Similar results were observed in China and Japan, where high educated women faced notable barriers in translating their qualifications into wage equality, often due to rigid organizational hierarchies and traditional gender norms (Abe, 2010; Shi et al., 2011).

In the context of Türkiye, several studies provide evidence that aggregated statistics might understate the true extent of the gender wage gap due to the disproportionate presence of women with university education in formal sectors characterized by relatively favorable working conditions. High educated women in Türkiye are more likely to be employed in public administration, education, and health services which can have more compressed wage structures and relatively lower gender wage differentials (Ilkcaracan, 2012; Tansel, 2005). This occupational clustering contributes to a statistical illusion. Although average wages between men and women may appear similar in aggregate, these figures are heavily influenced by the relatively better-positioned subgroup of highly educated women. As Tekgüç et al. (2017) argue, the high concentration of women in the public sector, combined with their increasing access to tertiary education, can conceal deeper structural inequalities faced by less educated women in informal or low paying sectors. Consequently, disaggregating the analysis by educational attainment is essential to uncover the underlying patterns of wage inequality and to avoid drawing misleading conclusions based on average effects alone. This further justifies the need for subgroup specific analysis to assess the differential impact of education on the structure and sources of the gender wage gap.

2. Data and Methods

The empirical analysis draws on data from the Turkish Household Labor Force Survey (HLFS), employing quantile regression and distributional decomposition techniques. The Household Labor Force Survey (HLFS) is a nationally representative dataset constructed using a two-stage stratified cluster sampling design (Tunalı, 2023). It consists of a rotating panel of randomly selected households that are interviewed on a monthly basis throughout Türkiye. The survey provides detailed data on labor market outcomes for individuals aged 15 and over who reside in private households, excluding those living in institutional settings.

To be consistent with the previous studies, the analysis focuses solely on wages and salaried employees with positive earnings in the reference week. Employers, self-employed individuals and family workers are excluded from gender wage gap analysis because their earnings are not strictly wages, tend to be more volatile, are harder to compare, and often include non-labor components such as profits or capital income. Focusing on salaried workers ensures a more consistent and meaningful comparison of wage disparities between male and female workers. (OECD, 2003). Furthermore, the workers aged 20 to 54 are included in the analysis to exclude potential influences of educational enrollment and retirement decisions, it allows for comparability across studies and countries. Individuals below the age

of 20 are more probably enrolled in full-time education. Even though they might have a certain degree of labor market attachment, it generally be intermittent or part-time which is linked to lower earnings and not completely present the human capital productivity. Conversely, individuals aged 54 and above are often in the transition phase toward retirement. Those who stay in the labor market either reduce their working hours switching to part-time employment or choose to work in specific sectors which provide more flexible working conditions (Ameriks et al., 2020). Additionally, women in Türkiye are more likely to retire from wage employment in their 50s (Aşık, 2024).

The dependent variable in the analysis is the natural logarithm of the hourly wage in the respondent's current employment. In the HLFS, individuals are asked to report on their monthly earnings along with their usual weekly working hours. To construct the hourly wage, monthly earnings (in Turkish lira) are divided by 4.5 (the average number of weeks in a month) and then by weekly working hours. The natural logarithm of this value is then taken to obtain the dependent variable. Utilizing hourly wages, as opposed to monthly or annual earnings, helps reduce bias associated with differences in labor supply, particularly among females, who are more likely to work part-time or reduced hours due to household and childcare responsibilities. (Goldin, 2014; Lundberg and Rose, 2000)

Relying on previous studies, the set of control variables are included to examine the factors which might influence the wage disparities. The control variables encompass demographic, human capital, and job-related characteristics, including age and its square, educational attainment, potential experience, tenure in the current position, marital status (married or not), regional location, foreign-born status, employment in the private sector, firm size, access to social security, administrative responsibilities, contract type (permanent), and work arrangement (part-time). Educational attainment is incorporated into the regression model through a series of binary indicator variables corresponding to each level of education; primary, middle, high school, and university. This specification enables the analysis to account for potential heterogeneity in returns to education across different attainment levels.

Additionally, the occupational dummies based on ISCO-08 categories included to offset the effects of uneven distribution of male and female workers across different job types. Females might be disproportionately concentrated in lower-paying, care-related, or administrative roles, whereas males are more likely to work in high paying technical, managerial, and industrial occupations. This occupational sorting might contribute substantially to gender wage disparities (England, 2005). Without these controls, wage gaps may be overstated, conflating differences in job allocation with pay differentials. Including occupation controls helps

assess whether females receive lower pay than male workers within the same occupational category, which is important for evaluating the extent of wage disparities net of compositional effects. The similar pattern also holds for sectoral segregation which indicates females are more likely to be employed in some sectors such as healthcare and manufacturing where relative wages are lower than other sectors. Moreover, wage-setting mechanisms can vary significantly across sectors, or some sector wages might be more influenced by market competition, firm specific practices, or negotiation dynamics, often reinforcing existing inequalities (Christofides et al., 2013; Blau and Kahn, 2003).

