Araştırma Makalesi

Minimum Wage Effects on Gender Wage Gap in Türkiye

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Abstract: This paper aims to investigate the impact of the increases in minimum wages on gender wage gap in Türkiye. We use the individual level micro data of the HLFS provided by the Turkish Statistical Institute for the years 2004-2023. At first, the disparities in wage determination between genders with the use of a Heckman-type wage equation with selection is conducted. Second, the gender wage gap for each year using the Blinder-Oaxaca decomposition method is calculated. Finally, the wage gap is computed from the microdata serves as the dependent variable, while the explanatory variables include the share of women in employment, real minimum wage increases, and the proportion of individuals earning at or below the minimum wage by an OLS model. The results of Heckman wage equations show that education emerges as one of the most significant factors in both the wage and selection equations. The OLS regression results suggest that a one percent increase in the minimum wage correlates with a 2.4 percent reduction in the wage gap, and a one percent rise in the proportion of employees earning at or below the minimum wage leads to a 9.4 percent decrease in the wage gap.

JEL Codes: J16, J31, J38, J42, R23.
Keywords: Minimum wage, wage inequality, gender, Heckman sample selection, Türkiye

Türkiye'de Asgari Ücretin Cinsiyetler Arası Ücret Farkına Etkisi

Öz: Bu çalışma, Türkiye'de asgari ücret artışların cinsiyetler arası ücret

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farkına etkisini araştırmayı amaçlamaktadır. Bu amaçla, Türkiye İstatistik Kurumu'nun (TÜİK) 2004-2023 yıllarına ait Hanehalkı İşgücü Araştırması (HİA) mikro verileri kullanılmıştır. Araştırmanın ampirik çerçevesi üç aşamadan oluşmaktadır. Öncelikle Heckman tipi seçimli ücret denklemi kullanılarak her yıl için cinsiyetler arasındaki ücretin belirlenmesinde ortaya çıkan eşitsizlikler belirlenmiş ve bunun nedenleri açıklanmaya çalışılmıştır. İkinci aşamada, Blinder-Oaxaca ayrıştırma yöntemi ile yine her yıl için kadınların ve erkeklerin aynı özelliklere sahip olmaları durumunda ücret farklarının ne kadarının açıklanabileceğini ve ne kadarının hâlâ eşitsizliklerden kaynaklandığı hesaplanmıştır. Son aşamada, mikro verilerden hesaplanan ücret farkının bağımlı değişken, kadınların işgücündeki payı, reel asgari ücret artışları ve asgari ücretle çalışanların istihdama oranının açıklayıcı değişkenler olarak yer aldığı bir En Küçük Kareler (EKK) modeli tahmin edilmiştir. Heckman ücret denklemlerinden elde edilen sonuçlar, eğitim düzeyinin hem ücret hem de seçim denklemlerinde en önemli faktörlerden biri olduğunu göstermiştir. Eğitim seviyesi arttıkça hem işgücüne katılma olasılığı hem de ücret üzerindeki etkiler artmaktadır. EKK regresyon bulgularındaki ilk iki açıklayıcı değişkenin katsayıları teorik beklentilerle uyumludur. Sonuçlar, asgari ücretteki %1'lik bir artışın, ücret açığını %2,4 oranında daralttığını ve asgari ücret veya altında kazanan çalışanların oranındaki %1'lik artışın ise ücret açığını %9,4 oranında azalttığını ortaya koymaktadır.

JEL Kodları: J16, J31, J38, J42, R23.

Anahtar Kelimeler: Asgari ücret, ücret eşitsizliği, cinsiyet, Heckman seçim modeli, Türkiye

Introduction

Gender wage inequality, referring to the wage gap between men and women after accounting for factors like education, experience, and occupation has been studied extensively over many years starting from 1970s. The issue has been a focal point for economists and policymakers due to its multifaceted impact on society and the economy. Eradicating discrimination has the potential to enhance both operational efficiency and drive sustained economic growth. Therefore, reducing gender wage gap can have positive long-term effects, such as improved family income, better education for children, and enhanced overall well-being in communities.

One dimension of the issue rests on the fact that human capital characteristics including education, experience, skills, and other factors that contribute to productivity. Consequently, estimates of inequality are typically

obtained through the decomposition of the overall wage disparity, isolating the portion attributable to variations in human capital endowments. Moreover, there are differences in human capital and work histories between two genders. Women are more prone to experiencing interrupted work histories due to family responsibilities, including child-rearing or caregiving. These gaps can affect their overall experience and, consequently, their wages. Furthermore, the distribution of women and men often differs in industries, occupations, and job status, with women concentrated in lower-paying sectors like education and healthcare or service occupations, while men are more represented in higher-paying fields such as manufacturing jobs and industries.

Although considerable strides have been made in addressing gender inequalities in the labor market across many countries in recent decades, it still persists, and the pace of change varies significantly by region and industry. As of 2023, the gender wage gap remains a significant issue globally. On average, women employed full-time year-round in the United States earn 84% of the salary that their male counterparts receive. Similarly, in OECD countries, full-time working women earn, on average, only 88 cents for every dollar or euro earned by men in full-time employment.

The impact of minimum wage policies on wage inequality has garnered significant attention in labor market literature. The question of how changes in the minimum wage influence wage disparity remains pertinent, as the minimum wage is a key policy instrument designed to enhance the welfare of low-skilled workers, particularly those at the bottom of the earnings distribution. Theoretically, the primary function of a minimum wage is to establish a wage floor at the lower end of the income distribution, thereby safeguarding the most vulnerable workers. In many countries, especially in developing ones, women are disproportionately represented among low-wage workers, making the implementation of a wage floor especially beneficial for them. In other words, women represent a significant share of low-wage positions leading to the presence of a wage gap at the lower end of the distribution, highlighting the phenomenon of "sticky floors." An increase in the minimum wage is anticipated to narrow this aspect of the gender pay gap, as wages at the lower end of the distribution rise, leading to a reduction in earnings disparity and a compression of the wage distribution. Moreover, a higher minimum wage may incentivize greater female labor force participation by encouraging more women to enter the workforce.

However, labor market characteristics differ significantly between developing and developed countries. In developing nations, the "minimum wage bite"—referring to the proportion of workers earning at or just above the minimum wage relative to the total workforce—is higher. Additionally, informal employment represents a substantial share of the overall workforce in these

countries. The presence of this dualistic labor market, divided into formal and informal sectors, lends itself to the application of a two-sector model. In this framework, workers displaced from the formal (covered) sector due to a minimum wage increase are often compelled to seek employment in the informal (uncovered) sector.[2] This would result in a reduction in wages and an increase in employment within the informal sector. However, in contrast to the predictions of conventional dual labor market theory, both formal and informal wages may increase concurrently following a rise in the minimum wage. This phenomenon, known as the "lighthouse effect," could arise from factors such as labor market elasticities, demand-side dynamics, or shifts in the skill composition between the formal and informal sectors. In other words, while increases in the minimum wage can help narrow the gender wage gap, the specific outcomes may vary depending on several factors, including industry characteristics and regional economic conditions.

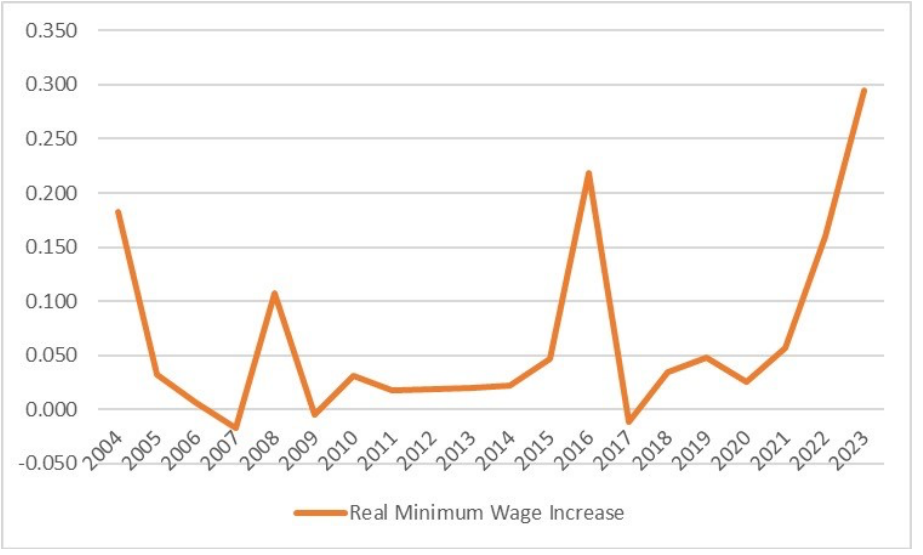
Over the past decade, Turkish wage earners have experienced several substantial increases in the real minimum wage. One of the most notable occurred in 2004, when the minimum wage commission implemented an 18.3% increase in real terms. The other one occurred in 2016. Minimum wages increased by 21.8 % in real terms in this year. The third increase was in 2022. The increase was 16.1 % in real terms. The highest increase over the period occurred in 2023 with an increase of 29.5 %.

