



Dynamics of Gender Wage Gap in Kazakhstan for 2011–2019

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Abstract

We examine the gender wage gap in Kazakhstan over the period 2011–2019. It was found to be persistent and stable during this period at around 30%; however, the decomposition suggests the increasing negative effect of growing industrial segregation which is not compensated for by a relatively better and improving human capital of females. Unsurprisingly, the highest gender gap is documented in more industrialised and economically successful provinces and the lowest gap, that is, in the poorest and predominantly agricultural ones. In the two largest cities with the most advanced economies, our findings suggest the existence of vertical segregation and discrimination. Thus, the policy aimed at narrowing down gender inequalities in Kazakhstan's labour market should seek to equalise industrial disparities and segregation and account for regional disparities.

Keywords Gender wage gap · Industrial segregation · FSU · Kazakhstan

JEL Classification J16 · J24 · J31

1 Introduction

Gender equality, including equality in opportunities and labour market outcomes, is one of the key United Nations (UN) Millennium Development Goals (MDGs). To reduce gender inequalities, in 2006 Kazakhstan adopted the National Strategy for Gender Equality whose aim was to empower women, eliminate discrimination

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in the labour market, and promote equal pay for equal work. However, despite the proclaimed policy, Kazakhstan constantly witnesses a gender wage gap (GWG) at a level of around 30%. This motivates the research questions raised by this study: What are the causes of the observed GWG? Is it the result of women's choice regarding certain areas of economic activity or gender discrimination? And to what extent do each of these contribute to the GWG?

The GWG is a relatively well-researched but still a relevant topic in economics. Despite the progress achieved over the last few decades, gender wage inequality is still an issue everywhere. In Organisation for Economic Co-operation and Development (OECD) countries, it ranges from around 1% in Belgium to 30% in South Korea.¹ While in the least developed countries, the GWG is still partially explained by a disparity in acquired human capital across genders (Si 2021), in many countries worldwide, females' advancement in education and skills is not lower and often is higher than that of males. The reasons for the remaining GWG span from gender horizontal and vertical segregation (Maltseva & Roshchin 2006; Antonczyk et al. 2010; Blau & Kahn 2017; Pearlman 2018; Khitarishvili 2019; Kireyeva & Satybalidin 2019) to the motherhood penalty (Grimshaw & Rubery 2015; Costa-Dias et al. 2018; Kleven et al. 2019; Goldin et al. 2022), discrimination against women along with nepotism towards men (Becker 1971; Johnes & Tanaka 2008; Barth and Dale-Olsen 2009; Chen et al. 2013; Lanning 2014; Gharehgozli & Atal 2020), and psychological traits (Bowles et al. 2007; Fortin 2008; Blau & Kahn 2017; Cook et al. 2021; Cullen & Perez-Truglia 2023).

However, research into gender-related labour market inequality in the countries of Central Asia, specifically Kazakhstan, is limited. Khitarishvili (2019) denoted horizontal and vertical segregation as the main reasons for the GWG in Central Asia. In turn, it has been found to be a result of existing institutional barriers and social attitudes regarding gender roles. Similarly, Dubok and Turakhanova (2017) specified the presence of discrimination against women in their employment and promotion in these countries. A high level of education does not guarantee them decent wages and does not protect them against job loss.

Lipovka (2016) considered the underutilisation of females' human capital and a lack of demand for their labour as the main reasons for the GWG in Kazakhstan and called for certain actions from the policymakers and business community to create favourable conditions for working women. Her study suggests that women in Kazakhstan, given their acquired human capital, have the same potential to become entrepreneurs and hold leadership positions, as men do. However, the established stereotypes regarding gender roles hinder the implementation of their capabilities, making women lag behind.

Most studies of the GWG in Kazakhstan were conducted on aggregated data (Van Klaveren et al. 2010; Lipovka 2016; Khitarishvili 2019; Kireyeva & Satybalidin 2019), while studies attempting to estimate the GWG with the use of individual-level data are almost non-existent. The first empirical study exploiting the microdata was performed by Newell and Reilly (2001), who estimated the GWG in several countries of the former Soviet Union (FSU). They came to the conclusion that the

¹ <https://data.oecd.org/>.

GWG in Kazakhstan has widened during the transition as a result of the market-oriented economic reforms and the weakening of wage regulation mechanisms. More recent work by Blunch (2010) considered the determinants of the GWG in Kazakhstan and identified a large proportion of the unexplained part of the gap, indicating the existence of discriminatory practices in the labour market.

In this study, we seek to partially fill the gap in the empirical literature and assess the gender disparities in Kazakhstan's labour market by scrutinising the period 2011–2019 with the household budget survey (HBS) data collected by the Bureau of National Statistics (BNS). The HBS provides a rich repeated cross-sectional individual-level dataset on 12,000 households observed each year, that first commenced in 2002; however, the data until 2011 does not record the industry of employment, which is likely to be the main observed determinant of the GWG, as our study suggests. We first examine the GWG over this period, determining that it was stable at a level of around 30%. However, the Blinder–Oaxaca decomposition (Blinder 1973; Oaxaca 1973) suggests the presence of a certain pattern specifically that the explained part of the wage differentials was consistently increasing, mostly due to the growing industrial segregation. Thus, increasing industrial segregation fully eliminates the improvements in females' human capital quality in Kazakhstan. In turn, industrial segregation can be explained by a lower level of social protection, higher risk, and worse working conditions in at least some of the best-paid industries and sectors of employment that primarily employ male workers.

We then focus on the regional peculiarities of the GWG by dividing the country into the five geographical sub-regions to reveal that both the GWG and its explained part are the highest in the richest western oil-producing and exporting regions, as opposed to the less industrialised and poorest south where the gap is the smallest and has been left mostly unexplained. Female employees are characterised by a higher level of education and higher returns to education in all regions; however, it is only in the two poorest regions—the southern and the northern—that the higher returns to human capital for females notably narrow down the GWG. This is much less true for the more industrialised and richer western and central regions. Furthermore, in the country's two largest and most economically advanced cities—the former and the current capital—which are characterised by fairly even allocation of genders across industries; the GWG is left almost fully unexplained by our model. We tend to explain the observed gender gap in these two cities as being due to unobserved vertical segregation and discriminatory practices in their labour markets providing us with an avenue for future research.

We thus conclude that the revealed geographical patterns are likely predominantly explained by the differences in the regional industrial compositions. The study, therefore, is suggestive that the policy aimed at narrowing down gender inequalities in Kazakhstan's labour market should seek to equalise industrial disparities and segregation in the first place by, for example, making the best-paid industries more female-friendly through increasing the level of social protection and social security.

The paper is organised as follows. The next section familiarises the reader with the country's context, shedding light on the nature of employment across genders by observing the existing studies and national statistics data. This is followed by a section introducing the data and descriptive statistics. We then present the results of

the study with each subsection displaying the decomposition separately according to year and region. The final section provides a discussion and a set of concluding remarks that highlight possible policy implications.

2 Institutional Background

In 2021, with the United Nations Development Programme (UNDP) Gender Inequality Index (GII) comprised of 0.161 and a rank of 41, Kazakhstan outperforms the world average, the OECD countries, and the majority of its FSU counterparts except for the Baltic countries and Belarus.² The Index accounts for reproductive health, empowerment, and labour market outcomes. Kazakhstan is particularly superb in terms of the female labour force participation rate, while it performs relatively worse in other dimensions.