Table 1 reports the sample averages of the key variables utilized in empirical analysis, reported separately for the overall sample and for two primary educational subsamples. Several gender-based differences emerge, particularly across educational groups. Overall, female workers in the sample tend to be more educated than male workers: approximately 45% of employed females hold a university degree, compared to 28% of male employees. This educational advantage among female workers helps explain why mean hourly wages are nearly identical between male (12.86 Turkish Lira – TL) and female workers (12.89 TL) in the overall sample, despite persistent gender disparities observed in most labor market outcomes. This pattern reflects what Tekgüç et al. (2017) describe as the education gap masking the wage gap where the higher concentration of university educated female workers, who earn substantially more on average, offsets wage disadvantages in the broader sample. However, disaggregating by education level reveals significant disparities. Among workers with a high school education or less, male workers earn an average hourly wage of 9.71 TL, while female workers earn only 7.85 TL. Even among university graduates, a wage gap remains, with male workers earning 20.77 TL per hour on average, compared to 19.02 TL for female workers. These figures indicate that gender wage differences persist even among highly educated workers.

Other characteristics also show gendered patterns. Female workers are less likely to be married (65% compared to 76% of male workers), and less likely to be employed in the private sector (62% vs. 73%). In addition to this, female workers have shorter job tenure and are slightly younger on average than their male counterparts. Female workers also appear to be slightly more concentrated in informal jobs without social security protection and are less likely to hold administrative or managerial positions, particularly among university graduates (8% for female workers versus 17% for male workers). These differences in job characteristics and sectoral placement likely contribute to the observed wage disparities.

Table 1
Descriptive Statistics

	Overall		High School or Less		University	
	Male	Female	Male	Female	Male	Female
Variables						
Hourly Wage (TL)	12.862	12.889	9.712	7.854	20.771	19.016
Age	36.742	35.849	37.007	37.409	36.078	33.950
Potential Experience	35.334	33.268	35.977	35.972	33.719	29.977
Seniority	6.488	5.573	5.375	3.707	9.281	7.842
Primary or less	0.252	0.252	0.353	0.459	–	–
Middle School	0.198	0.097	0.276	0.177	–	–
High School	0.265	0.199	0.371	0.363	–	–
University	0.285	0.451	–	–	1.000	1.000
Married	0.756	0.655	0.769	0.700	0.724	0.599
Private Sector	0.734	0.623	0.846	0.770	0.454	0.446
Formal	0.902	0.848	0.873	0.742	0.975	0.977
# of Workers (>10)	0.701	0.672	0.650	0.538	0.829	0.834
Administrative Duty	0.074	0.047	0.035	0.022	0.173	0.078
<i>NACE Rev.2</i>						
Agriculture	0.017	0.017	0.022	0.028	0.004	0.002
Manufacturing	0.278	0.178	0.329	0.259	0.152	0.080
Construction	0.092	0.012	0.114	0.010	0.034	0.014
Wholesale	0.239	0.185	0.280	0.241	0.137	0.117
Communication	0.009	0.007	0.005	0.003	0.018	0.011
Financial Activities	0.011	0.017	0.004	0.005	0.028	0.031
Real Estate Activities	0.012	0.006	0.015	0.009	0.004	0.003
Administrative Activities	0.070	0.088	0.068	0.087	0.075	0.090
Public Services	0.242	0.441	0.136	0.280	0.510	0.637
Arts & Entertainment	0.030	0.048	0.027	0.076	0.037	0.014
<i>ISCO-08</i>						
Managers	0.048	0.028	0.017	0.009	0.125	0.050
Professionals	0.115	0.260	0.015	0.022	0.365	0.549
Tech & Assoc Profes.	0.081	0.074	0.058	0.045	0.140	0.110
Clerical Support Wrk.	0.085	0.140	0.067	0.108	0.132	0.179
Services & Sales Wrk.	0.198	0.254	0.214	0.389	0.158	0.089
Skilled Agricultural Wrk.	0.011	0.003	0.014	0.005	0.001	0.000
Craft Wrk.	0.183	0.044	0.239	0.074	0.041	0.009
Machine Operators	0.154	0.046	0.206	0.081	0.023	0.004
Elementary Occ.	0.126	0.150	0.170	0.266	0.016	0.009
N	59,804	27,099	42,767	14,875	17,037	12,224

Note: Variables are represented as proportions except for Hourly Wage, Age, Potential Experience and Seniority. N = Number of Observations.

Source: HLFS 2018, authors' calculations.

