GENDER INEQUALITY IN THE LABOR MARKET IN KYRGYZSTAN: EMPIRICAL STUDY OF THE GENDER WAGE GAP 2013 – 2019

By

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ABSTRACT

This study examines the dynamics of the gender wage gap in Kyrgyzstan in the period from 2013 to 2019 using cross-sectional data for three years obtained from the Life in Kyrgyzstan Survey. The empirical model used in the paper is based on the Mincer earnings function with additional explanatory variables. The results of the Ordinary Least Squares regressions show a decrease in the gender wage gap within the examined timeframe.

Keywords: gender wage gap, gender inequality, Kyrgyzstan.

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1. INTRODUCTION

The Kyrgyz Republic has witnessed the re-emergence of a problem of gender inequality in the country after the dissolution of the Soviet Union and the collapse of the Soviet system that served as a basis for gender equality. During the Soviet period, the socialist ideology of equality actively promoted equal opportunities for women and men in education, employment, and political participation. The Soviet Union supported women's participation in the labor force and established social support systems that helped to alleviate some of the burdens related to balancing work and family responsibilities. The downfall of the Soviet system and the subsequent structural changes in the labor market, the withdrawal of the Soviet state-funded social programs, and the expansion of Islam and conservative norms have caused significant changes in Kyrgyz society's perception of women, consequently resulting in gender inequality.

For the past three decades, the government of Kyrgyzstan has been making efforts to address the problem of gender inequality, which includes legislation and policy changes. The country has ratified key international conventions on human rights and gender equality, including the Convention on the Elimination of All Forms of Discrimination against Women (CEDAW) in 1997. The government passed the Law "On State Guarantees of Equal Rights and Equal Opportunities for Men and Women" in 2008, implemented constitutional amendments postulating the principles of gender equality in 2010, adopted the first long-term National Gender Strategy 2012-2020 on Achieving Gender Equality, and established the National Council for Gender Development in 2012 (Asian Development Bank [ADB], 2019). Despite the implemented changes, Kyrgyzstan performs poorly in terms of key indicators related to gender equality with the female labor force participation rate dropping to its historically low levels of approximately 47% in 2018 and 48% in 2021 (see Figure A1). The country is ranked 118th out of 191 countries by the United Nations Development Programme (UNDP) Human Development Index (HDI), lower in the ranking than neighboring Kazakhstan

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and Uzbekistan, which are ranked 56th and 101st respectively (UNDP, 2022; ADB, 2019). Moreover, the recent report by the UN Women and the National Statistical Committee of the Kyrgyz Republic shows that the average salary of women constituted only 75.1% of the average salary of men in 2021 (2022). These numbers raise concerns about the effectiveness of the Kyrgyz government's policies in addressing the issue of gender inequality.

While there are many different forms of gender inequality, this research paper is going to focus on the gender wage gap. Research on the costs of gender inequality in earnings by Wodon & de la Brière suggests that closing the gender pay gap could significantly increase the GDP of a country (2018). Women make up a significant portion of the workforce and underpaying them can lead to under-utilization of human capital, reducing overall economic efficiency and productivity (Georgieva et al., 2019). Thus, addressing this issue is crucial for achieving sustainable economic growth in Kyrgyzstan. Existing empirical research papers about Kyrgyzstan shed light on the gender wage gap at the national level before the year 2012. However, empirical research examining the evolution of the gender wage gap at the national level over the past decade remains sparse. The country may have achieved some advancements in promoting gender equality. This potential progress could be evaluated by investigating the evolution of the gender wage gap during this timeframe.

The aim of this research paper is to explore the dynamics of the gender wage gap in Kyrgyzstan over the period from 2013 – 2019 using micro-level data from the Life in Kyrgyzstan Survey. I expect to see a reduction in the gender wage gap over the stated period. The empirical model in the paper is based on the Mincer earnings function. The Ordinary Least Squares method is employed. The main research question: What are the dynamics of the gender wage gap in Kyrgyzstan from 2013 to 2019?

The paper is structured as follows: Chapter 2 presents the historical background explaining the accomplishments of the Soviet Union in achieving gender equality and describes how the independence of Kyrgyzstan has led to a resurgence of gender inequality in the country. It also presents theories from labor economics that can explain the gender wage gap. The chapter ends with a summary of the existing empirical papers related to the gender wage gap in Kyrgyzstan. Chapter 3 provides a detailed description of the data, including the presentation of descriptive statistics and the examination of the limitations of the data set used in this empirical research. Chapter 4 introduces the empirical model and the estimation method used in the research. Chapter 5 presents and interprets the results of the regressions. Finally, the research is concluded with a summary of the results and policy recommendations for reducing the gender wage gap in Kyrgyzstan.

2. BACKGROUND AND LITERATURE REVIEW

2.1 Historical background

The era of the Kyrgyz Soviet Socialist Republic brought notable progress toward achieving gender equality in the region as the Soviet Union actively promoted the ideas and principles of social equality. Following the October Revolution of 1917, the Soviet Republic of Russia introduced a series of laws ensuring equal employment opportunities, equal compensation, and protection of motherhood (Mace, 1961, p. 330). These measures were implemented to eliminate gender-based discrimination within the society. In the post-World War II period, working mothers in the Soviet Union benefited from protective labor laws that explicitly prohibited actions such as laying off pregnant women or reducing their wages. Furthermore, these laws forbade assigning overnight shifts or requiring pregnant women and nursing mothers to work overtime (Mace, 1961). The Soviet system was successful in promoting gender equality in employment since by the end of the 1960s, according to Pankratova and Iankova, approximately 80% of working age women were employed while 7.5% were studying (1978).

The Soviet Union effectively established state-run systems of childcare and family support, which were crucial in facilitating the smooth integration of women into the labor force (Mace, 1961). The Soviet Union provided free healthcare services, including prenatal care, childbirth, and postnatal support. The state provided free education, including kindergartens and schools. As a result of these comprehensive measures, the Soviet Union fostered a supportive environment that enabled women to pursue their careers while ensuring the well-being of their families. As a result of the harmonious integration of work and family life, the Soviet Union era created a perception of an "egalitarian family" with a working mother at its core (Ibraeva et al., 2012).

The transition period from a Soviet republic to a sovereign country substantially affected gender equality in Kyrgyzstan. With the dissolution of the USSR, the entire system collapsed, leading to drastic changes and challenges in Kyrgyzstan. The collapse in trade among the former Soviet republics and the abrupt cutoff of subsidies and transfers from Moscow, which at some point constituted 50% of the Kyrgyz government expenditure, had severe consequences on state-run social programs, industrial output, and the economic growth of the Kyrgyz Republic (Howell, 1998). The beginning of the transition period was marked by a colossal contraction of the Kyrgyz economy. The GDP of the country shrank almost by 50% during the period from 1990 to 1995 (see Figure A2, Figure A3). Industries were suffering, factories were closing, and workers were losing their jobs as supply chains of production were disrupted and export markets for the products were lost (Howell, 1998).

