THE GENDER WAGE GAP IN KYRGYZSTAN:

DOES THE EQUAL RIGHTS

AMENDMENT MATTER?

By

Azhar Klycheva

Submitted to Central European University Department of Economics

In partial fulfillment of the requirements for the degree of Master of Arts

Supervisor: John Sutherland Earle

Budapest, Hungary

2016

ABSTRACT

In recent years, there has been the equal rights amendment in the Constitution of the Kyrgyz Republic. No empirical analysis has yet been performed to see the impact of the reforms on labor market outcomes. Current thesis investigates whether the regulatory changes of 2010-2011 narrowed the gender wage gap in the Kyrgyz Republic. The data is taken from the Life in Kyrgyzstan longitudinal survey. The sample size of the pooled sample includes 9446 people from different regions of the Kyrgyz Republic. Empirical analysis is carried out using the ordinary least square with and without correction for the sample selection and Oaxaca-Blinder mean wage decomposition technique. Results suggest that the equal rights amendment to the Constitution did not gradually narrow the gender wage gap within the estimated period of three years.

ACKNOWLEDGEMENTS

I would like to express my gratitude to several people. Above all, I thank my supervisor, John Sutherland Earle, for lecturing the labor economics courses and giving valuable suggestions and feedback throughout my work. I also thank my family for the love, support and encouragement. Finally, I am thankful to all my old friends for always staying in touch regardless of the distance and I am grateful to have new wonderful people in my life.

Table of contents

Introduction	1
Chapter 1 – Background and literature review	4
Chapter 2 – Methodology	9
Chapter 3 – Data description	12
Chapter 4 – Results	20
Conclusion	23
References	25
Appendices	28

Introduction

Female gender wage in Kyrgyzstan is a serious concern for researchers and policymakers that tracks its history from the country's independence days. The Soviet period brought institutional changes with free access to healthcare, education and female market activity. The transition period, followed by 50% fall in GDP and decrease in female employment during 1990-1994, disrupted the accessible education with corresponding steady wages provided by the government.¹ The variation in schooling level and wages became evident not only in urban/rural dimension, but also across genders (Appendix 1). The issue of gender pay inequality seems paradoxical since Kyrgyz females, on average, have higher tertiary education attainment than men and employment of women in Kyrgyz Republic is to the highest in Central Asia.² The Word Bank statistics show that the average female labor force participation rate is 56.15% with a minimum of 53.5% in 2004 and a maximum of 58.4% in 1990 (Appendix 2).

The analysis of the gender wage gap is considered through the prism of sociodemographic and regulatory factors. ³ Social aspect including individual demographic characteristics is one of the main reasons explaining the gender gap in employment. The Kyrgyz structure of society, based on patriarchal origin from 19th century, provided a basis for the view that men are the prime earners and women should be devoted to family caregiving.⁴ This, in turn, might have impacted the decision of women whether to participate in labor market work. On top of that, it is still "traditional" to marry through bride kidnapping, especially in rural areas, where it accounts for almost 60% of marriages.⁵

¹ "Economic Reforms in Kyrgyzstan." By Marek Dabrowski, Rafal Antczak.

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1479566

² http://data.worldbank.org/indicator/SL.TLF.CACT.FE.ZS

³ Gungoren Gender differences in labor market outcomes during the early phase of transition: the case of Kyrgyzstan

⁴ http://www.adb.org/sites/default/files/institutional-document/32233/cga-kyrgyz-republic.pdf

⁵ Kyrgyz Country Case Study, Background paper for World Development Report 2012, World Bank (2011).

The regulatory framework of Kyrgyzstan both promotes and hampers female labor force activity⁶. On the one hand, the health of women is of prime importance in light of their maternal and physical conditions⁷. On the other hand, these regulations result in women's entry barriers into the labor market. For example, females are restrained from working in industries involving heavy work, known as industrial segregation. Additionally, according to the Labor Code of the Kyrgyz Republic, women cannot perform jobs such as "cement work", which in turn result in occupational discrimination.⁸

Government intervention with the aim of reducing the gender pay gap resulted in a set of reforms. The new Constitution of the Kyrgyz Republic of 2010 promoted the equal rights and opportunities for men and women⁹, whereas a year later, the government set a 30% quota for women to parliament.¹⁰ Equal opportunities comprehend the political, economic, social, cultural aspects of the life of people. This period is also prominent with female positions of the interim presidency of a country, the chief justice of Supreme Court, the Chairman of the National Bank. The area of gender wage gap in Kyrgyzstan, explored previously for the period 1993-1997, showed that the gender wage gap narrowed during the early periods of country's transition to market economy (Anderson & Pomfret, 2000). However, there is no recent empirical evidence on wage structure across the gender and no investigation was done on the effect of the new Constitutional amendments of 2011 on the gender wage outcomes.