Figure 1 illustrates the changes in real minimum wages from 2004 to 2023. These values represent the monthly net minimum wages for workers aged over 14 years old. For years with multiple adjustments, the average minimum wage was used, and all wage figures have been deflated using the Consumer Price Index (CPI) for December of each year to ensure consistency.

In the Turkish labor market, changes to the minimum wage have long been a subject of debate, as a significant portion of the population earns wages at or below the national minimum wage, at least in legal terms. Minimum wage policies, designed to improve the living standards of low-wage workers and reduce wage and income inequality, impact a substantial segment of the Turkish workforce. This labor market is characterized by low levels of educational attainment and a high proportion of informal employment. Despite a decline in the proportion of informal employment over the past two decades, it still constitutes approximately one-third of total employment.

[2] See (Welch, 1976; Gramlich, 1976; Mincer, 1976)

Figure 1. The Real Minimum Wage Increases (%), 2004-2023



Source: Ministry of Labor and Social Security. The average of the minimum wages was taken into account for the years having more than one adjustment and all wage levels are deflated by 12 months consumer price index of December every year for consistency.

In an emerging economy like Türkiye, where wage inequality is significant, examining the binding nature of the minimum wage is particularly important. A binding minimum wage suggests effective enforcement and coverage. Ideally, well-enforced minimum wage laws are expected to result in a censored wage distribution, with no workers earning below the minimum threshold. However, weak compliance with minimum wage laws is prevalent in the Turkish labor market, as in many other developing countries, undermining the anticipated effects of the minimum wage. In other words, the expected wage compression at the minimum wage level may not materialize. Many employers—especially small businesses—frequently circumvent these regulations by hiring workers informally, thereby avoiding registration with the social security system. The continued prevalence of informal employment, despite its decline in the 2000s, suggests that small firms may operate in environments with fewer regulatory constraints, leading to a higher prevalence of informal labor practices. This can create a segmentation where smaller firms rely on informal employment due to factors like lower

operational costs and flexibility, while larger firms tend to comply with formal regulations, providing more secure and stable employment conditions.[3]

Moreover, the Turkish labor market exhibits clear segmentation, marked by significant disparities in labor force participation rates, unemployment rates, and wages between women and men. Women's participation in the labor force is notably lower than that of men, and they face higher unemployment rates. Furthermore, a persistent gender wage gap underscores the systemic inequalities women experience, with women often earning less than their male counterparts for comparable work.

Furthermore, the Turkish labor market is marked by regional disparities, with unemployment rates notably higher in major migrant-receiving provinces, in contrast to the northeastern region, which experiences lower unemployment and relatively higher labor force participation, largely due to a greater reliance on agricultural employment. Additionally, significant wage disparities exist across regions, particularly between small and large firms.

A substantial body of literature examines the effects of minimum wage policies on wage distribution and the gender wage gap in developed countries. However, empirical research on this topic in developing countries remains relatively sparse, despite existing evidence from emerging markets suggesting that the wage-compression effect of minimum wage increases is more pronounced than in developed economies.

Despite the long history of national minimum wage legislation and the substantial proportion of workers potentially affected by minimum wage policies, research on this issue remains notably limited in Türkiye, as will be discussed in the following section. The impact of minimum wage changes on various dimensions may differ significantly in the Turkish context, as well as in many other developing economies, due to the unique characteristics of the labor market outlined earlier. As such, this issue warrants greater attention.

This study seeks to make a contribution to the relatively sparse literature on the effects of minimum wage policies in the Turkish labor market. Specifically, it is the first to examine the impact of minimum wage increases on the gender wage gap. We utilize microdata from the Household Labor Force Surveys (HLFS) provided by the Turkish Statistical Institute for the period 2004-2023. The HLFS includes key demographic variables such as age, marital status, and education level, as well as critical factors relevant to this study, including net wage, employment status, employment type, firm size, and other related variables.

The empirical framework of this research encompasses three distinct stages. In the initial phase, we examine the disparities in wage determination between

[3] See (Orhangazi, 2019; Pelek, 2018)

genders. To achieve this, we establish a Heckman-type wage equation with selection and conduct a wage regression utilizing the microdata from the Household Labor Force Survey (HLFS) for the period spanning 2004 to 2023. In the second stage, we employ the aforementioned microdata to calculate the wage gap for each year within the specified timeframe using the Blinder-Oaxaca decomposition method.

Finally, in the third stage, we develop an Ordinary Least Squares (OLS) model to examine the factors influencing the wage gap. In this step, the wage gap derived from the microdata is treated as the dependent variable, while the explanatory variables include the share of women in employment (sourced from the ILO statistics database), real minimum wage increases, and the proportion of individuals earning at or below the minimum wage. This approach allows us to investigate the issue from a macroeconomic perspective.

The study is structured as follows: Section 2 reviews the relevant literature, while Section 3 outlines the dataset and details the methodology employed. Section 4 presents the empirical findings, and Section 5 concludes the study.

Related Literature

The labor economics literature has devoted a great attention to the earning differences between men and women over many years. Several factors are identified as contributing to the gender wage gap. In addition to differences in employee characteristics, such as education, work experience, and the occupational and industrial composition of employment,[4], institutional factors within the labor market—such as trade union density, wage bargaining processes, employment protection legislation, and minimum wage policies which is the main interest of the present study can also influence the level and distribution of wages between men and women. (Majchrowska and Strawiński, 2018)

Women are often overrepresented among low-wage workers (Card, Cardoso, and Kline, 2016; Caliendo and Wittbrodt, 2022; Kahn, 2015), making them particularly susceptible to the effects of minimum wage changes, which are expected to reduce wage disparities and, consequently, the gender wage gap. In a foundational study, DiNardo, Fortin, and Lemieux (1996) argue that labor market institutions, such as minimum wage laws, can play a crucial role in reducing inequality, especially for women in the United States. Similarly, Lee (1999) demonstrates that the decline in the real minimum wage accounts for much of the widening of wage inequality at

[4] See (Blau and Kahn, 2017; Kunze, 2000; Kunze, 2005); (Katz and Autor, 1999); Card and DiNardo 2002; (Autor, Katz, and Kearney, 2008); (Goldin and Katz, 2008); (Lemieux, 2008) as examples.

the lower end of the female wage distribution in the U.S.

This body of literature has expanded significantly, with a growing body of empirical studies demonstrating a negative relationship between minimum wage levels and the gender wage gap across various countries. Building on Lee (1999), Autor, Manning, and Smith (2016) reassess the impact of the minimum wage on wage distribution by pooling individual responses from the Current Population Survey Merged Outgoing Rotation Group for each year in the United States. They argue that the minimum wage helps reduce inequality at the lower end of the wage distribution, suggesting that the increase in lower-tail inequality after 1980 primarily reflects changes in the underlying wage structure rather than an unmasking of hidden inequality. Their findings indicate that the wage effects extend to percentiles where the minimum wage is nominally nonbinding, implying spillover effects. Similarly, Caliendo and Wittbrodt (2022) analyze the introduction of the minimum wage in Germany in 2015 and its impact on the gender wage gap. They find that the minimum wage reduces gender wage disparities, particularly for low-wage workers, and that its effects also extend to higher percentiles of the wage distribution. The findings of (Majchrowska and Strawiński, 2018) indicate that minimum wage policy can effectively decrease gender pay differentials in former centrally planned economies, where such disparities are often pronounced. Although there is a theoretical concern that high minimum wages could reduce employment, this effect was found to be small during the studied period. In a working paper, Cerejeira, Kızılca, Portela, and Sa (2012) present findings on the gender wage gap in Portugal following an increase in the minimum wage, relating the gap to the distribution of fringe benefits and overtime payments. Using matched employer-employee data and exploiting a quasi-natural experiment created by a nationwide increase in the minimum wage for minor employees in 1998, they conclude that the gender gap widened among minor workers after the wage adjustment. This widening is primarily attributed to a redistribution of fringe benefits and overtime payments, which favored male employees. Garnero, Kampelmann, and Rycx (2015), using data from the European Statistics on Income and Living Conditions (EU-SILC) survey, explore the relationship between various institutional features of minimum wage systems and earnings inequality across European countries. They empirically demonstrate what many practitioners have long suspected: a combination of sectoral minimum wage rates and extensive coverage of collective bargaining can, at least in terms of earnings inequality, function as an effective alternative to a national statutory minimum wage. Dong-Hee and Seongman (2020), using an unbalanced country-level panel dataset spanning from 1990 to 2017, find that increases in the minimum wage help reduce wage inequality at the lower end of the distribution. They further observe that the effect is more pronounced for women than for men, suggesting that