The reduction in the state budget resulted in the discontinuation of state-funded family and childcare support systems such as kindergartens, healthcare services, and others. The environment that allowed women to work while also carrying their family duties ceased to exist. These changes significantly hindered the ability of women of childbearing age to balance work and family life (Ibraeva et al., 2012). Consequently, the female labor force participation rate decreased. The statistics provided by the National Statistical Committee (NSC) and the UN Women show that the largest gender employment gap in 2021 in Kyrgyzstan was in the 25-34 age group (2022). This age range coincides with the period in a woman's life when she is typically more inclined to start a family.

The transition period was further worsened by a surge in unemployment. The economic transformation from a planned economy to a market economy resulted in a substantial decrease in formal sector employment. While everyone suffered from structural changes in the economy, women were hit disproportionately harder since there was a loss of bureaucratic jobs that during the Soviet period were mostly occupied by women (ADB, 2019). In 1991, 81.6% of working

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women were employed in the formal sector, and by 2007, this number decreased to 42.3% (ADB, 2019; Ibraeva et al., 2012). These changes had a severe impact on women's employment opportunities and caused an increase in female income poverty (ADB, 2019).

The period of independence in the country was marked by the development of Islam as the most prevalent religion in the country. Since the ideology in the Soviet Union promoted state atheism, religion did not have an impact on social or political life in Soviet Kyrgyzstan. However, once the country gained its independence, religion has come to the front stage. Although Kyrgyzstan is a secular state by constitution, the predominant religion in the country is Islam. According to Muldoon and Casabonne, the leaders of independent Kyrgyzstan "…gravitated to Muslim theology and Islamic discourse as a pragmatic way of staying in power." (2017, p. 5). Several thousand mosques have been opened in post-Soviet Kyrgyzstan. Today, the number of mosques in the country is more than 100 times the number of mosques that existed in Soviet Kyrgyzstan (Bengard, 2017). The influence of the Islamic religion started reshaping gender and family roles in society (Muldoon & Casabonne, 2017). Gradually, traditional conservative norms began to dominate, placing men as the primary earners and decision-makers in the household, while women were perceived to be responsible mostly for household and childcare duties (Ibraeva et al., 2012).

Despite poor performance in gender equality indicators, the country has been developing its legal system in a way that promotes gender equality. According to the UNDP, Kyrgyzstan is the leader in the Commonwealth of Independent States (CIS) region in developing a legal framework on women's rights in compliance with international standards (2021, p. 3). The Kyrgyz Republic passed a law protecting equal rights and opportunities for men and women in 2008. The ADB perceives this law as the most important one in establishing equality between men and women (2019). The laws regulating state institutions such as the Supreme Court, the National (Central) Bank, and the Central Election Committee have gender

quotas. A gender quota of 30% exists for the Parliament (UNDP, 2021). The integral principles of human rights and gender equality were added to a new constitution of the Kyrgyz Republic in 2010 (ADB, 2019). Despite all the progress in a legal framework, the problem of gender inequality continues to persist (UNDP, 2021).

2.2 Literature review

The Organization for Economic Co-operation and Development (OECD) defines the gender wage gap as "the difference between the median full-time earnings of men and women, relative to the median full-time earnings of men" (2023).

Labor economics provides several reasons for differences in the wages of individuals. The three relevant theories for this research are compensating wage differentials, human capital theory, and labor market discrimination. Compensating wage differentials theory suggests that wage differences across different jobs can exist to compensate workers for the nonwage characteristics of jobs such as risk level associated with the job, working environment, and other working conditions (Borjas, 2016, p. 196-197). The theory says that people may be willing to accept lower wages for jobs that offer pleasant working conditions or higher wages for jobs with less desirable working conditions.

Data provided by the National Statistical Committee (NSC) of the Kyrgyz Republic for the year 2020 show that women prevail in sectors of health and social services, education, and real estate, with 78%, 79%, and 96% of the labor force in those sectors being female respectively (2022). The predominantly male sectors are mostly technical: mining and quarrying; construction; transportation and storage; electricity, gas, steam, and air conditioning supply; water supply and waste management, with 95%, 99%, 96%, 83%, and 84% of the labor force in those sectors being male respectively. Women are predominantly employed in the

sectors that offer more pleasant working conditions but at the same time are lower paid, which results in the gender wage differential.

This disproportionate concentration of women in certain occupations can also be described as occupational crowding. The hypothesis states that societal perceptions may label certain jobs as more suitable or "not suitable" for women. Consequently, women are often directed towards a limited number of occupations. The crowding in a narrow selection of occupations eventually reduces wages in those jobs, which results in a gender wage gap (Borjas, 2016, p. 401).

The latest report by the UN Women and the National Statistical Committee (NSC) of the Kyrgyz Republic shows that in 2021, the average salary of women was 75.1% of the average salary of men (2022). An important factor that contributes to this wage gap is the regulatory legal act of the government of the Kyrgyz Republic that provides a list of around 400 occupations with harmful or dangerous working conditions that are legally prohibited for women's employment (Government of the Kyrgyz Republic, 2000; ADB, 2019). For example, the list includes, but is not limited to, the jobs related to the manufacture of fiberglass-based or synthetic resin products; assembly or disassembly of filter presses for obtaining morphine, raw opium, and antibiotics; and manual concrete laying. This law contributes to occupational crowding by hindering employment opportunities for women. The list contains many technical occupations in sectors such as mining and quarrying, which explains the prevalence of males in these sectors. Despite minor edits in 2005 and 2012, the list of occupations established by the law in 2000 has remained unchanged. Given technological advancements, it is worth questioning whether working conditions in these occupations remain as dangerous as they once were, as modernization may have mitigated the harmfulness of those jobs (ADB, 2019).

The human capital theory provides another explanation for wage differences among people. According to this theory, wage differences arise from disparities in sets of abilities and skills possessed by individuals. These skills and abilities include education, on-the-job training, accumulated experience, and other specific skills of a person (Borjas, 2016). The Mincer earnings function, developed by Jacob Mincer, serves as a fundamental tool in understanding the relationship between human capital and earnings. The Mincer earnings function has the following form:

$$\log w = as + bt - ct^2 + \text{Other variables}$$

where the dependent variable is the logarithm of wage, *s* is the number of years of schooling, t is the number of years of labor market experience, t[2] is the experience squared. This function has been widely used in empirical research to estimate the returns to education and experience. It has been used extensively across many countries and is considered reasonably reliable for the description of age-earnings profiles (Borjas, 2016, p. 271-272).

When looking at the education dimension of human capital in Kyrgyzstan, the statistics show near gender parity in enrollment in primary-level education (ADB, 2019). When it comes to secondary general education and tertiary education, the share of enrolled females is slightly higher than the share of enrolled males (NSC, 2021). When it comes to selecting academic majors, there is a prevailing tendency among female students to opt for non-STEM (Science, Technology, Engineering, and Mathematics) fields, which results in a significant underrepresentation of women in technical employment sectors. The ADB suggests that gender stereotypes prevalent in Kyrgyz society contribute to the observed patterns in academic subject selection (2019). The work that is done by international and non-governmental organizations in encouraging young women to follow careers in STEM fields plays a vital role in challenging these gender stereotypes.