Similarly, Kazakhstan has a relatively good position according to the Global Gender Gap Report 2023 produced by the World Economic Forum (WEF) assessing countries according to economic opportunities, education, health, and political leadership. In consistency with the GII, the country is particularly successful in the two first dimensions and performs relatively poorer in terms of health and political leadership. Strong positions of Kazakhstan in both rankings are highly related to female human capital and their participation in the labour market which puts the country on par with the developed world.

The labour force participation rate is relatively high both for men and women in Kazakhstan. During the period under analysis, the female labour force participation rate was stable at around 76%. There are at least two reasons for this: The first is the relatively low average wage that does not allow one spouse to support their family alone; the second is the relatively high level of education amongst females which motivates them to apply their acquired human capital in their professional activities.

A historical path should also be mentioned: Labour force participation was high in the Soviet Union due to the existent ideology and an attitude to work as a duty, not only a right of a Soviet citizen, while the Soviet women's plight in the labour market was relatively equal to that of men (Khitarišvili 2019; Sarosh 2011). By the beginning of the market-oriented reforms in the early 1990s, Kazakhstan, like other FSU countries, was characterised by a relatively high level of social protection for both male and female workers that included publicly funded healthcare and recreation, universally paid maternity leave, and availability of universal childcare (Khitarišvili 2019). However, despite the declared gender equality at work, household responsibilities within most Soviet families were not equal. Women were considered to be the main contributors to household duties, while men took the role of the main breadwinners. This was at least partially explained by the industrial nature of the Soviet economy, where more generously remunerated jobs were mostly concentrated in male-dominated industries believed to be “unsuitable and hazardous” for females (Khitarišvili 2019) and often required more physical efforts. Job restrictions

² UNDP Gender Inequality Index, <https://hdr.undp.org/>.

preventing women from engaging in these jobs were in action (Khitarišvili 2019). As a result, gender segregation across industries, occupations, and jobs appeared, with females being primarily involved in relatively worse-paid, white-collar work and males in better-paid jobs in mining and quarrying, heavy industry, and manufacturing. Nonetheless, gender segregation had not substantially contributed to the wage inequality that was compressed by the wage grids.

However, such gender roles in Soviet society predetermined a high level of female education. Access to higher education had been free of charge, and even though it was highly competitive, the proportion of women gaining a higher education had not been lower than the proportion of men. This trend has become even more pronounced in independent Kazakhstan. The proportion of women with higher education is greater than the proportion of such men for each year considered in our analysis; on average, it comprised 49% of females against 38% of males.³ This is generally typical for other FSU countries, where despite this trend, the GWG was growing with the market reforms.

Although the comparable cross-country statistics for the GWG are unavailable, the studies on GWG in FSU states found it to be around 25–40% (Ganguli & Terrell 2006; Oshchepkov 2007, 2021; Khitarišvili 2009; Akulava & Verashchagina 2021). However, there is no consensus on the reason for the GWG in the FSU. Studies have found it to be explained by both ‘sticky floor’ and ‘glass ceiling’ (Unt et al. 2021; Ganguli & Terrell 2005, 2006; Newell & Reilly 2001; Pignatti 2012; Anderson et al. 2015) motherhood wage penalty (Karabchuk et al. 2021), sectoral and occupational segregation and discrimination (Kazakova 2007; Akulava & Verashchagina 2021; Gatskova 2021; Oshchepkov 2021). Despite the evidence is limited, the GWG was likely relatively small in the FSU immediately after the dissolution of the Soviet Union (in Belarus, for example, it was recorded at a level of 8% in 1996 [Akulava & Verashchagina 2021]). However, it increased to double-digit levels with the market reform. This is consistent with Goldin’s explanation of the GWG as being a feature of a market economy and the demand for worker flexibility it creates, in which women give in compared to men (Goldin 2014).

Similarly, with other FSU countries, the labour market in Kazakhstan is characterised by sectoral and occupational gender segregation. The industries preferred by women, such as education, healthcare, agriculture, and wholesale and retail trade are characterised by lower-than-average wages, while those preferred by men have above-average wages (such as mining and quarrying, manufacturing, construction, transportation, and storage). This is to some extent driven by differences in working men’s and women’s individual and occupational characteristics (Maltseva & Roshchin 2006). Even at the stage of making educational choices, women often self-select into subjects associated with lower-paid jobs (Kay & Gorman 2008). Oshchepkov (2007) suggests that the existing sectoral asymmetry can be explained by women’s preferences for the types of activities in which the development of skills requires less investment since it is assumed that women’s labour careers will be rather shorter compared to men’s.

³ Computed by the authors based on the Bureau of National Statistics data, <https://taldau.stat.gov.kz/>.

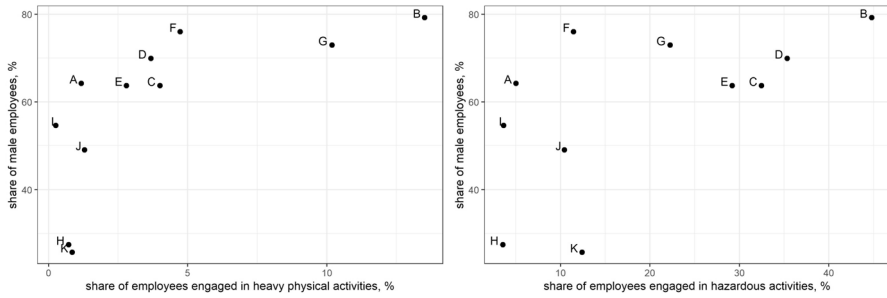


Fig. 1 Industries with employees engaged in heavy physical activities and in hazardous activities in 2011–2019 and average share of male employees. *Notes:* A—agriculture, forestry and shing; B—mining and quarrying; C—manufacturing; D—electricity, gas, steam, and air conditioning supply; E—water supply; sewerage, waste management, and remediation activities; F—construction; G—transportation and storage; H—accommodation and food service activities; I—information and communication; J—professional, scientific, and technical activities; K—human health and social work activities. *Data Source:* The Bureau of National Statistics, <https://taldau.stat.gov.kz/>

To some extent, such conclusions are justified for Kazakhstan too, where child-bearing and childrearing duties are disproportionally fulfilled by females, which likely leaves them with little incentive to invest in their professional skills. However, at least some lower-paid occupations that are much more often chosen by women are not less costly in terms of investment. Thus, gender sectoral segregation cannot be fully explained in terms of females’ investment decisions.

Compensating wage differentials are often identified as another possible reason for gender segregation across economic activities (Johnson et al. 2007; Daw & Hardie 2012): women are more likely to choose jobs that do not require heavy physical effort, have shorter working hours, and provide a higher level of social security, which to some extent can compensate for lower wages. Indeed, in Kazakhstan, employment in mining and quarrying and construction is associated with more dangerous working conditions, and the “List of jobs where the use of women’s labour is prohibited” is still in force. The 299 occupations included in this list are, in their entirety, those with above-national average wages. Some authors (Lipovka 2016) believe that banning women’s access to certain types of work in Kazakhstan contradicts the principles of equal rights. Nevertheless, the abolition of the list is unlikely to change the female employment sectoral allocation significantly. It is rather explained by a negative attitude amongst women towards hazards and risks due to their maternal duties. Thus, similarly to in majority of other FSU countries, the existing industrial structure of the country’s economy still drives the gender sectoral allocation of the labour force. This is evident from the figure depicting the industries with employees engaged in heavy physical activities and hazardous activities for 2011–2019 against the industries with male employees’ representation in the same years. The figure highlights that the industries associated with physically heavier jobs and higher risk are predominantly those with a greater share of male workers (Fig. 1).