The effect of the reforms on gender wage gap is the interest of my work. The question this thesis poses is "Did the regulatory changes of 2010-2011 narrow the gender pay gap in the Kyrgyz Republic?" The investigation is carried out using OLS, Heckman correction procedures

⁶ Legal barriers to women's participation in the economy in the Kyrgyz Republic. European Bank for Reconstruction and Development, Oct. 2015 < www.ebrd.com/documents/admin/legal-barriers-gender.pdf> ⁷ Labor Code of the Kyrgyz Republic, Part viii, Article 306

⁸ http://www.libertas-institut.com/de/Mittel-Osteuropa/Draft%20Labor%20Code.pdf

⁹ Constitution of the KR, Section II, Chapter I, Article 16 (4)

¹⁰ http://users.unimi.it/dirpubesteuropa/wp-content/uploads/Costituzione-della-Repubblica-del-Kyrgyzistan.pdf

and the linear Oaxaca-Blinder decomposition technique for each of the years 2010 and 2012. The unexplained part of the gap can be due to discrimination or other factors that are often difficult to capture. Women's intermittent employment is a significant factor not accounted in the statistical regressions. The explained part of the decomposition is shown through the available demographic characteristics. The more the effect of the reforms, the less would be the coefficient on discrimination in each subsequent year. The additional checks include the within-sector wage decompositions.

There are several chapters in the thesis. The first chapter of the work provides the background and reviews the relevant literature. The second chapter deals with the selection of appropriate methodology. The description of data source and employed variables is presented in the third chapter. Further, chapter four provide the empirical investigation of my thesis. In conclusion, the summary of work with further implications of the problem in the Kyrgyz Republic is stated.

Chapter 1 – Background and literature review

According to the Organization for Economic Cooperation and Development, gender pay gap is defined as the "difference between median earnings of men and women relative to median earnings of men".¹¹ This definition corresponds to the full-time and self-employed categories of workers. Also, working population includes those aged 15-64 as stated by International Labor Organization.¹²

In labor literature, there are several sources of wage differentials. There are two main causes of wage inequality: gender-specific factor changes such as the discrimination and changes in returns to observed and unobserved skills(Blau & Kahn, 1992, 1997). Compensating wage differentials and the theory of human capital shed light on different pays across the genders.¹³ The review of these approaches is used to provide the idea of what is behind the explained and unexplained parts of gender wage decomposition. According to the previous approaches, consideration of non-monetary aspects is often detrimental in choosing the right job. At this stage, the riskiness of a job and discrimination within compensating wage differentials theory give rise to different pay levels.

The statistical evidence shows that males and females, depending on the risk level, tend to self-select themselves into certain jobs (DeLeire & Levy, 2001). The data from the Bureau of Labor Statistics presented by DeLeire & Levy shows, that though the proportion of males and females in the US labor force for 1991-1994 was equal, more than 90% of injured employers were comprised of men (2001). Looking deeper at the reasons, the authors show that females tend to have a higher risk aversion than men. As a result, the share of women in risky

¹¹ The definition is taken from OECD Data. https://data.oecd.org/earnwage/gender-wage-gap.htm

¹² Definition of labor force participation rate. kilm.ilo.org/2011/download/kilm01EN.pdf

¹³Acemoglu, Daron and David Autor.2011. "Lectures in Labor Economics." Manuscript. http://economics.mit.edu/files/4689.

occupations such as forestry, fishing and motor vehicle operations is low (2001). Another evidence for the degree of risk aversion across genders shows that females are more protective of their heath conditions, measured by better tooth brushing and fastening the seat belts (Hersch, 1996). Thus, the literature provides a foundation for the view that women self-select themselves into safer jobs.

The distribution of Kyrgyz population across economic sectors is not random signaling the possible sorting of genders on the basis of risk aversion.¹⁴ Though no empirical literature for Kyrgyz labor market provides evidence of the correlation between the degree of risk and occupational choice, the raw statistics is a long-lived support for this view. During the Soviet times, women were mainly occupying healthcare, catering, trade services rather than mining or fishing related jobs.¹⁵ Since then, the situation has not changed much. According to the National Statistical Committee of the Kyrgyz Republic, men are mostly occupying the construction (95%), mining (91%), whereas women's employment is the highest in social services (79%), education (76%) and hotels and restaurants services (65%)¹⁶. This may manifest the women's preferences toward the non-technical, public sector jobs, which result in a higher wage compensation for men. The within-industry decomposition of wages will give a better understanding of this issue.

