Pamukkale Üniversitesi
Sosyal Bilimler Enstitüsü Dergisi
Pamukkale University Journal of Social Sciences Institute
ISSN 1308-2922 E-ISSN 2147-6985

Article Info/Makale Bilgisi
√Received/Geliş:02.03.2023 **√Accepted/Kabul:**02.10.2023
DOİ:10.30794/pausbed.1259237
Research Article/Araştırma Makalesi

Kılınç, N.ve Işık, H. (2023) "Gender Wage Gap in Regional Turkish Labor Markets: NUTS1 Regions", *Pamukkale University Journal of Social Sciences Institute*, Issue 59, Denizli, pp. 325-343.

GENDER WAGE GAP IN REGIONAL TURKISH LABOR MARKETS: NUTS1 REGIONS

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Abstract

This paper investigates the gender wage gap at a regional level for NUTS 1 in Turkey and the factors contributing to this gap through an analysis of 2019 TURKSAT Household Labor Force Survey data and a Machado-Mata decomposition analysis. The paper reveals variations in the wage gap between men and women in different regions, and also in the contributing factors and finds further that the direction and dimensions of the gender wage gap change across the wage distribution. In some regions, among lower wage groups, the gender wage gap and one particular component of this gap discrimination favors women. In every region, however, women in the higher wage groups are subject to wage discrimination, and this is intensified in many regions towards the distribution's upper tail, creating a glass ceiling. In the regional labor market, therefore, the experiences of women at different socioeconomic levels can vary.

Keywords: *Regional labor market, Gender wage gap, Machado-mata decomposition, Gender wage discrimination, Glass ceiling.*

TÜRKİYE BÖLGESEL İŞGÜCÜ PİYASALARINDA CİNSİYETE DAYALI ÜCRET EŞİTSİZLİĞİ: NUTS1 BÖLGELERİ

Öz

Bu çalışma, Türkiye'de NUTS1 bölgeleri için cinsiyete dayalı ücret eşitsizliğini ve bu eşitsizliğe neden olan faktörleri incelemektedir. Çalışmada 2019 TÜİK Hanehalkı İşgücü Anketi verileri ve Machado-Mata ayrıştırma yöntemi kullanılmıştır. Elde edilen bulgulara göre kadın ve erkek ücreti arasındaki fark ve bu farka neden olan faktörler bölgeler arasında değişmektedir. Çalışmanın ortaya koyduğu bir diğer bulgu ise bölgede, eşitsizliğin yönünün ve büyüklüğünün de ücret dağılımı boyunca değişebildiğidir. Bazı bölgelerde, düşük ücret grupları arasında cinsiyete dayalı ücret eşitsizliği ve bu eşitsizliğin bileşeni olarak ayrımcılık kadın çalışanlar lehinedir. Fakat her bir bölgede, yüksek ücret gruplarında, ücret ayrımcılığına maruz kalan kadın çalışanlardır. Dahası birçok bölgede ücret ayrımcılığı dağılımın üst bölgelerine doğru şiddetlenmekte ve cam tavan etkisi yaratmaktadır. Dolayısıyla farklı sosyoekonomik özelliklere sahip kadın çalışanların bölgesel işgücü piyasalarındaki deneyimleri farklılaşmaktadır.

Anahtar kelimeler: *Bölgesel işgücü piyasaları, Cinsiyete dayalı ücret eşitsizliği, Machado-mata ayrıştırma yöntemi, Cinsiyete dayalı ücret ayrımcılığı, Cam tavan.*

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1.INTRODUCTION

The squeezing of productive labor into the market system in capitalist economies and the increasing demands for labor bring more women into the labor market, while simultaneously producing a gender wage gap (GWG). The number of women in the workforce, although increasing, continues to lag behind that of men. Concentrated in specific sectors and occupations, women are regularly subject to wage discrimination, and the resulting wage gap ensures they remain a secondary source of income, leaving them economically dependent.

Women employed in the labor market face two competitive situations: competition in the workplace and gender-based competition. Although the situations faced by women are explained in terms of the concept of competition, they should in fact be read as gender-based inequality/discrimination (Kıroğlu-Bayat and Baykal-Parıldar, 2021:746). Gender inequality, which leads men and women to be positioned differently and establishes a hierarchical relationship in favor of men, should not be considered an individual issue, as inequality is deeply embedded in the structure of societies. Gender inequality is built into the language we speak, the family, the institution of marriage, the fields of business and economy, politics, belief systems, art and other cultural activities (Lorber, 2010:4-6), and emerges as an important variable in any society that is affected by the age of the individual, as well as their social class, ethnicity, race, economic status, political standing and geography (Dedeoğlu, 2018:19). The sectors, occupations and lines of business deemed appropriate for women employment are, to a large extent, predetermined on the basis of gender inequality. In other words, gender-based horizontal and vertical segregation is rife in the labor market, where women are seen mostly as a low-skilled labor force and are employed in secondary and subordinate positions, and can easily be pushed out of the labor market. The concentration of women in low-skilled, low-paid, and atypical jobs is evidence of the existence of the "sticky floor" employment pattern. Furthermore, in many workplaces, including those in which women constitute the majority of the workforce, they are all but excluded from managerial positions as it is more difficult for them to ascend in the hierarchy, or to be promoted or assigned managerial positions, than their male counterparts, with the "glass ceiling" being another form of segregation to which women are exposed. In addition to the divisions resulting from indirect discrimination in the labor market, women may also encounter gender-based wage discrimination, in which men and women carrying out the same job are paid differently. This position of women in the labor market is a reflection of the universal nature of women's labor (Ecevit, 1998:1-6; Kıroğlu-Bayat and Baykal-Parıldar, 2021:750; Memiş, 2018:32).

When analyzing the status of women in paid employment, the fact that gender-based and wage discrimination in the labor market are largely fed by the pre-market discrimination that precedes their entry to the workforce, or a particular sector or profession, should not be overlooked. The most prominent manifestations of pre-market discrimination include differentiations in the field and quality of education, as well as in career planning, both of which bring inequality in opportunities. The discriminated group is thus under-represented in certain sectors and occupational groups, or is paid less than their counterparts with the same level of productivity and is thus a victim of wage discrimination. In this respect, pre-market discrimination and discrimination within the market can be considered interrelated (Chiplin and Sloane, 1976:49-51). In short, the inequality/discrimination that exists between women and men should actually be thought of as pre-market and intra-market gender inequality/ discrimination. The summary indicator of gender-based segregation and wage discrimination in the labor market is GWG, which exhibits country- and region-specific features that have strong roots in history.

The GWG differences between geographies have raised questions of whether institutional, demographic and economic factors are at play that are challenging to control with wage equations, thus contributing to the gap. Regional analyses offer significant advantages of country comparisons of geographic variations in the GWG, as more homogeneous, comparable data sets are used when comparing different regions of the same country. Since regional labor markets share similar cultural and institutional features, any unobservable heterogeneity can be better controlled (Huertas et al. 2017:982-983). Analyzing the GWG at a regional level allows the equal distribution of factors that are believed to affect the wage gap at a national level to be avoided, and the effect of regional features on the wage gap to be observed (Fuchs et al., 2019). Regional features play an independent role in the determination of wage levels and the GWG, and in many ways regions influence the functioning and outputs of the labor market, although regional labor markets are neither constant nor homogenous (Martin and Morrison, 2004).

This paper investigates the GWG at a regional level in Türkiye and the factors that contribute to this gap. Türkiye can be considered an appropriate subject for a regional analysis of the GWG due to the different levels of socioeconomic development between regions, particularly west-east/coastal-inland, in favor of the western and coastal areas, and one of the components of this difference is gender within the labor market. In Türkiye, labor force participation and unemployment rates, the sectoral-professional distribution of employment and employment conditions predominantly disfavor women, and some regions are worse than others in this regard. The GWG is a summary indicator of the differences in the job opportunities that are open to women and men, the working conditions and the discrimination in wages. Previous studies of the GWG in regional employment in Türkiye have generally focused on the mean wage gap. As a result, regional classifications have been narrowed by aggregation, thus obscuring the effect of regional characteristics on wage distribution. Furthermore, by focusing on the mean wage gap, specific gaps affecting different parts of the wage distribution are ignored.

