Effect of minimum wage increase on gender wage gap in Mongolia

By

Namuun Enkhbayar

Submitted to

Central European University

Department of Economics and Business

In partial fulfillment of the requirements for the degree of

Master of Arts in Economics

Supervisor: Professor Andrea Weber

Vienna, Austria

2024

Abstract

This study examines the impact of large minimum wage increase observed in Mongolia in 2019 on wage difference between men and women. The estimation is conducted on both the entire sample and subsets categorized by different education levels and age groups to account for any potential varied effects across groups experiencing distinct wage dynamics resulting from different labor market qualifications and experiences. To account for the impact of minimum wage increase, Mincerian wage equations and Oaxaca-Blinder decomposition method is used. The findings suggest that the substantial reduction in the wage difference between men and women observed among young workers and workers with low educational attainment is due to the rise in the minimum wage. The impact of minimum wage increase are insignificant for older workers and for workers with higher education. The findings support the literature that a minimum wage policy would be a useful instrument for closing the pay gaps between men and women, specifically for those who are less experienced and have poor qualifications.

Acknowledgement

I would like to express my deepest gratitude to my supervisor, Professor Andrea Weber, for her unwavering support and guidance throughout my thesis journey. I would also like to thank my family, friends and my cohort for their valuable feedback, encouragement and support throughout my research process.

Table of Contents

1. Introduction 1

2. Background 4

2.1. Literature Review 4

2.2. Overview of Mongolian Labor Market 7

2.3. Minimum Wage in Mongolia 8

3. Empirical Model 11

3.1. Data 11

3.2. Model for estimation 13

4. Empirical results 17

5. Conclusion 23

References 25

A. Appendix 27

1. Introduction

The inequality in earnings between men and women has been a subject of extensive research in recent years. The literature on this topic indicates that a number of factors may influence the gender wage gap, including variations in individual characteristics of workers, such as education, labor market experience and differences in the industrial and occupational structures. Moreover, the specific institutional environment of the labor market may also contribute to gender wage gaps. In developing economies, low-paid workers are predominantly employed in sectors such as agriculture, retail sales, food services, childcare, healthcare support, cleaning and maintenance and administrative support, in which women are overrepresented. If women are more frequently among those earning minimum wages than men, they would be disproportionately affected by minimum wage policies. Consequently, institutional frameworks such as minimum wage policy can potentially increase the relative wages of women who are subject to the minimum wage, thereby narrowing down the gender wage gap.

Number of studies have been conducted on the relationship between minimum wage policy and gender wage gap. In their fundamental research, DiNardo et al. (1996) found that a significant portion of the increase in the gender wage gap can be attributed to the real minimum wage decrease that happened in the U.S. in late 1980s. More recently, studies conducted in European and non-European economies have found a positive impact of minimum wage policies on reducing the gender wage gaps (Boll et al., 2015; Li and Ma, 2015; Bargain et al., 2018; Hallward-Driemeier et al., 2015; Machrowska and Strawinski, 2018). To my current knowledge, there is not any empirical literature on how minimum wage policies affect the wage difference between men and women in Mongolia. Nevertheless, previous studies in Mongolia found that the gender pay gap is

large (Bat-Erdene, 2019; Batchuluun, 2021; Enkhbayar, 2022) and there is strong evidence of a sticky floor.

The objective of this study is to empirically investigate how a substantial rise in the minimum wage seen in Mongolia in 2019 affected the wage differential between men and women. To account for possible varied effects across wage distribution, the study is conducted on both the entire sample and subsets categorized by different education levels and age groups. This is because the labor market is often segmented by education and age, with different groups experiencing distinct wage dynamics. I used a published cross-sectional data from pre-intervention period of 2018 and after intervention period of 2020 including over 45000 individuals from Labor Force Survey conducted by the National Statistical Office of Mongolia. To account for the effect of the rise in the minimum wage on the gender wage gap, I conducted an Oaxaca-Blinder decomposition, which is based on Mincerian wage equation. This was done on the before and after intervention periods which makes it possible to isolate the effects of minimum wage increase from the change in unexplained part of the decomposition assuming that observed and unobserved characteristics of men and women between 2018 and 2020 stay fixed.

The results indicate that among workers with low educational attainment, namely those with only a primary or below-primary education, and those with a secondary education, the decrease in the gender wage gap between 2018 and 2020 was significantly influenced by the increase in the national minimum wage observed in 2019. Nevertheless, for those with higher levels of education, the effect of the minimum wage increase on the gender wage gap was minimal or insignificant. Moreover, the results indicated that the gender wage gap among young workers was significantly reduced as a result of the minimum wage increase.

The rest of the paper is organized as follows. Section 2 presents the review of the previous studies in the literature of minimum wage effects on gender wage gap. It then provides an overview of the Mongolian labor market, followed by a summary of the minimum wage legislation in Mongolia. Section 3 presents the overview of the LFS data and the empirical model. Lastly, in Section 4, the empirical results are summarized.

2. Background

2.1. Literature Review

There are considerable amount of studies analyzed on the literature of gender wage gap in both developed and developing countries (Altonji and Blank, 1999; Blau and Kahn, 2017; Goldin, 2014; Psacharopoulosa, 1985; Behrman & Deolalikar, 1995; Amaya & Mougenot, 2019; Nadolnyak et.al., 2021). The variations in gender wage gap is mainly explained with differences in human capital, occupational segregation and discrimination. In addition to these, labor market institutions, or minimum wages are also an important determinant of wage disparity between men and women. More specifically, by increasing the lower bound of wages workers get, minimum wages have the potential to reduce the size of gender wage gaps by reducing the "sticky floor" effect. Due to the fact that women are more likely to be employed at lower pay levels, minimum wages have the potential to close the gender wage gap by disproportionately increasing lower wages.

Several research has been conducted in the literature of minimum wage impact on labor market outcome such as employment and wage, taking gender dimension into account. According to (DiNardo et.al., 1996) labor market policies like minimum wage increase can effectively decrease inequality, particularly for women. Numerous studies have followed up on this line of study, demonstrating a negative relationship between minimum wages and gender wage gaps across a wide range of nations. Blau and Kahn (2003) found an evidence for the institutional effect on the gender wage gap, namely, minimum wage laws and collective bargaining agreements. They discovered a negative relationship between the ratio of minimum to average salary and the gender gap in their investigation of 22 countries between 1985 and 1994. Dex et.al., (2000) studied the implication of minimum wage for gender wage inequality using national statutory minimum wage in 1999 in UK. The result also found that minimum wage is proven to benefit women at the lower

end of the wage distribution and in that decreases the gender wage gap. Moreover, Robinson (2002, 2005) studied the effects of minimum wage on gender wage gap using British Labor Force Survey Data from 1997 to 2000 and found a variation in the effects in different regions.