Even though the part of the wage differential is reflected by the sorting of workers due to risk aversion, there are still factors that are, potentially, the product of statistical discrimination. This approach shows that discrimination is possible even when the employer is not in favor of any particular group (Borjas, 2005, p. 381). As the author suggest, imperfect

¹⁴ More information can be found here: Kyrgyz Republic: Country Gender Assessment, Asian Development Bank, 2005/12/01, pp.90-92. http://www.adb.org/documents/kyrgyz-republic-country-gender-assessment

¹⁵ See Dhur, Agnes. "Secondary data review on the food security situation in the Kyrgyz Republic." Food Security Analysis Service, World Food Programme. Accessed November 11, 2014. https://www.ids.ac.uk/files/dmfile/SecondaryDataReviewKyrgyzstan161008.pdf

¹⁶ See Ibraeva, Gulnara, Anara Moldosheva, and Anara Niyazova. 2011. "Kyrgyz Country Case Study"

information often serves as an underlying reason for this practice. Borjas describes a scenario where a color-blind and –race and gender-indifferent employer wants to hire one person (2005, p. 385). If, eventually, it turns out that there are two suitable candidates, male and female, with identical educational background and work experience, then the position would likely be given to a male. This happens because the statistical records show that females take a maternity leave after working for a while as depicted by Borjas (Borjas, 2005, p. 386). As a result, females could be offered a lower pay to compensate for the possible leave.

The statistical discrimination can have a negative spillover effect on the decision of women regarding the market participation.(Heckman, 2015) The theory of time allocation shapes the neoclassical approach.(Becker, 1962) According to Becker, the decision of a person whether to participate in the labor market is formed through the comparison of utilities derived from work and leisure.(1962) In this theory utility from market activity comes from the financial reward. At the same time, the importance of non-market work is expressed via the willingness of a woman to be involved in children's upbringing and care-taking activities. According to Becker, if the latter factor dominates, then a woman stays at home.(1962) This problem is acute in econometric estimations since those women who choose not to work, are indeed willing to supply negative, i.e. not zero hours as the data indicates.(Blau & Kahn, 2007) Consequently, the estimation with OLS without the correction for sample selection provides upwardly biased results.

In addition to compensating the wage differentials, human capital theory provides another insight into the pay gap. Unlike the previous theory, human capital approach shows that wage gap is the reflection of individual endowments.(Becker, 1962) Economic papers rely heavily on the model of Jacob Mincer who provided a fundamental approach for estimating the returns to human capital.(Mincer, 1974) The logarithm of the earnings is modeled through the schooling, experience and the square of the years of potential experience. Extensions of this model include the control for gender, occupation, industry.(Campos & Jolliffe, 2007) Overall, the coefficient at schooling variable typically refers to the rate of schooling.(Borjas, 2005, p. 238) However, it is so only when workers have identical wage-schooling profile. Otherwise, the estimation suffers from the ability bias.

"Ability bias" is a popular issue addressed by many researchers. One of the works compared the sample of identical twins assuming that having them is exogenous in light of genetics and similar family backgrounds.(Ashenfelter & Krueger, 1994) While the coefficient at schooling in their studies appeared to be around 15%, this does not guarantee the causal effect since the coefficient found in the early studies for twins is much smaller.(Taubman P, 1976) Assuming that the distance to schooling is uncorrelated with the ability, another author uses it as an instrument in his wage regression.(Card, 2001) It is typically difficult to come up with a good instrumental variable, but the upward direction of ability bias in Mincerian equation guides across the interpretation of results.

Cross-country analysis reveals different trends regarding the sign of the Mincerian explanatory variables. There are variations both across developed and developing countries. There is a positive correlation between schooling and wages in case of Sweden.(Nordin, Dackehag, & Gerdtham, 2013) Evidence from the United States suggests that the urban residence is associated with higher wages. (Reid, 1985) The author also shows that white females enjoy more gains as compared to black counterpats.