minimum wage increases may contribute to narrowing the gender wage gap. Similarly, Dickens and Manning (2004) examine the impact of the introduction of the national minimum wage in the United Kingdom in 1999 on the wage distribution. They conclude that the minimum wage has been effective in raising the earnings of the lowest-paid workers. Less than 1% of adult workers fail to receive the minimum wage, and some of these cases may not be illegal. Chen and Xu (2024) find that raising the minimum wage significantly reduces the gender wage gap, with a 10% increase resulting in a 0.82% reduction in the gap after controlling for various factors. The benefits are most pronounced for low- and middle-income workers, particularly women, helping to narrow the gap at the lower and middle wage levels, although no similar effect is observed at the top end of the wage distribution. A study on Mexico labor market by (Campos-Vazquez and Esquivel, 2021) shows that the 2019 minimum wage increase did not notably impact employment levels among existing workers. Authors suggest that future research should focus on two key areas: how employers, especially those employing low-wage workers, adapted to the wage hike, and whether the increase affected the hiring of individuals with limited experience in the formal sector. Di Nola, Wang, and Haywood (2023) investigate the impact of the minimum wage on the gender income gap by analyzing differences in employment, hours worked, and wages. Their study of Germany's introduction of its first federal minimum wage reveals adverse effects on female marginal employment, while facilitating transitions to part-time work. This suggests potential income gains for women and a reduction in the gender income gap. They reveal that the minimum wage affects men and women differently, significantly decreasing female non-employment while having a minimal impact on males. Factors such as children and spousal income is important in determining the effects of the minimum wage among women, with those without children experiencing similar impacts to men, while women with children show a more pronounced shift towards longer hours.

Regarding to the Turkish labor market, there is a rather limited but growing literature on the issue. The first strand of studies focuses on the gender wage gap without specifically addressing the effects of the minimum wage. Ilkkaracan and Selim (2007) explore the sources of the gender wage gap using the Employment and Wage Structure Survey from 1994. They find that a significant portion of the gap arises from women's notably lower levels of work experience and job tenure. Other key factors contributing to the gender wage gap include women's underrepresentation in jobs covered by collective bargaining agreements and substantial occupational and industrial segregation. Cudeville and Gurbuzer (2010), using data from the 2003 Turkish Household Budget Survey, estimate that the average gender wage gap is approximately 25.2% in favor of men for salaried workers, with around 60% of this gap attributed to discrimination. In terms of

wage discrimination, they find that Türkiye's gender wage gap is comparable to those observed in France and Italy, with the discrimination component aligning closely with levels seen in Spain and Greece when using similar methods. However, they argue that in the Turkish context, wage discrimination is a poor indicator of gender inequalities in the labor market, as exclusion and segregation of women are more pressing concerns. Aktaş and Uysal (2016), using a firm-level dataset, examine the gender wage gap across the wage distribution. They conclude that the gender gap is nearly negligible at the lower end of the distribution but appears to favor women at the higher end, where men earn less than women. Similarly, Kaya (2017), using data from the 2006 Structure of Earnings Survey, identifies three key findings: first, the gender wage gap is more pronounced at the upper end of the wage distribution, suggesting the existence of a "glass ceiling" effect for women in the Turkish labor market. Second, this glass ceiling effect is not evident in the raw gender wage gap but becomes apparent once workers' labor market qualifications are accounted for, indicating that women in the upper wage percentiles are more qualified and better educated than their male counterparts. Using the 2015 Household Labor Force Survey from TURKSTAT, Kara and Selim (2018) find significant effects of human capital variables on monthly salaries, highlighting substantial wage differences based on region, gender, and occupation. Akgül (2018), analyzing the gender wage gap over the period 2004-2017 using the Household Labor Force Survey microdata, finds that in 2004, women would have earned, on average, 5.2% more than men. However, the data shows that, by 2017, male employees earned 15.1% more than female employees, indicating a wage loss of approximately 20.3% for women due to discrimination. Both the wage gap and the impact of discrimination vary by region, with industrialized and developed regions, as well as those with a high share of agricultural employment, typically exhibiting larger gaps and higher levels of discrimination. The wage gap and the effects of discrimination decreased until 2010, but began to rise again thereafter. Tokgöz and Memiş (2020), using data from the 2004-2016 Household Labor Force Surveys, analyze gender disparities in informal employment and hourly wages at the sub-sector level within Türkiye's manufacturing sector. Their study focuses on the relationship between informality and the gender wage gap, particularly in export-oriented sectors with a relatively high concentration of female labor. Aldan (2021) examines the unexplained wage gap by isolating gender differences in productivity characteristics across regions and years between 2009 and 2018, using data from the Household Labor Force Surveys. The study's findings indicate that female labor force participation is positively correlated with both the raw and unexplained components of the wage gap.

The second line of research examines the impact of minimum wage changes on wage distribution and labor market outcomes. Bakis and Polat (2015) explore

the evolution of wage inequality using data from the Household Labor Force Survey for the period 2002-2010. Their decomposition analysis reveals that the real minimum wage increase in 2004 marked a significant institutional shift, which contributed to a reduction in wage inequality. Specifically, they found that upper-tail wage inequality (the 90/50 ratio) declined between 2002 and 2004 and remained stable thereafter, while lower-tail inequality (the 50/10 ratio) continued to decrease throughout the period. Gürcihan Yüncüler and Yüncüler (2016) investigate the effects of minimum wage increases on labor market outcomes, focusing on the substantial minimum wage hike in 2004 using Household Labor Force Survey microdata. Their findings show that the 2004 minimum wage increase had a compressing effect on the wage distribution, particularly benefiting lower-wage earners. Işık, Orhangazi, and Tekgüç (2020) examine the consequences of a sharp minimum wage increase on wages, informality, and employment in Türkiye. Their study reveals that the minimum wage hike led to statistically significant increases in wages, with no discernible negative effects on employment, suggesting that the wage increases did not result in job losses. Pelek (2018) assesses the impact of the 2004 minimum wage increase on the entire wage distribution, paying particular attention to its effects on gender wage inequality. The study finds that the minimum wage played a pivotal role in reducing wage inequality for both male and female wage earners in Türkiye between 2003 and 2005. Bakis and Polat (2023) investigate the effects of two major policy interventions—minimum wage hikes and educational expansion—on wage inequality in Türkiye between 2002 and 2019, using Household Labor Force Survey data. Their results show a significant reduction in wage inequality during the period, which they attribute, in part, to minimum wage increases in 2004 and 2016. The decomposition analysis indicates that minimum wage increases had a substantial effect on wages, with spillover effects extending to workers earning above the minimum wage.

Building on this body of literature, the contribution of this study is twofold: First, it is one of the few studies to examine the effects of minimum wage changes on the gender wage gap in Türkiye. Second, it adds to the limited body of research on the impact of minimum wage policies on gender wage inequality in developing countries.

Data and Methodology

Data

We utilize individual-level data from the annual Household Labor Force Survey (HLFS) microdatasets, provided by the Turkish Statistical Institute (TurkStat), covering the period from 2004 to 2023. The HLFS is the primary source of labor market statistics in Türkiye, offering comprehensive information on the

demographics and socio-economic characteristics of the entire labor force, including both formal and informal workers. Key variables include age, gender, education, marital status, employment status, type of employment, hours worked, income from paid employment, and unemployment duration. Economic activities and occupations are classified at the four-digit level according to the NACE-Rev2 and ISCO-88 systems. The data are standardized using sampling and weighting methods, ensuring that the dataset is representative of Türkiye's entire non-institutional population. The survey has a repeated cross-sectional design.

Finally, our sample includes individuals aged 15 and older who are part of the labor force. We exclude the years of the economic crisis (2000-2001) and the first two years of the recovery period (2002-2003). This is because real minimum wage increases began in 2004, and there was no specific question regarding employment type in the 2003 survey. A question of whether an individual is working full-time or part-time was added to the HLFS in 2004. Minimum wage data are sourced from the Ministry of Labor and Social Security. Table 1 presents the characteristics of the sample for selected years.