The distribution of workers across NACE Rev. 2 sectors and ISCO-08 occupations reveals clear patterns of gender-based segregation. Female workers are more concentrated in public services (44% compared to 24% of male workers), while male workers are overrepresented in manufacturing and wholesale, which are sectors typically associated with higher male wage premiums. In terms of occupations, female workers are more likely to work as professionals and in services and sales, whereas male counterparts are concentrated in craft, machine-related and

services and sales jobs. These patterns become more pronounced when disaggregated by education. Among the low educated workers, males are mainly employed in manufacturing and wholesale, while females are more represented in public services and manufacturing sectors. For university graduates, both female and male workers are concentrated in public services, with higher representation among females (64% compared to 51%). Occupationally, low educated female workers are more likely to work in elementary or sales positions, while university educated female workers are predominantly employed as professionals, indicating persistent horizontal segregation across education levels.

The decomposition analysis relies on data from the 2018 wave of the Household Labor Force Survey (HLFS), which is used as the reference year for both the Blinder-Oaxaca and unconditional quantile decomposition exercises. This year is selected because it offers a large and representative snapshot of the Turkish labor market prior to the COVID-19 pandemic, making it well suited for examining the underlying structure of the gender wage gap without the influence of pandemic-related disruptions. After 2020, labor market conditions such as employment patterns, working hours, and sectoral composition changed substantially (Cortes and Forsythe, 2022; Fana et al., 2020). These shifts are not easily accommodated within standard wage decomposition frameworks.

To place these findings in a broader perspective, this study also traces the evolution of gender wage gaps over the period 2004 – 2022 using repeated cross-sectional data. These long-run trends provide context on how gender wage differentials have evolved over time, while the decomposition analysis focuses more narrowly on the distributional structure and sources of the gap at a specific point in time.

This paper utilizes a combination of descriptive findings, Blinder (1973) and Oaxaca (1973) decomposition analysis based on two different Mincerian wage equations, and the distributional decomposition approach introduced by Chernozhukov et al. (2013) to investigate gender wage disparities. The analysis proceeds in three stages. First, descriptive graphs are employed to compare male and female workers hourly and monthly earnings in the mean and the median from 2004 to 2022. Second, Blinder (1973) and Oaxaca (1973) decomposition provides a standard framework for analyzing wage differentials by separating the observed wage gap into two components: one explained by differences in observable productivity-related characteristics, such as education, experience, and occupation and another unexplained component, linked to differential returns to these characteristics.

While the Blinder-Oaxaca decomposition is widely used to analyze mean wage differentials, its framework is limited to average effects and not able to capture variations in wage disparities across the entire wage distribution. It overlooks potentially some heterogeneities that might exist at different points of the wage

distribution. To overcome the limitations of mean-based decomposition methods, we utilize the distributional decomposition technique proposed by Chernozhukov et al. (2013). This approach offers a more flexible framework for analyzing counterfactual wage distributions by decomposing the unconditional wage differentials between male and female workers at various points of the wage distribution. It allows to separate the portion of the gap attributable to differences in observable characteristics from the portion arising from differences in the returns to those characteristics, often interpreted as the unexplained or structural component (Blau and Kahn, 2017; Piazzalunga and Tommaso, 2019; Arulampalam et al., 2003; de la Rica et al., 2008).

This method breaks down unconditional wage disparities at a specific percentile into two components: one attributable to the distribution of individual characteristics and the other to differences in the wage structures applied to those characteristics. It entails estimating both the distribution of covariates and the gender-specific conditional wage distributions. Let Y denote log hourly wages, y a specific value of wages, and X the vector of observed characteristics. Subscripts m and f represent male and female workers, respectively. The decomposition involves the following counterfactual distributions:

$$F_{Y[m,m]}(y) = \int F_{Ym|Xm}(y|x) dF_{Xm}(x) \quad (1)$$

$$F_{Y[f,f]}(y) = \int F_{Yf|Xf}(y|x) dF_{Xf}(x) \quad (2)$$

$$F_{Y[m,f]}(y) = \int F_{Ym|Xm}(y|x) dF_{Xf}(x) \quad (3)$$

Here, $F_{Y[m,m]}$ denotes the unconditional wage distribution for male workers, determined by their wage structure and observed characteristics. $F_{Y[f,f]}$ is the counterpart for female workers. The counterfactual distribution $F_{Y[m,f]}$ shows what the wage distribution of female workers would look like if they were paid according to the male wage structure. The gender wage gap at a specific point of distribution is decomposed as follows:

$$F_{Y[m,m]} - F_{Y[f,f]} = \left\{ F_{Y[m,m]} - F_{Y[m,f]} \right\} + \left\{ F_{Y[m,f]} - F_{Y[f,f]} \right\} \quad (4)$$

The first term captures the contribution of differences in characteristics (composition effect), while the second term reflects differences in returns to those characteristics (structure effect), which may result from discrimination or wage-setting practices. Under the assumption of conditional exogeneity, the counterfactual comparison generated by this decomposition can be interpreted as indicative of causal

effects. The estimation relies on linear quantile regression following Koenker and Bassett Jr. (1978), and confidence intervals are computed via bootstrapping, based on the asymptotic properties established by Chernozhukov et al. (2013), ensuring valid inference across the distribution.