More recently, several researches have examined the effect of raising the minimum wage in economies outside of Europe (Kambayashi et al., 2013; Gindling et al., 2015; Li and Ma, 2015) as well as in European economies (Boll et al., 2015; Bargain et al., 2018; Majchrowska and Strawinski, 2018). Kambayashi et.al., (2013) analyzed the impact of minimum wage on the wage distribution in Japan. They discovered that half of the decrease in lower-tail inequality among women that took place between 1994 and 2003 could be attributed to the minimum wage rise, which caused the lower tail of the wage distribution among women to compress. Furthermore, Gindling et.al., (2015) examined the results of Costa Rica's minimum wage law and discovered that women experienced greater wage increases than men. Li and Ma (2015) also studied if gender wage inequality in urban China have been impacted by the minimum wage law. The findings demonstrated that a minimum wage reduced gender wage gap and that the impact was especially significant for the low-income and low qualification groups.

Boll et.al., (2015) examined how gender wage gap was affected by Germany's 2015 implementation of statutory minimum wage. Namely, when comparing regions where women were significantly impacted by the minimum wage to those where they were not, they discovered that there was a significant decline in the gender wage gap. Specifically, from 2014 to 2018, the minimum wage reduced the wage disparity in high-bite regions by 4.6 percentage points at the 10th percentile. Moreover, in Ireland and UK, the impact of national minimum wages were studied by Bargain et al. (2015). The gender wage gap was found to have significantly decreased in Ireland at low income groups, with very minor effects observed further up in the distribution. Though,

little impact was discovered in the UK, presumably as a result of possible noncompliance with minimum wage laws. Majchrowska and Strawinski (2018) analyzed the effect of significant increase in the minimum wage observed in Poland in 2008–2009 on gender wage gap. The results found that a significant decrease in gender wage gaps among younger workers in Poland in 2006 to 2010 that could be attributed to an increase in the minimum wage. Though, the effects of minimum wage increases were negligible for the middle-aged workers. Changes in gender wage gaps among educational groups were much smaller.

To my current knowledge, there is not any empirical literature on the effect of minimum wage rise on gender pay gap in Mongolia. However, earlier studies of gender wage gap in Mongolia show that the wage gap between men and women is large (Bat-Erdene, 2019; Batchuluun, 2021; Enkhbayar, 2022) and in that there is a strong evidence of sticky floor. However, in the past decade, gender wage gap is exhibiting a declining trend in which education has played the largest part in explaining this decline as women became to have more advantage in education (Batchuluun, 2021; Enkhbayar, 2022).

In overview, the previous studies in the literature of minimum wage impact on gender wage gap in wide range of nations reveal that a minimum wage policy significantly reduces the gender wage gap. Namely, the effect is the highest for low-paid and low-qualified workers for whom the law is mandatory. Since there are not many research on this subject for Mongolia, and none that examine this relation for Mongolian economy, this study attempts to partially fill this gap to a certain extent.

2.2. Overview of Mongolian Labor Market

In 1990, Mongolia initiated a radical economic restructuring program, commonly referred to as "shock therapy," with the objective of transforming its centrally planned economy into a market-based system. The early 1990s witnessed a significant decline in the country's GDP per capita, with a 25% reduction observed in the annual growth rate. Prior to the economic transition, the Mongolian labor market was heavily regulated, with a historically high labor force participation rate. Moreover, gender inequality in the labor market was minimal, as equality was a fundamental tenet of the socialist system.

The structural economic changes were the main reasons for the divergence of gender wage gap. Beginning in 1993, Mongolia implemented economic reforms that expanded the gender wage gap while benefiting the economy, such as privatization, wage, price and trade liberalization. Because of the closure of industries with a high concentration of women, women experienced higher rates of unemployment during the transition period (Asian Development Bank and World Bank, 2005). Although the unconditional gender wage gap was minimal in the mid-2000s, the conditional gender wage gap was significant (Batchuluun and Dalkhjav, 2019; Pastore, 2010a). Women's employment-population ratio fell sharply from 60% to 50% during the 2007–2008 financial crisis (National Statistical Office, 2022).

Over time, there has been a decline in the gender gap in log monthly earnings and log hourly wage (Figure 1). Between 2010 and 2022, there was a 3% increase in the average monthly earnings ratio and a 6% increase in the hourly wage ratio. In 2022, the hourly wage of women were 92% of those of men and with lower ratios, monthly earnings exhibit a similar trend to hourly wage rates. Regarding the hours worked by women, it stayed mostly stable but with slightly increasing trend since 2019.

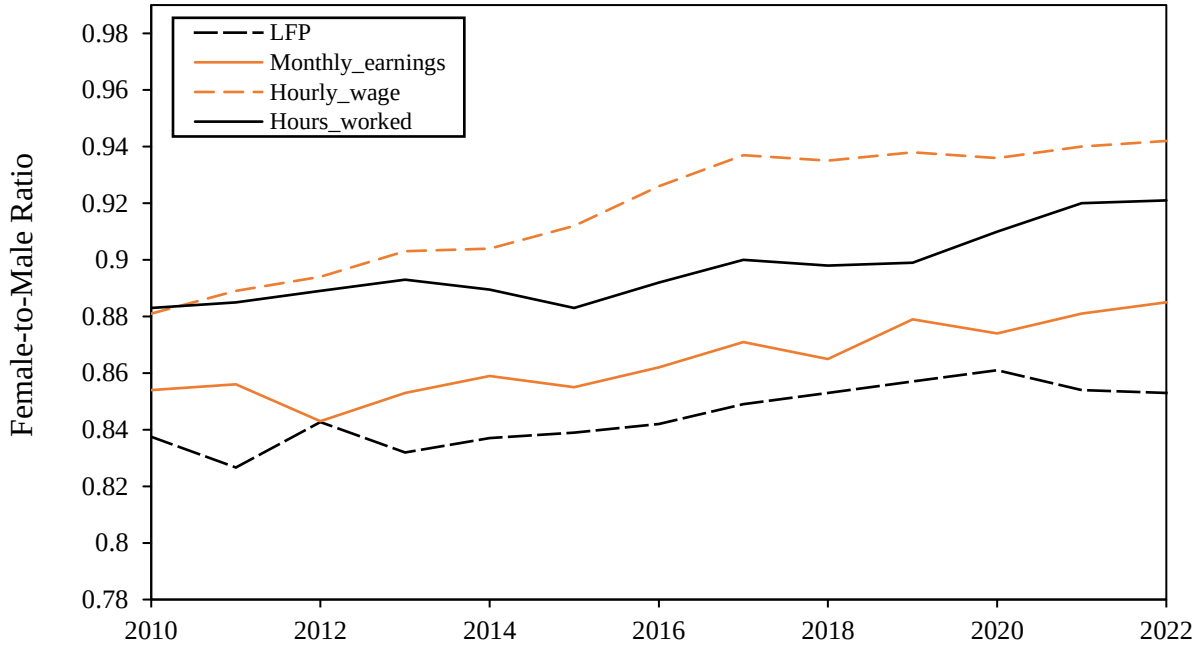

Figure 1. Female-to-male ratios of labor market outcomes. **Source**: Own calculation. **Note**: The female to male ratios are computed from LFS 2010-2022 data. The ratio of participation is computed for the entire population aged 16 and over, while the ratio of monthly earnings, hourly wage and hours worked are computed conditional on employment.