Studies on developing countries in the cases of Kazakhstan and Pakistan show positive returns to schooling.(Arabsheibani & Mussurov, 2007; Behrman, Ross, & Sabot, 2008) The former study emphasizes the importance of the transition period after the Soviet regime and reveals that there was a limited number of educated people rewarded by the employers with higher wages. The classical Mincer equation used in the analysis of Albanian sample reported

the importance of tertiary education. (Arsena & Suela, 2011) Hungarian study by Campos-Joliff showed the increasing and decreasing returns for experience and potential experience correspondingly (2007).

The main findings of literature review suggest that the variables within the Mincerian equation are all important and have certain implications in different societies. This thesis follows the classical Mincerian procedure of estimating the earnings regression taking into account the geographical location. Finally, the decomposition of gender wage gap will show the significance of explained/endowments and unexplained parts.

Chapter 2 – Methodology

In order to fulfill the objectives of this thesis, I use the Oaxaca-Blinder decomposition technique. Being a popular decomposition approach, it divides the overall wage gap between two groups (males and females) into two parts: explained and unexplained.(Blinder, 1973; Oaxaca, 1973) The underlying earnings function takes a simple Mincerian form with normally distributed standard error:

$$\ln w_{ig} = \beta_g X_{ig} + \varepsilon_{ig} \text{ and } \tag{1}$$

$$\ln w_{i} = \beta_{g} X_{i} + \gamma_{0} f_{i} + \gamma_{1} f_{i} * 2011 + \gamma_{2} f_{i} * 2012 + \gamma_{3} year_{2011} + \gamma_{4} year_{2012} + \varepsilon_{i},$$
(2)

where *i* refers to individuals, *g* to one of the gender groups: males or females, f_i is a female dummy, $year_{2011}$ and $year_{2012}$. After the estimation of two separate wage equations for males and females, the Oaxaca decomposition follows. The equation (2) is the pooled specification. A general gender wage decomposition provides a three-fold decomposition that overcomes the indexation problem.(Neumark, 1988) It is described as follows:

$$\overline{lnw_m} - \overline{lnw_f} = \beta(\overline{x}_m - \overline{x}_f) + [\overline{x}_m(\beta_m - \beta) + \overline{x}_f(\beta_f - \beta)]$$
(3)

The first term on the right-hand side refers to endowments effect, the second is the coefficients effect and the third is interaction of the first two parts. Following Neumark, this approach is relevant when it is doubtful which of the groups (males or females) are discriminated against (1988). Another specification of Oaxaca-Blinder approach is defined in the equation (4):

$$\overline{lnw_m} - \overline{lnw_f} = \beta_m(\overline{x}_m - \overline{x}_f) + (\beta_m - \beta_f)\overline{x}_f, \qquad (4)$$

where w_m and w_f stand for mean wages of males and females correspondingly.(Blinder, 1973) The left part of the right hand side equation shows the wage gap due to observed factors and refers to the explained/characteristics effect. It is worth to note that the equation (4) is a twofold decomposition with weights equal to 1, where the chosen reference group is men. It means that men receive competitive wages and females, being a discriminated group, are underpaid.¹⁷ Given the patriarchal nature of the state discussed in the introduction, the raw gender wage gap in the Kyrgyz Republic (Appendix 1) and dominant position of males in the Kyrgyz labor market (Appendix 3), twofold decomposition is relevant for current investigation. The set of explanatory variables in equation (1) include the years of schooling, experience, experience squared and location of individuals. If the regulatory changes indeed had an effect on wages, then we should expect lower coefficient on difference term across time.

Most literature deals only with the sample of working individuals, implying no observed wage offers for zero hours of work (Longhi, Nicoletti, & Platt, 2013). However, the selectivity bias often causes problems (Heckman, 1977a). The selectivity occurs when the error from participation equation is correlated with the error from earnings estimation. Since the decision of women whether to participate in the labor market might not be random, the results of OLS would yield biased estimates. Heckman correction is employed to fix the selection bias (1977b). The baseline reduced form and selection equations are presented in (4) and (5) respectively:

$$\ln w_i = X_i \beta + u_i; \ u_i \sim \mathcal{N}(0, \sigma^2) \tag{5}$$

$$y_i^* = z_i \delta + e_i; \quad e_i \sim \mathcal{N}(0, 1) \tag{6}$$

The wage equation (5) contains the same controls as in the Mincer equation (1). In the participation equation (6), y_i^* is the latent market participation. A person participates in labor

¹⁷ See the Oaxaca (1973). Male-Female Wage Differentials in Urban Labor Markets. 693-709.

market $(y_i = 1)$ if $y_i^* > 0$ and does not work otherwise $(y_i = 0)$ when $y_i^* \le 0$. The assumptions in Heckman include $E(u_i|X_i, z_i) = 0$ and the set of controls X_i should belong to the subset of z_i (1977a). The identification restrictions require having instruments or variables that determine the participation and not wages. This is done to avoid the multicollinearity in the earnings regression due to the inclusion of inverse Mills ratio, estimated by probit. The number of children of two age categories, marital status, household possession of assets and income of a spouse fulfill this requirement.