This paper draws upon Turkish Statistical Institute (TURKSTAT) 2019 Household Labor Force Survey (HLFS) and NUTS1 statistical region classification data for its analysis. A Machado-Mata decomposition approach is adopted for the methodological part of the paper in which the GWG across the distribution is examined, and, as a general approach adopted in decomposition methods, divides the wage gap into two effects: the part resulting from differences in observable characteristics, and the part resulting from discrimination. By monitoring the effects of different characteristics and discrimination across the distribution, the Machado-Mata decomposition also reveals the glass ceiling and sticky floor effects. As its primary contribution to literature, the present study addresses the lack of studies of the GWG at a regional level adopting the Machado-Mata decomposition approach.

The paper is presented in six sections. The following section provides a review of literature on the subject, which is followed in Section 3 with an examination of the gender-based view of selected labor market indicators for NUTS 1 regions. The data set and method used in the paper are introduced in Section 4, while Section 5 presents the empirical results of the study and Section 6 offers some concluding remarks.

2. LITERATURE REVIEW

Regional studies of the GWG are typically fewer in number than those conducted at a country level (or between countries). Majchrowska and Strawisk (2016) investigated the GWG in Poland's NUTS 2 regions at a regional level adopting the decomposition methods proposed by Oaxaca-Blinder (Blinder (1973), Oaxaca (1973)), and Nopo (2008), women earned less than men in every region. While a substantial proportion of the GWG in developed regions was attributed to observed labor characteristics (education level, age, work experience, etc., and the characteristics of the firms that employ them), the impact of discrimination on the gap was greater in less-developed regions where employer competition was lower. Duraisamy and Duraisamy (2016) investigated the GWG and glass ceiling/sticky floor in different segments of the Indian labor market using the decomposition methods proposed by Oaxaca-Blinder (Blinder (1973), Oaxaca (1973)) and Machado-Mata-Melly (2006), and concluded that the wage gap resulting from discrimination is larger in urban labor markets. Furthermore, women encounter the sticky floor phenomenon in both rural and urban labor markets.

Bacolod (2017) reported a negative correlation between the size of the city and the GWG in major US cities making use of the Oaxaca-Blinder (Blinder (1973), Oaxaca (1973)) and Gelbach (2016) decomposition methods, and found a difference in the return on labor characteristics between cities, which explains a significant portion of the GWG. Using the three-component Oaxaca-Blinder decomposition, Benguria and Ederington (2021) identified a decrease in the observable portion of the GWG in the import-intensive regions of Brazil, where the structure of women's employment in the import-exposed regions has changed in a way that reduces GWG, leading to an increase in the number of women working in high-paying positions. Vaccaro et al. (2022) analyzed the GWG in the Peruvian labor market at a regional level using Oaxaca-Blinder (Blinder (1973), Oaxaca (1973)) and Machado-Mata (2005) decomposition methods and found the low GWG in regions to be interrelated with high GDP and a low level of domestic violence against women, while an increase in domestic violence against women also increases the unexplained part of wage inequality. In addition, the GWG widens towards the bottom of the distribution, regardless of geographic or cultural factors.

Eraslan (2012), in one of the first papers investigating the GWG at a regional level in Turkey, adopted the Oaxaca-Blinder decomposition (Blinder (1973), Oaxaca (1973)) method for the identification of six regional units combining those with similar labor market structures among the NUTS 1 regions. The study found women to be more qualified than men, particularly in terms of education level, leading to a wage gap in favor of women in some regions, although wage discrimination in favor of men exists in almost every region, lowering women's wages. Cergibozan and Özcan (2012) combined the NUTS 1 regions outside Istanbul, considering their geographical classifications, and explored the GWG at a regional level using both the Oaxaca-Blinder(Blinder (1973), Oaxaca (1973)) and Reimers decomposition methods. They reported that no statistically significant GWG exists in Turkey as a whole and in some regions, and that in the regions where the wage gap is statistically significant, the effect of discrimination is clearly apparent.

Adopting a quantile regression analysis approach, Çelik and Selim (2016) analyzed the GWG on a regional basis for which they divided the NUTS 1 regional units into seven groups based on geographic conditions and income distribution, and found that the GWG widens towards the upper parts of the distribution. Onuk (2017) reported that human capital approach in the NUTS 1 Istanbul region had an effect on wage inequality, but that education alone fails to explain the inequality between men and women in this regard. Kaya and Selim (2018), in contrast to other studies, analyzed the NUTS 1 regional units separately, adopting the Oaxaca(1973) decomposition method, and identified a wage gap to the detriment of women in all regions. Discrimination against women is the common cause of the GWG between men and women. Yalçın et al. (2019) highlighted the significance of regional variations in the GWG, as well as human capital endowment, in a study in which the NUTS 1 regions were adopted as explanatory variables and that made use of the Oaxaca-Blinder(Blinder (1973), Oaxaca (1973))decomposition method, and found that even if women are better educated than their male counterparts, discrimination reduces their wages.

Aldan (2021) examined the relationship between female labor force participation, employment rates and wage differences between men and women for the NUTS 2 regions. Adopting a panel data regression analysis approach and the Oaxaca-Blinder decomposition method, the study found that the GWG and the portion of the gap that cannot be explained by observed variables increased in regions with high female labor force participation or employment rates. Halaçlı and Karaalp-Orhan (2022), on the other hand, investigated the GWG at the NUTS 3 level in a study in which frequency analyses and percentage calculations were adopted, and concluded that male workers are paid more than female workers and that the wage gap is greater in some cities.

3. OVERVIEW OF TURKISH REGIONAL LABOR MARKETS

Significant socioeconomic development disparities exist between regions in Türkiye, particularly between the western and eastern, and coastal and inland areas, in favor of the western and coastal areas. Demographic characteristics, education, health, competitiveness, per capita income, quality of life and labor market indicators vary considerably from region to region (Celebioğlu and Dall'erba, 2010; Temiz, 2011; Karahasan et al., 2016; Erdem,2016; SEGE,2017; Karaalp-Orhan, 2020), and while the causes of disparity in regional socioeconomic development in Türkiye lies beyond the scope of this paper, a gender-based view of labor market indicators will serve as an important foundation for understanding the wage gap.

We present here a gender-based analysis of selected labor market indicators for the NUTS 1 regions in Türkiye, as defined by TURKSTAT in its classification of statistical region units. Each city is accepted as a NUTS 3 regional unit in the TURKSTAT classification. Merging neighboring cities at this level for analysis results in the identification of 26 NUTS 2 regional units, which are merged to create 12 NUTS 1 statistical regional units.

Table-1 presents the female labor force participation rates in NUTS1[1] regions, with the values for T*ürkiye* as a whole given in the first column of the table for comparison. Although female participation in the workforce at a regional level and for Türkiye as a whole has witnessed a recent increase, there is still much to be done before equality is reached in this regard. As can be seen in Table-1, the region with the lowest female labor force participation rate in the study period was TRC, while the highest rate was recorded in TR9.

1 NUTS1 Region: TR1 Istanbul , TR2 West Marmara, TR3 Aegean, TR4 East Marmara, TR5 West Anatolia, TR6 Mediterranean, TR7 Central Anatolia, TR8 West Black Sea, TR9 East Black Sea, TRA Northeast Anatolia, TRB Middle East Anatolia, TRC Southeast Anatolia.