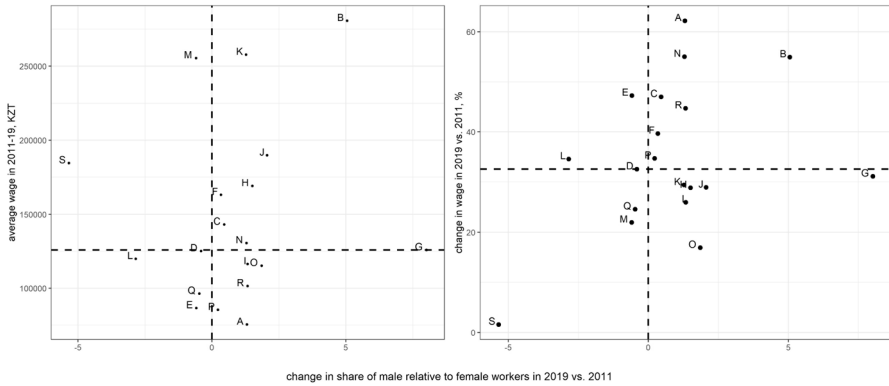


Fig. 2 Change in male relative to female employment by industry in 2011–2019. *Notes:* A—agriculture, forestry and shing; B—mining and quarrying; C—manufacturing; D—electricity, gas, steam, and air conditioning supply; E—water supply; sewerage, waste management, and remediation activities; F—construction; G—transportation and storage; H—accommodation and food service activities; I—information and communication; J—professional, scientific, and technical activities; K—human health and social work activities. *Data Source:* The Bureau of National Statistics, <https://taldau.stat.gov.kz/>

However, women in Kazakhstan are not solely concentrated in industries with low wages. A study examining the relationship between wages by industry and the sectoral concentration of female employees has not revealed such a relationship (Maltseva & Roshchin 2006). Gender-neutral sectors, where the proportions of men and women are fairly identical, include sectors with high, medium, and low earnings. Consequently, the existing gender sectoral segregation is rather explained by a voluntary choice on the part of women of typically ‘female occupations’ (education, care, training, or manual work), which are more ‘female-friendly’ in terms of working hours flexibility, social security, and physical comfort of the work (Maltseva & Roshchin 2006).

According to the national statistics data, industrial segregation by gender slightly increased over the period under analysis. This can be seen from Fig. 2, which demonstrates the change in employment (as measured by a change in the share of male employees to female employees by percentage points) by industry in 2019 in comparison with 2011 against (a) the 2011–2019 average wages by industry and (b) the percentage change in an average wage in 2019 versus 2011. Overall, gender composition was relatively stable over the period. The greatest increase in the share of male employees is documented in ‘Wholesale and retail trade’ and comprises only 8.02 p.p. The greatest drop comprising 5.34 p.p. is found in ‘Other service activities’ The horizontal dashed line in panel (a) divides the industries into those with a greater or a less than a median wage (125,835 KZT); in panel (b)-into those with a greater or a less than a median wage change (32.6%). Male employment notably increased at least in some of the best-paid sectors and in the sectors with a greater increase in average wages. It likely should be explained by the higher mobility of men in choosing employment, making them more sensitive to perceived changes in wages. In addition, they are more risk-prone and have to sacrifice a certain level of social protection due to their role as breadwinners.

In addition to industry, wage inequalities in Kazakhstan are substantially driven by an employee's company characteristics. A public company employee's wage was found to be around half the wage of a private company employee over the analysed period, assuming foreign companies are considered; even if they are excluded from consideration, the average public sector wage is around 70% that of private sector employment. Similarly, a small business employee earns the smallest wage, despite that small and medium enterprises (SMEs) currently provide jobs for around 40% of the workforce. In 2019, the average wage in a small company—one with less than 100 employees—was around 80% of the average wage found in a medium-sized enterprise (with a number of employees between 100 and 250) and 65% of the average wage in a large-sized enterprise (with more than 251 employees). In turn, according to the BNS data, females are overrepresented in the public sector and SMEs.

Finally, region and residence are important determinants of wage inequalities. Kazakhstan is the ninth largest country in the world with a very geographically diverse socioeconomic and institutional setting that significantly affects the behaviour of economic agents in the labour market and, indeed, the outcomes of their economic activities. The high-wage regions include the economically successful export-oriented oil provinces, Atyrau and Mangistau, and the biggest cities, the previous capital city, Almaty (remaining the country's financial and business centre), and the current capital city of Astana (civil service administrative centre). The low-wage regions are predominantly the agricultural southern and northern provinces. Thus, the regional disparities are correlated with the industrial structures of the regional economies.

For this analysis, we group the country's provinces sharing common borders and similarities in their industrial composition and certain cultural traits into five sub-regions. We also separate the two largest cities—the main centres of economic activity—into a specific sub-region entitled 'metropolises'. According to the BNS data, in 2022, the biggest contribution to the country's gross domestic product (GDP) was provided by the cities of Astana and Almaty (29%). They are followed by the four oil-exporting provinces producing 26% of the GDP which we entitle as the "western region". The industrialised "central region" added 18% to the GDP. The least economically developed and predominantly agricultural "southern" and "northern regions" produced 17% and 10% respectively. These sub-regions vary in terms of population: the biggest southern region accommodates 38% of the country's population, and the smallest northern—11%. The population of the metropolises, central and western regions comprise 17%, 18%, and 16%, respectively. The share of the urban population is 66% in the central region, 60% in the northern, 56% in the western, and 39% in the southern. While the unemployment rate does not vary substantially across the country, the share of wage earners-employees in the total number of employed (as opposed to self-employed) varies from 68% in the southern region to 89% in the metropolises. In the northern, central and western regions it comprises 77%, 78%, and 85%, respectively. In Kazakhstan, wage employment is overall more secure than self-employment which is known to be "necessity-driven" (Mussurov and Arabsheibani 2015); thus, this variation in the share of employees reflects economic opportunities in a certain region.

Table 1 Descriptive statistics

Variables	Men	Women
Average age	40	41
Share of respondents with higher education and above, %	29.8	44.3
Share of respondents living in rural area, %	52.0	44.9
Share of respondents working in a company with public ownership	27.5	59.8
Marital status, %		
Married	80.3	61.9
Never been married	6.2	15.2
Divorced	12.8	14.3
Widower/widow	0.7	8.6
Number of observations	61,849	60,913

Source: HBS, 2011–2019

The wages in rural areas are consistently lower than the wages in urban; for the period under consideration, the wage of a rural area employee would comprise, on average, about 70% of the wage of an urban area employee. Unsurprisingly, geographical wage polarisation causes internal labour force migration from poorer to richer regions and outflow from rural to urban areas. Nonetheless, this trend is generally similar across genders.

3 Data and Descriptive Statistics

The empirical analysis is carried out with the microdata collected with the HBS for 2011–2019. The survey is conducted in all regions of Kazakhstan: 14 provinces (oblast's) and the cities of Almaty and Astana. According to the survey methodology, around 12,000 households are surveyed each year with one-third of them being replaced annually, thus, it is a repeated cross-sectional data that is representative both at the country and at the regional levels.

The sample used for analysis includes 122,762 employees (wage-earners) observed in 2011–2019. The survey records individual-level annual wages, a respondent's individual characteristics (gender, age, education, marital status), characteristics of their workplace (type of economic activity, for simplicity further referred to as 'industry' and 'company ownership'), region and residence (urban or rural). Regrettably, the size of the company is not recorded. To eliminate outliers, respondents with annual wages below or above the lower and upper five percentiles of the sample wage distribution in each observed year were dropped.