Two alternative model specifications are employed in the decomposition analysis to disentangle the contribution of occupational and sectoral segregation to the gender wage gap. The first specification, referred to as the Human Capital Model, includes standard individual-level characteristics commonly used in the gender wage gap literature, as well as basic job-related controls. Specifically, this model includes age and age squared, educational attainment, potential labor market experience, marital status, region of residence, private sector employment, formal employment status, firm size (more than 10 workers), and an indicator for administrative duties.

The second specification, referred to as the Full Model, extends the Human Capital Model by additionally controlling for detailed occupational and sectoral classifications. In particular, this model incorporates occupational controls based on the ISCO classification and industry controls based on the NACE Rev.2 classification. By accounting for gender differences in occupational and sectoral allocation beyond individual and basic job characteristics, the Full Model captures additional sources of wage heterogeneity. This allows an assessment of how much of the wage differential is attributable to gender-based sorting into different jobs and sectors. The inclusion of occupational and sectoral classifications follows a large literature emphasizing the role of gender differences in job allocation in explaining wage disparities (Groschen, 1991; Blau and Kahn, 2000). Table 1 summarizes the descriptive statistics for all individual and job-related variables included in both model specifications.

3. Results and Discussion

Before turning to the decomposition results, Figure 1 briefly summarizes the evolution of gender wage gaps over the period 2004–2022 to provide context for the subsequent analysis, which focuses on the 2018 cross-section. Figure 1 illustrates the evolution of the mean and median gender wage gap in Türkiye from 2004 to 2022 for three distinct groups: the overall sample (Panel a), workers with a high school education or less (Panel b), and university educated workers (Panel c). Across all groups, both the mean and median monthly wage gaps remain consistently negative throughout the period, indicating that female workers earn less than male counterparts on average and at the median. Although some fluctuation is observed, particularly during the mid-2000s, the gap stabilizes in the 2010s, with

the mean difference hovering around 10%. The median gap is slightly narrower but follows a similar pattern, consistent with persistent inequality even when the influence of extreme wage values is mitigated. These aggregate trends, however, mask potentially important differences across the wage distribution that cannot be captured by summary statistics alone.

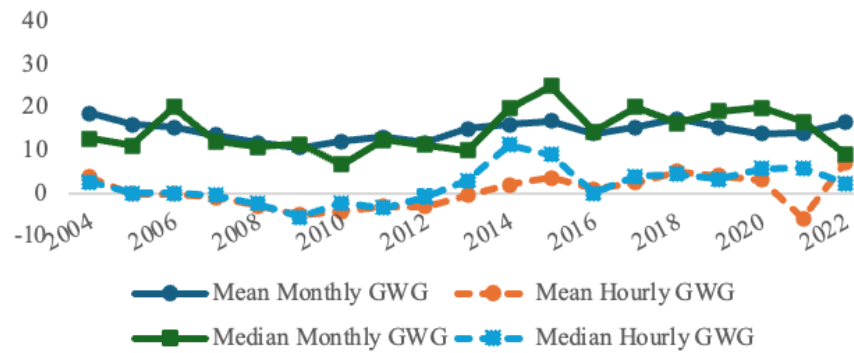
When the sample is disaggregated by educational attainment, different patterns emerge. Among workers with lower levels of education (Panel b), the gender wage gap is considerably wider than in the overall sample, with the monthly mean wage gap reaching nearly 40% and the hourly mean gap approaching 25% in some years. These disparities also appear more volatile over time and are consistent with heightened labor market vulnerability among female workers with lower education levels, potentially related to precarious employment conditions, informal work arrangements, or occupational segregation into lower-paying roles (Borrowman and Klasen, 2020; Dedeoğlu, 2010). In contrast, among university educated workers (Panel c), the gender wage gap is both narrower and more stable. The monthly mean gap remains around 20% on average, with smaller fluctuations, while the median gap is even lower. These patterns indicate that education not only shapes the magnitude of the gender wage gap but also its stability over time.