Table 1 : Female Labor Force Participation Rates in NUTS 1 Regions (aged 15 and over, %)

Yıllar	TR	TR1	TR2	TR3	TR4	TR5	TR6	TR7	TR8	TR9	TRA	TRB	TRC
2009	26	22,6	31,8	28,4	26,2	25,7	29	17,7	39,6	48	31,3	18,5	9,7
2010	27,6	24	32,4	31,7	26,7	26,6	32,9	23	35,6	45,4	31,2	21,9	12,4
2011	28,8	25,2	31,5	34,9	30,6	25,9	33,2	27,1	39,5	44	30,2	24	10
2012	29,5	28,6	32,3	37	30,3	26,8	31,2	28	36,8	43,1	30,5	26,6	9,8
2013	30,8	30,5	33,1	38,3	32,7	28	30,9	28,9	35,4	36,6	34,7	29,4	14,9
2014	30,3	31,4	32,8	35,6	31,6	29,8	29	26,3	35	38,2	34,5	26,4	16,2
2015	31,5	33,4	34	36,1	32,7	31,1	29,4	29,2	36,1	39,7	34,8	27,5	17,8
2016	32,5	35,5	35,3	37,1	31,7	31,2	31,7	29,7	37,2	41,3	32,4	26,5	19,5
2017	33,6	37,8	36,1	37,5	33,4	31,8	32,4	28,9	37,2	41,2	31,2	29,4	21,9
2018	34,2	37,9	36,3	38,9	34,6	31,9	33,9	28,8	39,2	40,4	29,3	29	22,1
2019	34,4	37,6	36,3	38,9	33,7	33,3	33,6	29,1	38	43,5	28,4	30,9	23,6
2020	30,9	33,6	35	34,1	31	30,9	30,5	26,4	33,5	38,4	27,4	26,9	20
2021	32,8	35,8	35,9	35,5	33,4	32,6	33	28,1	36,5	41,6	29,5	27,2	21,3
2022	35,1	38,3	37,5	38,1	37,8	34,2	35,3	29,7	38	42	31,7	30,3	22,8

Source: TURKSTAT Regional Statistics

Table-2 presents data on the proportion of unemployed women. The regions with the lowest female unemployment rates are TR8, TR9, TR2, and especially TRA, while the region with the highest female unemployment rate in the study period,2019, is TRC.

Table 2: Female Unemployment Rate in NUTS 1 Regions (aged 15 and over, %)

Yıllar	TR	TR1	TR2	TR3	TR4	TR5	TR6	TR7	TR8	TR9	TRA	TRB	TRC
2009	14,3	19,9	13,9	16	17	14,5	18,9	11,8	6,6	4,7	3	12,3	10,5
2010	13	17,4	10,8	14,8	13,9	13,9	15,3	14,3	8,2	4,4	3,3	12,3	7,6
2011	11,3	15,2	10,2	13,3	13	11,2	12	10,5	6,5	4,7	3,3	9,4	9,1
2012	10,8	14,4	9,5	12,6	12,4	12,2	11,2	7,1	7,2	4	3,6	6,6	9,1
2013	11,9	14,8	9,7	13,9	12,1	13,1	13,3	9,7	8,8	5,2	4,9	6,8	11,5
2014	11,9	15,6	9	12,2	11,5	14,4	13,8	10,2	6,9	6,1	2,9	8,2	12,4
2015	12,6	17	9	12,2	12,1	15,2	15,1	12,9	8	4,4	3	6,2	14
2016	13,7	17,3	11	12,9	13,6	14,5	15,8	15	9,3	4,4	4,4	8,7	18,9
2017	14,1	18,6	11,4	13,1	13,7	13,2	15,3	18,5	8	4,1	5,2	10,7	18,1
2018	13,9	15,5	10,7	13,5	13,7	12,6	16,2	17,9	8,5	6,8	6	14,4	19,6
2019	16,5	18,9	13,8	15,5	15,2	17	17,4	18,4	9,9	11,3	7,7	18,4	23,1
2020	15	16,8	11,3	14,9	13,4	17,3	15,8	14,9	9,1	9,7	8,6	17,4	19,4
2021	14,7	15,3	12,1	14,8	12,6	16,5	17,4	16,2	9,9	11,4	9,9	16,6	17
2022	13,4	13,4	11	13	12,9	15,2	16	12,8	11	10,9	8,9	18	12,3

Source: TURKSTAT Regional Statistics

Studies of female employment and the participation of women in the labor force in Türkiye have identified education level, rural-to-urban migration, marital status, birth rate, household income (spouse's income), number of household dependents and the proportion of employment in the agricultural sector as influential factors (Yıldırım and Doğrul, 2008; Dayıoğlu and Kırdar, 2010; Kılıç and Öztürk, 2014; Kızılgöl, 2020). Unskilled agricultural work and unpaid employment in family businesses are common employment areas for women, although the reduction in agricultural production and rural-to-urban migration has led to the alienation of many women from the labor market. The TRA, TR8 and TR9 regions, where employment in agriculture is higher, have

a low female unemployment rate. The TRC region has the highest crude birth rate, followed by TRB and TRA (TURKSTAT,2023:https://data.tuik.gov.tr/Bulten), meaning an increase in the proportion of the population engaged in care labor.

Although the agricultural sector has a significant share in women's employment in Türkiye, the main employment area is the service sector, which accounted for 51.75% of total employment in 2009, rising to 56.57% in 2019 (World Bank, 2023). In the same period, the share of the agricultural sector in employment decreased from 22.95% in 2009 to 18.11% in 2019. The service sector being at a significant intersection of skilled and unskilled labor, making it an important source of employment for women who have left the agricultural sector. In 2009, 46.88% of women were employed in the service sector, and this figure had risen to 59.10% by 2019, while the proportion of women employed in the agricultural sector decreased from 37.79% in 2009 to 25.05% in 2019. It can thus be understood that the service sector has become the priority sector for female employment in Türkiye, while the industrial sector records the lowest female employment rate (World Bank, 2023). It should be noted that while the number of companies operating in the service sector and the employment they provide are both high in Türkiye, their contribution to the Turkish economy remains limited. The sector's expanding subsectors typically employ unskilled labor, and the development of the Turkish service sector can be considered "premature" given its rapid growth before the nation's industrialization was complete (Koru and Dincer, 2018). Women employed in the service sector are concentrated in occupational roles, for example, as service or sales personnel, as unskilled labor, and as office workers (ISKUR, 2018: 49), and the employment of women in the industrial sector has similar characteristics. Türkiye's growth has developed with focus on service and construction rather than industrialization, and so employment opportunities for the female workforce in industry have remained limited. Women employed in the industrial sector are concentrated mostly in low value-added areas such as clothing, textiles and food where the need for skilled workers is low, and have little opportunity to access management positions (Sönmez, 2018). The employment structure in the industrial sector ensures it remains male-dominated, and in parallel with the low level of female employment in this sector, the number of female managers in the industrial sector is lower than in other sectors, contributing to the lack of effort to address the problems experienced by women in industry (Ustabaş and Fındıklı, 2017).

The predominance of roles for women in low-skilled production areas has been attributed to the human capital differences between male and female workers. Education is a basic factor in human capital endowment, and while the proportion of female university graduates in the labor force has risen in Türkiye and the NUTS 1 regions, they still lag behind men, and this gap is wider in some NUTS 1 regions (TURKSTAT Regional Statistics,2023). Changes in the education policies in Türkiye have led to an increase in the number of women with university degrees, supported by the inclusion of foundation universities in higher education in Türkiye since 1980, which has introduced a competitive market structure to higher education, and the "University in every city" policy adopted by the government. The accelerated policy implementations in the 2000s have led to a gradual increase in the number of higher education institutions, including foundation universities, and many higher education establishments have opened in Anatolia offering different qualifications, increasing the proportion of educated people within the labor market (Gül and Gül, 2014; Yalçıntaş and Akkaya, 2019: 791-792).