A significant limitation of the data that might affect the accuracy of the results obtained is the lack of data on hours worked by HBS respondents. Since women usually work fewer hours than men, the lack of control over working hours might lead to overestimation of the GWG (Oshchepkov 2021). On the other hand, the gender gap in annual earnings reflects differences in wealth and purchasing power between men and women (Moyser 2019). Along with this, as Lips (2003) notes,

Table 2 Distribution of men and women and their annual wages by industry

Industry	Share of respondents, %		Participation rate, %		Annual wage, thousand tenge		GWG, %
	Male	Female	Male	Female	Male	Female	
Manufacturing	4.8	3.5	57.8	42.2	840.4	643.9	23
Mining and quarrying	5.4	2.4	69.5	30.5	913.4	566.1	38
Agriculture, forestry, and fishing	12.3	4.2	74.7	25.3	392.1	253.5	35
Construction	7.7	2.7	74.2	25.8	666.3	546.3	18
Trade and services	19.1	32.5	37.4	62.6	661.4	490.7	26
Information technology	1.8	2.3	44.4	55.6	679.5	485.9	28
Electricity, gas, steam, and water supply	3.9	1.6	71.8	28.2	695.3	570.0	18
Human health and social work activities	3.4	6.3	35.3	64.7	616.0	544.8	12
Education	6.6	16.3	29.1	70.9	565.4	524.1	7
Public administration	9.2	7.4	55.7	44.3	726.9	523.5	28
Financial and insurance, real estate	7.7	5.8	57.6	42.4	761.2	569.2	25
Other service activities	18.1	15.0	55.1	44.9	590.8	426.2	28

Source: HBS, 2011–2019

when a bank makes a decision to grant a loan, a worker's annual rather than hourly wage is considered. These arguments favour the use of the annual wage in estimating gender wage differentials, as this characterises the overall economic well-being of women versus men.

The sample utilised for estimations consists of nearly the same proportion of women and men aged 16–65 (Table 1). The average age of a working employee is approximately the same for both genders at 40 years old for men and 41 years old for women. More than 70% of individuals in the sample are married, with the number of married men being 18 p.p. greater than the number of married women. In addition, there are 2.5 times more women who have never been married than men with the same marital status. In conformity with the national statistics data, women have a higher level of acquired human capital; the proportion of women who have at least gained a higher education in the sample is more than 44%, while the proportion of such men is less than 30%.

About 50% of women prefer employment in the public sector of the economy, while the vast majority of men (over 75%) are concentrated in the private sector. The distribution of men and women across industries, as shown in Table 2, suggests that most labour-intensive industries are the same for both genders. Wholesale and retail trade and services together employ 37.2% and 47.5% men and women, respectively. In agriculture, construction, electricity, gas, steam, and water supply and mining and quarrying the share of men is more than twice higher than the share of women, while education, human health, and social work activities demonstrate the opposite. Notably, in all sectors, including traditionally 'female sectors', men's wages are higher. The highest wages are observed in mining and quarrying, one of the least labour-intensive industries. It also demonstrates the largest GWG (38%), while the smallest (7%) is recorded in education.

4 Methodology

To estimate the GWG, we use a ‘classical’ Mincer’s wage equation (Mincer 1974), as follows:

$$\ln W_i = b_0 + b_1 X_i + b_2 Y_i + b_3 Z_i + b_4 \text{Year}_i + \varepsilon_i \quad (1)$$

where W_i —employee’s i ’s real wage adjusted by CPI with 2011 as the base year; X_i —employee’s i ’s personal characteristics (gender, age, education, marital status); Y_i —employee’s i ’s job characteristics (industry and company ownership); Z_i —employee’s i ’s place of residence variables (region and urban/rural residence).

The country’s 14 provinces and two so-called ‘cities of republican significance’ were combined into five larger regions: Metropolises (Astana and Almaty), Central, Northern, Southern, and Western. To control for year fixed effects, the regression includes dummy variables for each year of observation.

Methodologically, the estimation of the GWG with the simple OLS is prone to a positive sample selection bias due to an unobserved counterfactual outcome. Firstly, labour force participation for both genders involves a trade-off between paid work and leisure (or unpaid household work) which implies that potentially more productive workers of both genders eventually participate. Secondly, female labour force participation is to a much larger extent driven by the trade-off between a market wage and a reservation wage: When costs for females to engage in paid work are higher, women who eventually engage are those with higher productivity (Ashraf et al. 2022).

To account for a sample selection bias, we use the Heckman two-step selection method (1979). In the first step, we estimate the likelihood of being employed with a probit model, controlling for age, education, marital status, disability status, head of household status, the log-transformed unearned (passive) income, and the region. We then estimate the inverse Mills ratio:

$$\lambda_i = \frac{\varphi(Z_i)}{1 - \Phi(Z_i)} \quad (2)$$

where φ and Φ are the probability and cumulative density functions of the standard normal distribution; Z_i is a vector of characteristics of a person i that explain the probability of being employed.

In the second step, the inverse Mills ratio is added to the wage equation as an additional regressor.

The standard Oaxaca–Blinder decomposition (Oaxaca 1973; Blinder 1973) with the Neumark correction (Neumark 1988) is used to decompose the GWG:

$$\ln W_m - \ln W_f = (\bar{V}_m - \bar{V}_f) \hat{\beta}_t + \bar{V}_m (\hat{\beta}_m - \hat{\beta}_t) + \bar{V}_f (\hat{\beta}_t - \hat{\beta}_f) \quad (3)$$

where \bar{V} —mean values of explanatory variables for men and women, respectively; $\hat{\beta}_m$ and $\hat{\beta}_f$ —the estimated regression coefficients for men and women, respectively; $\hat{\beta}_t$ —the estimated regression coefficients for all individuals in the absence of discrimination.

The first term on the right-hand side of Eq. (3) is the explained proportion of the GWG due to employees' observed characteristics. The second and third terms are the unexplained share of the GWG, which characterises differences in the returns to those characteristics.

The issue arising with decomposition is a sensitivity to the choice of a baseline category for qualitative variables. For that, we used the method of normalised effects proposed by Yun (2005).

5 Regression Outcomes

5.1 Gender Wage Gap

The results of the estimated regressions with the Heckman correction are shown in Table 3. Notably, the inverse Mills ratio is significantly different from zero for all three samples indicating that the probability of being sampled for both genders is related to their wages. Hence, these estimates are more reliable than conventional OLS.

We document positive returns to higher education for both genders, though the premium is more than 1.5-fold greater for women in comparison with men. Women who have gained a higher education and above receive 32% higher wages than women who have not achieved the same level of education, whereas in men this difference is 19%.

The wage of a married woman is much lower than that of an unmarried woman, which is consistent with the productivity theory, assuming that married women, due to their childcare and housework responsibilities make less effort related to paid work and thus have lower productivity and wages than women who do not have such family responsibilities. The opposite is true for married men, whose wages are found to be higher than those of unmarried men. These findings are in line with the international literature (Goldin et al. 2022). A divorced man earns on average 18% less than a married man, and a widower 12% less than a married man. Thus, marriage imposes additional family obligations on men too due to their status as main family wage-earners.