Table 1. Characteristics of Wage Earners in Türkiye, ≥ 15 years (%)

	2004			2014			2023	
	Female	Male		Female	Male		Female	Male
Sector								
Agriculture	44.90	55.10		46.28	53.72		41.20	58.80
Industry	19.96	80.04		22.90	77.10		26.09	73.91
Construction	2.69	97.31		4.80	95.20		5.90	94.10
Trade	13.42	86.58		21.68	78.32		27.31	72.69
Services	21.20	78.80		31.46	68.54		38.75	61.25
Marital_Status								
Single	44.35	55.65		43.34	56.66		43.13	56.87
Married	50.39	49.61		50.85	49.15		50.90	49.10
Divorced	73.00	27.00		60.77	39.23		59.20	40.80
Widowed	85.95	14.05		82.86	17.14		82.22	17.78
Education								
NotAbletoReadWrite	82.02	17.98						
CanRead/NoDiploma	55.37	44.63	No Education	76.99	23.01	No Education	79.25	20.75
PrimarySch	51.70	48.30	PrimarySch	50.68	49.32	PrimarySch	52.07	47.93
PrimarySch	39.31	60.69	SecondarySch	43.11	56.89	SecondarySch	43.83	56.17
HighSch	42.42	57.58	HighSch	45.13	54.87	HighSch	46.31	53.69
Voc.HighSch	36.31	63.69	Voc.HighSch	38.22	61.78	Voc.HighSch	39.43	60.57
			2YearsCollege	.	.	2YearsCollege	50.16	49.84
UniversityAndHigher	38.06	61.94	University	43.16	56.84	University	47.85	52.15
				39.10	60.90	MastersOrPhD	46.44	53.56
Registered_Employment								
UnregisteredEmp	34.42	65.58		42.38	57.62		42.19	57.81
RegisteredEmp	16.94	83.06		23.41	76.59		29.95	70.05

Public_Private								
Public	.	.		34.11	65.89		36.80	63.20
Private	.	.		29.09	70.91		32.24	67.76
Firm_Size								
1-9 Empl.	27.43	72.57	1-10 Empl.	32.07	67.93	1-9 Empl.	33.80	66.20
10-24 Empl.	22.99	77.01	11-19 Empl.	27.56	72.44	10-19 Empl.	32.31	67.69
25-49 Empl.	24.13	75.87	20-49 Empl.	28.00	72.00	20-49 Empl.	33.98	66.02
50+	21.83	78.17	50+	26.58	73.42	50-249 Empl.	32.72	67.28
			Unknown	21.03	78.97	250+ Empl.	30.16	69.84
						Unknown	27.07	72.93
Number of Obs.	338.132		386.461			462.468		

Source: Own calculations using HLFS, 2004-2023. The 20-year analysis period is split into two equal segments, with the results for 2004, 2014, and 2023 being extracted and presented in the tables. Statistics for the whole period can be provided upon request.

The share of primary-school graduates has gone up slightly over the period for females whereas the opposite is true for males. The share of high school graduates has also increased slightly for females over the period. University graduates among females has increased from 2014 to 2023 whereas the counterparts for males have lost its share. The share of females working in agriculture still constitutes the biggest share over the period while the largest share among males in the construction sector. The share of agricultural sector, however slightly declines for females in 2023 while services sector significantly increases its share. The share of females working in the service sector has jumped roughly from 21% to 38% among female wage earners. Construction sector is heavily male dominated as could be expected, but there is a significant increase in women employment share in the given period.

Another key indicator is the rate of unregistered employment, which has seen a slight decline among male wage earners, while it has risen among female workers, from almost 34% to 42%. The share of gender composition regarding firm size also has changed. Among women, the highest employment share occurs in the middle size firms and has increased over the period. As the firm size increases male employment has also increased. This indicates that men have more secure and decent works compared to women.

The share of females in public sector in both 2014 and 2023 is higher than the share of those in private sector. On the other hand, the share of those working in private sector is higher compared to those working in public sector among males.

Table 2. Average Net Wages by Gender, ≥ 15 years

	2004			2014			2023	
	Female	**Male**		**Female**	**Male**		**Female**	**Male**
Sector								
Agriculture	9456560	2.30e+07		658.229	983.300		7729.65	978.879
Industry	3.00e+08	3.92e+08		1107.26	1364.68		11543.47	13829.62
Construction	4.39e+08	3.07e+08		1513.30	1357.06		12095.66	12454.28
Trade	2.52e+08	1.79e+08		1104.57	1285.76		11142.9	12171.28
Services	5.22e+08	4.63e+08		1672.17	1902.85		14408.67	17482.52
Marital_Status								
Single	7.05e+07	1.05e+08		1315.15	1253.56		13083.06	12992.33
Married	3.57e+07	2.20e+08		1534.11	1729.34		13489.2	16200.3
Divorced	1.09e+08	2.03e+08		1540.33	1661.46		13751.3	16609.87
Widowed	9235733	2.47e+07		1039.31	1462.50		9454.69	12818.99
Public_Private								
Public	.	.		2100.07	2533.58		19693.73	20830.02
Private	.	.		1209.16	1365.64		11172.08	13574.68
Education								
NotAbletoReadWrite	3540567	3.19e+07						
CanRead/NoDiploma	9171092	4.36e+07	NoEdu	731.62	9591.79	NoEdu	5960.37	9809.72
PrimarySch	1.59e+07	1.41e+08	PrimarySch	825.98	1193.86	PrimarySch	8529.97	11431.79
SecondarySch	2.41e+07	1.33e+08	SecondarySch	827.60	1113.09	SecondarySch	8320.51	10829.6
HighSch	7.43e+07	2.19e+08	HighSch	1198.14	1444.22	HighSch	10888.6	13204
VocationalHighSch	1.13e+08	2.84e+08	VocationalHighSch	1210.97	1489.62	VocationalHighSch	10832.51	13721.55
UniversityAndHigher	3.92e+08	5.02e+08	2YearsCollege	.	.	2YearsCollege	13004.46	16343.78
			University	2098.16	1489.62	University	18055.22	22323.56

Registered_Empl.			MastersOrPhD	3317.11	4369.49	MastersOrPhD	26331.24	33058.92
UnregisteredEmp	5.03e+07	1.31e+08		658.18	888.933		5279.58	8257.81
RegisteredEmp	5.20e+08	4.17e+08		1632.48	1717.02		14537.1	15790.6
Firm_Size								
1-9 Empl.	5.69e+07	1.24e+08	1-10 Empl.	964.98	1176.47	1-9 Empl.	8546.12	10822.6
10-24 Empl.	4.11e+08	4.28e+08	11-19 Empl.	1421.50	1510.03	10-19 Empl.	12568.21	13478.88
25-49 Empl.	5.16e+08	5.30e+08	20-49 Empl.	1531.82	1596.11	20-49 Empl.	14305.24	15121.88
50+	5.69e+08	6.34e+08	50+	1858.52	2000.52	50-249 Empl.	15241.52	16753.22
			Unknown	1132.84	1252.88	250+	18346.14	19987.8
						Unknown	14267.52	14788.5

Source: Own calculations using HLFS, 2004-2023. "." stands for decimal points. The 20-year analysis period is split into two equal segments, with the results for 2004, 2014, and 2023 being extracted and presented in the tables. Statistics for the whole period can be provided upon request.

Average net wages for females working in agriculture sector have increased sharply from 2014 to 2023 while is almost remained constant for males. Services sector average wages has also increased significantly for females from almost 1672 TL to 14.408 TL from 2014 to 2023, respectively.

Divorced females still earn the highest average wages over the period. The average wage differences between single and married females have remained almost the same from 2014 to 2023. Another key indicator is that average wages across marital status groups for both males and females has increased from 2014 to 2023. Both divorced females and males gets the highest average wages within the group in the last year of analysis. It seems that married men have no longer earn more than divorced ones.

Average wages in the public sector for both genders are higher than wages in the private sector in 2014 and 2023.

As education level increases average wage levels also increases for both females and males as expected. Educated males still earns more than their counterparts, i.e., the wage gap between genders across education groups is still persistent. The gap between registered and unregistered average wages has slightly improved for males but it has decreased for females between 2014 and 2023.

Methodology

Türkiye's labor supply and employment exhibit a notably heterogeneous structure in terms of the gender distribution of the workforce. Women, who constitute half of the population, make up approximately a quarter of the labor force. Although men participate in the workforce despite having lower educational levels, education exerts a significantly stronger influence on women's labor force participation and employment compared to their male counterparts. In other words, women's participation in the labor force increases with education, while those with lower educational attainment tend to remain outside the workforce. Consequently, there emerges a pronounced heterogeneity both in the number of employed individuals, regardless of gender, and in the distribution of employment levels among both genders based on their educational qualifications. The heterogeneous distribution of samples undermines the assumption of normality concerning estimation coefficients, leading to unreliable predictions. Therefore, the two-stage Heckman selection model, which is suitable for heterogeneous data sets, has been chosen as the empirical method for this study.

Heckman posited that including only employed individuals in the samples created to ascertain the true effects of independent variables such as education and age on wages could lead to biases (Heckman, 1979). The exclusion of women who prefer not to work due to market wages being lower than their reservation wages, as well as highly educated individuals who feel that their educational qualifications are

not adequately compensated in the job market, poses various challenges. The absence of high-skilled individuals who do not participate in the labor market because they perceive the wage premium of their education as insufficient, along with women who remain outside the labor force for reasons such as childcare or familial pressure, undermines accurate calculations of the effect of gender on wages. Additionally, the exclusion of women who are not working for various reasons, while including less educated, less qualified men in the sample, will skew the assessments of both gender and educational impacts on wages. Furthermore, all other coefficients estimated in the wage equation may also be biased, as those included in the sample may differ heterogeneously from those excluded in terms of other explanatory variables. To address all these issues, Heckman proposed a two-stage model.