In summary, there is a clear distinction between the priority employment areas for women and men in Türkiye that depends on the production structure of the individual regions, with a marked influence on regional female unemployment and participation rates. In addition, segregation in employment based on gender persists in the sub-branches of the production sectors, and women are generally disadvantaged in this regard. The disparities in human capital, particularly gains in educational attainment, also contribute to the disadvantageous position of women, and despite the increase in the number of higher education institutions in Türkiye, the proportion of female graduates in employment still lags behind that of men, and is more pronounced in some regions.

4. DATA AND METHODOLOGY

This paper draws upon the 2019 HLFS micro dataset published by TURKSTAT, which provides details of the workforce structure in the country. Based on surveys, the dataset provides information on the economic activity branch, and the occupational group (or job), status and working duration of the employed, and information

about the job search durations and the job groups (or job) in which employment is sought for the unemployed, along with similar characteristics. The surveys a based on a household statistical unit. While demographic information such as age, gender and education level is garnered for each household, questions about labor force participation are addressed only to households aged 15 and over. The results of the annual HLFS are presented for 12 NUTS 1 and 26 NUTS 2 regions (TURKSTAT,2023: https://data.tuik.gov.tr), although the present study is limited to full-time wage earners employed in the private sector who are registered within the social security system, while those employed in the agricultural sector and those who do not report weekly working hours or wages are excluded. The reason for the exclusion of the agricultural sector from the sample is that the activities in the agricultural sector in Türkiye are mainly carried out as small family businesses and make use of unpaid family labor. In other words, in the Turkish labor market, especially for the female workforce, paid or salaried employment is found most frequently in the service and industrial sectors.

For the purpose of the present study, we calculate the hourly wages using the main job's monthly wage and the weekly working hours and take the (ln) hourly wages as the dependent variable. Educational attainment, potential years of experience, potential years of experience squared, years of job tenure, squared years of job tenure and firm size (number of employees in the firm) are used as explanatory variables. Categorical data is used for the education variable, and the most recently completed school listed in the dataset is considered, with seven distinct categories defined for education that can be consolidated into five categories: Primary and below, secondary school, high school, vocational high school and higher education (college, faculty, and postgraduate diploma). Since the total experience of the employee in the labor market is not given in the data set, the potential years of experience is calculated as defined by Mincer (1974). According to Mincer, although education is an important investment in the early stages of human life, it is not the only human capital investment, as the skills acquired through post-school experience are also a significant part of human capital. To calculate the potential years of experience, Mincer subtracts the years of education and the year in which the person started school from their age, revealing a quadratic relationship between the experience variable and wage. Using a similar approach, we accepted potential experience as the age of the person, minus the years of schooling, minus six. A similar relationship between experience and wage level can be expected between the years of job tenure and wage level. Tenure is defined as the number of years of the employee in their current job as of the reference date. The other explanatory variable is firm size, and a positive relationship is expected between firm size and wage levels. Large firms are assumed to offer higher wages and more regular working conditions (Oi and Idson, 1999; Brown and Medoff, 1989), and while five categories of firm size are adopted as a categorical variable in the data set, for the present study we define four categories of firm size: 10 employees or fewer, 11–19 employees, 20–49 employees and 50 or more (and unknown) employees.

We present the descriptive statistics for the variables in two tables. The variables relating to the categorical data are detailed in Table -3, and the others in Table-4.

Table 3: Frequencies of Education and Firm Size by Gender

Variables	Observation	
Education	**Female**	**Male**
Primary and Below	3.218 (23,57 %)	9.160 (26,6 %)
Secondary School	1.692 (12,39 %)	7.906 (23%)
High School	1.881 (13,78%)	4.245 (12%)
Vocational High School	1.828 (13,39%)	6.321 (18%)
Higher Education	5.036 (36,88%)	7.245 (21%)
Firm Size		
10 or Fewer Employees	4.315 (31,6%)	10.871 (31,17%)
11-19 Employees	1.136 (8,32)	2.664 (7,64 %)
20-49 Employees	2.680 (19,63%)	6.688 (19,18%)
50 and More (and unknown) Employees	5.524 (40,45%)	14.654 (42,02%)

Source: TURKSTAT 2019 Household Labor Force Survey

Table 4: Descriptive Statistics by Gender

Variable	Observation	Mean	Standart Deviation	Median
LnW	48,532	2,47272	0,4303638	2,366397
Female	13,655	2,451515	0,4146828	2,345575
Male	34,877	2,481022	0,4360747	2,38887
Experience				
Female	13.665	18,1941	11,4619	17
Male	34.887	21,2357	11,3704	21
Tenure				
Female	13.665	4,03955	4,7119	2
Male	34.887	5,63265	6,16768	3

Source: TURKSTAT 2019 Household Labor Force Survey

As can be seen from Tables 3 and 4, our sample includes 48,532 employees, most of whom are male employees. TRA and TRB are the regions with the lowest numbers of female employees,[2] which can be attributed to the fact that the labor force participation and employment rates of women in Türkiye lag behind those of men. The average hourly wages of males are higher than those of females, except in the TR1, TRA, TRB, and TRC regions. The region in which hourly wages most favor men is the TR4. In our sample, the proportion of men with higher education degrees lags far behind that of women. Women working full-time in the private sector who are registered with the social security institution can be seen to be more qualified than men in the education variable, although this comes as no surprise, as higher educated women are more involved in the workforce in Türkiye (Cin et al., 2020). An analysis of the potential years of experience reveals an average of 21 years for male employees, compared to 18 years for female employees, and this difference in experience favoring males increases as one moves toward the eastern regions. Similarly, tenure also favors male employees, and increases as one moves toward the eastern regions, with the average tenure years being 4 years for women and 5.6 for men. In terms of firm size, the proportion of men and women employed in larger firms is similar. A significant proportion of the working population is employed in firms employing 50 workers or more.

The following wage equation is used in the decomposition analysis, in which the (*ln)* average hourly wage serves as the dependent variable, while the explanatory variables are education, potential experience, tenure and firm size, respectively.

$$lnW_i = \beta_0 + \beta_1 Education_i + \beta_2 Experience_i + \beta_3 Experience_i^2 + \beta_4 Tenure_i + \beta_5 Tenure_i^2 + \beta_6 Firm\ size_i + \varepsilon_i \quad (1)$$

We adopt the Machado-Mata(2005) for the decomposition of the *ln* GWG for each NUTS 1 region, which involves extending the classic Oaxaca (1973) decomposition approach to average wages across the entire wage distribution, based on the counterfactual distribution of the observed characteristics (Machado and Mata, 2005: 446). In other words, this method is a quantile regression that transforms an observation into a counterfactual observation (Ferri et al., 2021). The GWG in each quantile is decomposed using a counterfactual distribution (Khanna, 2012: 8). For the counterfactual distribution, females are assigned male characteristics in the sample, but continue to receive the corresponding female wages, or females retain their characteristics but are assigned sample male wages corresponding to these characteristics (Albrecht et al., 2003:168; Vaccaro, 2021:21). The decomposition method aims to identify whether a wage gap exists between men and women with the same characteristics in terms of the explanatory variables, and any wage difference between male and female employees with the same characteristics, as the heterogeneity that the model cannot capture, is called discrimination.

The Machado-Mata method decomposes GWG within selected quantiles of the wage distribution using a quantile regression approach. The quantile regression analysis was introduced by Koenker and Bassett (1978). It is an extended version of the median regression analysis for conditional quantiles. With the median regression as

2 Descriptive statistics for the variables at a regional level are presented in Appendix 1.

a particular case, a quantile regression analysis offers more information about the conditional distribution (Wu and Liu, 2009:801), and permits the effect of explanatory variables on the dependent variable to vary across the distribution, thus serving as an essential basis for decomposition methods that draw attention to inequalities in different parts of the wage distribution. One of the innovative approaches that takes advantage of this basis proposed to date is the Machado-Mata decomposition method (Figueiredo and Botelho, 2013:297).