This sharing of family responsibilities is reflected in the gender-related preferences for either the public or private sector of employment. Since the private sector usually requires more effort and commitment, which married women cannot fully afford, they prefer to gain employment within the public sector, despite the wages being on average 3% lower than in the private sector. In addition, employment in the public sector provides an employee with a higher level of security, such as stability in earnings and a social package, paid sick leave, and maternity leave, which compensates for the lower wages. In the private sector in Kazakhstan, especially in small- and medium-sized enterprises, back pay, tax, and social security contribution evasion, and unwritten verbal contracts persist. Despite being less secure, employment in the private sector might bring a much higher wage premium, which is the case for men. Private businesses, on average, provide them with 17% higher wages than state-owned companies. In a similar

Table 3 Wage equation, 2011–2019, pooled data. Household Budget Survey of Bureau of National Statistics (Data source: HBS, BNS)

Variable:	Dep.var.:lnW _i		
	All	Men	Women
Gender (0—female, 1—male)	0.2902*** (0.0072)		
Age	0.0442*** (0.0008)	0.0348*** (0.0012)	0.0425*** (0.0010)
Age squared	−0.0005*** (0.0000)	−0.0004*** (0.0000)	−0.0006*** (0.0000)
Higher education (0—no, 1—yes)	0.2446*** (0.0069)	0.1704*** (0.0125)	0.2814*** (0.0081)
Ownership (0—private, 1—public)	−0.1084*** (0.0071)	−0.1550*** (0.0127)	−0.0359*** (0.0085)
Industry (Education—baseline category)			
Manufacturing	0.2589*** (0.0163)	0.2754*** (0.0279)	0.2894*** (0.0204)
Mining and quarrying	0.3193*** (0.0175)	0.3964*** (0.0274)	0.2824*** (0.0235)
Agriculture, forestry and fishing	−0.4043*** (0.0138)	−0.2063*** (0.0222)	−0.6016*** (0.0190)
Construction	0.0732*** (0.0158)	0.0847*** (0.0243)	0.1254*** (0.0226)
Trade and services	0.0823*** (0.0092)	0.1134*** (0.0192)	0.1011*** (0.0108)
Information technology	0.0014 (0.0189)	0.0307 (0.0360)	0.0176 (0.0221)
Electricity, gas, steam, and water supply	0.1143*** (0.0177)	0.1423*** (0.0263)	0.1665*** (0.0252)
Human health and social work activities	0.1035*** (0.0125)	0.0161 (0.0299)	0.1246*** (0.0138)
Public administration	0.0285** (0.0114)	0.1512*** (0.0217)	0.0004 (0.0135)
Financial and insurance, real estate	0.1392*** (0.0145)	0.2464*** (0.0258)	0.1037*** (0.0176)
Marital status (Married—baseline category)			
Never married	0.0003 (0.0104)	−0.1787*** (0.0199)	0.0576*** (0.0128)
Widower/widow	0.0144 (0.0110)	−0.1150*** (0.0418)	0.0060 (0.0117)
Divorced	0.0155 (0.0096)	−0.1628*** (0.0281)	0.0420*** (0.0105)
Residence (0—rural, 1—urban)	0.1958*** (0.0066)	0.2245*** (0.0120)	0.1740*** (0.0078)

Table 3 (continued)

Variable:	Dep.var.:lnW _i		
	All	Men	Women
Region (Metropolises—baseline category)			
Central	−0.3421*** (0.0110)	−0.2700*** (0.0208)	−0.3790*** (0.0129)
Northern	−0.3914*** (0.0106)	−0.3462*** (0.0199)	−0.4110*** (0.0123)
Southern	−0.2880*** (0.0109)	−0.2518*** (0.0195)	−0.2964*** (0.0129)
Western	−0.2290*** (0.0105)	−0.1435*** (0.0194)	−0.2745*** (0.0123)
Inverse mills ratio	−0.5988*** (0.0122)	−0.6280*** (0.0204)	−0.5621*** (0.0151)
Observations	122,762	61,849	60,913

All regressions control for year of observation. Robust standard errors are given in parentheses

Significance codes: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

way, there is a higher inter-industry differentiation with regard to wages for men than women. Furthermore, for both genders, in all sectors except agriculture, wages are higher than in our baseline industry, education.

For both men and women, wages in urban areas are higher than those in rural areas. Indeed, women working in urban areas earn 19% more than women in rural areas, while for men, this premium increases by 6 p.p. Differences in wages across regions are, as might be expected, significant. Employees of both genders in all regions of the country earn less than those working in the cities of Astana and Almaty. Notably, the smallest difference in wages is observed between the metropolises and the western region, 15% and 32%, respectively, for men and women. On the contrary, the northern region is characterised by the largest wage gap compared to the metropolises, at 41–50% depending on gender.

The results of the first-step probit model are shown in Table 4.

For both men and women, age is positive and statistically significant suggesting that the probability of being employed increases with age. Higher education, a head of household status and an urban area residency also positively affect employment. As expected, disability decreases the likelihood of entering the labour market for both genders, while marital status affects employment decisions differently for the two genders. Men who are married are more likely to be employed than men who have never been married. For women, the opposite is the case. An important factor affecting employment is the unearned income: The higher it is, the lower the probability of employment in both men and women.

Table 4 First-step probit equation, 2011–2019, pooled data

Variables:	Dep. var.: Employed (0—no, 1—yes)		
	All	Male	Female
Gender (0—female, 1—male)	–0.2902*** (0.0107)		
Age	0.2276*** (0.0028)	0.1500*** (0.0052)	0.2639*** (0.0034)
Age squared	–0.0027*** (0.0000)	–0.0018*** (0.0001)	–0.0031*** (0.0000)
Higher education (0—no, 1—yes)	0.4592*** (0.0102)	0.4000*** (0.0219)	0.4717*** (0.0117)
Residence (0—rural, 1—urban)	0.0682*** (0.0094)	0.1691*** (0.0185)	0.0207* (0.0111)
Marital status (Married—baseline category)			
Never married	0.1881*** (0.0160)	–0.3858*** (0.0326)	0.4161*** (0.0197)
Widower/widow	0.1608*** (0.0163)	–0.0012 (0.0625)	0.2438*** (0.0180)
Divorced	0.4225*** (0.0168)	0.0351 (0.0503)	0.4956*** (0.0186)
Disabled (0—no, 1—yes)	–1.4982*** (0.0264)	–1.4709*** (0.0359)	–1.5363*** (0.0411)
Head of household (0—no, 1—yes)	0.4294*** (0.0097)	0.3414*** (0.0199)	0.4463*** (0.0118)
Log of unearned income	–0.2002*** (0.0026)	–0.1902*** (0.0050)	–0.2042*** (0.0031)
Constant	–2.1806*** (0.0739)	–0.2451* (0.1394)	–2.8473*** (0.0886)
χ^2/p -value	18,437.3/0.000	5153.9/0.000	14,257.0/0.000

All regressions control for year of observation and region. Robust standard errors are given in parentheses

Significance codes: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

5.2 GWG Decomposition for Each Year of Observation

To determine the contribution of each factor to the GWG, we apply the Neumark decomposition with Heckman correction. The results of the decomposition for 2011–2019 are shown in Table 5. We use the estimates of the ‘female’ regression equations as the reference coefficients.