2.3. Minimum Wage in Mongolia

The national minimum wage law was first enacted in Mongolia in 1998, with its implementation scheduled for July 1, 1999. The law defines the minimum wage as a basic wage, excluding overtime work and certain other allowances, for workers engaged in simple work or jobs that do not require specified qualifications or special skills. Annually, the Tripartite Consultative Council—comprising representatives from the government, employers' associations, and trade unions—convenes to negotiate the minimum wage in Mongolia. In the event of an impasse, the Council of Ministers is empowered to determine the minimum wage for the ensuing fiscal year. In Mongolia, all workers across all sectors are entitled to the minimum wage. In accordance with the

policy, the minimum wage is determined by considering a number of factors, including the minimum living standards, social security contributions, level of economic development, employment, wage and income levels in the country.

The annual growth rate of the minimum wage usually had a substantial increasing trend (Figure 2). From 1999 to 2022, the hourly wage in Mongolia grew from 102 MNT to 3270 MNT, which is nearly 30 times from its original level. From 1999 to 2007, the minimum wage growth was fairly moderate with average growth rate of 13% approximately. In 2012-2013, minimum wage was significantly increased from 835 MNT to 1145 MNT by almost 40% and it stayed relatively constant until 2016. From 2016 to 2022, the minimum wage was adjusted significantly every year with average growth rate of 20%. Amongst the adjustments, the rise in the minimum wage in 2019 was the most substantial, in nominal terms the minimum wage was increased by almost 34% and in real terms, the growth rate was 27%.

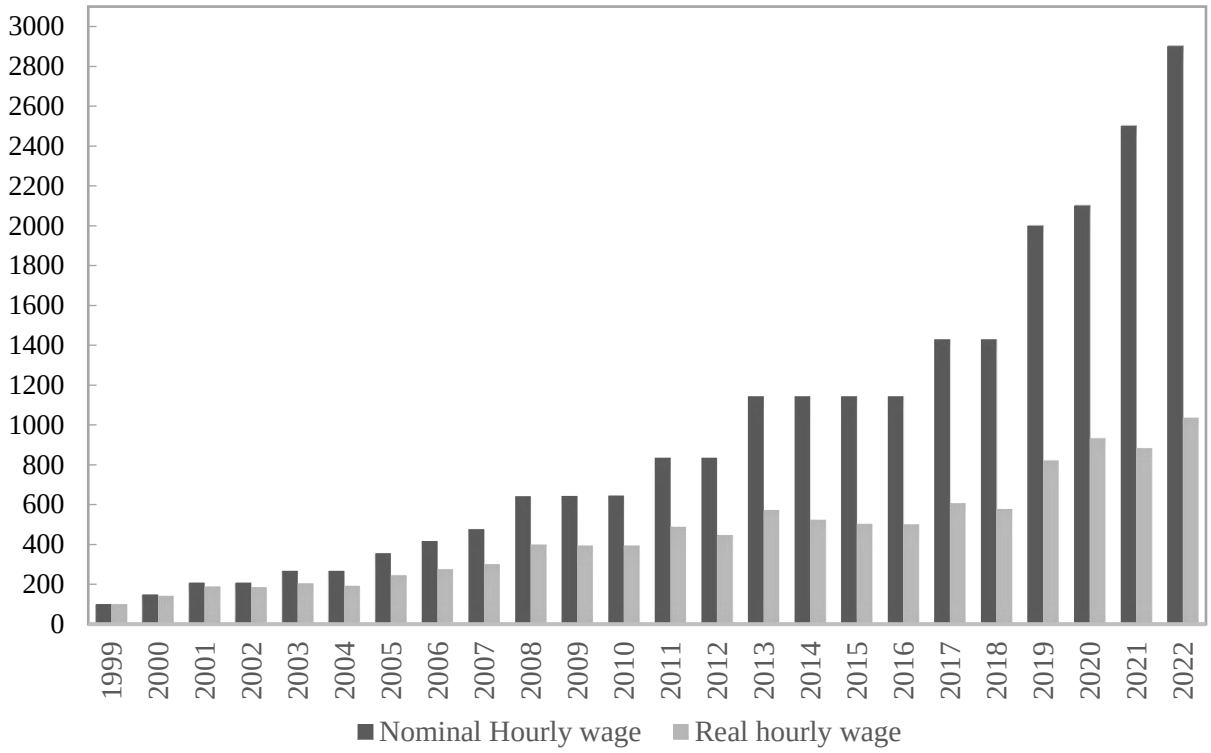

Figure 2. The nominal and real minimum wage in Mongolia in 1999-2022. **Source**: Own calculation using World Bank CPI data and National Statistical Office data on minimum wage. **Note**: The consumer price index (1999 = 100) is used to adjust the nominal minimum wage to determine real values.

3. Empirical Model

3.1. Data

The purpose of this study is to examine the impact of the minimum wage increase in 2019 on the gender wage gap. Hence, data from representative national households of the Labor Force Survey (LFS) of Mongolia in 2018 and 2020 conducted by the National Statistical Office (NSO) of Mongolia, is used in this study. NSO follows international standards for LFS and employs the International Labor Organization (ILO) criteria and methodology in their surveys. The data is comparable both on a national and international level. In the LFS, around 9000 to 15000 households are randomly selected and it includes individual data on age, gender, marital status, status of household members, highest level of education attained, place of residence, intervals of employee tenure measurement, type of employment contract, type of employer ownership, industry, occupation, number of hours worked, and monthly labor income for each individual.

In the LFS 2018 and 2020 sample, there are total over 49,000 and 51,200 observations respectively. The sample is restricted to workers who are aged between 16 and 54. The lower bound restriction comes from the legal working age in which it allows individuals who are 16 and over are permitted to enter into any type of contractual or apprentice employment with the consent of their guardians. The upper bound comes from the consideration of retirement age of men and women. Namely, full retirement age for men is 60 while it is 55 for women. Since women of age 55 to 60 almost never work, men who are aged 55 to 60 are excluded from the sample because gender wage gap at that age group is unable to be calculated. There was no restriction made on the workers' employment type except self-employed workers since minimum wage is set universally that should be observed in general without any exemptions. The final sample size is 21,565 in 2018 and 23,818 in 2020 (see Table A.1 in the Appendix).

Figure 3 shows the proportion of men and women who were working at the minimum wage level of 2018 in 2018 and 2020. The proportion of women who are working at the 2018 minimum wage level (39.2%) in 2018 is greater than men (25.6%). Moreover, in 2020, the proportion of workers who are working at the 2018 minimum wage level decreased significantly. If the compliance of the minimum wage law was perfect, after the minimum wage increase in 2019, there should not be workers who still work at the 2018 minimum wage level in 2020. However, small percentage of workers were still working at 2018 minimum wage level in 2018, which suggests that the compliance with the minimum wage law might not be perfect in Mongolia.