The next step shows the way the Heckman procedure works. The selection rule or the expected value of market participation given the vector of controls can be written as:

$$E(ln w_i | y_i^* > 0, z_i) = E(ln w_i | z_i \delta + e_i > 0, z_i) = E(ln w_i | e_i > -z_i \delta, z_i) =$$
$$= E(X_i \beta + u_i | e_i > -z_i \delta, z_i) = X_i \beta + E(u_i | e_i > -z_i \delta, z_i)$$
(7)

Based on the result of bivariate normal distribution, $E(u_i|e_i > -z_i\delta, z_i)$ from (6) is the inverse Mills ratio $\lambda(z_i\delta)$. Heckman showed that the sample selection bias is the bias resulted from the omission of λ (Heckman, 1979). Running the second stage earnings regression using OLS with the Mills ratio obtained from the first stage participation equation estimated by Probit, solves the selection problem. As stated in the introduction, both employment of women and gender wage gap in Kyrgyzstan are relatively high. This might imply that the reservation wages of females from the upper wage distribution are higher than the offered market wage rate and they prefer to not to participate in the labor market. Thus, the sign of the selectivity bias is expected to be negative.

Chapter 3 – Data description

The Life in Kyrgyzstan longitudinal survey is used for the analysis of the gender wage gap. The survey is a joint work of DIW Berlin, Humboldt University of Berlin, CASE-Kyrgyzstan, and American University of Central Asia. There are 3000 households from 120 communities interviewed annually for 3 years from 2010 to 2012. The data was collected using stratified two-stage random sampling. In total, there are 16 strata that consist of rural and urban parts of 7 oblasts and two biggest cities: Bishkek and Osh. Life in Kyrgyzstan is a micro-level dataset covering the topics on labor market, family and household, subjective well-being, education, health and social life.¹⁸

Life in Kyrgyzstan enables conducting the analysis of individual's well-being and behavior that stands for the advantage of current data source. Moreover, individuals who participated in the survey in the first round are interviewed in subsequent years as well. Those who migrated to other regions or leaved the previous household are tracked for the purpose to be interviewed again. Thereby, no replacement of individuals from original sample enables revealing true picture of changing patterns. Another advantage of the survey is the ease of individual's identification given both the individual and household IDs. Last but not least is data collection method. Stratified sampling allows obtaining key features of individuals in the sample that is proportional to overall population.

However, there are also drawbacks of this survey. Above all, Life in Kyrgyzstan is not the biggest dataset. Information on 3000 households does not provide precise characteristics of the whole population. Further, there is a missing data on some survey questions in some of the years, which, in turn, limits the scope of variables that could be employed in the model. Besides,

¹⁸The description is shown in the description of the project from DIW site.

 $http://www.diw.de/de/diw_01.c.100313.\ en/forschung_beratung/projekte/projekte.html?id=diw_01.c.345525.en/forschung_beratung/projekte/projekte.html?id=diw_01.c.345525.en/forschung_beratung/projekte/projekte.html?id=diw_01.c.345525.en/forschung_beratung/projekte/projekte/projekte.html?id=diw_01.c.345525.en/forschung_beratung/projekte/projekte/projekte.html?id=diw_01.c.345525.en/forschung_beratung/projekte/projekt$

more than 8000 individuals participated in the survey in 2010. However, only 90% of people surveyed in 2010 are re-interviewed.¹⁹

The total amount of observations for all the years is 9446. The variables employed in the Mincerian equation include logarithm of wages, years of schooling, experience, experience squared, urban/rural dummy, oblast specification. Figure 1 presents the Kernel density estimates for monthly wages by gender for 2010-2012.