An important methodological consideration underlying these results is the distinction between hourly and monthly wage measures. Monthly wages reflect not only pay per hour but also the number of hours worked, which tends to differ systematically by gender. Women are more likely to engage in part-time work or reduce working hours due to caregiving responsibilities and unequal household labor burdens, factors that contribute to wider monthly wage gaps. By focusing on hourly wages, the analysis controls for these differences in labor supply and provides a more accurate assessment of pay inequality per unit of labor input (Piazzalunga and Di Tomasso, 2019). This is especially critical for interpreting gender wage disparities in a context like Türkiye, where female labor force participation is relatively low and shaped by strong family-related constraints.

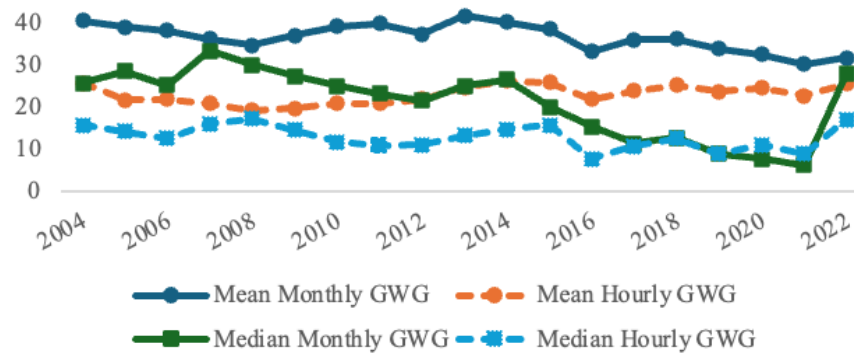
The observed patterns document that, even when adjusting for hours worked, significant wage disparities persist particularly among less educated workers (Panel b). This implies that the wage gap is not solely driven by differences in working time but can also be influenced by structural inequalities such as job segregation, access to formal employment, differences in tenure, and promotion opportunities (Arulampalam et al., 2007; Ilkcaracan and Selim, 2007). Among university educated workers, the narrower wage gap may reflect better access to formal and higher-paying jobs for women, yet the persistence of a gap even within this group indicates that returns to similar qualifications and experience still differ by gender.

Figure 1
Mean and Median Gender Wage Gap in Türkiye from 2004 to 2022

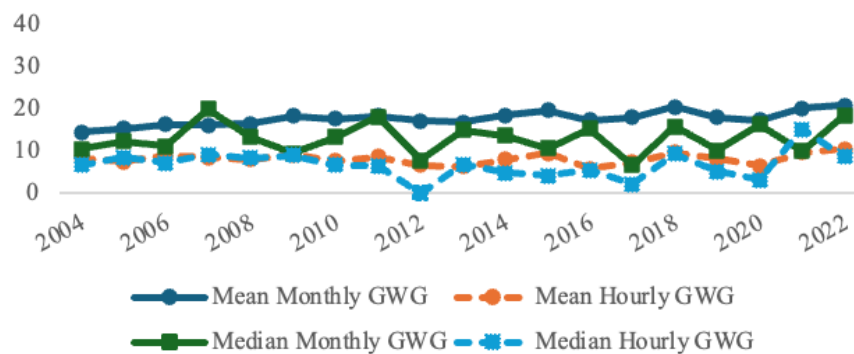
a) Overall Sample



b) High School or Less



c) University



Source: HLFS, authors' calculations.

Table 2 presents the results of the Blinder-Oaxaca decomposition for the overall sample and for educational subgroups, using both a Human Capital Model and a Full Model. In the overall sample, the estimated gender wage gap is around 5% under the Full Model, with a negative explained component (–8.7), indicating that female workers possess more favorable observable characteristics than their male counterparts on average. The unexplained component (13.6) more than offsets this result pointing to the differential returns to characteristics as the main source of the wage gap. This can be due to discriminatory structures or unmeasured factors. However, these results require more careful interpretation before attributing the wage gap solely to discrimination.

Table 2
Oaxaca-Blinder Decomposition

	Overall			High School or Less			University		
	T	E	U	T	E	U	T	E	U
<i>Panel A – Human Capital Model</i>									
Mean	0.049*** (0.005)	–0.084*** (0.004)	0.133*** (0.003)	0.225*** (0.005)	0.047*** (0.003)	0.178*** (0.004)	0.093*** (0.007)	0.039*** (0.005)	0.054*** (0.005)
%	100	–171.4	271.4	100	20.9	79.1	100	41.9	58.1
<i>Panel B – Full Model</i>									
Mean	0.049*** (0.005)	–0.087*** (0.004)	0.136*** (0.003)	0.225*** (0.004)	0.073*** (0.003)	0.152*** (0.003)	0.093*** (0.007)	–0.002 (0.006)	0.095*** (0.004)
%	100	–177.6	277.6	100	32.4	67.6	100	–2.2	102.2
N	86,903			57,642			29,261		

Note: The values in parentheses represent standard errors, they are calculated through bootstrapping with a hundred iterations. Significant at ***1%. Percentages are in bold. N = Number of Observations. T = Total, E = Explained, U = Unexplained.