The GWG in Kazakhstan averaged 28.7% during the period under consideration. The smallest gap of 23.9% was recorded in 2012, and the largest of 32.4% in 2018. Overall, there is no clear trend in the GWG dynamics over time; however, there is an apparent decrease in its unexplained part (wage structure) due to a change in

Table 5 Decomposition of the differences in the log of average annual wage between men and women in 2011–2019, %. Household Budget Survey of Bureau of National Statistics (Data source: HBS, BNS)

	2011	2012	2013	2014	2015	2016	2017	2018	2019
Gross differential	28.1	23.9	27.9	29.6	30.7	28.6	31.5	32.4	25.8
Explained differential	-26.9	-31.9	-23.9	-22.4	-10.6	-14.8	-7.6	-2.5	-3.1
Age	-9.5	-10.0	-9.9	-8.6	-6.9	-8.8	-8.1	-6.8	-5.8
Education	-16.2	-19.9	-17.4	-18.3	-15.2	-18.3	-16.4	-16.2	-19.8
Residence	-6.4	-7.1	-5.2	-4.6	-4.6	-3.8	-3.1	-3.5	-3.2
Ownership	-1.0	0.5	0.7	-2.5	2.8	1.4	0.5	3.7	5.9
Industry	9.5	9.8	12.1	17.7	15.6	18.4	22.3	25.2	22.8
Marital status	-1.6	-2.0	-1.7	-3.1	-0.3	-2.0	-1.7	-3.5	-2.5
Region	-1.8	-3.3	-2.6	-3.1	-1.9	-1.6	-0.9	-1.4	-0.5
Unexplained differential	126.9	131.9	124.0	122.4	110.6	114.8	107.6	102.5	103.1

the composition of its explained part (composition effect). Over the entire period, the explained part was negative, indicating a narrowing of the gap due to changes in individuals' observed characteristics. Education and age (with the latter being a proxy for the unobserved accumulated experience) significantly contributed to reducing the GWG. This indicates that women in Kazakhstan have excessive human capital compared to men. The high level of their education has a positive effect on their wages and reduces gender wage inequalities by 15–20%.

At the same time, we observe a striking increase in the contribution of industrial segregation to the GWG. We document that uneven allocation of men and women across industries increased the GWG by 9.5% in 2011, and which increased to 22.8% in 2019. This soaring effect of gender segregation is not offset by the positive effect of improving women's human capital. Thus, to achieve gender wage equality in Kazakhstan, policy to eliminate the asymmetry in the labour force allocation across industries should be considered.

A company's ownership has relatively small explanatory power in terms of explaining the GWG; however, it notably grew over the period. The domination of women in the public sector of the economy, where wages are lower than in the private sector, increases the GWG. Despite this, in 2011 and 2014, the company ownership slightly reduced the gap. This might reflect the effect of economic crises which likely affect the private sector to a larger extent than the public sector. While private companies might either cut staff or reduce wages to tackle the financial consequences of the economic downturn, public companies are unlikely to do so, instead, they might increase salaries to balance out inflation.

5.3 GWG Decomposition for Each Region

This section seeks to identify regional features of gender wage inequality and decompose the GWG for each sub-region. Table 6 suggests that the greatest returns to higher education in both men and women are observed in the northern region of the country (34% for men and 45% for women), while in the southern

Table 6 Wage equation, regions

Variables	Metropolis		Central		North		South		West	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Age	0.0167** (0.0084)	0.0388*** (0.0069)	0.0230*** (0.0085)	0.0228*** (0.0073)	0.0159** (0.0079)	0.0254*** (0.0058)	0.0067 (0.0061)	0.0087 (0.0065)	0.0096 (0.0069)	0.0219*** (0.0059)
Age squared	-0.0003*** (0.0001)	-0.0005*** (0.0001)	-0.0003*** (0.0001)	-0.0002** (0.0001)	-0.0002* (0.0001)	-0.0002*** (0.0001)	-0.0001 (0.0001)	-0.0002** (0.0001)	-0.0001 (0.0001)	-0.0003*** (0.0001)
Higher education (0—no, 1—yes)	0.1575*** (0.0212)	0.2131*** (0.0141)	0.2335*** (0.0299)	0.3082*** (0.0161)	0.2946*** (0.0286)	0.3715*** (0.0133)	0.1005*** (0.0194)	0.2046*** (0.0148)	0.1748*** (0.0227)	0.2791*** (0.0136)
Ownership (0—private, 1—public)	-0.0374 (0.0326)	-0.0220 (0.0171)	-0.0994*** (0.0264)	0.0908*** (0.0163)	-0.0511** (0.0220)	0.1030*** (0.0139)	-0.0457*** (0.0147)	0.0377*** (0.0137)	-0.2676*** (0.0228)	0.0115 (0.0136)
Industry (Education—baseline category)										
Manufacturing	0.0845 (0.0607)	0.1515*** (0.0381)	0.2877*** (0.0548)	0.1733*** (0.0367)	0.2054*** (0.0586)	0.11994*** (0.0343)	0.0674 (0.0415)	0.1228*** (0.0346)	0.3579*** (0.0478)	0.1304*** (0.0348)
Mining and quarrying	0.0476 (0.0703)	0.0841* (0.0501)	0.2788*** (0.0626)	0.0428 (0.0421)	0.3446*** (0.0574)	0.1173*** (0.0375)	0.2350*** (0.0414)	-0.0084 (0.0461)	0.4962*** (0.0401)	0.2548*** (0.0348)
Agriculture, forestry, and fishing	-0.7361** (0.3652)	-0.5962 (0.3709)	-0.1547*** (0.0493)	-0.2066*** (0.0518)	-0.0389 (0.0363)	-0.0802*** (0.0249)	-0.0749*** (0.0282)	-0.2093*** (0.0353)	-0.2361*** (0.0438)	-0.3270*** (0.0422)
Construction	0.0140 (0.0501)	-0.0073 (0.0361)	0.0115 (0.0624)	0.1033 (0.0674)	0.1012* (0.0530)	0.0225 (0.0452)	0.0484 (0.0303)	-0.0384 (0.0393)	0.0665 (0.0406)	-0.0064 (0.0307)
Trade and services	-0.0384 (0.0458)	0.0037 (0.0239)	-0.0366 (0.0460)	-0.0619*** (0.0221)	0.1419*** (0.0371)	0.0016 (0.0179)	0.0991*** (0.0248)	0.0669*** (0.0174)	0.1301*** (0.0332)	-0.0247 (0.0167)
Information technology	0.0763*** (0.0308)	-0.0822** (0.0386)	0.1290*** (0.0390)	-0.0770 (0.0400)	0.0914 (0.0721)	-0.0933** (0.0390)	-0.0840 (0.0543)	-0.0636 (0.0394)	-0.1063 (0.0658)	-0.0813** (0.0345)
Electricity, gas, steam, and water supply	0.0431 (0.0573)	0.0395 (0.0537)	0.0738 (0.0647)	0.1834*** (0.0452)	0.1491*** (0.0527)	0.0542 (0.0399)	0.0836** (0.0333)	0.0382 (0.0489)	0.1207*** (0.0441)	0.0408 (0.0370)

Table 6 (continued)