Labor market discrimination comes up as another reason that can lead to differences in wages of equally skilled individuals employed at the same job. According to the theory, disparities in wages can be attributed to factors such as gender, race, ethnicity, or other characteristics of a worker, which may appear unrelated to their job performance or qualifications (Borjas, 2016, p. 362). When it comes to the female-male wage gap, Borjas highlights the importance of considering the possibility that men and women of similar educational background, age, and skillset may have different labor market histories. While women typically drop out of the labor market for some period to raise children, men generally have an uninterrupted career. Borjas presents a hypothesis suggesting that career breaks taken by women allow males to acquire more human capital, while their female counterparts experience a depreciation of their skills as they devote time to raising children. This hypothesis is supported by evidence and may help in explaining a part of the gender wage gap (Borjas, 2016, p. 399 - 400).

The empirical literature on the gender wage gap in Kyrgyzstan is scarce. Klycheva conducted an empirical analysis to see the effect of the constitutional amendment of 2010, which promotes gender equality, on the gender wage gap in the period from 2010 to 2012. Her results showed that the changes in the constitution did not decrease the gender wage gap in that period (2016). The legislative changes such as the constitutional amendment of 2010 or the introduction of the law guaranteeing equality of rights and opportunities for both genders of 2008 are likely to have lagged effects. The wages of people would not change immediately after the laws are enacted but would be affected by regulations over time. Thus, it is likely that those legislative changes have an effect over a longer period. Kyrgyzstan adopted the National Gender Strategy on Achieving Gender Equality 2012-2020 which highlighted the areas that need to be addressed to improve gender equality in the country. However, I have not found any policies implemented under this gender strategy targeting the gender wage gap.

There is not enough empirical literature that looks at the dynamics of the gender wage gap at the national level in Kyrgyzstan over the last decade. Akay et al. surveyed 675 women to analyze the causal effect of education and experience on the wages of women in Bishkek (2019). Kolpashnikova & Kan analyzed gender differences in housework participation among Kyrgyz women and men (2020). Landmann et al. studied the effect of coresidence on female labor supply in 2011 (2018). Their research was narrowly focused on the labor force participation decisions of women that moved to live with their husband's parents. Barrientos & Kudebayeva conducted empirical research on social transfers and their influence on the labor supply of women in 2010-2013 (2015). Anderson & Esenaliev described the gender gap in wages and hours of work for teachers, healthcare workers, and other social workers in 2010-2016 (2019). Arabsheibani et al. conducted empirical research to examine women's labor supply elasticities in 2011 – 2016 (2021). My research is going to fill in the gap in the literature that assesses the dynamics of the gender wage gap at the national level from 2013 – 2019.

3. DATA

3.1 Overview

The data for this research study is collected from the Life in Kyrgyzstan (LiK) Survey, which is a collaborative project of the German Institute for Economic Research (DIW Berlin), Humboldt University of Berlin, the Center for Social and Economic Research (CASE-Kyrgyzstan), and the American University of Central Asia (AUCA). Life in Kyrgyzstan is a longitudinal survey of households and individuals in Kyrgyzstan. The sample for the survey consists of around 3,000 households and approximately 8,000 individuals from all seven regions of Kyrgyzstan and the two biggest cities of Bishkek and Osh. The original sample was drawn through stratified two-stage random sampling, and it is representative at the national level, for urban and rural areas, as well as for the south and the north of Kyrgyzstan (Brück et al., 2014). The micro-level survey provides information about various socioeconomic characteristics of individuals and households covering such topics as household composition, demographics, employment, expenditure, income, education, health, and many other topics.

The waves of the survey were conducted in 2010, 2011, 2012, 2013, 2016, and 2019. As some households drop out from the original sample since they refuse to participate in subsequent years of the survey or are simply not found by the interviewers, new households are added to the sample. Therefore, the longitudinal data suffers from the loss of originally tracked households.

In my sample, I intend to keep the individuals that receive wage income. In a country like Kyrgyzstan, the share of formally employed people is low. According to Goncha and Jasmina from the International Labor Organization, in 2019 less than 25% of the labor force in Kyrgyzstan was employed in the formal sector (2021). Thus, I expect to keep less than 30% of the original sample since most of the people are likely to be employed without a formal wage.

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I constructed panel and multi-year cross-sectional data sets using years 2013, 2016, and 2019. I obtained a balanced panel of 393 individuals observed over the three years, giving me 1,179 observations in total. While the samples for each year of the survey separately are representative at the country level by design, I cannot claim the same for my panel data set. Multi-year cross-sectional data gives around 1,700 people with wages for each year. The cost of constructing the balanced panel data is a serious reduction in the number of individuals observed and possible attrition bias of the results. The attrition rate in my sample is approximately 77 percent ([1,705 – 393] / 1,705 ≈ 0.77).

I conducted t-tests to compare the averages of the key continuous variables such as wage, age, and experience between the panel and cross-sectional data sets (Table A1). The results of the tests showed that there is a statistically significant systematic difference in the mean age between the cross-sectional and panel data (p-value ≈ 0.00). There is also a statistically significant systematic difference in the average experience (p-value ≈ 0.00). The difference in the mean wage between the data sets is statistically significant at 10% significance level (p-value ≈ 0.08). The difference in the mean age between the cross-section and panel data is 4.2 years. The difference in the mean years of experience between the data sets is 2.3 years. The difference in the mean wages per month is 366 KGS. Since the representativeness of the sample is important for the research, I decided to proceed with multi-year cross-sectional data.

The OECD defines working age individuals as those between 15-64 years old (2023). After keeping the working age population, I obtained 1,683 observations in the year 2013; 1,926 observations in the year 2016; and 1,610 observations in the year 2019.

3.2 Descriptive statistics

Age: Age distributions in the sample are relatively similar for each year 2013, 2016, and 2019 (see Figure A4). The average and the median age are relatively the same across the years (Table A2).

Education: Secondary education in Kyrgyzstan is compulsory and generally requires 11 years to complete. As a result, the median individual in the sample has 11 years of education (Table A2). The distribution of education by gender shows that women have more years of education than men, on average (Figure A5). The average number of years of education for women is 11.4 years and for men is 10.4 years. The median number of years of education is the same for both genders – 11 years. The pattern is consistent with the reports by the NSC and the ADB, which state that in Kyrgyzstan, women are more educated than men, on average (2021; 2019).

Experience: I am using the experience variable as it was given in the data. The variable indicates the years of relevant experience to the occupation the individual is working at. For example, if a person has been working as a teacher for five years, his/her experience is going to be five years. However, if he/she finds a new job in finance, his/her years of experience are going to be recorded as 0 if he/she had not worked in finance before. The distribution of work experience by gender is shown in Figure A6. Women have slightly more work experience than men, on average. The mean work experience of females is 7.8 years, while the mean work experience of males is 6.7 years. This difference in means is driven by the presence of very experienced women in the sample. The median work experience is 5 years for both genders.