Source: HLFS 2018, authors' calculations.

To obtain a better understanding of gender wage gap, the analysis is further disaggregated by educational attainment. For workers with high school education or less, the gender wage gap is substantially higher (around 22 – 23%), and the explained share increases meaningfully compared to the overall sample. The differences in the observed characteristics of workers account for 7.3 percentage points, or approximately 32.4% of the total gap in the Full Model, indicating that compositional factors such as education, occupation, and sector contribute to the wage differential. This demonstrates that disaggregating by education helps capture variation in endowments that would otherwise be masked in the overall sample. For university educated workers, the gap is more modest (around 9%), but the explained part is slightly negative (–0.2%) in the Full Model, indicating that female workers in this group possess, on average, more favorable observable characteristics than male workers, yet earn lower wages. This pattern is consistent

with unequal returns to characteristics or other structural factors affecting wage determination even among higher-skilled workers. Notably, the explained component declines substantially from 3.9 percentage points (41.9% of the gap) in the Human Capital Model to -0.2 percentage points (-2.2%) in the Full Model, showing that the inclusion of occupational and sectoral controls does not account for the observed wage gap but instead shifts a larger share of the gap into the unexplained component for higher-skilled female workers.

Table 3 presents unconditional quantile decomposition results of the gender wage gap across the wage distribution, disaggregated by education level and model specification. In the overall sample, the total gender wage gap is statistically significant and positive at lower and middle quantiles but turns negative in the upper quantiles (Q75 – Q90) under both the Human Capital and Full Models. However, the decomposition reveals that the explained component, which represents differences in observable characteristics such as education, occupation, and sector, is relatively small and negative, particularly at the median and upper quantiles. This pattern shows that female workers often possess more favorable observable characteristics than their male counterparts but still earn lower wages, pointing to a substantial unexplained component of the wage gap. For example, in the Full Model at the 90th percentile, the explained component is -0.190 while the unexplained component is 0.144 . Taken together, these results indicate that even after accounting for compositional differences, a large share of the wage gap remains unexplained by conventional controls, particularly at the upper end of the wage distribution.

The educational breakdown yields further insights into the heterogeneous structure of the gender wage gap. Among workers with high school or less education, the total gap is larger and more persistent across the distribution, and the unexplained component accounts for over 70 – 80% of the gap in most quantiles under the Full Model. The predominance of the unexplained component points to the presence of factors beyond observable characteristics, such as unmeasured constraints or differential returns, that are more pronounced among less educated female workers. In contrast, among university educated workers, the wage gap is smaller, and the explained component plays a more substantial role, especially in the lower quantiles under the Human Capital Model. This pattern reflects that, for more educated female workers, differences in job-related characteristics contribute relatively more to observed wage differences, although a non-negligible unexplained component remains across the distribution. These contrasts underscore the importance of educational segmentation when analyzing wage inequality: the sources and magnitude of the gender wage gap vary meaningfully across education levels.