Assume that we are trying to estimate the following wage equation:

$$W_i = \beta X_i + \varepsilon_i \quad (1)$$

where W_i denotes the wage of individual i, X_i denotes the endowments vector of individual i, β denotes the coefficients vector and ε_i is the error term.

The reservation wage is a crucial factor that influences whether individuals choose to work. In essence, each person establishes a minimum wage they consider acceptable for employment. If the market wage falls below this threshold, the individual will decide not to work. If the market wage matches the reservation wage, they will feel indifferent about working. However, if the market wage exceeds the reservation wage, the individual will choose to enter the workforce (Di=1, where D represents the decision to work or not). While we cannot directly observe individuals' reservation wages, we can see whether they are part of the workforce. Therefore, we will assume that Di=1 when an individual is employed, meaning they will only join the workforce if the offered wage is above their reservation wage. Thus:

$$D_i = \begin{cases} 1 \rightarrow enter\ workforce\ if\ W_i - R_i > 0 \\ 0 \rightarrow do\ not\ enter\ workforce\ if\ W_i - R_i < 0 \\ 0 \rightarrow indifferent\ if\ W_i - R_i = 0 \end{cases} \quad (2)$$

Now, we can define the status, or decision of an individual regarding the work force as:

$$D_i = \vartheta E_i + \varepsilon_i \quad (3)$$

Here, ϑ represents the vector of observable characteristics of an individual, including factors such as education, age, experience, marital status, and others. These variables play a pivotal role in determining an individual's decision to enter

the workforce. Consequently, in the initial stage of the Heckman model, a probit model akin to Equation 3 is formulated to account for sample selection. In the subsequent stage, a conventional wage equation, similar to Equation 1, is estimated.

Given that the primary focus of this research is the gender-based wage gap, the initial step in the empirical analysis involves conducting probabilistic labor force participation regressions for both genders. The specific formulation of the labor force participation regression, referred to as the "selection" equation in the Heckman model, is outlined as follows:

$$InWorkForce_i = \vartheta_0 + \vartheta_1 Age_i + \vartheta_2 Age_i^2 + \vartheta_3 HouseholdSize_i + \vartheta_4 NumberOfIncomeEarners_i + D_1 Education_i + D_2 MaritalStatus_i + \varepsilon_i \quad (4)$$

The dependent variable *InWorkForce* equals one if the individual is employed or actively seeking employment, indicating participation in the labor force, and is zero when the individual is not in the labor force. Factors such as age and experience exert a positive yet diminishing influence on labor force participation; thus, one should anticipate that that $\vartheta_1 > 0$ and $\vartheta_2 < 0$. As household size increases, the likelihood of being unskilled rises, which negatively impacts labor force participation; therefore, we expect $\vartheta_3 < 0$. The effect of the number of income earners in a household varies by gender. In traditional, low-educated families, the probability of women participating in the labor force declines if the husband is employed. However, in poorer households, the necessity for the wife to seek employment often counteracts this negative effect. Furthermore, in educated families, it is common for both spouses to participate in the workforce, resulting in an ambiguous sign for ϑ_4.

D_1 represents the coefficient for the education dummy variables. The category "NoEducation," which pertains to individuals lacking any formal diploma, is selected as the reference group. It is posited that the probability of labor force participation rises with increasing levels of education. Consequently, all education dummy variables are anticipated to exhibit a positive coefficient for both genders.

D_2 represents the coefficient for the marital status dummy variables, with "single" designated as the reference category. Marriage positively influences labor force participation for men, largely due to factors such as age, familial responsibilities, and traditional gender roles. Conversely, marriage and/or having children often lead women to exit the labor market. Thus, the dummy variable for marital status is expected to be positive for males but negative for females. The

impact of being widowed, however, is ambiguous for both genders. While widowhood typically results in reduced income, necessitating participation in the labor force, widows are often older, which can negatively affect their job search process.

Finally, ϑ_0 denotes the constant and ε_i stands for the error term.

After the selection regression, the second step of Heckman model consists of the regular wage equation regression. The wage equation, explicit form of Equation 1 is as follows:

$$\begin{aligned} LnWage_i = {} & \beta_0 + \beta_1 Age_i + \beta_2 Age_i^2 + D_1 Education_i + D_2 Firmsize_i \\ & + D_3 Sector_i + D_4 EmploymentType_i + D_5 Sector_i \\ & + D_6 RegEmployment_i + D_7 PublicPrivate_i + \mu_i \end{aligned} \quad (5)$$

The effects of age and its square are consistent with those observed in the selection equation; thus, β_1 is anticipated to be positive, while β_2 is expected to be negative. The expectations for the education dummy variables align with those from the selection equation. Additionally, larger firms are typically regarded as more capital-intensive, leading to increased labor productivity and higher wages as firm size expands. In surveys conducted by the Turkish Statistics Institution, firm size is categorized by the number of employees as follows: "1-9 employees," "10-49 employees," "50-249 employees," and "250+ employees." Although this classification has undergone changes in the analyzed period, the smallest category, "1-9 employees," is selected as the reference group, with the expectation that wages will rise with increasing firm size. Therefore, the dummies for the variable Firmsize are anticipated to be positive.

Regarding the sector dummies, agriculture—the sector with the lowest wages—serves as the reference category, while the dummies for the industry, construction, and services sectors are expected to exhibit positive coefficients. The variable EmploymentType differentiates between part-time and full-time contracts, with full-time employees expected to receive higher compensation. The variable RegEmployment indicates whether employment is registered or unregistered, with registered employees anticipated to earn more. Lastly, the dummy variable PublicPrivate distinguishes between public sector employees (including those in non-governmental organizations) and private sector employees, with public sector workers expected to earn higher average salaries in Türkiye. Finally, β_0 represents the constant term, and μ_i denotes the error term.

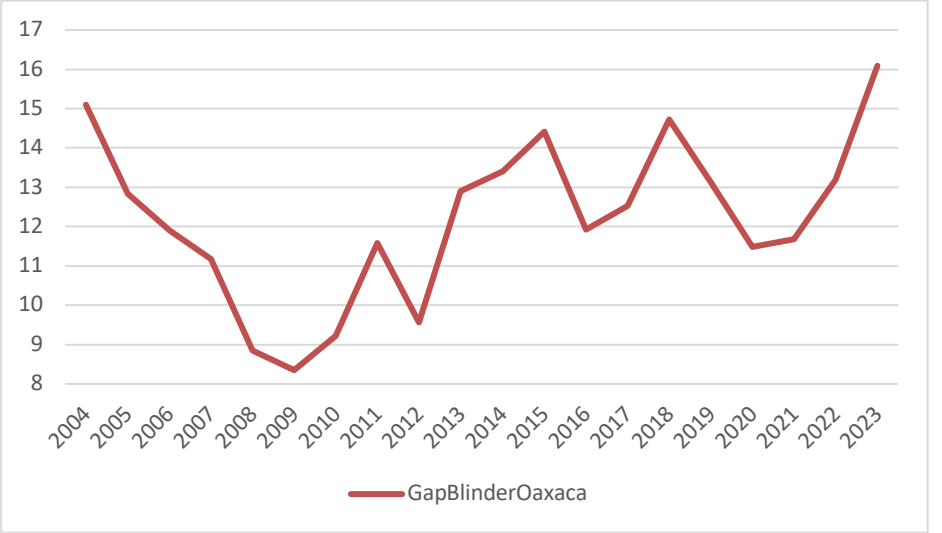
The Heckman wage regression model, incorporating sample selection, is executed on the microdata from the Household Labor Force Survey for each year spanning 2004 to 2023, encompassing both genders.

The regression results align with economic theory, revealing that a significant majority of the explanatory variables are significant at the 1% level. The findings from the wage equation regression indicate that the determinants influencing wages are valued differently between genders in Türkiye throughout the specified period. This discrepancy elucidates the gender-based wage gap at the microeconomic level. A comprehensive discussion of the detailed regression results is presented in the results section.

Following the demonstration of the origins of the gender-based wage gap through Heckman wage equation regressions, the gap is quantified for each year using the Blinder-Oaxaca decomposition method in the second phase of the empirical analysis. The Blinder and Oaxaca approach provides a statistical framework for examining wage differentials and discrimination by decomposing the wage disparity into two components: explained and unexplained (Blinder, 1973; Oaxaca, 1973). The explained difference pertains to disparities arising from variations in endowments such as education, experience, and firm size, while the unexplained difference indicates discrimination.

Consistent with other empirical studies, the logarithm of wages is employed to mitigate the effects of inflation and to analyze the elasticities between the explained and explanatory variables. The results indicate that the calculated raw wage differential was 15.09% in 2004, gradually declining each year until it reached a nadir of 8.35% in 2009. Although an upward trend is observed from 2010 to 2023, there were instances of decline during certain years. The wage gap for 2023 is calculated at 16.09%, suggesting an almost U-shaped trajectory for the wage difference. Figure 2 represents the gender wage gap calculated by Blinder-Oaxaca Method for 2004-2023 period using HLFS.