Wage: The wage variable indicates a monthly wage after the deduction of taxes and contributions. The values are reported in the local currency – in soms (KGS) per month. The absolute values of monthly wages are increasing, on average, across the three years, which can

be observed by increases in the mean and the median wage in each year (see Table A2). Inflation is a contributing factor to the observed increases. There is no need for adjusting wages for inflation since I am going to run separate regressions for each year, and each year's regression is independent of others. Inflation-related influences would not confound the picture of the gender wage gap dynamics over the examined period.

The distribution of wages looks different for the year 2016, when compared to other years since there is an observation with a wage of 170,000 KGS (Figure A7). When this individual is omitted, the distribution is consistent with other years. The distribution of wages by gender is shown in Figure A8. The average wage of women is 9,076 soms per month, while the average wage of men is 11,409 soms per month. The median wage of women is 8,000 soms and the median wage of men is 10,000 soms. The statistics show that women have lower wages than men, on average.

Gender: The sample has slightly more men in the first two years, with approximately 53% of the observations being male and 47% female (see Table A3). In 2019, the share of men increases to 57%, which could be explained by a decrease in the female labor participation rate. As it was mentioned, the female labor force participation rate reached its historically low levels in 2018 (see Figure A1).

Ethnicity: The original data divides people into 8 different ethnicities. I kept the three largest ethnic groups (Kyrgyz, Uzbek, Russian) as separate groups and other ethnicities in the "Other" group. Most individuals in the sample are of Kyrgyz ethnicity. The share of Kyrgyz stays around 70% across all three years, while the share of people of Uzbek and Russian ethnicities slightly fluctuates but remains in the range of 7% - 15%. Around 8% - 9% of the observations are of other ethnicities across the three years (see Table A4).

Rural/urban: the share of people residing in rural areas is fluctuating across the years from 52% in 2013 to 43% in 2019 (Table A5). *Married:* the share of married individuals gradually increased from 2013 to 2019 (Table A6).

Occupation sector: I divided the occupations into three sectors, based on the three-sector model developed by Allan Fisher, Colin Clark, and Jean Fourastié, which divides an economy into three sectors of activity: primary sector/ or extraction of raw materials (agriculture and fishing; mining), secondary sector/ or manufacturing (manufacturing; energy and water; construction; trade and repair), and tertiary/ or services sector (Wolfe, 1955; Kenessey, 1987). Although the survey data provides 16 different occupation sectors, it does not provide enough differentiation to use more complicated sector models (e.g. with the quaternary sector, or in other words the sector of services based on research, information, and technology). Each year, more than 70% of individuals were employed in the tertiary sector, approximately 20% in the secondary sector, and around 5% in the primary sector (Table A7).

Region/city: There are seven administrative regions in Kyrgyzstan: Issyk-Kul, Jalal-Abad, Naryn, Batken, Osh, Talas, and Chui. The two biggest cities in the country are Bishkek and Osh city. It is important to account for the geographical factors since there are significant wage disparities in the country across regions and cities. The distribution of the observations by region is shown in Table A8.

4. MODEL AND METHODOLOGY

4.1 Model

The model in this paper is based on the Mincer earnings function, incorporating additional explanatory variables:

$$log\,w_i^s = \beta_0^s + \beta_1^s female_i^s + \beta_2^s age_i^s + \beta_3^s exper_i^s + \beta_4^s expersq_i^s + \beta_5^s educ\_y_i^s$$
$$+ \beta_6^s X_i^s + \varepsilon^s$$

where *s* is the cross-sectional year (2013, 2016, 2019) since I will run separate regressions for each of the years. *w* is the logarithm of monthly wage earnings. Mincer highlighted that earnings can be expressed in dollar values if human capital investment variables (education and experience) are also expressed in dollar terms. However, if education and experience are expressed in terms of years, earnings must be expressed in logs (Mincer, 1975). **Female** is a dummy variable which equals 1 if the person is female and 0 otherwise. **Age** stands for the age of the person. **Exper** is the years of experience of the individual. The quadratic form of experience *(expersq)* captures the concavity of the age-earnings profile (Borjas, 2016; Mincer, 1975). **Educ_y** stands for the number of years of education the person has. The variable includes years studied in secondary school and years studied in post-secondary education (e.g. technikum or university).

X is the vector of other explanatory variables: dummy variables for **ethnicity** (Kyrgyz, Uzbek, Russian, Other); dummies for **occupation sector** (primary, secondary, and tertiary sectors); a dummy for **marital status**, 1 if married and 0 otherwise; a dummy for **rural** residence, 1 if the person is living in the rural area and 0 otherwise; dummy variables for **region/city** of residence (Issyk-Kul, Jalal-Abad, Naryn, Batken, Osh, Talas, Chui, Bishkek city, and Osh city). **ε** is the unobserved error term.

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4.2 Methodology

Most papers on the gender wage gap use the Oaxaca-Blinder decomposition method. The method breaks down the wage differential between two groups (e.g. male and female) into two components: explained and unexplained part (discrimination). The validity of the measure of the discrimination component depends on the inclusion of all control variables that differentiate the two comparison groups. It means that control variables should include all the skills in which males and females differ (Borjas, 2016). In practice, there are almost always missing variables in the model, which impedes the accurate assessment of a person's human capital stock. Borjas provides quality of education as an example. Most data sets cannot provide much information about the quality of education a person obtained. If there's a consistent pattern when men and women attend educational institutions of different quality, the Oaxaca-Blinder decomposition produces a biased estimate of discrimination (Borjas, 2016). Since certain schools in Kyrgyzstan are only for boys or only for girls, there could be a systemic difference in the quality of education obtained by men and women, which would yield biased results from the Oaxaca-Blinder decomposition.

Since my main goal is to explore the dynamics of the gender wage gap, using Ordinary Least Squares regression should be sufficient. It is likely that people underreport their earnings in surveys due to privacy concerns or fear that the information they share might increase their taxes. It causes a systematic measurement error in the dependent variable and leads to attenuation bias of OLS estimates. The absence of variables such as quality of education and other variables describing the human capital stock of individuals causes omitted variable bias in the results. However, the main goal of the research is to investigate the dynamics of the gender wage gap and not to measure the size of the gap. The OLS regressions can provide valuable insights into the changes in the gender wage gap throughout the examined timeframe since the estimated coefficients will be equally biased for all years.

5. RESULTS

The results of the OLS regressions are presented in Table 1 on the next page. The regressions for each year were carried out separately. Kyrgyz ethnicity, Bishkek, and primary sector dummy variables were omitted to avoid multicollinearity. The reference group is a Kyrgyz male, living in Bishkek (urban area), not married, and employed in the primary sector occupation. It is important to reiterate that due to attenuation and omitted variable bias, the obtained coefficients are unreliable. Nonetheless, given that these biases are consistent across the estimated coefficients for all years, the observed trends in the variables are likely to be representative of their actual dynamics.

The main variable of interest is *female*. The results show that the gender wage gap decreased in the period from 2013 to 2019. The coefficient estimate of *female* on *log wage* is statistically significant at all conventional significance levels for all years in the data. For the years 2013, 2016, and 2019, the wages of females are expected to be approximately 26.75%, 21.11%, and 17.65% less, respectively, on average, compared to their male counterparts, controlling for all other variables in the model.