In the Machado-Mata decomposition method, the quantile regression analysis for male and female samples is as follows:

$$lnWage_{\theta}^{m} = X^{m}\beta_{\theta}^{m} + \varepsilon_{\theta}^{m}$$

$$lnWage_{\theta}^{f} = X^{f}\beta_{\theta}^{f} + \varepsilon_{\theta}^{f} \quad (2)$$

in which X , θ , ε and β are the explanatory variables, the quantile, the error term, and the estimation parameters of the wage equations, respectively. The superscripts "f and m" refer to "female" and "male."

Since $E(\varepsilon_{\theta i} \mid X) = 0$ we can rewrite (2) as equation (3), for the estimated wage densities of men and women :

$$ln(\overline{Wage}_{\theta}^{m}) = \bar{X}^{m}\acute{\beta}_{\theta}^{m}$$

$$ln(\overline{Wage}_{\theta}^{f}) = \bar{X}^{f}\acute{\beta}_{\theta}^{f} \quad (3)$$

Each NUTS1 region's gender-based quantile regressions are estimated. For the analysis of the counterfactual distribution in which females are assigned male characteristics in the sample but continue to receive female wages corresponding to these characteristics, the decomposition of the (*ln)* GWG across the distribution using the Machado-Mata method can be written as follows:

$$ln(\overline{Wage}_{\theta}^{m}) - ln(\overline{Wage}_{\theta}^{f}) = [\bar{X}^{m} - \bar{X}^{f}]\,\acute{\beta}_{\theta}^{f} + \bar{X}^{m}[\acute{\beta}_{\theta}^{m} - \acute{\beta}_{\theta}^{f}] \quad (4)$$

in which $\bar{X}^{m}\acute{\beta}_{\theta}^{f}$ is the counterfactual wage density of women. In this paper we use the Melly (2006) estimation approach for the Machado-Mata decomposition. The principles behind the Melly and Machado-Mata decomposition methods are the same, and in this respect, both methods are similar. When the number of simulations used in the Machado-Mata method is set as infinity, both methods are numerically equal (Duraisamy and Duraisamy, 2016:4105). The first expression on the right-hand side of Equation (4) refers to the portion of the wage gap attributable to gender-based differences in labor characteristics (explained wage gap), while the second expression on the right-hand side of the equation reflects the wage gap between men and women with the same characteristics (unexplained wage gap). The second expression, being the unexplained wage gap, is interpreted as wage discrimination based on gender.[3]

5.EMPIRICAL RESULTS

In this section of the paper we first present the raw GWG (observed wage gap) based on the results of each region in Table-5, and then present the Machado-Mata decomposition for the NUTS 1 regions in Table-6. Positive coefficients in Table-5 and Table-6 imply a wage gap in women's favor, while negative coefficients indicate a wage gap in favor of men. The first and most significant finding of the raw GWG data presented in Table-5 is that the direction and dimension of the gap vary across regions and quantiles, and that the raw gap favors men in most regions.

3 For the estimation, we adopt the Stata rqdeco command developed by Melly (2007), following Kaya (2010), Figueiro and Botelho (2013), and Duraisamy and Duraisamy (2016). Standard errors are computed using the bootstrap method with 100 replications.

Table 5: Raw Gender Wage Gap

	Quantiles						
NUTS1	5.	10.	25.	50.	75.	90.	95.
TR1	0.000 (0.005)	0.010 (0.008)	0.010** (0.005)	-0.031*** (0.009)	0.086*** (0.032)	0.105*** (0.022)	0.000 (0.056)
TR2	-0.051 (0.038)	-0.069*** (0.014)	0.000 (0.004)	-0.122*** (0.02)	-0.213*** (0.006)	-0.172*** (0.029)	-0.182*** (0.054)
TR3	-0.039** (0.019)	-0.056*** (0.011)	-0.010*** (0.001)	-0.065*** (0.008)	-0.182*** (0.009)	-0.170*** (0.032)	-0.085* (0.047)
TR4	-0.010*** (0.002)	-0.065** (0.03)	-0.039*** (0.013)	-0.177*** (0.013)	-0.225*** (0.022)	-0.251*** (0.03)	-0.223*** (0.059)
TR5	0.051*** (0.014)	0.000 (0.014)	0.01*** ($3X10^{-3}$	-0.063*** (0.014)	-0.041 (0.025)	0.056 (0.046)	0.000 (0.062)
TR6	0.015 (0.025)	0.002 (0.009)	0.031*** (0.011)	-0.022 (0.018)	-0.089*** (0.013)	-0.069 (0.044)	-0.129** (0.06)
TR7	0.000 (0.039)	0.000 (0.021)	-0.010 (0.027)	-0.039*** (0.013)	-0.087*** (0.031)	-0.195*** (0.046)	-0.061 (0.105)
TR8	-0.010 (0.034)	0.010 (0.03)	0.036 (0.032)	-0.045*** (0.015)	-0.108*** (0.015)	-0.223*** (0.059)	-0.231*** (0.077)
TR9	0.080 (0.059)	0.000 (0.028)	0.000 (0.035)	-0.039*** (0.011)	-0.039* (0.021)	-0.266*** (0.05)	-0.223*** (0.073)
TRA	-0.144** (0.068)	-0.018 (0.054)	-0.021 (0.066)	0.000 (0.024)	0.000 (0.06)	0.118** (0.052)	0.076 (0.1)
TRB	0.000 (0.057)	0.010 (0.056)	0.000 (0.02)	0.031*** (0.011)	0.048 (0.039)	0.087 (0.121)	0.064 (0.103)
TRC	-0.069 (0.067)	0.014 (0.036)	0.039 (0.026)	0.000 (0.002)	0.010 (0.012)	0.108** (0.051)	0.000 (0.086)

Source: Author's estimates. Standard errors are in parentheses. For quantile regressions bootstrapped standard errors (1000 replications) are reported. *, ** and *** statistical significance at 0.10, 0.05 and 0.01 respectively.

As can be seen in Table-6, in the absence of wage discrimination, the decomposition proposes that male and female employees with the same labor market characteristics should receive equal wages.

According to the Machado-Mata decomposition results presented in Table-6, the total wage gap is positive across the distributions of TR1, TRB, and TRC, implying that women earn more than men, although the total wage gap coefficients are only statistically significant at the 50th, 75th, 90th, and 95th quantiles for the TR1 region and the 50th quantile for the TRB region. In the TRC region, the wage gap across the distribution is statistically insignificant.

TR1 has the lowest agricultural employment percentage among regions in favor of the industrial sector and the services sector in particular (TURKSTAT Regional Statistics, 2023). All coefficients for the explained and unexplained wage gaps in the TR1 region are statistically significant. A positively explained wage gap indicates that female employees in the TR1 region are more qualified than their male counterparts in terms of observed labor characteristics, and such explained wage gaps increase toward the upper tail of the distribution. This suggests that the characteristics of women at high socioeconomic levels diverge from those of men. While qualifications influence the wage difference in favor of women, the unexplained wage gap, which is negative at each quantile, reduces the total wage gap. In other words, if there were no discrimination in the TR1 region, the wage difference in favor of women would grow even wider. At the 90th quantile of the distribution, for instance, women are expected to earn around 19% more than men in the absence of discrimination; however, due to discrimination, the increase in women's wages has been only 9.8% that of men, while discrimination against women has resulted in an actual 9.2% wage reduction for women. Our findings for the Istanbul region are comparable with those of Eraslan (2012), and Cergibozan and Özcan (2012), both of which report a wage difference in favor of women in Istanbul and highlight the influence of education. Kaya and Selim (2018) and Onuk (2017), on the other hand, agree that women's human capital endowment is high, but emphasize that due to discrimination in the region, women are paid lower than men.