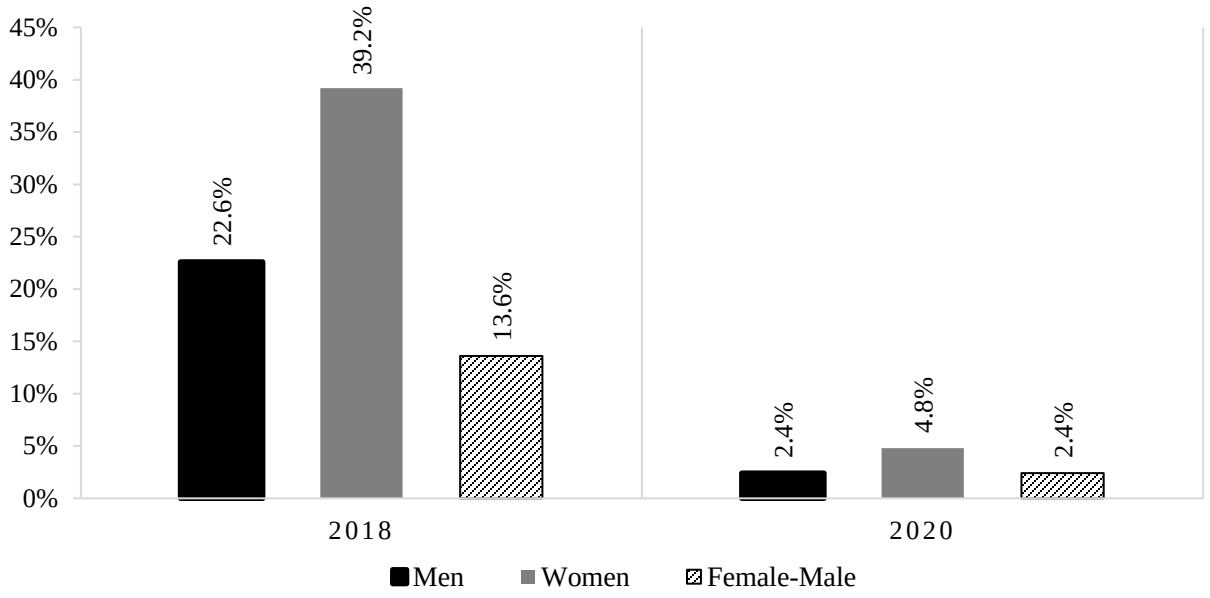

Figure 3. Proportion of men and women with wages at the minimum wage level of 2018 in 2018 and 2020. **Source**: Own calculation using LFS 2018 and LFS 2020. **Note**: The ratios are the proportion of workers who has wages at the minimum wage to the total workers in each group.

The dependent variable in this study is the natural logarithm of hourly wage. The hourly wage is not directly provided in LFS, hence it is derived based on the reported monthly earnings of the

individuals divided by the working hours. Moreover, the difference in the CPI between 2018 and 2020 is used to adjust hourly wages to 2020 prices. The CPI ratio between 2020 and 2018 is 1.125.

Observable worker characteristics such as, education level, experience, number of children, marital status, employment type, region, industry and occupation is also controlled in the study. Education level is controlled for five dummy variables which represent particular education levels, namely, primary and below, secondary, vocational, bachelor and above bachelor. The marital status is measured with four dummy variables that are single, married, divorced and widowed. The creation of dummy variables for employment type (part-time and full-time), industry and occupation are also included in the study. Industry and occupation information is categorized in four-digit numbers in the LFS data, in accordance with international classification standards. By considering the classification according to NSO rules, 12 dummy variables (agriculture, manufacturing, mining, construction, transportation/communication, wholesale, real estate, health, education/arts, technical services, financial industry and others) and 18 dummy variables for occupation is controlled in the analysis.

3.2. Model for estimation

This study intends to explore how raising the minimum wage affects the gender wage gap, specifically, by measuring how much the gender wage gap has changed from 2018 to 2020 as a result of the 2019 minimum wage increase.

In each period of 2018 and 2020, the gender wage gap (GWG) is defined as the difference between the average wages of men (M) and women (W) at time period t.

$$GWG_t = \bar{w}_{Mt} - \bar{w}_{Wt} \quad (1)$$

According to the foundational study of Mincer (1974), individual attributes and institutional policy determine the worker's wage. In other words, one can describe the wage as a function of individual attributes (X) and institutional factor, taking into account policy change (P) (Majchrowska and Strawinski, 2018).

$$f(w) = f(X, P) \tag{2}$$

Moreover, the change in the gender wage gap between 2018 and 2020 can be written as:

$$\Delta GWG = GWG_{2020} - GWG_{2018} \tag{3}$$

Taking the function of wage (2) into account, the change in the gender wage gap between the two periods can be written as:

$$\Delta GWG = [f(X_M^{2020}, P^{2020}) - (X_W^{2020}, P^{2020})] - [f(X_M^{2018}, P^{2018}) - f(X_W^{2018}, P^{2018})] \tag{4}$$

The main identification is that if workers' average individual attributes are stable between 2018 and 2020 which means,

$$X_M^{2020} = X_M^{2018} \tag{5}$$

$$X_W^{2020} = X_W^{2018} \tag{6}$$

the policy variable (P) is solely responsible for this change in wage difference between men and women. Except the minimum wage increase in 2019, there were minimal changes observed in other labor market institutions such as density of labor unions and the degree of centralization and coordination of wage negotiations. Namely, the trade union density increased a little from 22.3% in 2018 to 23.1% in 2020 and the country's level of employment protection remained the same between 2018 and 2020 (ILO, 2021). Moreover, the composition of the labor force remained essentially unchanged between the two periods (see Table A.1 in Appendix) and the employment

effect of COVID-19 was not yet to be fully experienced since the pandemic broke in Mongolia in late 2020. Government took a strong recovery package to mitigate the adverse employment effects in late 2020, hence the economic condition can be considered relatively stable (World Bank, 2022).

Assuming that (5) and (6) hold, the analysis will start with the estimation of Mincerian wage equations for a subsample defined by gender with controlling for several variables such as age, education, experience and marital status in each year. In addition to the individual characteristics, regional dummies, as well as employment, industrial and occupational characteristics are controlled in the wage equations:

$$\ln(w_{igt}) = \beta_{gt} X_{igt} + \varepsilon_{igt} \tag{7}$$

where w_{igt} is the hourly wage of worker i of gender g, $g = \{M, W\}$ at time $t = \{2018, 2020\}$; β_{gt} are the coefficients to be estimated; X_{igt} is a vector of individual and work characteristics that are controlled, such as, age, age squared, education, experience, experience squared, marital status, number of children, employment, regional, industrial and occupational dummies; and ε_{igt} is an error term.