Figure 2. Gender Wage Gap (%), 2004-2023



Source: Own calculations.

In the concluding phase of the empirical analysis, an Ordinary Least Squares (OLS) regression model is developed to clarify the wage gap from a macroeconomic standpoint. The computed wage gap functions as the dependent variable in this regression, whereas the independent variables encompass the increase in minimum wage, the female share of employment, and the proportion of individuals earning less than or equal to the minimum wage within the labor force. Consequently, the OLS regression model for the macroeconomic analysis of the wage gap is articulated as follows:

$$WG_t = \alpha_0 + \alpha_1 MWI_t + \alpha_2 FS_t + \alpha_3 MWES_t + \varepsilon_t \quad (6)$$

Here, WG_t represents the wage gap in year t, MWI_t signifies the minimum wage increase in year t, FS_t indicates the female share in employment at that time, $MWES_t$ denotes the ratio of individuals earning at or below the minimum wage within the workforce, and epsilon is the error term for year t. An increase in the minimum wage exerts a narrowing effect on the wage gap by smoothing the wage distribution; therefore, we anticipate that $\alpha_1<0$.

Given that minimum wage earners constitute a substantial portion of the labor force, when the minimum wage is elevated, employers often limit salary

increases for their employees, particularly those in mid-level positions. This restriction contributes to a reduction in the wage gap, leading us to expect a negative sign for the minimum wage increase, hence $\alpha_3<0$.

Conversely, the coefficient for the female share in employment presents an ambiguous outcome due to two opposing influences. On one hand, as the minimum wage rises, more women may enter the labor market, which could contribute to a narrowing of the wage gap. On the other hand, as indicated by the descriptive statistics, a significant percentage of women occupy insecure, unregistered, and low-paying positions, which may, in turn, exacerbate the wage gap. Consequently, the overall result and the sign of this coefficient will depend on the relative strength of these competing factors.

Results

Table 3. Heckman Model with Selection Regression Results by Gender, 2004

	Male		Female	
	1	2	1	2
Variables	InWorkForce	LnNetWage	InWorkForce	LnNetWage
age	0.275***	0.0286***	0.218***	0.0307***
	(0.000258)	(0.000198)	(0.000335)	(0.000245)
ageSquare	-0.00408***	-0.000213***	-0.00307***	-0.000321***
	(3.17e-06)	(2.72e-06)	(4.55e-06)	(3.53e-06)
CanReadWritebutNoDiploma	0.270***	0.0274***	0.248***	0.105***
	(0.00355)	(0.00206)	(0.00338)	(0.00315)
PrimarySch	0.363***	0.0428***	0.183***	0.0754***
	(0.00272)	(0.00162)	(0.00218)	(0.00220)
SecondarySch	0.209***	0.0943***	0.255***	0.152***
	(0.00284)	(0.00166)	(0.00258)	(0.00248)
HighSch	0.225***	0.264***	0.547***	0.356***
	(0.00287)	(0.00167)	(0.00246)	(0.00246)
VocationalHighSch	0.570***	0.212***	0.906***	0.332***
	(0.00309)	(0.00173)	(0.00275)	(0.00262)
Unv.AndHigher	0.774***	0.556***	1.651***	0.654***
	(0.00313)	(0.00172)	(0.00263)	(0.00264)
10-24Employees		0.144***		0.255***
		(0.000643)		(0.00130)
25-49Employees		0.179***		0.295***
		(0.000604)		(0.00123)
50+		0.276***		0.345***
		(0.000531)		(0.00115)
Industry		0.275***		0.163***
		(0.00113)		(0.00186)
Construction		0.273***		0.298***
		(0.00120)		(0.00404)

Trade		0.272***		0.269***
		(0.00117)		(0.00207)
Services		0.327***		0.331***
		(0.00111)		(0.00184)
PartTime		-0.291***		-0.761***
		(0.00186)		(0.00206)
RegisteredEmp		0.216***		0.374***
		(0.000504)		(0.00111)
Married	1.285***		-0.889***	
	(0.00174)		(0.00156)	
Divorced	0.687***		0.199***	
	(0.00522)		(0.00317)	
Widowed	1.311***		-0.197***	
	(0.00615)		(0.00334)	
HouseholdSize	-0.179***		-0.324***	
	(0.000261)		(0.000381)	
Num.ofIncEarners	0.890***		1.009***	
	(0.000666)		(0.000677)	
Constant	-5.005***	18.51***	-4.596***	18.13***
	(0.00529)	(0.00417)	(0.00600)	(0.00492)
Observations	105,111	105,111	148,869	148,869
athrho	-0.489***		-0.0617***	
	(0.00214)		(0.00162)	
lnsigma	-0.622***		-0.603***	
	(0.000324)		(0.000481)	

Source: Own calculations. Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. The 20-year analysis period is split into two equal segments, with the results for 2004, 2014, and 2023 being extracted and presented in the tables. Statistics for the whole period can be provided upon request.

Table 4. Heckman Model with Selection Regression Results by Gender, 2014

	Male		**Female**	
	1	2	1	2
Variables	InWorkForce	LnNetWage	InWorkForce	LnNetWage
age	0.284***	0.0433***	0.194***	0.0391***
	(0.000212)	(8.91e-05)	(0.000234)	(0.000131)
ageSquare	-0.00392***	-0.000429***	-0.00241***	-0.000393***
	(2.49e-06)	(1.16e-06)	(2.89e-06)	(1.75e-06)
PrimarySch	0.206***	-0.0282***	0.133***	-0.0490***
	(0.00187)	(0.000723)	(0.00142)	(0.000999)
SecondarySch	0.468***	0.0655***	0.232***	0.0871***
	(0.00189)	(0.000731)	(0.00166)	(0.00110)
University	0.835***	0.524***	1.351***	0.575***
	(0.00207)	(0.000763)	(0.00165)	(0.00115)
MastersOrPhD	1.560***	0.962***	1.874***	0.940***
	(0.00538)	(0.00104)	(0.00427)	(0.00152)
HighSch	0.366***	0.150***	0.475***	0.222***
	(0.00203)	(0.000773)	(0.00171)	(0.00115)
Voc.HighSch	0.600***	0.177***	0.718***	0.244***
	(0.00212)	(0.000770)	(0.00184)	(0.00119)
11-19 Empl.		0.0916***		0.135***
		(0.000489)		(0.000837)
20-49 Empl.		0.0927***		0.144***
		(0.000353)		(0.000629)
50+		0.151***		0.193***
		(0.000325)		(0.000590)
Unknown		0.0372***		0.0975***
		(0.000695)		(0.00139)
Industry		0.0615***		-0.0291***
		(0.000883)		(0.00133)
Construction		0.185***		0.0755***
		(0.000915)		(0.00204)

Trade		0.0559***		0.0260***
		(0.000910)		(0.00143)
Services		0.0575***		0.0372***
		(0.000874)		(0.00131)
PartTime		-0.638***		-0.661***
		(0.000757)		(0.000802)
RegisteredEmp		0.259***		0.394***
		(0.000379)		(0.000684)
Public		0.296***		0.273***
		(0.000376)		(0.000554)
Married	0.880***		-1.049***	
	(0.00142)		(0.00132)	
Divorced	0.475***		-0.0484***	
	(0.00323)		(0.00233)	
Widowed	0.720***		-0.709***	
	(0.00547)		(0.00278)	
HouseholdSize	-0.341***		-0.455***	
	(0.000322)		(0.000407)	
NumberOfIncomeEarners	0.913***		1.041***	
	(0.000535)		(0.000570)	
Constant	-4.892***	5.670***	-4.178***	5.479***
	(0.00434)	(0.00192)	(0.00447)	(0.00273)
Observations	130,329	130,329	168,297	168,297
athrho	-0.159***		-0.0766***	
	(0.000995)		(0.00111)	
lnsigma	-0.919***		-0.871***	
	(0.000211)		(0.000343)	

Source: Own calculations. Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. The 20-year analysis period is split into two equal segments, with the results for 2004, 2014, and 2023 being extracted and presented in the tables. Statistics for the whole period can be provided upon request.