Table 6: Machado-Mata Decomposition Result

NUTS-1	TR1			TR2			TR3			TR4		
Quantiles	Total Wage Gap	Explained Wage Gap	Unexplained Wage Gap	Total Wage Gap	Explained Wage Gap	Unexplained Wage Gap	Total Wage Gap	Explained Wage Gap	Unexplained Wage Gap	Total Wage Gap	Explained Wage Gap	Unexplained Wage Gap
5	0,0055	0,0310***	-0,0255***	0,0071	-0,0124	0,0195	-0,0272**	0,0079	-0,0352***	-0,0116	-0,0187**	0,0071
10	0,0128	0,0366***	-0,0237***	-0,0185	-0,0117	-0,0068	-0,0220**	0,0076	-0,0297***	-0,0315***	-0,0207***	-0,0107
25	0,0047	0,0536***	-0,0488***	-0,0308***	-0,0135***	-0,0172***	-0,0282***	0,0041	-0,0323***	-0,0771***	-0,0266***	-0,0504***
50	0,0240**	0,0828***	-0,0587***	-0,1127***	-0,0252***	-0,0875***	-0,0771***	0,0083*	-0,0855***	-0,1737***	-0,0406***	-0,1330***
75	0,0989***	0,1530***	-0,0541***	-0,1735***	-0,0340***	-0,1395***	-0,1412***	0,0188**	-0,1601***	-0,2395***	-0,0467***	-0,1927***
90	0,0988***	0,1941***	-0,0952***	-0,1765***	-0,0311**	-0,1453****	-0,1576***	0,0395***	-0,1972***	-0,2527***	-0,0335**	-0,2192***
95	0,0542*	0,1870***	-0,1327***	-0,1766***	-0,0249	-0,1516***	-0,1495***	0,0458**	-0,1954***	-0,2447***	-0,0148	-0,2299***
NUTS-1	TR5			TR6			TR7			TR8		
Quantiles	Total Wage Gap	Explained Wage Gap	Unexplained Wage Gap	Total Wage Gap	Explained Wage Gap	Unexplained Wage Gap	Total Wage Gap	Explained Wage Gap	Unexplained Wage Gap	Total Wage Gap	Explained Wage Gap	Unexplained Wage Gap
5	0,0207	0,0184*	0,0023	0,0145	0,0160	-0,0015	0,0205	-0,0201	0,0406***	0,0443*	0,0319*	0,0123
10	0,0246**	0,0213***	0,0032	0,0396***	0,0153*	0,0242***	0,0075	-0,0185*	0,026**	0,0340*	0,0267**	0,0073
25	0,0099	0,0267***	-0,0167***	0,0295***	0,0150***	0,0145**	-0,0302**	-0,0204***	-0,0098	0,0237**	0,0236***	0,0001
50	-0,0231***	0,0471***	-0,0703***	-0,0181***	0,0233***	-0,0414***	-0,0615***	-0,0205***	-0,0410***	-0,0580***	0,0050	-0,0630***
75	-0,0165	0,0975***	-0,1140***	-0,0640***	0,0423***	-0,1064***	-0,1097***	-0,0076	-0,1021***	-0,1458***	-0,0141	-0,1316***
90	0,0181	0,1942***	-0,1761***	-0,1187***	0,0733***	-0,1920***	-0,1404***	0,0013	-0,1418***	-0,1967***	-0,0237	-0,1729***
95	-0,0271	0,2313***	-0,2584***	-0,1697***	0,0915***	-0,2612***	-0,1207***	0,0060	-0,1267***	-0,2167***	-0,0188	-0,1979***
NUTS-1	TR9			TRA			TRB			TRC		
Quantiles	Total Wage Gap	Explained Wage Gap	Unexplained Wage Gap	Total Wage Gap	Explained Wage Gap	Unexplained Wage Gap	Total Wage Gap	Explained Wage Gap	Unexplained Wage Gap	Total Wage Gap	Explained Wage Gap	Unexplained Wage Gap
5	0,0574***	0,0006	0,0568***	-0,0550	0,0047	-0,0598**	0,0648	0,0491*	0,0156	0,0109	-0,0102	0,0212
10	0,0369***	-0,0034	0,0404***	-0,0373	0,0201	-0,0574***	0,0128	0,0381**	-0,0253	0,0173	-0,0010	0,0184
25	0,0036	-0,0031	0,0068	-0,0055	0,0396***	-0,0451***	0,0115	0,0340***	-0,0224***	0,0270	0,0051	0,0218*
50	-0,0561***	-0,0015	-0,0546***	0,0151	0,0332***	-0,0180	0,0426***	0,0466***	-0,0039	0,0056	0,0002	0,0053
75	-0,1064***	0,0066	-0,1131***	0,0348	0,0378***	-0,0030	0,0203	0,0584***	-0,0381***	0,0142	0,0511***	-0,0369***
90	-0,1845***	0,0303	-0,2148***	0,0697	0,0765***	-0,0068	0,0370	0,0750***	-0,0379*	0,0220	0,0965***	-0,0745***
95	-0,2151***	0,0660*	-0,2811***	0,0758	0,1536***	-0,0778**	0,1069	0,0919***	0,0149	0,0244	0,1174***	-0,0929***

Source: Author's estimates. *, ** and *** statistical significance at 0.10, 0.05 and 0.01 respectively.

Similar to the TR1 region, the explained wage gap coefficients in the TRB region are positive and statistically significant, and the 5th quantile has a 10% level of significance. Employment in agriculture maintains a secondary position in the region (TURKSTAT Regional Statistics, 2023). Despite the percentage of employment in the agricultural sector in the region, the participation of women in the labor force is low and the unemployment rate is high. As a reflection of this, only 19% of the people in employment in our sample are women, although around 47% of female employees have a university education. Aldan (2021) attributes this situation to the employment of women with more qualifications and motivation in regions with low female labor force participation. The unexplained wage gap coefficients in the region are statistically significant and negative at the 25th, 75th and 90th quantiles, and women face discrimination in these parts of the wage distribution.

Although the total wage gap for the TRC region is positive, there is no statistically significant wage gap. Employment in the TRC region is dominated by the service and manufacturing sectors, and the latter in particular (TURKSTAT Regional Statistics, 2023), and the region has a low female labor force participation and high female unemployment rates. Of the regions in our sample, TRC has the second-lowest percentage of female employees after TRA. In the TRC region, the coefficients of the explained wage gap and the unexplained wage gap at the 75th, 90th and 95th quantiles are statistically significant at a 1% significance level. Even though women are more qualified at these quantiles, wage discrimination to the detriment of women remains. Another region in the east of Türkiye, TRA, records the lowest number of female and male employees in our sample. Approximately 20% of employees are women, which can be partially attributed to the employment structure of the region.

One prominent feature of the TRA region is that agriculture maintains a strong share of employment and the lowest share of employment in industry (TURKSTAT Regional Statistics, 2023), and the rate of urbanization is quite low (Kızılgöl and Kuvat,2020:125). As previously mentioned, employment in the agricultural sector primarily takes the form of unpaid family work, and such informal employment reduces the number of women in the region who work full-time and are registered for social security outside the agricultural sector. The total wage gap coefficients in the TRA region are statistically insignificant. In the region, the explained wage gap coefficients are positive with an increasing value towards to upper tail of the distribution, and are significant other than for the 5th and 10th quantiles. The coefficients of the unexplained wage gap are negative and statistically significant at the 95th and below median quantiles. The effect of the explained and unexplained wage gap coefficients in the TRA region overlaps with that of the TRB and TRC regions, which have the lowest female employment rates. In other words, women who find employment opportunities in these regions tend to be more qualified than men, but as is the case in other regions, women are exposed to discrimination.

In the northern coastal regions of Türkiye in the TR8 Western Black Sea and TR9 Eastern Black Sea regions, women's wages are higher than men in the quantiles below the median, while men are paid higher in other quantiles. In the TR8 region the total wage difference coefficients are statistically significant at the 1% level, aside from at the 5th and 10th quantiles. The most notable feature of employment in the region is the loss of weight of agriculture in employment to the benefit of the service sector (TURKSTAT Regional Statistics, 2023). The explained wage gap coefficients in the region are only statistically significant at the 5th (with 10% significance), 10th and 25th quantiles, where they are positive. The unexplained wage gap coefficients are statistically significant and negative at the median and above-median quantiles, and the values intensify toward the upper tail of the distribution, especially at the top, becoming robust.