Then, the difference in the mean wages of men and women at time t can be decomposed with Oaxaca–Ransom decomposition method (Oaxaca and Ransom, 1994) to avoid index number problem that is present in standard Oaxaca-Blinder decomposition method (Oaxaca 1973; Blinder 1973). It separates the gender wage gap into two components: one explained by variations in mean characteristics and the other unexplained component:

$$\ln(\bar{w}_{Mt}) - \ln(\bar{w}_{Wt}) = \hat{\beta}_t^{*}(\bar{X}_{Mt} - \bar{X}_{Wt}) + (\hat{\beta}_{Mt} - \hat{\beta}_t^{*})\bar{X}_{Mt} + (\hat{\beta}_t^{*} - \hat{\beta}_{Wt})\bar{X}_{Wt} \tag{8}$$

In (8), M denotes men, W denotes women, $\ln(\overline{w})$ is the logarithm of average hourly wage, $\bar{X}$ is the vector of average individual characteristics, and $\hat{\beta}_M$ and $\hat{\beta}_W$ are the estimated coefficients from the wage equation (7) for men and women, separately. $\hat{\beta}_t^{\,*}$ is the weighted average of the coefficient vectors. The first term on the right hand side, $\hat{\beta}_t^{\,*}(\bar{X}_{Mt} - \bar{X}_{Wt})$ is the component explained by the variations in observable characteristics between men and women which is evaluated at $\hat{\beta}_t^{\,*}$. In other words, it is the portion of the wage gap that is due to the observed individual characteristics that are controlled in the wage equation. The sum of the second and third terms is the portion of the wage gap that cannot be explained by the observable differences. Namely, $(\hat{\beta}_{Mt} - \widehat{\beta}_t^{\,*})\bar{X}_{Mt}$ is the part of the unexplained component, showing how much of the wage gap is due to different returns to the characteristics of men and similarly, $(\widehat{\beta}_t^{\,*} - \hat{\beta}_{Wt})\bar{X}_{Wt}$ is showing how much of the wage gap is due to different returns to the characteristics of women.

Since the decomposition is estimated in both years 2018 and 2020, according to the assumption that average individual characteristics of men and women stay stable in this time span of two years, any changes observed in the unexplained part of the decomposition between 2018 and 2020, is attributed to the minimum wage increase in 2018-2019.

The estimation is conducted on both the entire sample and subsets categorized by different education levels and age groups. The reason for looking across different age groups is that labor market is often segmented by education and age, with different groups experiencing distinct wage dynamics. Moreover, younger workers and those with lower education levels are typically more directly affected by labor market changes, such as minimum wage adjustments. Hence, analyzing sub-groups enables us to identify the impact such policy at different wage dynamics.

4. Empirical results

The primary identification is based on the assumption that the average individual characteristics of male and female workers remain stable between 2018 and 2020. Therefore, it is essential to assess the equality of means for these observable characteristics between the two periods (see Table A.2 in the Appendix). The findings revealed that there was no significant difference in the means for all observable characteristics between 2018 and 2020 for both men and women.

Table 1 presents the total raw gender wage gaps in 2018 and 2020 for the pooled sample and across education levels, along with the decomposition results. Test statistics of the decomposition components between 2018 and 2020 is presented in Table A.3 in Appendix. The total raw gender wage gap was 13.8% in 2018 and significantly reduced to 10.5% in 2020. The largest gender wage gaps were found for workers with primary and less than primary education, at 30.5%, and among workers with vocational education, at 23.6%. The lowest gender wage gap was observed between workers with bachelor's and above bachelor's level education, at 12.8% and 14.5%, respectively.

The findings show that there were significant declines in gender wage gaps across primary and below primary, secondary, and vocational education groups (see Table A.3 in Appendix). The largest decreases were observed among workers with primary and below primary, and vocational education, resulting in a decline of 2.9% and 3.3%, respectively. For those with a secondary education, the gender wage gap was significantly decreased by approximately 2.4%. However, the increase in the gender wage gap for bachelor's and above bachelor's degree education groups were insignificant.

Table 1. Total gender wage gaps and decomposition results across education levels.

	Year	Log wage		Wage gap		
		Men	Women	Raw wage gap	Explained	Unexplained
Total	2018	8.135	7.997	0.138	-0.045	0.183
	2020	8.452	8.337	0.105	-0.049	0.154
Primary and below	2018	7.578	7.273	0.305	-0.116	0.421
	2020	7.702	7.426	0.276	-0.119	0.395
Secondary	2018	7.785	7.569	0.216	0.012	0.204
	2020	7.972	7.780	0.192	0.019	0.173
Vocational	2018	8.004	7.768	0.236	-0.091	0.327
	2020	8.263	8.060	0.203	-0.097	0.300
Bachelor	2018	8.267	8.139	0.128	-0.034	0.162
	2020	8.316	8.177	0.139	-0.022	0.161
Above bachelor	2018	8.754	8.609	0.145	-0.041	0.186
	2020	8.755	8.587	0.168	-0.019	0.187

Note: Own calculation using LFS 2018 and 2020. The OLS estimation controlling for age, age squared, experience, experience squared, marital status, number of children, employment type, regional, industrial and occupational dummies, is used to estimate the gender wage gaps.

Figure 5 presents the decomposition of the changes in gender wage gaps across different education levels, using the decomposition results in Columns (5), (6) and (7) from Table 1 to account for the impact of minimum wage increase on the gender wage gap. In addition to the minimum wage increase in 2019, it can be assumed that the other unobserved institutional factors remain stable, given the minimal observed adjustments in other labor market institutions such as density of labor union and the degree of coordination and centralization of wage negotiation. Specifically, the density of trade union increased only marginally from 22.3% in 2018 to 22.9% in 2020, whereas the country's degree of protection for employment remained unchanged between 2018 and 2020 (ILO, 2021). Therefore, the change in the unexplained component is assumed to be attributed to the policy impact.