Age has a negative and statistically significant relationship with wage at all conventional significance levels in all years. *Experience* has a positive and statistically significant relationship with wage at all conventional significance levels in all years. *Squared experience* coefficient is negative and statistically significant at 1% significance level only for the year 2016. In other years the coefficient is statistically insignificant, which contradicts the theory of diminishing returns to experience.

Education has a positive and statistically significant relationship with wage at all conventional significance levels in all years. The magnitude of the coefficient decreased over the examined period, suggesting that wage returns to education are getting lower.

Table 1: Results of the OLS regressions.

	(OLS_2013) log_wage	**(OLS_2016)** log_wage	**(OLS_2019)** log_wage
female	-0.2675*** (0.0259)	-0.2111*** (0.0246)	-0.1765*** (0.0287)
age	-0.006880*** (0.0013)	-0.004257** (0.0014)	-0.008475*** (0.0013)
experience	0.01705*** (0.0043)	0.01930*** (0.0047)	0.01585** (0.0049)
sqexperience	-0.0002157 (0.0001)	-0.0003288** (0.0001)	-0.0002728 (0.0002)
educ_y	0.02339*** (0.0043)	0.009959*** (0.0022)	0.007157* (0.0028)
e_uzbek	-0.1350* (0.0593)	-0.02063 (0.0402)	0.03224 (0.0521)
e_russian	-0.07743* (0.0385)	-0.02848 (0.0418)	0.09249* (0.0456)
e_other	0.08627* (0.0424)	0.05960 (0.0518)	0.03309 (0.0428)
secon_sec	0.06588 (0.0926)	-0.1748* (0.0809)	0.05013 (0.0800)
tert_sec	-0.02772 (0.0896)	-0.1928* (0.0780)	0.002546 (0.0761)
married	0.05540* (0.0270)	0.08563** (0.0289)	0.1043** (0.0330)
rural	-0.1221** (0.0422)	-0.09900** (0.0334)	-0.02783 (0.0407)
issyk_kul	-0.3105*** (0.0597)	-0.2791*** (0.0510)	-0.3497*** (0.0566)
jalal_abad	-0.1180* (0.0558)	-0.2062*** (0.0425)	-0.4801*** (0.0549)
naryn	-0.05837 (0.0735)	-0.4630*** (0.0779)	-0.3276*** (0.0873)
batken	-0.2007** (0.0673)	-0.2722*** (0.0587)	-0.4469*** (0.0669)
osh	-0.1542** (0.0584)	-0.3766*** (0.0553)	-0.1425* (0.0565)
talas	-0.1793** (0.0651)	-0.4376*** (0.0811)	-0.1087 (0.0747)
chui	-0.08148 (0.0481)	-0.1357* (0.0546)	-0.03309 (0.0491)
osh_city	-0.2125** (0.0682)	-0.01205 (0.0500)	-0.1479* (0.0612)
_cons	9.0777*** (0.1128)	9.4815*** (0.0968)	9.6163*** (0.0950)
N	1670	1926	1610
R²	0.1786	0.1607	0.1653

Standard errors in parentheses; $^{*} p < 0.05$, $^{**} p < 0.01$, $^{***} p < 0.001$.

The results do not show that there is constant and systemic discrimination based on *ethnicity* since none of the ethnicity coefficients is statistically significant in all years. The results on the relationship between *occupation sectors* and wage are inconclusive. In 2016, there is a negative and statistically significant relationship between working in secondary or tertiary sectors and wage at 5% significance level. In 2016, on average, an individual working in the secondary or tertiary sectors has a lower wage than his/her counterpart with the same characteristics working in the primary sector. However, in other years the coefficient is statistically insignificant. *Married* individuals have a higher wage, on average, when compared to not married individuals, controlling for other factors in the model.

Workers that reside in *rural* areas, in the years 2013 and 2016, on average, have a lower wage than their urban counterparts, controlling for other variables in the model. The magnitude of the coefficient in 2013 is lower than in 2016. Surprisingly, the coefficient is statistically insignificant in the year 2019. The results show a trend toward narrowing urban/rural wage disparities. There is a relationship between *region/city* of residence and wage. Bishkek is the administrative, cultural, and financial center of Kyrgyzstan. It is not surprising that individuals who are employed in other regions than the capital are enjoying a lower wage, on average. However, this pattern does not hold for Chui region since the coefficient is insignificant in 2013 and 2019. Furthermore, the results indicate a trend toward a widening wage gap between Bishkek and the southern regions of Batken and Jalal-Abad.

R-squared for the regression is 17.86% for the year 2013, 16.07% for the year 2016, and 16.53% for the year 2019, which means the model explains around 16% - 18% of the variability in the logarithm of monthly wage earnings.

While this study does not specifically examine the drivers behind the decreasing gender wage gap in Kyrgyzstan, it is worth mentioning some potential factors that may have

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contributed to this observed trend. The government law "On State Guarantees of Equal Rights and Equal Opportunities for Men and Women" passed in 2008, constitutional amendments postulating the principles of gender equality in 2010, and the enforcement of gender quotas in some public institutions might have contributed to the decrease in the gender wage gap. These measures did not necessarily target the wage gap, but they might have affected society's perception of women in the labor force and consequently reduced the gender wage gap over time.

6. CONCLUSION

This study contributes to the existing literature by providing insights into the dynamics of the gender wage gap in Kyrgyzstan in the period from 2013 to 2019. Separate OLS regressions were conducted for the years 2013, 2016, and 2019. Despite the potential bias in the coefficients, the findings of the study show a decrease in the gender wage gap within the examined timeframe. The government's efforts in developing the legal framework promoting gender equality in compliance with international standards could be a contributing factor in narrowing the gender wage gap.

Part of the existing gender wage gap can be attributed to gender stereotypes in Kyrgyz society. Social labeling of jobs and professions as suitable or 'not suitable' for females influences the distribution of women across occupation sectors. There is a disproportionate concentration of women in certain low-paid occupation sectors such as healthcare and education, for example. At the same time, there is a significant underrepresentation of females in high-paid technical sectors. Furthermore, there is a tendency for female students to select non-STEM related majors in university, which causes their underrepresentation in high-paid STEM jobs, which in turn contributes to the gender wage gap.

A portion of the gender wage gap in Kyrgyzstan can be attributed to the outdated legislative measures that were originally designed to protect women. The law that provides the list of occupations that are prohibited for women was initially enacted as a measure to safeguard women from jobs with hazardous working conditions. However, it is important to recognize that technological advancements have likely transformed the workplace environment in these occupations. This progress may have significantly reduced or eliminated the risks previously associated with these jobs, making such legal restrictions unnecessary.

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Finally, the withdrawal of state-funded social programs, which offered support to women in balancing work and family life during the Soviet era, impacted women's labor force participation decision and consequently contributed the gender wage gap.