The total wage gap is statistically significant total in the TR9 region, except for at the 25th quantile. Women below the median quantile of the distribution in the region are paid more than men. The TR9 region has the highest female labor force participation rate while unemployment among women is relatively low due to the share and structure of the agricultural sector in employment. That said, the development of the tourism sector in the region has shifted the region's employment weight toward the service sector. There is no statistically significant explained wage gap in the region, while the coefficients of the unexplained wage gap are statistically significant, except for at the 25th quantile. In the region's relatively lower income groups, men face wage discrimination, with women earning higher wages than men in jobs with the same observed labor characteristics, and this wage discrimination in favor of women becomes more robust at the bottom tail of the distribution. Toward the upper parts of the wage distribution, however, the direction of the wage discrimination changes in favor of men. It can

be seen that the statistically significant total wage gap and unexplained wage gap coefficients for the TR8 and TR9 regions follow a similar pattern at the upper parts of the wage distribution. In both regions there is a total GWG and wage discrimination against women at higher wage levels.

The TR5 region, in the inner-central part of Türkiye, resembles TR1 in its sectoral distribution of employment, which is concentrated in the service sector followed by the industrial sector, while the share of agriculture remains relatively low (TURKSTAT Regional Statistics, 2023). The total wage gap is significant for the region only at the 10th and 50th quantiles, and is in favor of women at the 10th quantile but moves to favor men at the median quantile. The coefficients of the unexplained wage gap are statistically significant except for at the 5th and 10th quantiles and negative. In other words, wage discrimination against women affects the distribution significantly, and this discrimination intensifies towards the upper tail of the distribution.

In TR7, another region in the inner-central part of the country, the service sector has a dominant share in employment, with agriculture coming second to the service sector in the western part of the region, compared to industry in the eastern part (TURKSTAT Regional Statistics, 2023). The regional female labor force participation rate is low, accounting for only 25% of the total. The total wage gap coefficients in the TR7 region are statistically significant and negative, except at the 5th and 10th quantiles. In the region, men enjoy higher wages than women, although the explained gap coefficients in the region are only statistically significant at the 10th (with 10% significance), 25th and 50th quantiles. Men are more qualified in terms of the explanatory variables observed at these quantiles. The unexplained wage gap coefficients, which are statistically significant except for at the 25th quantile, reveal that the discrimination against women in the lower and upper parts of the distribution may differ. Discrimination at the 5th and 10th quantiles favors women, but turns against women at the upper quantiles.

In TR6, the south coast region of Türkiye, the service sector is dominant in employment, while the shares of industry and agriculture are similar (TURKSTAT Regional Statistics, 2023). The total wage gap coefficients for the TR6 region are statistically significant for all quantiles except the 5th. However, while there is a wage difference in favor of women below the median quantile, it moves in favor of men at and above the median due to the unexplained wage gap coefficients in the distribution. The coefficients of the unexplained wage gap are statistically significant throughout the distribution, except at the 5th quantile, and are negative except at the 10th and 25th quantiles. Due to the explained and unexplained wage gaps, women's wages are higher than those of men in the lower parts of the distribution in the region. At the 25th quantile, women earn 2.9% higher wages than men, 1.5% of which relates to netter qualified women while 1.4% comes from wage discrimination in favor of women. At the 75th, 90th and 95th quantiles, wage discrimination affects women's wages by 10%, 19% and 26%, respectively, at which women's wages are lower than men's due to discrimination.

In the west-coast regions of Türkiye, namely TR2, TR4 and TR3, men are paid more than women at all quantiles, and the total wage gap is statistically significant. In the TR2 and TR4 West and East Marmara regions, the involvement of women in the labor force is greater in the TR2 region than in the TR4 region, and the female unemployment rate is low. The service sector is dominant in regional employment, followed by the industrial and agricultural sectors (TURKSTAT Regional Statistics, 2023). The total wage gap coefficients are statistically significant in the TR2 region, except for at the 5th and 10th quantiles, and the GWG favors men, as do the explained and unexplained wage gaps. In our sample, the TR2 region has the lowest percentage (28%) of women with higher education degrees. The explained wage gap for the region is statistically significant and its coefficients are negative, except for at the 5th, 10th, and 95th quantiles. The wage gap created by the explained gap against women is widened by the negative coefficients of the unexplained wage gap. The coefficients of the unexplained wage gap are statistically significant, except for the 5th and 10th quantiles. At the 90th quantile, for instance, the GWG would be 3.1% in favor of men in the absence of discrimination, but due to discrimination, men's wages are actually 17% higher than those of women. In summary, women in this region are less qualified than men and are paid less than them due to wage discrimination. The results of the findings of the analysis of the TR2 region are similar to those recorded for the TR4 region.

The service sector is the dominant employment field in the TR4 region, although the share of the industrial sector in employment is higher than in the other regions (TURKSTAT Regional Statistics, 2023). As previously

mentioned, the industrial sector in Türkiye provides the lowest employment to women, and women in management positions are rare, being employed mainly in low-quality jobs and low-value-added production areas. The total wage gap coefficients in the region are statistically significant, except for at the 5th quantile, and a wage gap exists to the detriment of women that is attributable to the negative coefficients of both the explained and unexplained wage gaps. In the region, the explained wage gap coefficients are statistically significant except for at the 95th quantile, and the unexplained gap coefficients are statistically significant except for at the 5th and 10th quantiles. Similar to the TR2 region, women in the TR4 region are less qualified than men and are subject to wage discrimination, and the explained wage gap coefficients obtained for female employees in the West and East Marmara regions are worthy of particular note. The Marmara region is the only region among the socioeconomically more developed western-coastal regions of Türkiye where the characteristics of the labor market disfavor women, and this has been noted in other studies in literature (Eraslan, 2012; Cergibozan and Özcan, 2012; Kaya and Selim, 2018).

In TR3, another west coast region of Türkiye, the participation of women in the labor force is higher than the national average in Türkiye, and the service sector is predominant in regional employment (TURKSTAT Regional Statistics, 2023). All coefficients for the total and unexplained wage gaps are statistically significant in this region, and the explained wage gap is statistically significant at the distribution's 50th (with 10% significance) 75th, 90th and 95th quantiles. Even though women in the region are more qualified than men in terms of observed characteristics, they earn lower wages due to wage discrimination.

We conclude this section with comments on the glass ceiling and sticky floor concepts. The term "glass ceiling" refers to the gender-based discrimination faced by women that prevents them from advancing their career positions, such as into management. The "sticky floor" effect, on the other hand, refers to the discriminatory attitudes that push women towards lower-paying jobs. An analysis of the GWG across the entire distribution reveals the prevalence of both these effects, with the glass ceiling effect manifesting a wider GWG at the top of the distribution. The wage difference between men and women becomes more pronounced in the higher wage group. The sticky floor effect, on the other hand, is determined by the increased wage gap at the bottom of the distribution. In this paper, we test the effects of the sticky floor and glass ceiling effects considering the unexplained wage gap in Table-6. As can be seen in Table-6, although the direction of discrimination differs in the lower quantiles of the wage distribution in regional labor markets in Türkiye, wage discrimination against women is noted in each region at the upper quantiles. The glass ceiling effect can be seen in all regions except for the Aegean (TR3), Central Anatolia (TR7), Northeast Anatolia (TRA) and Middle East Anatolia (TRB). In other words, the effect of discrimination intensifies towards the upper regions of the distribution in a significant proportion of the regions, and leading to a glass ceiling effect for women in employment.