Variables	Metropolis		Central		North		South		West	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Human health and social work activities	0.0199 (0.0632)	0.0150 (0.0300)	-0.1105 (0.0706)	0.1054*** (0.0284)	0.1475** (0.0652)	0.1046*** (0.0233)	-0.0820** (0.0366)	0.1552*** (0.0200)	-0.0920* (0.0527)	0.1095*** (0.0203)
Public administration	0.1756*** (0.0365)	0.1084*** (0.0198)	0.1392*** (0.0484)	0.0064 (0.0268)	0.1262*** (0.0439)	-0.0201 (0.0210)	0.1169*** (0.0287)	-0.0071 (0.0236)	0.0523 (0.0527)	-0.0260 (0.0304)
Financial and insurance, real estate	0.1479*** (0.0382)	0.2773*** (0.0596)	0.0195 (0.0278)	-0.0433 (0.0528)	0.2187*** (0.0586)	0.0304 (0.0347)	0.0266 (0.0340)	-0.0109 (0.0293)	0.3487*** (0.0432)	0.0343 (0.0299)
Marital status (Married—baseline category)										
Never married	-0.1588** (0.0364)	0.0771*** (0.0206)	-0.1729*** (0.0481)	-0.0273 (0.0259)	-0.1689*** (0.0422)	0.0577** (0.0247)	-0.1567*** (0.0325)	0.0288 (0.0249)	-0.1311*** (0.0339)	-0.0418** (0.0212)
Widower/widow	-0.3099*** (0.0956)	0.0300 (0.0249)	-0.2681** (0.1050)	-0.0268 (0.0242)	-0.1112 (0.0904)	-0.0647*** (0.0192)	-0.0272 (0.0573)	-0.0191 (0.0186)	-0.0257 (0.0725)	0.0227 (0.0193)
Divorced	-0.1403*** (0.0509)	0.1071*** (0.0191)	-0.2180*** (0.0683)	0.0019 (0.0202)	-0.0961* (0.0520)	-0.0014 (0.0159)	-0.1565*** (0.0481)	0.0591*** (0.0187)	-0.2122*** (0.0536)	0.0364* (0.0207)
Residence (0—rural, 1—urban)	-	-	0.1798*** (0.0261)	0.1671*** (0.0154)	0.1422*** (0.0249)	0.1525*** (0.0120)	0.1308*** (0.0168)	0.0439*** (0.0121)	0.2248*** (0.0201)	0.2527*** (0.0123)
Inverse mills ratio	-0.4984*** (0.0542)	-0.3426*** (0.0330)	-0.5961*** (0.0403)	-0.5164*** (0.0324)	-0.7724*** (0.0357)	-0.4666*** (0.0222)	-0.6448*** (0.0293)	-0.5314*** (0.0230)	-0.6937*** (0.0333)	-0.6311*** (0.0242)
Constant	-0.1063*** (0.4763)	-2.9266*** (0.2500)	-0.3517*** (0.3575)	-2.6658*** (0.2229)	-1.2978*** (0.2986)	-2.9381*** (0.1867)	0.0738*** (0.2521)	-3.4655*** (0.1882)	-0.1299*** (0.3014)	-2.6096*** (0.1760)
Observations	8790	9737	8175	8639	13,547	13,789	13,474	12,781	17,863	15,967

All regressions control for year of observation. Robust standard errors are given in parentheses

Significance codes: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

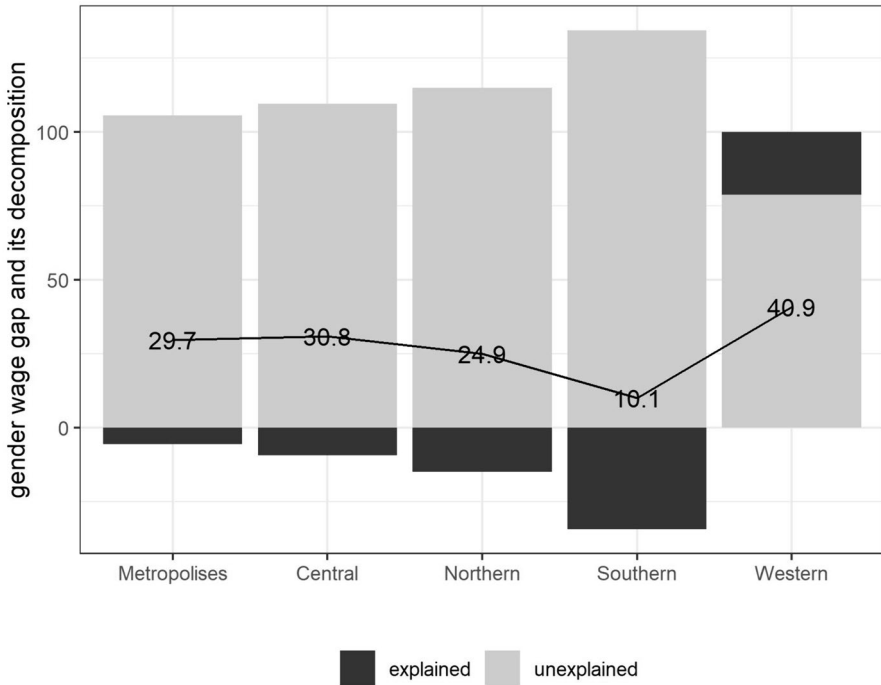


Fig. 3 GWG by region and its decomposition. Household Budget Survey of Bureau of National Statistics (Data source: HBS, BNS)

regions, the premium for higher education for both gender groups is the smallest (11% and 23%, respectively). Nevertheless, in all regions, there remains a tendency for higher returns to higher education among women (1.5–2 times higher) than among men.

Men’s and women’s wages across the sectors of the economy are determined by the industrial specialisation of the regions where they reside. In the central and western regions, characterised by the developed oil and gas, coal, and metallurgical industries, male workers’ wages in the respective industries are 32–41% higher than those of male workers in education. For women, this advantage ranges from 4 to 11% only.

The country metropolises, Astana and Almaty, are the financial and knowledge centres. Employment in the financial industry rewards women to a greater extent than men, yielding returns of 32% and 16%, respectively. For men, a substantial gain in wage is observed in public administration versus education, which can be explained by the uneven distribution of men and women within the official hierarchy in the civil service apparatus and, possibly, in the headquarters of the largest national companies. According to the BNS, in 2019, high-ranking positions in the civil service were overwhelmingly held by men. However, one should note that the difference in the wages between married and unmarried women is much higher in these two cities than in other regions. That is, women who are not burdened with family

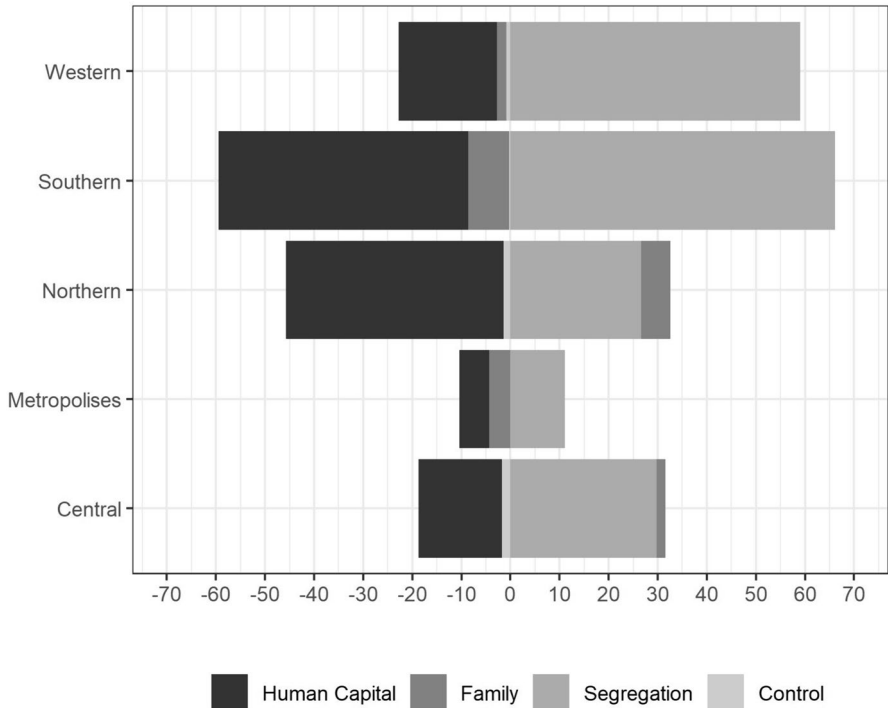


Fig. 4 GWG decomposition by region: The explained part. Household Budget Survey of Bureau of National Statistics (Data source: HBS, BNS)

responsibilities have more opportunities for self-realisation and career advancement, which provides them with higher wages.