The following are the limitations of this research. Although the results of the OLS regressions provided insights into the dynamics of the gender wage gap, the biased coefficients cannot be used to infer the magnitude of the actual wage gap. Therefore, further research should be focused on quantifying the magnitude of the gender wage gap across the years. In addition, further research could focus on assessing the effectiveness of specific government policies in reducing the gender wage gap.

7. POLICY RECOMMENDATIONS

The government of the Kyrgyz Republic could consider implementing the following policy changes that have the potential to further narrow the gender wage gap:

1.   ***Revise or revoke the law on occupations prohibited for women***. Technological advancements have likely improved the working conditions in occupations that were deemed to be dangerous for women. If the statement turns out to be true, the law serves as an unjust legal barrier limiting employment opportunities for women. Revision or removal of the list would likely increase the number of women employed in those sectors, which in turn would decrease the existing gender wage gap.

2.   ***Promote enrollment of women in STEM disciplines by providing education scholarships.*** By making STEM education more financially accessible for females, this policy could incentivize more women to consider careers in these fields. Consequently, it may provide more women with access to high-paying employment sectors, such as information technology or data science and analytics, which could potentially narrow the gender wage gap.

3.   **Address persistent gender stereotypes within society**. The government should invest in educational campaigns and programs aimed at combating social gender stereotypes. These stereotypes often serve as cultural barriers, constraining women's choices in education and professional career. Promoting gender equality in all aspects of life, starting from early education, can help to shift societal attitudes. Interventions could include creating more gender-aware curricula in schools (ADB, 2019) and promoting media content that challenges conservative gender roles.

4.   ***Create state-subsidized kindergartens and childcare facilities.*** This strategy could potentially increase the labor force participation rate of women with young children by providing affordable childcare services. It may reduce the duration of employment breaks that women have during child-rearing years and as a result decrease the gender wage gap.

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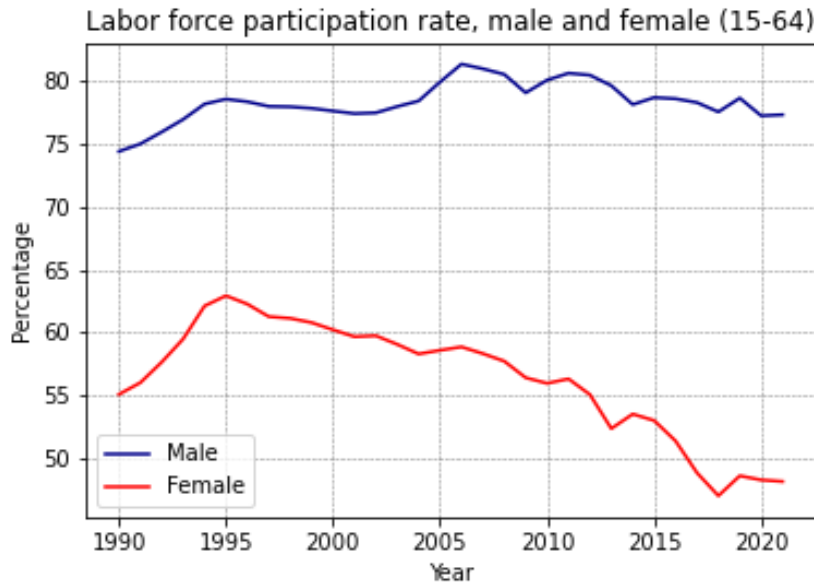
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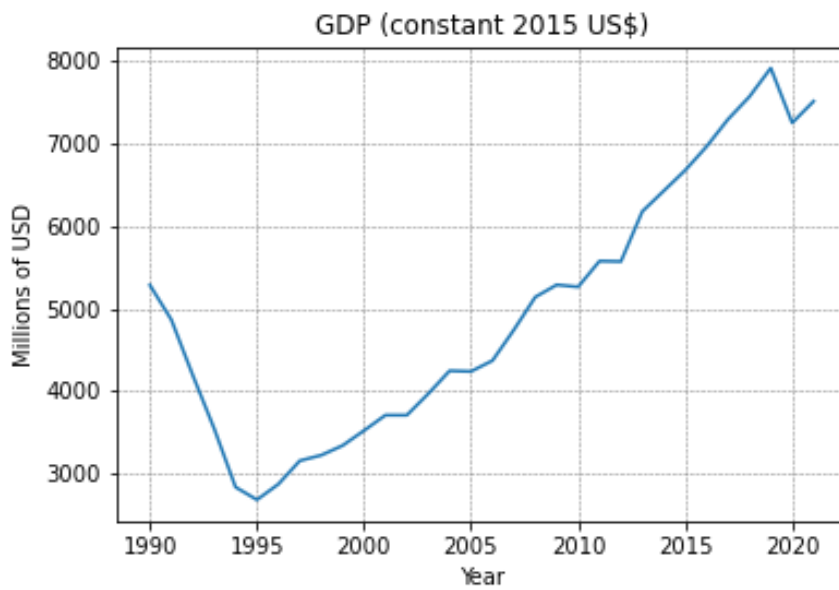
APPENDIX

Figure A1: Labor force participation rate (15 - 64), male (upper line) and female (lower line).

Labor force participation rate, male and female (15-64)

Source: International Labor Organization, World Bank.

Figure A2: GDP, in constant 2015 USD.

GDP (constant 2015 US$)

Source: World Bank, OECD.

Figure A3: GDP growth rate, annual.
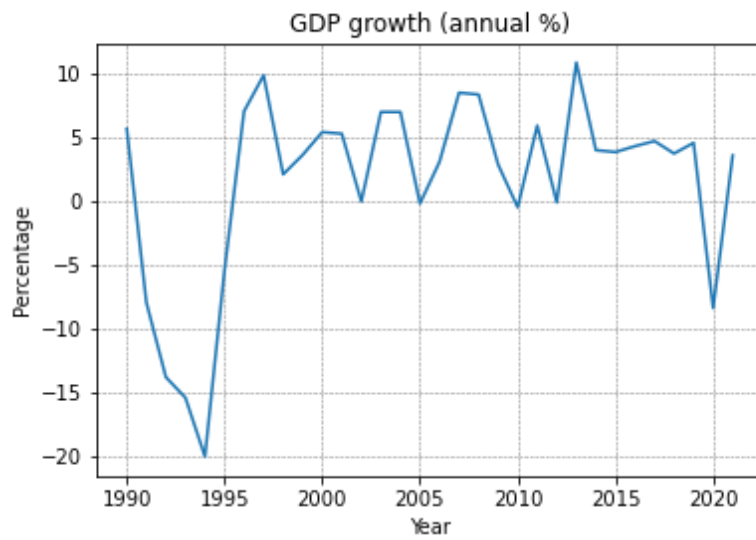
Source: World Bank, OECD.