Figure 1. Kernel density estimates for monthly wages

The years of schooling are not explicitly provided in the questionnaire. The information on schooling is presented by the question: "What is the highest degree you obtained so far?" The answer ranges from "Illiterate" to "PhD" also including primary, basic, secondary general, primary technical, secondary professional, university degrees in between. Based on these

¹⁹ The detailed analysis of longitudinal surveys of Kyrgyzstan and Central Asian region is available by Tilman Bruck, Damir Esenaliev, Antje Kroeger and Susan Steiner, "Household Survey Data for Research on Well-being and Behavior in Central Asia," DIW Berlin Discussion Paper No. 1257 (2012)

categories, I recoded the corresponding year equivalents such as 0 years for illiterate, 4 years for primary, 9 years for basic. More detailed description is provided in Table 1.

Degree	Years	Degree	Years
Illiterate	0	Primary technical	14
Primary	4	Secondary Professional	15
Basic	9	University	16
Secondary general	11	Kandidate/PhD	20

Table 1. Educational level and corresponding year-equivalents in Kyrgyzstan

Further, experience is calculated by subtracting years of schooling and additional 7 years, the age at which people in Kyrgyzstan go to school, from age. The sample includes prime-age individuals (25-54 years old). Young and old people are excluded in order not to distort the results. Experience squared is divided by 100.



Figure 2. Work experience taken from the sample

Table 2 provides descriptive statistics on time-variant predictors. There are 1071 out of 3326 people receiving wages in 2010. Experience varies from 0 to 57 with an average of approximately 26 years across the years. The maximum years of schooling was 20 in 2010 and 16 thereafter meaning that a PhD candidate was not in a sample anymore starting from 2011. It is worth to note that initial wages, the income of a spouse and total assets are in dollar equivalents. The exchange rates are taken from the National Bank of the Kyrgyz Republic for the corresponding years.²⁰ Total assets are presented by households possessions: housing, vehicles, appliances and livestock.²¹

Year	Variable	Observations	Mean	Standard deviation	Min	Max
	Log_wages	1071	4.56	0.83	0.79	7.27
	Number of children below 1	3326	0.21	0.44	0	3
2010	Number of children between 1 and 6	3326	0.51	0.74	0	5
	Spouse's income	3326	34	78	0	1438
	Total assets	3326	21303	18767	4.42	260000
	Log_wages	1087	4.79	0.85	0.8	7.6
	Number of children below 1	3159	0.21	0.46	0	3
	Number of children between 1 and 6	3159	0.56	0.76	0	5
	Spouse's income	3159	45.4	98.7	0	2064.8

Table 2. Descriptive statistics of time-variant predictors

²⁰ Exchange rates are from the National Bank of the Kyrgyz Republic. http://www.nbkr.kg/index1.jsp?item=1562&lang=ENG

²¹ More information can be retrieved from

<http://www.diw.de/documents/dokumentenarchiv/17/diw_01.c.412559.de/household_forms_eng_lik12.pdf>

2011	Total assets	3159	25494	20248.4	44.4	294476
	Log_wages	999	4.94	0.7	1.44	7.43
	Number of children below 1	2961	0.17	0.43	0	3
2012	Number of children between 1 and 6	2961	0.56	0.8	0	5
	Spouse's income	2961	49	101	0	1687.8
	Total assets	2961	26612	19660.8	2.09	172000

Table 3 provides the information on time-invariant characteristics such as urban/rural residence, employment and marital status. As the data indicates, more than 60% of the sample population resides in rural parts of the country. Marital status equals 1 if a person is married or living together with someone. Approximately 86% of people in the sample come under this category. Since there is no precise question for the employment status in the questionnaire, the variable employed is defined by 1 if either of the following four questions is true: "During the past 7 days, have you worked for someone who is not a member of your household, e.g. for an enterprise, company, farm, the government, or any other individual?", "Do you have a permanent job, own business, other income-generating activity, or work as an unpaid family worker where you were absent during the last 7 days but to which you will return?", "During the past 7 days, have you worked on a farm or in a business owned or rented by you or another member of your household?" and "In the past 7 days, have you done any farming, fishing, hunting, or gathering of fruit, berries, nuts or other products?"²²

²² The information is taken from individual questionnaires of Life in Kyrgyzstan Survey, Section 3. http://www.diw.de/documents/dokumentenarchiv/17/diw_01.c.412557.de/individual_forms_eng_lik12.pdf

Year	Variable	Frequency	Percent	Cumulative
	Urban			
	0	2026	60.91	60.91
2010	1	1300	39.09	100.00
	Marital status			
	0	351	10.55	10.55
	1	2975	89.45	100.00
	Employed			
	0	1187	35.69	35.69
	1	2139	64.31	100.00
	Years of schooling			
	0	8	0.24	0.24
	4	34	1.02	1.26
	9	209	6.28	7.55
	11	1678	50.45	58.00
	14	198	5.95	63.95
	15	556	16.72	80.67
	16	642	19.30	99.97
	20	1	0.03	100.00
	Urban			
	0	1954	61.86	61.86
	1	1205	38.14	100.00
2011	Marital status			
	0	368	11.65	11.65