Table 5. Heckman Model with Selection Regression Results by Gender, 2023

	Male		**Female**	
	1	2	1	2
Variables	InWorkForce	LnNetWage	InWorkForce	LnNetWage
age	0.250***	0.0385***	0.162***	0.0296***
	(0.000172)	(7.86e-05)	(0.000173)	(9.48e-05)
ageSquare	-0.00342***	-0.000395***	-0.00202***	-0.000277***
	(1.97e-06)	(1.01e-06)	(2.01e-06)	(1.21e-06)
PrimarySch	0.499***	0.00776***	-0.0471***	0.00387***
	(0.00197)	(0.000913)	(0.00129)	(0.000934)
SecondarySch	0.632***	0.0633***	0.0770***	0.0338***
	(0.00197)	(0.000910)	(0.00149)	(0.00104)
HighSch	0.601***	0.174***	0.297***	0.208***
	(0.00200)	(0.000922)	(0.00147)	(0.00104)
VocationalHighSch	0.935***	0.204***	0.493***	0.214***
	(0.00210)	(0.000936)	(0.00162)	(0.00110)
MastersOrPhD	1.283***	0.819***	1.551***	0.767***
	(0.00339)	(0.00109)	(0.00258)	(0.00125)
2YearsCollege	1.105***	0.308***	0.829***	0.299***
	(0.00239)	(0.000978)	(0.00169)	(0.00112)
University	1.089***	0.513***	1.105***	0.506***
	(0.00217)	(0.000937)	(0.00150)	(0.00108)
10-19 Empl.		0.119***		0.104***
		(0.000403)		(0.000594)
20-49 Empl.		0.139***		0.129***
		(0.000411)		(0.000601)
50-249 Empl.		0.188***		0.174***
		(0.000388)		(0.000577)
250 + Empl.		0.278***		0.258***
		(0.000410)		(0.000620)
Unknown		0.183***		0.137***
		(0.00217)		(0.00359)
Industry		0.0276***		-0.0902***
		(0.000938)		(0.00148)

Construction		0.0749***		-0.104***
		(0.000997)		(0.00212)
Trade		0.0253***		-0.0335***
		(0.000963)		(0.00153)
Services		0.0379***		-0.0905***
		(0.000931)		(0.00144)
PartTime		-0.767***		-0.629***
		(0.000694)		(0.000660)
RegisteredEmp		0.252***		0.560***
		(0.000490)		(0.000694)
Public		0.156***		0.217***
		(0.000372)		(0.000504)
Married	0.995***		-0.446***	
	(0.00127)		(0.00107)	
Divorced	0.567***		0.272***	
	(0.00240)		(0.00181)	
Widowed	0.893***		-0.254***	
	(0.00435)		(0.00220)	
HouseholdSize	-0.212***		-0.280***	
	(0.000233)		(0.000242)	
Num.OfIncomeEarners	0.946***		0.969***	
	(0.000506)		(0.000442)	
Constant	-5.046***	8.150***	-3.916***	8.056***
	(0.00400)	(0.00201)	(0.00364)	(0.00258)
Observations	160,74	160,74	206,899	206,899
athrho	-0.134***		-0.120***	
	(0.000981)		(0.00102)	
lnsigma	-0.797***		-0.786***	
	(0.000193)		(0.000272)	

Source: Own calculations. Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. The 20-year analysis period is split into two equal segments, with the results for 2004, 2014, and 2023 being extracted and presented in the tables. Statistics for the whole period can be provided upon request.

Heckman wage equations incorporating selection for both genders have been analyzed using HLFS microdata from 2004 to 2023. All explanatory variables demonstrate statistical significance and exhibit expected signs, though a few exceptions arise in certain years. Below, we elucidate the findings related to the explanatory variables:

The coefficient for age is positive, indicating that its impact on wages ranges from 2.6% to 5.6% over the years, with a generally more pronounced effect for men. Specifically, ceteris paribus, a one-year increase in age correlates with a wage that is 2.6% to 5.6% higher than that of a younger employee. Notably, the influence of age on an individual's probability of workforce participation surpasses its effect on wages across all examined years. As anticipated, the coefficient for age squared is negative, though its magnitude remains quite small. Consistently, the effect of age squared on workforce attendance probability is greater than its impact on wages throughout the analyzed period.

Education emerges as one of the most significant factors in both the wage and selection equations. As educational attainment increases, its influence on both selection and wage escalates. Intriguingly, in certain years, the absence of a diploma exerts a greater impact than possession of a primary school diploma. This phenomenon may be attributed to the average ages associated with these educational levels; individuals lacking a diploma are likely older than those with a primary education. Given that wages tend to rise with age, it follows that those without a diploma may earn more than their primary school-educated counterparts.

Additionally, it is noteworthy that the effect of education on both job acquisition and wages is more pronounced for women than for men, indicating a greater return on educational investment for females. Furthermore, in some years, the wage effect of a vocational high school diploma surpasses that of a traditional high school diploma, while in other years, the opposite holds true. Nonetheless, the differences in these effects are generally minimal. Crucially, the vocational high school diploma consistently shows a stronger influence on job attainment than the high school diploma across all years, suggesting that the benefits of vocational education are more pronounced in terms of labor market entry than in earnings.

As anticipated, the impact on wages intensifies with increasing firm size. Larger companies typically possess more robust institutional frameworks, leading to reduced employee turnover compared to smaller firms. Additionally, larger enterprises are often characterized by capital-intensive production, which enhances labor productivity. These factors may elucidate why larger companies tend to offer higher wages.

Agriculture serves as the reference category for the sector dummy variable, and, as anticipated, all other sectors display positive coefficients within the wage

equation. Notably, the services sector consistently registers the highest coefficient, whereas the industrial sector tends to exhibit the lowest across nearly all years of the analyzed period. Variations in these coefficients may be attributable to differences in average educational attainment across sectors.

The public-private variable differentiates whether an individual is employed in the public sector (including non-governmental organizations) or the private sector. This variable was not present in the HLFS surveys prior to 2008, thus it is incorporated into the regressions for the period 2009-2023. The private sector is utilized as the baseline and the variable reflects a positive coefficient, indicating that employment in the public sector positively influences wages.

The RegisteredEmp variable assumes a value of 1 for employees formally registered within the social security system. As expected, registered employees earn more than their unregistered counterparts, ceteris paribus, throughout the entire analyzed period.

Marital status is considered exclusively within the selection equation, with single status serving as the reference category. The coefficients exhibit divergent signs for males and females. For women, marriage correlates negatively with labor force participation, while the opposite is true for men. Conversely, the coefficient for the divorced category is positive for both genders, suggesting that women are likely to exit the labor market upon marriage and may re-enter if they subsequently divorce.

The HouseholdSize variable represents the number of individuals within a family and, as expected, exhibits a negative correlation for both genders. Moreover, household size is inversely related to educational attainment; individuals with lower levels of education are more prone to having larger families. Due to poorer socio-economic conditions and diminished educational opportunities, an increase in household size correlates with a decrease in the likelihood of labor force participation.

The NumberOfIncomeEarners variable indicates how many individuals within a family are employed. It was anticipated that this variable would yield a positive coefficient for males, although the expectation for females was less definitive. In families with lower educational attainment, married women often withdraw from the labor market if their partners earn a sufficient income. Additionally, in families with a higher average age, there is an increased likelihood of children entering the job market. Consequently, the number of income earners may exhibit varying coefficients for women. Nonetheless, the results indicate that this variable carries a positive coefficient for both genders during the analyzed period.

Table 6. Aggregate OLS Regression for the Gender Wage Gap, 2004-2023

Variables	**GapBlinderOaxaca**
logMinimumWage	-2.400*
logBelowMinWageEarners	-9.112**
logShareofWomeninEmp	19.20**
	(7.095)
Observations	20
R-squared	0.983

Source: Own calculations. Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. The 20-year analysis period is split into two equal segments, with the results for 2004, 2014, and 2023 being extracted and presented in the tables. Statistics for the whole period can be provided upon request.

Upon calculating the wage disparities for each year within the specified period, we implemented an Ordinary Least Squares (OLS) regression to elucidate the aggregate factors influencing the gender-based wage gap. The term GapBlinderOaxaca represents the gender wage gap derived from microdata from the Household Labor Force Survey (HLFS) for the designated period. The variable logMinimumWage denotes the logarithm of the minimum wage series, with data sourced from the Ministry of Labor and Social Security, while logShareofWomeninEmp refers to the logarithm of the proportion of women in employment.

The coefficients of the first two explanatory variables align with our expectations. The results indicate that a one percent increase in the minimum wage correlates with a 2.4 percent reduction in the wage gap, and a one percent rise in the proportion of employees earning at or below the minimum wage leads to a 9.4 percent decrease in the wage gap.

However, the relationship concerning the share of women in the labor force is less straightforward. On one hand, an increase in the minimum wage tends to encourage more women to enter the job market, thereby reducing the wage gap. Conversely, a considerable segment of employed women occupies insecure, low-paying, and irregular positions, which exacerbates the wage disparity. Consequently, the overall impact hinges on the relative strength of these opposing influences. Ultimately, the regression findings suggest that the increase in the share of women in the labor force tends to widen the wage gap, indicating that the detrimental mechanism is more pronounced.