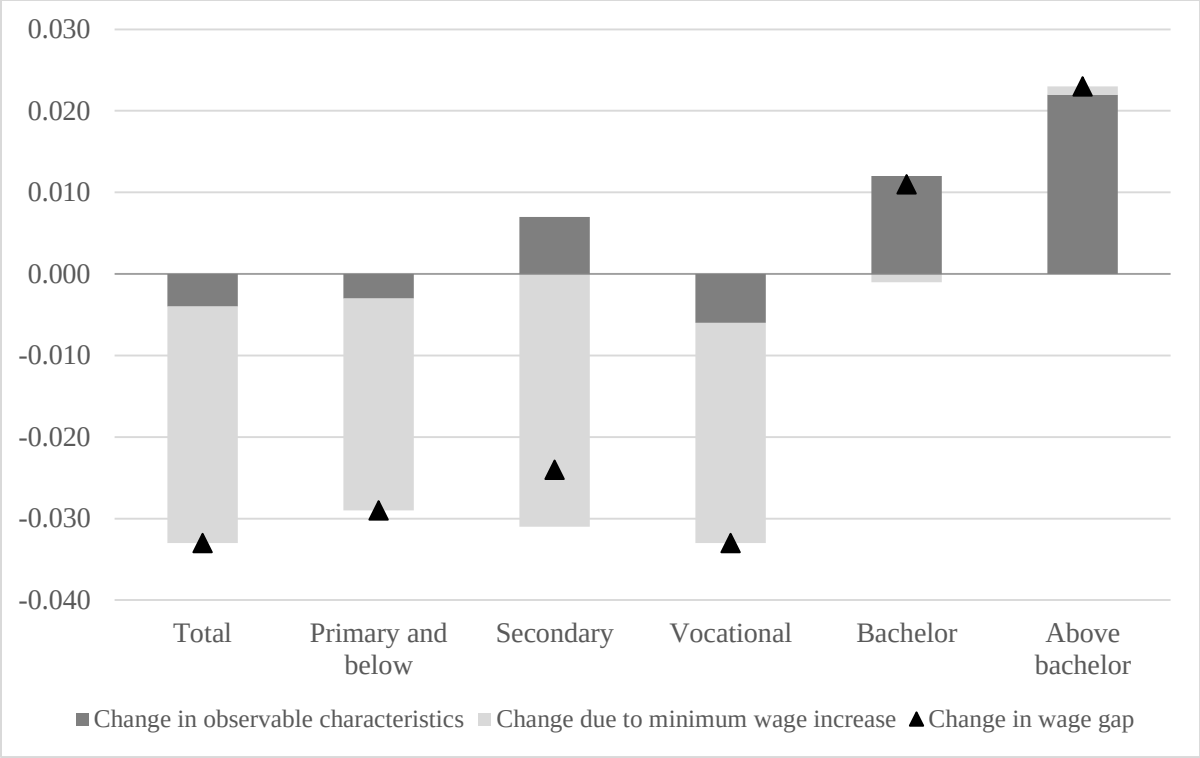

Figure 5. Decomposition of gender wage gap changes between 2018 and 2020 across education levels. **Source**: Own calculation using LFS 2018 and 2020. Wages are deflated to 2020 wages.

The results suggest that the significant decreases in gender wage gap for primary, secondary and vocational education workers in Mongolia were almost entirely due to the minimum wage increase in 2019. The changes in the unexplained parts of these education groups are all significantly different from zero (see Table A.3. in Appendix). Namely, the minimum wage increase accounted for the 2.6 percentage point decline in the wage gap of primary education workers. For those with secondary education, the impact of the minimum wage increase was even larger, resulting in 3.1 percentage point reduction in the gender wage gap. For those with vocational education, the minimum wage increase accounted for 2.7 percentage point of the decline in the gender wage gap. However, for workers with bachelor's and above bachelor's degrees, the minimum wage increase did not have a significant impact on the change in gender

wage gaps. Instead, the increase in the wage gap was almost entirely driven by changes in worker characteristics though which the change in the observable characteristics was not significantly different from zero at 5% significance level.

The findings above are consistent with the existing literature on the relationship between minimum wage and the gender wage gap which suggests that an increase in the minimum wage may contribute to a reduction in the gender wage gap, particularly among low-paid workers with low levels of qualifications (Majchrowska and Strawinski, 2018; Li and Ma, 2015). The direction of the results is somewhat comparable to what has been noted for Poland and China, but the magnitude in this study is bit smaller. Majchrowska and Strawinski (2018) conducted a similar study for Poland and found that minimum wage increases led to a decrease in wage gaps across all education levels, with the exception of lower secondary education. The magnitude of the results was on average approximately 3.3-3.6 percentage points. However, in contrast to the negligible effect of minimum wage rise for bachelor's and above bachelor's education groups in this study, they found a significant effect in this education group. Li and Ma (2015) also found that an increase in minimum wage reduces the gender wage gap for low-wage groups with a magnitude of approximately 2.4-3.1 percentage points.

Moreover, a large increase in minimum wage can also have a potential spill-over effects to workers with moderately higher wages and higher qualification in the sense that workers with already high wages would want to pertain their status (Lopresti and Mumford, 2016). However, the results in this study did not see any spill-over effects on high qualified workers as the changes in unexplained component in these groups were almost zero.

The final stage of the analysis examines the change in the gender wage gap across different age groups between 2018 and 2020. It also assesses the extent to which the increase in the minimum

wage may have contributed to this change. The group of workers aged 26 to 30 exhibited the greatest average gender wage gap, while the smallest gap was observed between young workers aged 16 to 20 and senior workers close to their retirement age (Table 2). The findings show that there were significant declines in gender wage gaps for young workers aged between 16 to 20, 21 to 25 and 26 to 30 (see Table A.4 in Appendix).

Table 2. Adjusted gender wage gaps in 2018 and 2020 across age groups.

		Men	Women	Raw wage gap	Explained	Unexplained
Age 16-20	2018	7.742	7.634	0.108	-0.345	0.453
	2020	7.921	7.846	0.075	-0.347	0.422
Age 21-25	2018	8.105	7.968	0.137	-0.016	0.153
	2020	8.301	8.195	0.106	-0.021	0.127
Age 26-30	2018	8.327	8.152	0.175	-0.008	0.183
	2020	8.485	8.332	0.153	-0.018	0.171
Age 31-35	2018	8.394	8.229	0.165	-0.020	0.185
	2020	8.414	8.266	0.148	-0.031	0.179
Age 36-40	2018	8.524	8.369	0.155	-0.041	0.196
	2020	8.631	8.469	0.162	-0.035	0.197
Age 41-45	2018	8.516	8.388	0.128	-0.026	0.154
	2020	8.528	8.417	0.111	-0.041	0.152
Age 46-50	2018	8.103	7.942	0.161	0.048	0.113
	2020	8.218	8.047	0.171	0.059	0.112
Age 51-54	2018	7.625	7.520	0.105	0.036	0.069
	2020	7.722	7.601	0.116	0.048	0.068

Note: Own calculation using LFS 2018 and 2020. The OLS estimation controlling for age, age squared, experience, experience squared, marital status, number of children, regional, industrial and occupational dummies, is used to estimate the gender wage gaps.

Figure 6 indicates that the increase in the minimum wage was the primary factor contributing to the significant reduction in the gender wage gap for young workers. Namely, the results suggest that a minimum wage increase significantly reduced the gender wage gap by 3.1 percentage points for workers aged 16 to 20 and 2.6 percentage points for workers aged 21 to 25. The magnitude of

the minimum wage effect was also significant for workers in their late 20s, but smaller than that observed for young workers in which the effect was approximately 1.2 percentage points. For workers in their 30s, 40s and 50s, the changes in the gender wage gaps were insignificant including the change in observable characteristics and change in the unexplained component.

Figure 6. Decomposition of gender wage gap changes between 2018 and 2020 across age groups.

Source: Own calculation using LFS 2018 and 2020. Wages are deflated to 2020 wages.