Table 3
Quantile Decomposition

	Overall			High School or Less			University		
	<i>T</i>	<i>E</i>	<i>U</i>	<i>T</i>	<i>E</i>	<i>U</i>	<i>T</i>	<i>E</i>	<i>U</i>
<i>Panel A – Human Capital Model</i>									
Q10	0.192*** (0.011)	–0.048*** (0.003)	0.240*** (0.011)	0.425*** (0.011)	0.022*** (0.004)	0.403*** (0.011)	0.084*** (0.009)	0.039*** (0.006)	0.045*** (0.007)
%	100	–25.0	125.0	100	5.2	94.8	100	46.4	53.6
Q25	0.061*** (0.004)	–0.063*** (0.003)	0.124*** (0.004)	0.137*** (0.005)	0.007*** (0.002)	0.130*** (0.005)	0.130*** (0.010)	0.050*** (0.007)	0.080*** (0.007)
%	100	–103.3	203.3	100	5.1	94.9	100	38.5	61.4
Q50	0.026*** (0.005)	–0.102*** (0.004)	0.128*** (0.004)	0.128*** (0.003)	0.006*** (0.002)	0.122*** (0.003)	0.089*** (0.008)	0.037*** (0.005)	0.052*** (0.006)
%	100	–392.3	492.3	100	4.7	95.3	100	41.6	58.4
Q75	–0.066*** (0.007)	–0.146*** (0.005)	0.080*** (0.006)	0.206*** (0.004)	0.010*** (0.003)	0.196*** (0.003)	0.068*** (0.007)	0.024*** (0.005)	0.044*** (0.006)
%	100	224.6	–121.2	100	4.8	95.2	100	35.3	64.7
Q90	–0.035*** (0.009)	–0.126*** (0.005)	0.091*** (0.008)	0.279*** (0.008)	0.020*** (0.006)	0.259*** (0.007)	0.061*** (0.009)	0.007 (0.007)	0.054*** (0.008)
%	100	360.0	–260.0	100	7.2	92.8	100	11.5	88.5
<i>Panel B – Full Model</i>									
Q10	0.187*** (0.009)	–0.015*** (0.003)	0.202*** (0.009)	0.404*** (0.011)	0.061*** (0.004)	0.343*** (0.011)	0.100*** (0.009)	0.021*** (0.008)	0.079*** (0.006)
%	100	–8.0	108.0	100	15.1	84.9	100	21.0	79.0
Q25	0.065*** (0.003)	–0.037*** (0.003)	0.102*** (0.003)	0.145*** (0.007)	0.038*** (0.003)	0.107*** (0.006)	0.137*** (0.011)	0.020*** (0.009)	0.117*** (0.007)
%	100	–56.9	156.9	100	26.2	73.8	100	14.6	85.4
Q50	0.038*** (0.004)	–0.092*** (0.004)	0.130*** (0.003)	0.134*** (0.003)	0.034*** (0.002)	0.100*** (0.003)	0.086*** (0.009)	–0.020*** (0.007)	0.106*** (0.005)
%	100	–242.1	342.1	100	25.4	74.6	100	–23.3	123.3
Q75	–0.079*** (0.007)	–0.208*** (0.006)	0.129*** (0.005)	0.205*** (0.004)	0.040*** (0.003)	0.165*** (0.004)	0.065*** (0.007)	–0.031*** (0.006)	0.096*** (0.005)
%	100	263.3	–163.3	100	19.5	80.5	100	–47.7	147.7
Q90	–0.046*** (0.009)	–0.190*** (0.006)	0.144*** (0.006)	0.276*** (0.007)	0.049*** (0.006)	0.227*** (0.007)	0.071*** (0.009)	–0.022*** (0.006)	0.093*** (0.007)
%	100	413.0	–313.0	100	17.8	82.2	100	–31.0	131.0
N	86,903			57,642			29,261		

Note: The distributions of independent variables are estimated by a set of a hundred quantile regressions to have the conditional wage distribution. The values in parentheses represent standard errors, they are calculated through bootstrapping with a hundred iterations. Significant at ***1%. Percentages are in bold. N = Number of Observations. T = Total, E = Explained, U = Unexplained.

Source: HLFS 2018, authors' calculations.

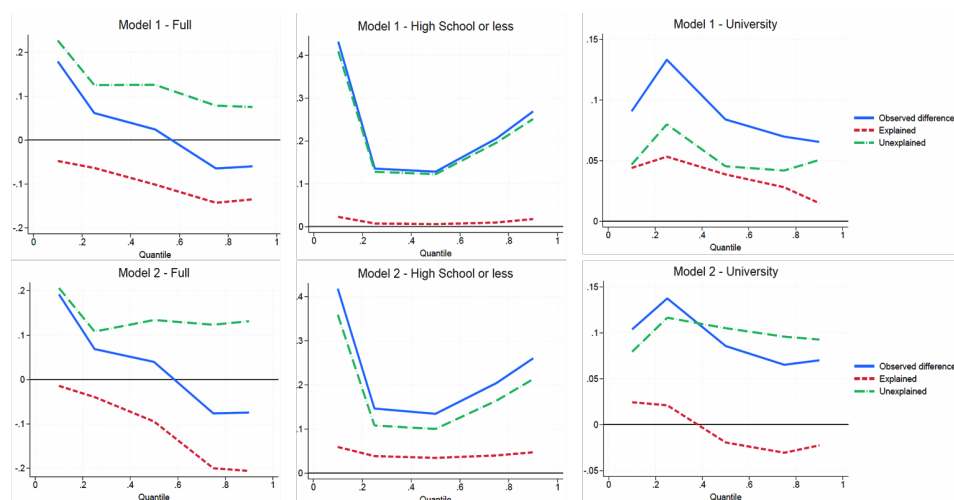
A comparison between the Human Capital and Full Models provides further insight. For less educated female workers, the inclusion of occupational and sectoral controls in the Full Model reduces the unexplained component slightly, pointing to the role of compositional effects in accounting for part of the observed disparities. However, for university educated female workers, adding these controls increases the unexplained portion, particularly in the upper half of the distribution. This pattern is consistent with the presence of unobserved factors or differences in returns to characteristics, even in high-skill jobs where female workers appear

to have greater parity in qualifications and employment attributes. Such factors may be related to firm-level practices, wage-setting mechanisms, or access to career-enhancing opportunities. The consistent contrast between education groups underscores how inequality manifests differently across skill levels and labor market positions.