Table 3. Descriptive statistics of time-invariant predictors

	1	2791	88.35	100.00
	Employed			
	0	947	29.98	29.98
	1	2212	70.02	100.00
	Years of schooling			
	0	6	0.19	0.19
	4	8	0.25	0.44
	9	209	6.62	7.06
	11	1639	51.88	58.94
	14	183	5.79	64.74
	15	505	15.99	80.72
	16	609	19.28	100.00
	Urban			
	0	1186	62.34	62.34
	1	1115	37.66	100.00
2012	Marital status			
	0	319	10.77	10.77
	1	2642	89.23	100.00
	Employed			
	0	789	26.65	26.65
	1	2172	73.35	100.00
	Years of schooling			
	0	6	0.20	0.20
	4	8	0.27	0.47
	9	218	7.36	7.84
	11	1722	51.18	66.01

14	106	3.58	69.59
15	361	12.20	81.79
16	539	18.21	100.00

In Table 4, there is a description of economic sectors that are integrated into groups. The classification includes primary, secondary and tertiary.²³ Primary is about the extraction and production of raw resources and includes agriculture, fishing and mining. Secondary group comprehends the processing of raw materials obtained in primary sector. Manufacturing, energy, water and construction constitute this group. Finally, tertiary sector deals with services and delivery of output from the first two economic sectors. There are trade and repair, hotels, restaurants, utilities, social services and extra-territorial organizations in this group.

Year	Prim	ary, %	Secondary, %		Tertiary, %		
	20).72	9.89		9.89 69.39		0.39
2010	Men, %	Women, %	Men, %	Women, %	Men, %	Women, %	
	52	48	72	28	36.5	63.5	
	25.39		10.13		64.48		
2011	Men, %	Women, %	Men, %	Women, %	Men, %	Women, %	
	60	40	73	27	33	67	
	26.68		10.71		62	2.61	
2012	Men, %	Women, %	Men, %	Women, %	Men, %	Women, %	
	51.7	48.3	71.6	28.4	34.8	65.9	

Table 4. Descriptive statistics of economic sectors

²³ The classification of economic sectors is presented in the article of Zoltan Kenessey. <u>"The Primary, Secondary, Tertiary and Quaternary Sectors of the Economy"</u>. The Review of Income and Wealth.

Chapter 4 – Results

The results of Mincer earnings equation (1) for 2010, 2011 and 2012 estimated by OLS and Heckman are presented in Tables 5, 6, 7 correspondingly (Appendices 3, 4, 5 respectively). The first two columns of these tables report the OLS results for males and females. The estimations are carried out both separately for all the years and including the pooled sample (Appendix 6, Table 8). In general, the direction of the effect support the findings of the literature: positive effect of schooling, experience, urban residence and negative for experience squared. Educational attainment turns out significant in all the estimations. Cross-sectional estimates suggest that another year of schooling is associated with 6-10% increase in wages for men and 6-12% for women. Experience and experience after which the wages start declining are 17 years ($\frac{\partial(ln wages)}{\partial(exper)} = 0.032 - 2*(0.000943)*exper = 0$).

Another set of controls includes the residence specification. The estimates for urban/rural imply that the residents of cities tend to earn more than their rural counterparts (2005)²⁴ This impact is strongly significant in 2010. The analysis also captures the impact of living in certain geographical areas, known in Kyrgyzstan as oblasts. Findings show that living in Chui region has a positive impact on earnings, especially for men. This is not surprising since the capital of the country is located in this region and wages there, on average, are higher than in any other region.²⁵

²⁴ The information is taken from the The Kyrgyz Republic: Poverty Profile and Overview of Living conditions. World Bank Report (2011)

²⁵ For further details see The Kyrgyz Republic: Poverty Profile and Overview of Living conditions, poverty profile section. http://siteresources.worldbank.org/intkyrgyz/Resources/KG_Poverty_Profile_062811a.pdf

The third column of tables 5, 6 and 7 report the results of Heckman correction. Overall, the negative selection confirms the expectations and implies that females from the lower part of wage distribution are self-selected into labor market. The sign of inverse Mills ratio is negative, but not significant in 2010 and 2012.