5. Conclusion

In this study, I analyzed the effect of significant increase in the minimum wage in Mongolia that is observed in 2019 on the gender wage gap. The estimation is conducted on both the entire sample and subsets categorized by different education levels and age groups to account for any potential varied effects across groups experiencing distinct wage dynamics resulting from different labor market qualifications. The data used in this study are from the representative national households of the LFS of Mongolia in 2018 and 2020 conducted by the National Statistical Office (NSO) of Mongolia. To account for the impact of minimum wage increase, Mincerian wage equations and Oaxaca-Ransom decomposition method is used.

The findings suggest that among workers with low education levels, namely, primary and below primary, and secondary education, decrease gender wage gap between 2018 and 2020 was significantly driven by the increase in the national minimum wage observed in 2019. However, for workers with high education levels, namely, bachelor's and above bachelor's degrees, the minimum wage increase did not have a significant impact on the change in gender wage gaps. Moreover, the results also suggested that the gender wage gap among young workers was significantly reduced by the minimum wage increase. The effects of the change in individual characteristics was minimal and almost negligible for young workers. Furthermore, the impact of minimum wage increase on gender wage gaps between middle aged and old workers were insignificant.

The findings of this study are consistent with the existing literatures (Li and Ma, 2015; Hallward-Driemeier et al., 2017; Majchrowska and Strawinski, 2018) which assumes that minimum wage increase mainly affects the workers who have low labor market experience and relatively poor qualifications. Indeed, for young workers and workers who have low education

level, the minimum wage increase reduced the gender wage gaps significantly between 2018 and 2020.

While this study provides valuable insights, it is important to acknowledge that the study has certain limitations. LFS data might present limitations such as self-reported earnings, which can introduce reporting biases, and a lack of detailed firm-level information, which may obscure firm-specific wage-setting practices and employment conditions that could influence the observed wage gaps. Moreover, to enhance the robustness and precision, assumption on the stability of the individual characteristics between the two periods can be relaxed using semi-parametric counterfactual estimation of the wage distribution, using larger dataset other than LFS. Finally, it is important to recognize that other unobserved factors, beyond institutional factors, such as labor market discrimination and individual productivity which are difficult to control, may have varied between the two periods, potentially impacting the results.

In conclusion, this study contributes to the literature on the effect of minimum wage increase on wage inequality between men and women in Mongolia. By employing Oaxaca-Blinder decomposition framework, the study offers valuable insight on the effectiveness of minimum wage policy as a tool to decrease the gender wage gap. The results suggest that minimum wage increase can be an effective tool to reduce the gender wage gap for certain groups of workers who lack labor market experience and poor qualifications in Mongolia.

References

Altonji, J., & Blank, R. (1999). Race and Gender in the Labor Market. *In Handbook of Labor Economics: Volume 3C*, 3143–259.

Amaya, E., & Mougenot, B. (2019). Gender disparities in scientific production: A nationwide assessment among physincians in Peru. *PloS one, 14(11)*.

Asian Development Bank, & World Bank. (2005). *Country gender assessment.* Manila, Philippines: Asian Development Bank; World Bank.

Bargain, O., Doorley, K., & Van Kerm, P. (2018). Minimum Wages and the Gender GAP in Pay: New Evidence from the United Kingdom and Ireland. *Review of Income and Wealth, 65*(3), 514-539.

Batchuluun, A. (2021). The gender wage gap in Mongolia: Sectoral segregation as a driving factor. *Review of Development Economics, vol. 25, Issue 3*, 1437-1465.

Batchuluun, A., & Dalkhjav, B. (2019). Supply analysis of labor market in Mongolia. *Economics: Theory and Practice, 33*, 87-120.

Bat-Erdene, B. (2019). *Gender Pay Gap in Mongolia.* Eötvös Lóránd University.

Behrman, J., & Deolalikar, A. (1995). Are There Differential Returns to Schooling by Gender? The Case of Indonesian Labour Markets. *Oxford Bulletin of Economics and Statistics, Department of Economics, University of Oxford, vol. 57(1)*, 97-117.

Blank, J. A. (1999). Race and gender in the labor market. *Hnadbook of Labor Economics*.

Blau, F. D., & Kahn, L. M. (2003). Understanding International Differences in the Gender Pay Gap. *Journal of Labor Economics, 21*(1), 106 - 144.

Blau, F., & Kahn, M. (2017). The gender wage gap: extent, trends, and explanations. *Journal of Economics Literature: Volume 55 (3)*, 789-865.

Boll, C., Hüning, H., Leppin, J., & Puckelwald, J. (2015). Potential Effects of a Statutory Minimum Wage on the Gender Pay Gap – A Simulation-Based Study for Germany. *SOEP papers, 766*.

Dex, S., Sutherland, H., & Joshi, H. (2000). Effects of Minimum Wages on the Gender Pay Gap. *National Institute Economic Review, 173*(1), 80-88.

DiNardo, J., Nicole M. Fortin, & Thomas Lemieux. (1996). Labor Market Institutions and the Distribution of Wages, 1973-1992: A Semiparametric Approach. *Econometrica Vol.64*, 1001-1044 .

Enkhbayar, N. (2022). *Gender wage gap in Mongolia over the years and the role of parenthood in shaping the gender wage gap.* Eötvös Loránd University, Faculty of Social Science.

Gindling, T., Mossaad, N., & Trejos, J. D. (2015). The Consequences of Increased Enforcement of Legal Minimum Wages in a Developing Country: An Evaluation of the Impact of the Campaña Nacional de Salarios Mínimos in Costa Rica. *ILR, 68*(3), 666-707.

Goldin, C. (2014). A grand gender convergence: Its last chapter. *American Economic Rview, 104(4)*, 1091-1119.

Hallward-Dreimeier, M., & Rijkers, B. (2015). Can Minimum Wages Close the Gender Wage Gap? Evidence from Indonesia. *Review of Income and Wealth*, 310-334.

ILO. (2021). *Accelerating the 2030 Sustainable Development Goals: Mongolia.* ILO.

Kambayashi, R., & Kawaguchi, D. (2013). Minimum wage in a deflationary economy: The Japanese experience, 1994–2003. *Labour Economics, 24*, 264-276.

Li, S., & Ma, X. (2015). Impact of minimum wage on gender wage gaps in urban China. *IZA Journal of Labor Development, 4*(1), 1-22.

Majchrowska, A., & Strawiński, P. (2018). Impact of minimum wage increase on gender wage gap: Case of Poland. *Economic Modelling, 70*, 174-185.

Mincer, J. (1974). Schooling, Experience, and Earnings. *National Bureau of Economic Research*.

Nadolnyak, D., Si, C., & Hartarska, V. (2021). The gender wage gap in developing countries. *Applied Economics and Finance, Redfame publishing, vol 8(1)*, 1-12.

National Statistical Office. (2022). *Labor Force Survey Report.* National Statistical Office.