Figure A4: Age distribution.
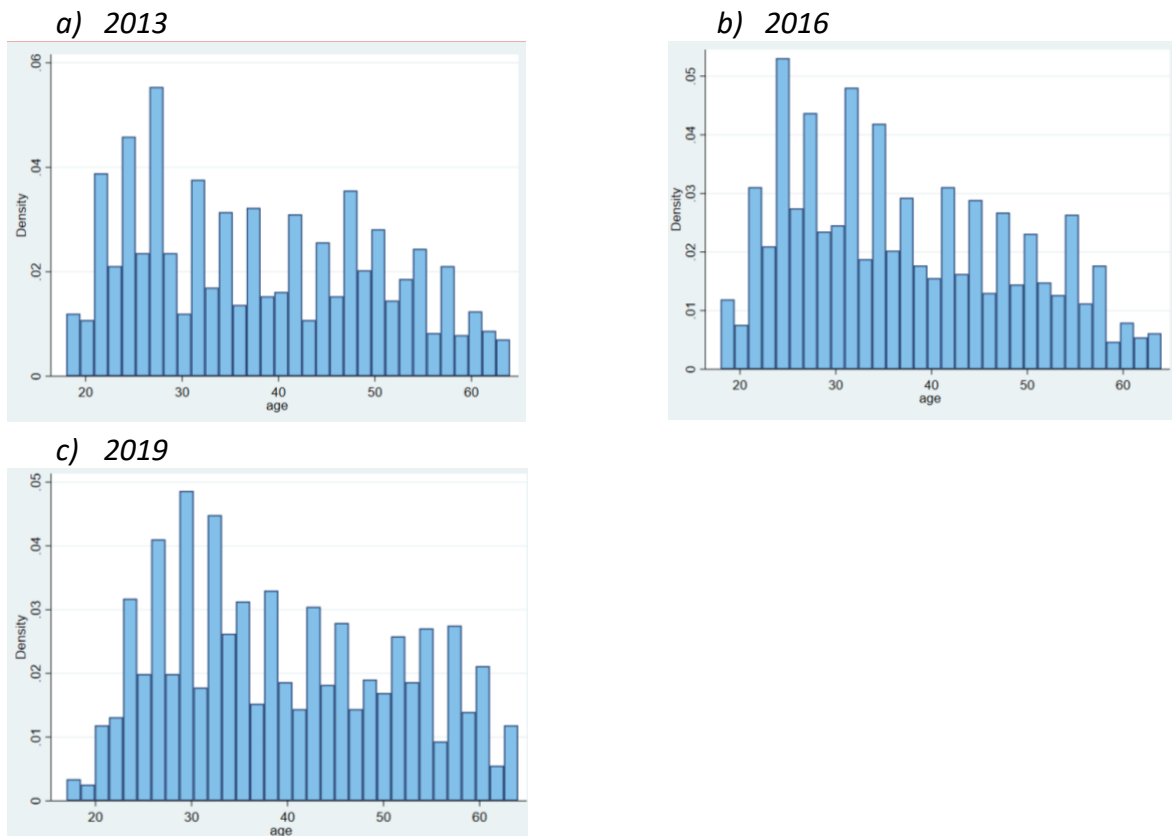
a) *2013*

b) *2016*

c) *2019*

Figure A5: Education distribution by gender.

a) female   *b) male*
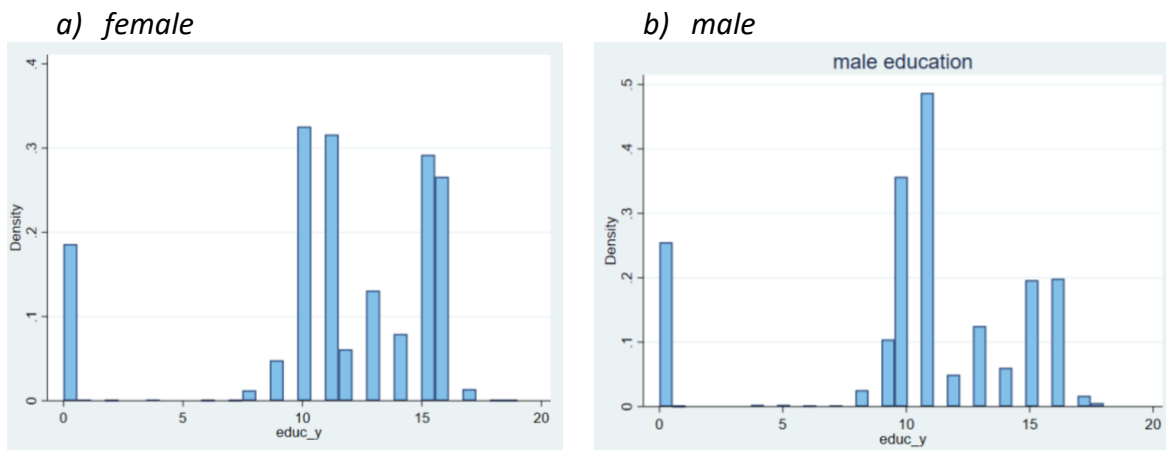
Figure A6: Experience distribution by gender.

a) female   *b) male*

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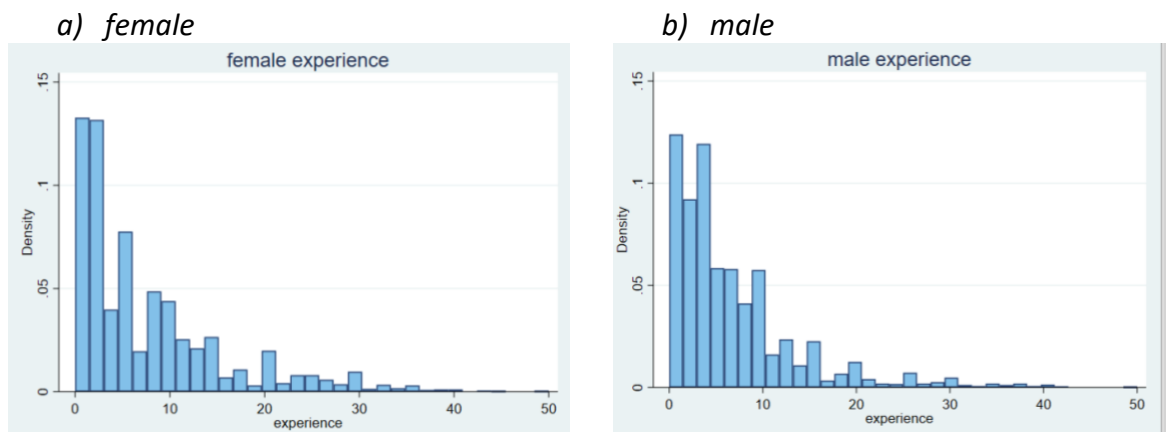
Figure A7: Monthly wage distribution.