Conclusion

In this paper, we contribute to investigate the effect of minimum wage changes in several years taking place in Turkish labor market on the wage gap between genders. We use the micro data of the HLFS provided by the Turkish Statistical Institute for the years 2004-2023. By using the large sample size of the HLFS, we first examine the disparities in wage determination between genders with the use of a Heckman-type wage equation with selection. We then calculate the gender wage gap for each year within the specified timeframe using the Blinder-Oaxaca decomposition method. Finally, in the last stage of the analysis, we construct an OLS model with the wage gap computed from the microdata serves as the dependent variable, while the explanatory variables include the share of women in employment (sourced from the ILO statistics database), real minimum wage increases, and the proportion of individuals earning at or below the minimum wage. This approach allows us to investigate the issue from a macroeconomic perspective. The results of Heckman wage equations show that the influence of age on an individual's probability of workforce participation surpasses its effect on wages across all examined years. As anticipated, education emerges as one of the most significant factors in both the wage and selection equations. As educational attainment increases, its influence on both selection and wage escalates. Furthermore, it is noteworthy that the effect of education on both job acquisition and wages is more pronounced for women than for men, indicating a greater return on educational investment for females. The OLS regression results to elucidate the aggregate factors influencing the gender-based wage gap imply that a one percent increase in the minimum wage correlates with a 2.4 percent reduction in the wage gap, and a one percent rise in the proportion of employees earning at or below the minimum wage leads to a 9.4 percent decrease in the wage gap. An increase in the minimum wage tends to encourage more women to enter the job market, thereby reducing the wage gap. Conversely, a considerable segment of employed women occupies insecure, low-paying, and irregular positions, which exacerbates the wage disparity. Ultimately, the regression findings suggest that the increase in the share of women in the labor force tends to widen the wage gap, indicating that the detrimental mechanism is more pronounced.

Genişletilmiş Özet

Cinsiyete dayalı ücret eşitsizliği, kadın ve erkek arasındaki ücret farklarını, eğitim, deneyim ve meslek gibi belirleyici faktörleri göz önünde bulundurarak ele alan bir kavram olarak, 1970'li yıllardan günümüze kadar kapsamlı bir şekilde araştırılmıştır. Ayrımcılığın ortadan kaldırılması, yalnızca işgücü piyasasında verimliliği artırmakla kalmaz, aynı zamanda sürdürülebilir ekonomik büyümeyi teşvik etme potansiyeli taşır.

Asgari ücretin, özellikle düşük vasıflı işgücünün refahını artırmaya yönelik bir politika aracı olarak, ücret eşitsizliğini nasıl şekillendirdiği konusu, hala geçerliliğini ve önemini koruyan bir tartışmadır. Asgari ücretin teorik işlevi, gelir dağılımının alt sınırını belirleyerek en savunmasız çalışan gruplarını, özellikle de düşük ücretli işgücünü korumak ve onlara daha uygun yaşam koşulları sunmaktır. Özellikle gelişmekte olan ülkelerde, kadınlar düşük ücretli işgücünde orantısız bir şekilde temsil edilmektedir. Bu durum, asgari ücretin kadınlar için önemli bir etki aracı olmasını sağlar.

Türkiye'de 2000'li yılların başından beri yaşanan reel asgari ücret artışları hem ekonomik hem de toplumsal düzeyde önemli etkiler yaratmıştır. 2004 yılında asgari ücret reel olarak %18,3 oranında artırılmıştır. 2016 yılı ise başka bir dönüm noktası olmuştur. Bu yıl, asgari ücretin reel olarak %21,8 oranında artırılması, düşük gelirli işçilerin ücretlerindeki önemli bir iyileşmeye yol açmış, aynı zamanda asgari ücretin Türkiye'nin ekonomik ve sosyal yapısındaki belirleyici rolünü daha da pekiştirmiştir. 2022 yılı, Türkiye'de asgari ücrette yine önemli bir artışın yaşandığı bir diğer yıldır. Bu yıl, reel olarak %16,1 oranında bir artış yapılmıştır. Son olarak, 2023 yılı, Türkiye'deki asgari ücret artışlarının en yüksek orana ulaşmasıyla dikkat çekmiştir. Reel olarak %29,5 oranında bir artış sağlanmış ve bu durum, ülke genelinde asgari ücretle çalışan milyonlarca kişinin yaşam standartlarını önemli ölçüde yükseltmiştir.

Bu çalışma, asgari ücret politikalarının Türkiye işgücü piyasasına etkilerine ilişkin mevcut literatüre katkı sağlamayı amaçlamaktadır. Bildiğimiz kadarıyla, asgari ücret artışlarının cinsiyetler arası ücret farkı üzerindeki etkilerini inceleyen ilk çalışmadır. Çalışmada, 15 yaş ve üzeri çalışanlar için Türkiye İstatistik Kurumu'nun (TÜİK) 2004-2023 yıllarına ait Hanehalkı İşgücü Araştırması (HİA) mikro verileri kullanılmıştır. HİA hem kayıtlı hem de kayıt dışı çalışanlar dahil olmak üzere tüm işgücünün demografik ve sosyo-ekonomik özellikleri hakkında kapsamlı veriler sunmaktadır.

Araştırmanın ampirik çerçevesi üç aşamadan oluşmaktadır. İlk aşamada, her bir yıl için Heckman tipi seçimli bir ücret denklemi kurarak, kadınların ve erkeklerin işgücü piyasasına girişte karşılaştığı eşitsizlikleri anlamaya imkân veren ücret farkı denklemleri hesaplanmıştır. İkinci aşamada, Blinder-Oaxaca ayrıştırma yöntemi ile yine her yıl için kadınların ve erkeklerin aynı özelliklere sahip olmaları durumunda ücret farklarının ne kadarının açıklanabileceğini ve ne kadarının hâlâ eşitsizliklerden kaynaklandığı elde edilmiştir. Son olarak, mikro verilerden elde edilen ücret farkının bağımlı değişken, kadınların işgücündeki payı, reel asgari ücret artışları ve asgari ücretle çalışanların istihdama oranının açıklayıcı değişken olarak yer aldığı bir EKK modeli tahmin edilmiştir. Heckman ücret denklemleri sonuçları tüm açıklayıcı değişkenlerin istatistiksel anlamlılık gösterdiğini ve beklenen işaretlere sahip olduğunu ortaya koymaktadır. *Eğitim* düzeyi hem ücret hem de seçim

denklemlerinde en önemli faktörlerden biri olarak öne çıkmaktadır. Eğitim seviyesi arttıkça hem işgücüne katılma olasılığı hem de ücret üzerindeki etkiler artmaktadır. Sonuç olarak, yaş ve eğitim gibi faktörlerin işgücü piyasasında ücret farklılıkları ve seçim süreçleri üzerinde belirgin etkiler yarattığı, ancak bu etkilerin yıllara göre değişkenlik gösterdiği ve bazı yıllarda istisnai durumların gözlemlendiği söylenebilir. Bu bulgular, özellikle işgücü piyasasında cinsiyetler arası ücret farklarının belirlenmesinde yaş ve eğitim düzeyinin önemli birer belirleyici olduğunu ortaya koymaktadır. Ek olarak, eğitimin hem iş edinme hem de ücretler üzerindeki etkisi kadınlar için erkeklere göre daha belirgin olarak gözlemlenmiştir.

Blinder-Oaxaca ayrıştırma yöntemi ile elde edilen sonuçlar, 2004 yılında hesaplanan ham ücret farkının %15,09 olduğunu ve bu oranın, 2009 yılında %8,35 ile en düşük seviyeye gerileyene kadar her yıl kademeli bir şekilde düştüğünü göstermektedir. Ancak 2010 yılından itibaren ücret farkı yükselişe geçmeye başlamış, buna rağmen belirli yıllarda zaman zaman düşüşler de yaşanmıştır. 2023 yılı için hesaplanan ücret farkı %16,09 olarak bulunmuş olup, bu durum ücret farkının zaman içinde neredeyse U şeklinde bir seyir izlediğini göstermektedir.

EKK regresyon bulgularındaki ilk iki açıklayıcı değişkenin katsayıları teorik beklentilerle uyumludur. Sonuçlar, asgari ücretteki %1'lik bir artışın, ücret açığını %2,4 oranında daralttığını ve asgari ücret veya altında kazanan çalışanların oranındaki %1'lik artışın ise ücret açığını %9,4 oranında azalttığını ortaya koymaktadır. Bu bulgular, asgari ücretteki artışın, özellikle düşük ücretli çalışanlar üzerinde güçlü bir etkisi olduğunu ve asgari ücretin işgücünün alt kesimlerine olan etkisinin önemli olduğunu göstermektedir.

Ancak, *kadınların işgücündeki payı* ile ücret farkı arasındaki ilişki daha karmaşıktır. Bir yandan, asgari ücretteki artışın, daha fazla kadının işgücüne katılımını teşvik ederek ücret farkını daraltması beklenmektedir. Öte yandan, iş gücündeki kadınların önemli bir kısmı, güvencesiz, düşük ücretli ve düzensiz pozisyonlarda çalışmaktadır. Bu durum, kadınların işgücüne katılımındaki artışın, ücret eşitsizliğini artıran başka bir mekanizma yaratmasına yol açmaktadır. Yani, kadınların iş gücüne katılmasının ücret farkını daraltıcı etkisi, bu tür düzensiz ve düşük ücretli işler nedeniyle zayıflayabilmektedir.

Author Statement / Yazar Beyanı

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