Oaxaca, R. (1973). Male-Female Wage Differentials in Urban Labor Markets. *International Economic Review*, 693-709.

Oaxaca, R., & Ransom, M. (1994). On discrimination and the decomposition of wage differentials. *Journal of Econometrics*, 5-21.

Pastore, F. (2010a). The gender gap in early career in Mongolia. *International Journal of Manpower, 31(2)*, 188-207.

Psacharopoulosa, G. (1985). Returns to Education: A Further International Update and Implications. *The Journal of Human Resources, 20(4)*, 583-604.

Robinson, H. (2002). Wrong Side of the Track? The Impact of the Minimum Wage on Gender Pay Gaps in Britain. *Wrong Side of the Track? The Impact of the Minimum Wage on Gender Pay Gaps in Britain, 64*(5), 417-448.

Robinson, H. (2005). Regional evidence on the effect of the national minimum wage on the gender pay gap. *Taylor & Francis Journals, 39*(7), 855-872.

World Bank. (2022). *Mongolia post-COVID-19: Risks to an inclusive recovery.* World Bank.

A. Appendix

Table A.1. Sample characteristics of LFS 2018 and 2020 in Mongolia.

	2018			2020		
	Men	Women	Total	Men	Women	Total
Sample statistics:						
Sample size	10,978	10,587	21,565	11,824	11,994	23,818
Share of all workers (%)	50.9	49.1	100	49.6	50.4	100
Age:						
18-22	7.1	6.2	6.6	6.8	6.4	6.6
23-27	10.8	11.2	11.0	11.5	10.8	11.2
28-32	15.2	14.8	15.1	14.1	13.2	13.7
33-37	13.9	13.4	13.6	14.4	14.2	14.3
38-42	13.8	12.7	13.2	13.2	13.7	13.5
43-47	13.1	13.8	13.5	12.3	13.2	12.8
48-52	12.3	11.0	11.7	13.1	13.6	13.4
53-57	9.0	9.3	9.7	10.7	9.9	10.3
58-62	4.8	7.6	5.6	3.9	5.0	4.5
Education:						
Primary and below	6.9	8.1	7.5	6.2	7.8	7.0
Secondary	17.3	19.5	18.4	15.8	18.1	17.0
Vocational	28.3	25.3	26.8	27.1	27.2	27.2
Bachelor	24.9	25.6	25.3	26.4	28.7	27.6
Above bachelor	22.6	21.5	22.1	24.5	18.2	21.4
Tenure:						
Tenured less than 5 years	16.9	15.8	16.4	17.8	16.9	17.4
Tenured 5-9 years	38.9	36.2	37.6	36.1	36.7	36.4
Tenured 10 or more years	44.2	48.0	46.1	46.1	46.4	46.3
Industry:						
Agriculture, forestry, fisheries	3.1	2.9	3.0	2.8	3.1	3.1
Manufacturing	12.4	11.2	11.8	12.8	13.9	11.5
Mining	16.6	9.5	13.1	17.4	9.1	12.1
Construction	11.1	4.5	7.8	11.8	4.1	10.2
Transportation/communication	11.3	5.2	8.3	10.2	4.2	8.4
Wholesale, retail and catering	2.6	10.8	6.7	3.9	8.9	6.4
Real estate	1.9	3.1	2.5	2.4	4.2	3.2
Health and social welfare	1.9	5.1	3.5	1.8	5.9	3.5
Education, arts and culture	3.8	8.1	6.0	3.1	9.2	5.2
Technical services	10.4	5.9	8.2	9.8	6.5	9.2
Financial industry	3.1	6.2	4.7	2.9	4.8	3.7
Public administration	16.1	19.2	17.7	15.8	18.9	19.2
Others	5.7	8.3	7.0	5.3	7.2	4.3

Table A.2. Test statistics for the mean characteristics between 2018 and 2020.

	Men			Women		
	Year	Mean	t-value	Year	Mean	t-value
Age	2018	33.25	3.24	2018	34.62	4.12
	2020	34.31		2020	35.21	
Experience	2018	8.54	25.86	2018	9.34	19.65
	2020	9.65		2020	10.16	
Education	2018	14.26	1.84	2018	13.28	4.65
	2020	16.92		2020	15.45	
Marital Status	2018	1.89	2.56	2018	1.85	3.96
	2020	2.13		2020	1.76	
Employment type	2018	2.78	4.21	2018	2.13	5.24
	2020	2.34		2020	2.21	
Industry	2018	4320.21	7.71	2018	5134.87	6.32
	2020	4678.23		2020	4432.88	
Occupation	2018	1092.18	9.57	2018	159.34	4.92
	2020	1221.32		2020	136.98	
Region	2018	31.78	36.21	2018	32.43	24.12
	2020	42.98		2020	48.99	

Note: the sample consists of workers aged between 16 and 54.

Table A.3. Test statistics for decomposition results across education groups.

	Year	Raw Wage Gap	t-value	Explained	t-value	Unexplained	t-value
Total	2018	0.138	3.26	-0.045	0.96	0.183	2.54
	2020	0.105		-0.049		0.154	
Primary and below	2018	0.305	2.96	-0.116	1.75	0.421	2.8
	2020	0.276		-0.119		0.395	
Secondary	2018	0.216	3.84	0.012	1.54	0.204	2.51
	2020	0.192		0.019		0.173	
Vocational	2018	0.236	2.75	-0.091	1.27	0.327	2.12
	2020	0.203		-0.097		0.300	
Bachelor	2018	0.128	1.15	-0.034	0.98	0.162	0.85
	2020	0.139		-0.022		0.161	
Above bachelor	2018	0.145	1.02	-0.041	1.76	0.186	0.56
	2020	0.168		-0.019		0.187	

Note: the sample consists of workers aged between 16 and 54.

Table A.4. Test statistics for decomposition results across age groups.

	Year	Raw Wage Gap	t-value	Explained	t-value	Unexplained	t-value
Age 16-20	2018	0.108	2.12	-0.345	0.56	0.453	2.72
	2020	0.075		-0.347		0.422	
Age 21-25	2018	0.137	2.54	-0.016	0.42	0.153	2.34
	2020	0.106		-0.021		0.127	
Age 26-30	2018	0.175	2.12	-0.008	1.24	0.183	1.85
	2020	0.153		-0.018		0.171	
Age 31-35	2018	0.165	1.24	-0.020	1.32	0.185	0.76
	2020	0.148		-0.031		0.179	
Age 36-40	2018	0.155	1.56	-0.041	1.64	0.196	0.12
	2020	0.162		-0.035		0.197	
Age 41-45	2018	0.128	1.38	-0.026	1.45	0.154	0.36
	2020	0.111		-0.041		0.152	
Age 46-50	2018	0.161	0.98	0.048	1.24	0.113	0.11
	2020	0.171		0.059		0.112	
Age 51-54	2018	0.105	1.21	0.036	1.22	0.069	0.35
	2020	0.116		0.048		0.068	

Note: the sample consists of workers aged between 16 and 54.