a) 2013

b) 2016

c) 2019
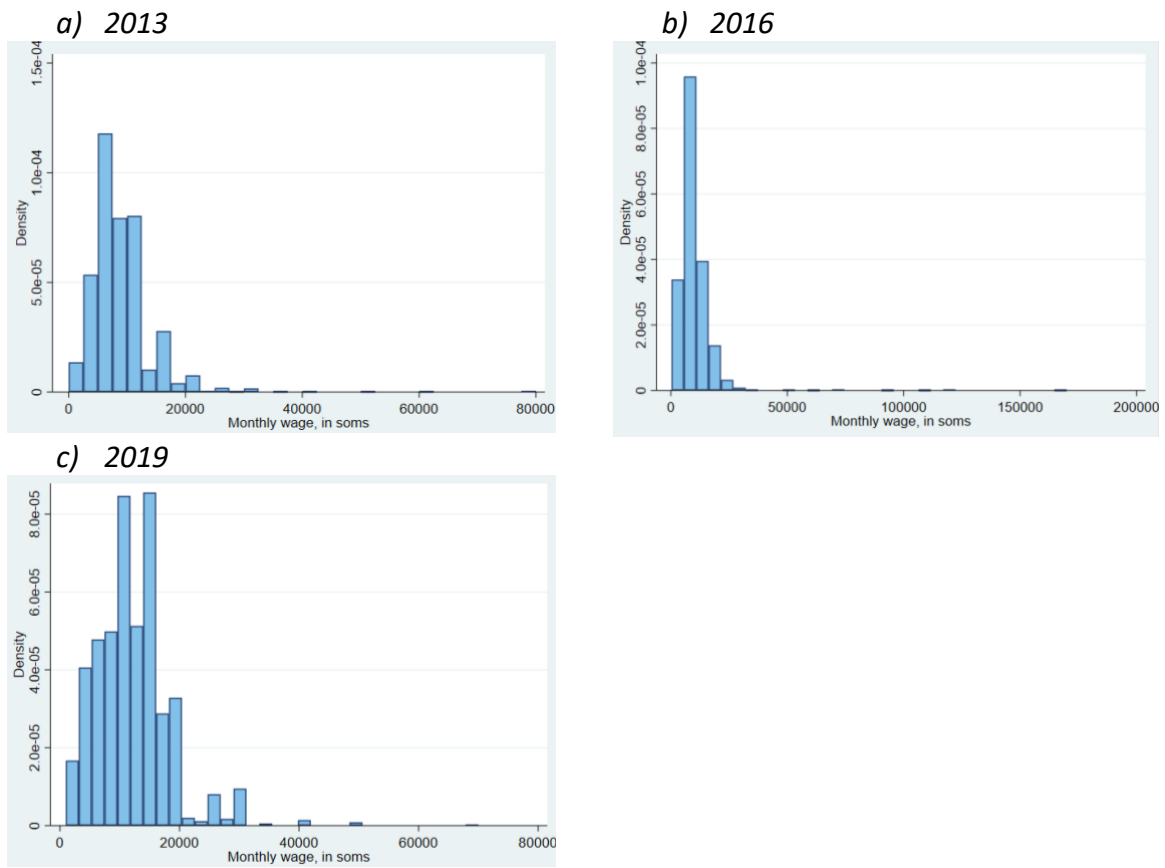
Figure A8: Monthly wage distribution by gender.
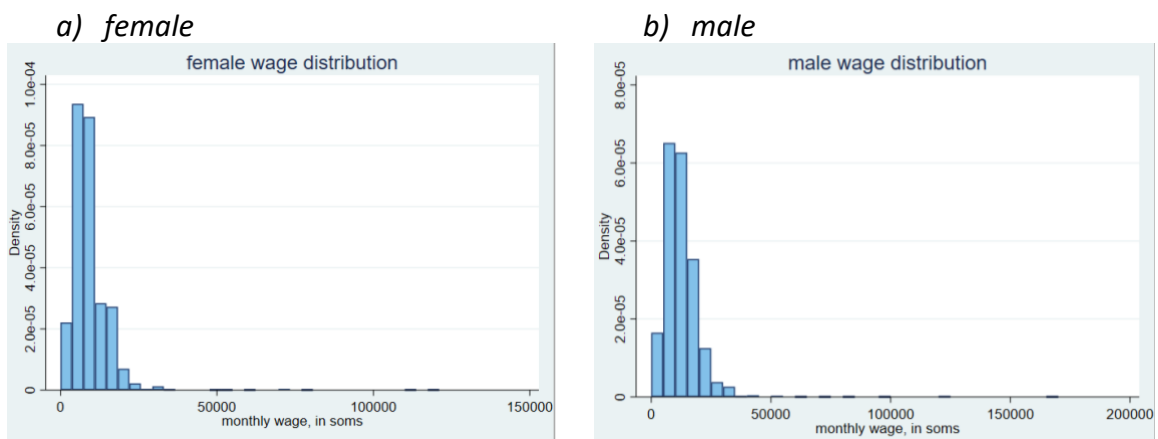
a) female

b) male

Table A1: T-test of multi-year cross-sectional data and panel data, before applying age constraints.

Covariate	Cross-sec. Sample Mean	Panel Sample Mean	T-test statistic	p-value
age	38.91	43.08	-11.32	0.00
wage_aftertax_m	10,301	10,667	-1.74	0.08
experience	7.45	9.77	-8.36	0.00

Table A2: summary statistics of continuous variables.

Year	Variable	Obs	Mean	Std. dev.	Median
2013	Age	1,683	38.05	12.17	37
	Education, years	1,683	12.2	3.2	12
	Experience	1,683	6.42	8.15	3
	Wage, per month	1,683	8,529	5,381	8,000
2016	Age	1,926	37.22	11.5	35
	Education, years	1,926	10.1	5.2	11
	Experience	1,926	7.25	7.4	5
	Wage, per month	1,926	10,419	8,595	9,000
2019	Age	1,610	39.7	11.97	38
	Education, years	1,610	10.3	5	11
	Experience	1,610	8.12	6.97	6.42
	Wage, per month	1,610	12,139	6,409	11,000

Table A3: Gender, sample distribution.

Year	Male, %	Female, %
2013	52.94	47.06
2016	52.60	47.40
2019	57.39	42.61

Table A4: Ethnicity, sample distribution.

Year	Kyrgyz, %	Uzbek, %	Russian, %	Other, %
2013	69.04	7.01	15.03	8.91
2016	69.11	11.63	11.16	8.10
2019	70.87	10.93	8.45	9.75

Table A5: Urban/rural, sample distribution.

Year	Urban, %	Rural, %
2013	48.25	51.75
2016	45.53	54.47
2019	57.36	42.64

Table A6: Marital status, sample distribution.

Year	Married, %	Not married, %
2013	65.36	34.64
2016	67.50	32.50
2019	73.42	26.58

Table A7: Occupation sector, sample distribution.

Year	Primary, %	Secondary, %	Tertiary, %
2013	5.47	22.64	71.90
2016	5.5	23.31	71.18
2019	4.6	19.07	76.34

Table A8: Region, sample distribution.

Oblast	2013, %	2016, %	2019, %
Issyk-Kul	7.89	8.73	10.43
Jalal-Abad	22.17	11.05	16.89
Naryn	3.53	3.45	5.40
Batken	6.96	6.89	6.77
Osh	9.92	11.47	14.10
Talas	2.65	3.45	3.66
Chui	15.89	20.38	18.39
Bishkek	23.21	30.01	19.25
Osh city	7.79	4.58	5.09