6. CONCLUSION

The findings of this study suggest that the GWG and the factors contributing to this gap vary from region to region in Türkiye and that even though women's human capital creates a wage gap that favors them in some regions, this difference is reduced or turned in favor of men as a result of discrimination. In the Istanbul region (TR1), for example, there is a wage difference in favor of women, and if there was no discrimination, the wage gap in favor of women would be even larger. In the Aegean (TR3), women's wages were found to be lower than men's due to discrimination, and there was no discrimination in the Aegean, women's wages would be higher than men's. In contrast, men in the West Marmara (TR2), East Marmara (TR4) and Central Anatolia (TR7) regions tend to be more qualified than women in terms of their labor characteristics, which when coupled with the wage discrimination against women, leads them to earn more than women. The analysis approach adopted in this paper also reveals that the direction and dimension of variations in the GWG differ across the distribution, and that women in different wage level groups have different labor market experiences. In the West Anatolia (TR5), Mediterranean (TR6), West-East Black Sea (TR8), and Middle East Anatolia (TRB) regions, women are paid higher than men at the lower end of the wage distribution, but the wage gap turns in favor of men in the upper parts. Among these regions, the wage discrimination favors women in the sub-quantiles of the wage distribution in the Mediterranean (TR6), Eastern Black Sea (TR9) and Central Anatolia (TR7) regions. That said, regardless of the socioeconomic structure of the region, women in the high-wage group are exposed to discrimination in each

region, and the effect of wage discrimination intensifies towards the upper tail of the distribution, except in the Aegean (TR3), Central Anatolia (TR7), Northeast Anatolia (TRA) and Middle East Anatolia (TRB) regions, creating a distinctive glass ceiling effect. As previously mentioned we test the effects of the sticky floor and glass ceiling effects by considering the unexplained wage gap is interpreted as discrimination. It should be also noted that discrimination can take various forms. When related to wages, discrimination can occur directly in the form of different wages for men and women working the same job and with the same human capital or indirectly due to gender-based segregation.

The socially defined characteristics and roles of men and women broadly discriminate against women in terms of employment options, conditions and opportunities. The sectors, occupations and lines of business deemed appropriate for women employment are, to a large extent, predetermined on the basis of gender inequality. This gender-based segregation, which ascribes women with a secondary position as a source of household income, is still an essential contributor to the wage gap, despite the increasing participation of women in the workforce and their educational achievement. In this context, the quality brought by women through their inclusion in the labor market is as important as the greater labor force participation and employment rates. Policies to increase the representation of women in high-income occupations and managerial positions should be activated.

Examining the GWG and its sources in the NUTS 1 regions can serve as an essential source of data in support of the development of regional policies. The unique features of each region are independent actors that impact the wage gap. It should be noted that ignoring such regional characteristics of the GWG and focusing only on the mean wage gap will reduce the effectiveness of policies designed to combat inequality. Therefore, policies that take into account regional characteristics should be emphasized. The fact that the NUTS 1 regions include more than one province with different socioeconomic development levels can be viewed as a limitation of this paper, as the direction and dimensions of the gender GWG and their effects on inequality may also differ within the wage distribution of NUTS-1 regions. The field of study can be expanded in future papers by analyzing the NUTS 2 and NUTS 3 regional units, providing further contributions to the literature.

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Appendix 1. Descriptive Statistics of Variables for NUTS 1 Regions

NUTS1	**Ln Wage**							
	Female				Male			
	n	mean	std deviation	median	n	mean	std deviation	median
TR1	2,781	2,652536	0,5313113	2,463358	5,839	2,611989	0,5061349	2,49423
TR2	1,239	2,381028	0,2953972	2,310307	2,579	2,486154	0,3591417	2,432355
TR3	2,214	2,421035	0,3675542	2,345575	4,577	2,507939	0,4095127	2,410848
TR4	1,818	2,437255	0,3397042	2,345575	4,427	2,593189	0,4053142	2,522401
TR5	1,559	2,489451	0,4263454	2,348047	4,543	2,498052	0,4375599	2,410848
TR6	1,390	2,380803	0,3641248	2,313646	3,759	2,41888	0,4369246	2,335625
TR7	516	2,304851	0,320029	2,281037	2,033	2,368075	0,3361329	2,319877
TR8	875	2,350852	0,3362744	2,281037	2,082	2,416761	0,4176028	2,325575
TR9	405	2,33072	0,2816725	2,281037	1,068	2,391543	0,3736968	2,319877
TRA	177	2,342474	0,3760854	2,281037	871	2,327117	0,3651338	2,281037
TRB	228	2,272589	0,3121271	2,271086	951	2,234442	0,3393857	2,240215
TRC	453	2,304976	0,4028588	2,271086	2,148	2,288298	0,4202519	2,271086

NUTS1	**Higher Education**			
	Female		Male	
	n	%	n	%
TR1	1,260	45,31	1,481	25,36
TR2	346	27,93	498	19,31
TR3	746	33,69	950	20,76
TR4	550	30,25	890	20,1
TR5	666	42,72	985	21,68
TR6	511	36,76	756	20,11
TR7	175	33,91	290	14,26
TR8	298	34,06	426	20,46
TR9	134	33,09	207	19,38
TRA	89	50,28	174	19,98
TRB	108	47,37	219	23,03
TRC	153	33,77	369	17,18

NUTS1	**Experience**							
	Female				Male			
	n	mean	std deviation	median	n	mean	std deviation	median
TR1	2.781	18,12909	11,55305	16	5.839	21,16801	11,84167	20
TR2	1.239	20,06376	11,65567	21	2.579	21,60721	11,19402	21
TR3	2.214	19,00497	11,38615	18	4.577	21,7352	11,48554	21
TR4	1.818	18,58801	11,42346	18	4.427	21,28304	11,12358	20
TR5	1.559	18,20334	11,37483	17	4.543	21,04865	11,38286	20
TR6	1.390	17,81871	10,98976	17	3.759	21,693	11,24231	21
TR7	516	17,66667	11,64196	17	2.033	20,67732	11,21362	19
TR8	875	18,02057	11,39862	16	2.082	20,42171	10,86835	19
TR9	405	18,5358	12,17028	18	1.068	21,28558	11,47655	21
TRA	177	13,44633	10,87839	9	871	20,71642	11,50367	20

TRB	228	13,26316	9,850023	10	951	20,40063	10,83592	20
TRC	453	14,02428	10,64769	11	2.148	21,28026	11,39038	20

NUTS1	**Tenure**							
	Female				**Male**			
	n	mean	std deviation	median	n	mean	std deviation	median
TR1	2.781	4,321108	4,858585	3	5.839	5,340298	6,058367	3
TR2	1.239	3,995157	4,621364	2	2.579	5,962389	6,325455	4
TR3	2.214	4,00813	4,620034	2	4.577	5,654359	6,245509	3
TR4	1.818	3,871287	4,432946	2	4.427	6,103682	6,404031	4
TR5	1.559	4,279666	5,230629	2	4.543	5,656394	6,130545	4
TR6	1.390	4,069065	4,702018	3	3.759	5,466613	5,991602	3
TR7	516	3,52907	4,38722	2	2.033	5,579931	6,222153	3
TR8	875	4,170286	4,573782	2	2.082	6,04611	6,329552	4
TR9	405	4,293827	5,049761	2	1.068	6,117041	6,781941	4
TRA	177	2,728814	3,778665	1	871	5,374282	5,963489	3
TRB	228	3,017544	4,030681	2	951	5,174553	5,717289	3
TRC	453	3,472406	4,431111	2	2.148	4,97067	5,579971	3

Beyan ve Açıklamalar (Disclosure Statements)

1. Bu çalışmanın yazarları, araştırma ve yayın etiği ilkelerine uyduklarını kabul etmektedirler (The authors of this article confirm that their work complies with the principles of research and publication ethics).

2. Yazarlar tarafından herhangi bir çıkar çatışması beyan edilmemiştir (No potential conflict of interest was reported by the authors).

3. Bu çalışma, intihal tarama programı kullanılarak intihal taramasından geçirilmiştir (This article was screened for potential plagiarism using a plagiarism screening program).