Figure 3 illustrates the decomposition of the GWG for the country's five geographical sub-regions. The lowest GWG was recorded in the southern region (10.1%) where the wages are below the national average. On the contrary, the richest regions—the western and central parts of the country—witnessed the greatest wage gap (40.9% and 30.8%, respectively). Thus, unsurprisingly, the higher the average wage in the region, the greater the gender wage inequalities.

The regions vary substantially in terms of the explained and unexplained parts of the GWG.

In all regions except the western oil-producing region, the explained part of the GWG has a negative sign suggesting that individuals' observed characteristics reduce it in these regions. On the other hand, the western region has the smallest unexplained gap. Among the determinants of the GWG in this region, gender industrial segregation is the main contributor, accounting for more than 44% (Fig. 4). At the same time, the contributions from gap-reducing factors, such as human capital, are almost two times smaller, or about 20%.

Substantial industrial segregation that negatively affects the labour market gender inequality is also observed in the southern part of the country, where it increases the GWG by 43.0%. However, this is largely offset by women's excess human capital,

the highest within the country, which narrows down the gap by more than 57.0%. An important factor that positively affects the reduction of the GWG in these provinces is employees' marital status, which reduces the gap between genders by 17.2% and can be explained by the higher proportion of unmarried women, whose earnings are significantly higher than the earnings of married women. A possible explanation for this phenomenon could be a lower labour market participation of married females in this geographical sub-region versus other regions since it is believed to be relatively more culturally traditional.

In the northern sub-region, by contrast, differences in family characteristics increase the GWG, which in total comprises 25%: the preponderance of married women whose wages are lower than those of married men increases the gap by 3%. Likewise in the other regions, industrial segregation contributes to the gap, increasing it by 17%. On the other hand, women with a higher level of education in the northern provinces benefit compared to men with the same level of education; as a result, women's accumulated human capital reduces the GWG by 31%.

In Astana and Almaty, unlike in the other regions, the contribution of industrial segregation to the observed gap is just 7%. It is almost fully offset by the positive effect of human capital and family characteristics. Notably, in the two largest cities with the most advanced economies, with their relatively even allocation of male and female employees across industries and the concentration of a highly educated labour force that includes both genders, gender wage equality has nonetheless not been achieved. The GWG remains stable at a level of 30%, which might be explained by the missing important determinants of labour force productivity in our model and by horizontal gender segregation and discriminatory practices present in Kazakhstan's labour market.

6 Discussion and Concluding Remarks

This study investigated the GWG in Kazakhstan's labour market and found it to be persistent and comparable to similar estimates obtained for other, especially FSU countries. Similarly, as in many of them, the GWG has steadily increased since independence and is likely mostly explained by females' segregation in lower-paid industries, occupations, and the public sector of the economy, at least given the data at hand. The proportion of women's wages to men's was documented at 71% over the period 2011–2019. Further, we record a decrease in the unexplained part of the GWG due to a change in the structure of its explained part.

Women in Kazakhstan have excess human capital compared to men, which reduces the GWG by 15–20%. Women's pursuit of higher education is rationalised by the higher returns to education they can consequently gain. In addition, a higher level of education makes women more likely to enter the labour market and deliver on their human capital potential.

However, over the period under consideration, we record an increase in the negative impact of industrial gender segregation, the contribution of which to the gap increased from 9.5% in 2011 to 22.8% in 2019. We tend to partially explain the industrial segregation by existing socio-cultural stereotypes according to gender

role, in the sense of considering females to be the main contributors to family duties, child-rearing, and child-caring, and males as the main breadwinners, and also partially by the rational family choices in existing conditions. While choosing industries of employment, women are primarily guided by working conditions, social security, and flexibility of working hours, which together, at least to some extent, compensate for their lower wages. As a result, they choose relatively worse-paid sectors such as education and healthcare. On the contrary, the best-paid industries and sectors in Kazakhstan are often those requiring heavy physical effort, exposure to risk, and a lower level of social protection. This makes them primarily dominated by male workers who have to sacrifice a certain level of protection at the expense of higher wages. Further, the wage inequalities across industries and public versus private sectors of the economy remained high over the period under consideration, inducing greater gender segregation.

Nonetheless, even in relatively better-paid industries, we observed lower female wages, which we tend to explain by vertical gender segregation: in this case, cultural beliefs regarding females' family roles likely limit their capability to move up the career ladder. This becomes especially apparent when we consider the effect of an employee's marital status on the GWG, which can explain around 3% of it. The wages of women who are not married are higher than those of married and divorced women. At the same time, similarly to international observations, a married man earns 20% more than a single man.

However, the GWG varies greatly across the country's regions, being correlated with a region's economic performance. While in the poorest southern provinces, the GWG is as small as 10%, in the oil-exporting western provinces it reaches 41%. The latter also has the smallest unexplained gap, because, to a greater extent, it is explained by industrial segregation. Segregation is also highly pronounced in the poor and predominantly agricultural southern region. However, the excess human capital of women outweighs the effect of industrial segregation in this region. In the northern provinces, we observe a significant contribution of accumulated human capital and industrial segregation, at 31% and 17%, respectively; in metropolises, their contribution to the GWG is several times smaller. Metropolises are characterised by a concentration of highly qualified human capital and almost equal allocation of male and female employees across industries. Despite this, the GWG remains persistent there at a level of 30%, which hints at the existence of vertical segregation within industries; this, however, is left for further study.

Despite a large part of the GWG remaining unexplained, this cannot be fully attributed to labour market discrimination since our model does not take into account such important determinants of productivity and wages as individual ability and other personal characteristics, working hours, and occupation due to such data being unavailable. Occupation might be particularly relevant to the case being considered since it is reasonable to expect substantial occupational gender segregation in addition to industrial segregation as a contributor to the GWG. In context of the FSU countries, evidence regarding the effect of occupational segregation on the GWG is rather controversial: while some studies found it to be modest (Newell & Reilly 1996; Unt et al. 2021), others found it to be substantial and sometimes even more important than industrial segregation (Glinskaya & Mroz 2000; Ogloblin &

Brock 2005; Kazakova 2007). Both factors are likely related to job flexibility extensively demanded by females, thus, controlling for occupation and working hours would potentially improve the explanatory power of our estimations. Furthermore, recent literature is suggestive that such factors as social norms, differences in psychological attributes, negotiation skills, and other non-cognitive skills are also critically important in explaining the GWG (Bowles et al. 2007; Fortin 2008; Blau & Kahn 2017; Cook et al. 2021; Cullen & Perez-Truglia 2023). This is likely the case in Kazakhstan too, especially, in more sophisticated occupations and highly qualified professionals which leaves us an avenue for future research.

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Declarations

Conflict of interest The authors have no competing interests to declare that are relevant to the content of this article.

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