Figure 2 provides a detailed visual account of the gender wage gap across the distribution, broken down into explained and unexplained components under the Human Capital and Full Models. In the overall sample, the gender wage gap declines with rising wages and becomes negative in the upper quantiles under both models. At the same time, the decomposition indicates that differences in returns to observable characteristics and other unobserved factors remain important across the distribution, even as the total gap narrows and reverses at the top. The explained component remains modest and declines across quantiles, becoming more negative toward the upper tail, indicating that observable characteristics account for a limited and decreasing share of the wage gap. The analysis is taken one step further by examining the gender wage gap across two educational subsamples. The findings diverge from the overall sample. Among the low educated, a dual pattern emerges: the gender wage gap is widest at both the bottom and top of the distribution, with the unexplained component dominating throughout. The Full Model changes the gaps only modestly across quantiles, which is consistent with structural and institutional forces, rather than compositional differences, playing an important role in persistent gender inequality at both tails of the distribution.

In the high educated group, Figure 2 reveals a distinct distributional pattern compared to lower educated workers. The total gender wage gap is positive at the lower end of the distribution, increases slightly between the lowest and the lower-middle quantile, and then gradually declines toward higher quantiles. At the same time, the explained component declines and turns negative from the median onward, implying that, when valued at male returns, differences in observed characteristics would narrow the wage gap among university educated female workers at the middle and upper quantiles. As a result, the unexplained component accounts for more than the total gap in the upper part of the distribution, reflecting the increasingly negative explained component at higher quantiles. Although wage differences among highly educated workers are relatively small and decline across much of the distribution after the lower quantiles, unexplained differences in returns to characteristics remain an important source of the observed gender wage gap. These patterns underscore the need for targeted policy interventions that go beyond improving women's qualifications to address deeper labor market inequalities embedded in occupational segregation, career advancement barriers, and informal institutional practices.

Figure 2
Distributional Decompositions



Source: HLFS 2018, authors' calculations.

Conclusion

This study provides an analysis of the gender wage gap in Türkiye by examining how disparities vary across the wage distribution and educational attainment levels. Using both Blinder–Oaxaca and unconditional quantile decomposition techniques, the findings indicate that the wage gap is not uniform; it is particularly wide among less educated workers and persists even among university graduates. While female workers, especially those with higher education, tend to have better observable characteristics than male workers, they experience an unexplained wage shortfall that cannot be explained by differences in education, experience, or job characteristics alone. Notably, the unexplained component which is interpreted as reflecting structural or discriminatory factors dominates the wage gap across most quantiles.

Disaggregating the analysis by educational attainment reveals important heterogeneity in the structure of the gender wage gap. Among low educated female workers, the wage gap is larger and more persistent across the wage distribution, indicating that both compositional disadvantages and unexplained factors play a substantial role. Notably, differences in observed characteristics account for a meaningful share of the gap among low educated workers. At the same time, the unexplained component remains the dominant share across the distribution, pointing to the continued importance of differences in returns to characteristics and other unobserved factors. In contrast, for university-educated female workers,

although a gender wage gap persists, its magnitude is relatively smaller and does not systematically increase toward the upper end of the wage distribution. Instead, the gap shows a slight increase at the lower quantiles and then gradually declines toward higher wage levels. At the same time, the explained component decreases across the distribution and becomes negative at upper quantiles, implying that highly educated female workers tend to possess more favorable observable characteristics but receive lower returns to these characteristics. Accordingly, the persistence of the gender wage gap among university graduates appears to be driven primarily by unexplained differences in returns to observable characteristics, even in contexts where the overall magnitude of the gap is relatively small.

Despite accounting for a wide range of workers and job attributes, as well as variations in occupational structure, it is possible that certain unobserved factors influencing wages remain unmeasured. The lack of longitudinal labor market data in Türkiye further restricts the analysis by preventing the tracking of individual employment histories, wage trajectories, or long-term impacts of career interruptions. Additionally, some variables, such as actual labor market experience, time spent out of the workforce, or detailed caregiving responsibilities are not available in the dataset. This omission, along with the absence of information on firm-level wage policies, negotiation behavior, and informal employment dynamics, may understate the role of within firm discrimination or network-based labor market access in shaping the unexplained component.

To address the gender wage gap in Türkiye, targeted and differentiated policy responses are required. For low educated female workers, policies should prioritize increasing access to formal and secure employment through improved childcare infrastructure, active labor market programs, and enforcement of labor rights in informal sectors. For university educated female workers, interventions should focus on reducing unexplained differences in returns to observable characteristics by promoting pay transparency, equal access to career advancement opportunities, and accountability in wage-setting practices. Across all education levels, systematic wage audits can be applied to support compliance with equal pay legislation and broader efforts to challenge gender norms around work, thereby contributing to reductions in both the explained and unexplained components of wage inequality.

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