After the regression analysis, the decomposition of wages follows. Oaxaca-Blinder decomposition estimates on basis of OLS suggest that the difference in mean earnings between men and women is statistically significant across all years. The coefficient on explained part is a reflection of changes in women's wages if females had the same characteristics as men. The results for explained part, being significant in 2010 and 2011 are negative and small. Interestingly, changes in unexplained part, being statistically significant, illustrates more than the total observed wage gap.

To see the reasons behind the significance of unexplained gap, we should turn to the detailed contribution of explanatory variables into explained and unexplained parts (Appendix 7, Table 9). Indeed the gender wage gap between men and women could be bigger if women are not better educated than men. Though the magnitude of this effect is small (-0.0545 in 2010), it significantly contributes to the explained portion of the gap. The unexplained part is formed by the difference in the intercepts of male/female equations (reported as a constant in unexplained part of detailed decomposition) and of differing returns to predictors. As the detailed decomposition for 2010 shows, the intercept accounts for most of the difference in unexplained part meaning that the wage gap in this year is solely due to gender effect.

The results of the detailed decomposition for 2011 show that intercept is no more significant, but coefficients to urban dummy, Issykkul, Talas, Batken and Chui regions make up the unexplained part. Overall, the wage gap between males and females in 2011 and 2012 is

smaller than in 2010 (0.412 in 2010, 0.238 in 2011 and 0.272 in 2012). Graphical illustration of the decomposition is reflected in Graph 4 (Appendix 8).

Mean wage decomposition after the correction of sample selection is presented in Tables 9 (Appendix 9). Since the coefficients on the selection are not statistically significant in 2010 and 2012, the discussion in devoted to 2012. Negative lambda implies that wages of women are underestimated. So after the correction for selectivity mean wages should increase leading to fall in gender pay gap. Empirical findings from Table 9 illustrate this: mean wages of women without correction for selectivity (4.672) in 2011 differ from the corrected results (5.045). As a result of the correction, the difference between mean earnings of males and females is no more significant. The results of the first stage Probit regressions are attached in Appendix 10.

Finally, sensitivity checks are provided in Appendix 11 in order to see whether the previous results hold when we look at the different economic sectors. In total, the gender wage gap is present across primary, secondary and tertiary sectors. The difference is statistically significant and varies in magnitude depending on the sector. The difference in male to female earnings is the highest in 2010 regardless of the sector, which is in line with the previous findings. Moreover, the unexplained part of the decomposition captures the observed gap.

Conclusion

This thesis provides insight into topical issue in the Kyrgyz Republic: the gender wage gap. From the country's transition to market economy, there have been changes both in social and regulatory aspects, which resulted both in positive and negative ways. On the one hand, Kyrgyz women are distinct in Central Asian region by high levels of labor force participation. On the other hand, the patriarchal setting of a society still exists and the female wages, compared to those of men, are lower

Recent regulatory changes brought the equal rights amendment to the Constitution of the Kyrgyz Republic and higher allowance for women's participation in parliamentary/high position jobs. This work focused on the effect of the reforms on women through the glance of gender pay gap patterns. Thus, this thesis provided the first investigation on this issue. The expectation was: the higher the effect of the reforms, the lower the gender wage gap over time.

Review of literature provided the concepts behind the wage differentials across particular groups. Human capital theory mainly incorporated the endowments' effect, whereas the compensating wage differentials shed light on possible sources of unexplained part of the gap (Borjas, 2005). To Life if Kyrgyzstan longitudinal survey was used for the analysis. Empirical steps included the estimation of the baseline Mincer equation with and without correction for the selectivity bias. Further, the decomposition of the results was carried out using the Oaxaca-Blinder mean wage decomposition technique.

The findings from earnings regressions are in line with the expectations. Both crosssectional and pooled sample' estimates have similar findings. The effect of educational attainment and experience on wages is positive. Also, the residents of cities, on average, have higher earnings than their rural counterparts. The geographical effect is more pronounced for men rather than for women.

The results of the Heckman correction revealed that the selectivity of females was only apparent in 2011. After the correction for the selectivity bias, mean female wages increased and gender wage gap, became negative and insignificant. Overall, I can conclude that regulatory changes did not result in lower pay gap since the inequality shrank in 2011 and increased again in 2012. The extended analysis of decomposition shows that unobserved components have attributed for the part bigger than the observed gap. Additional checks using the within-sector decomposition showed that the results are robust to previous findings.

Last, but not least is the space left for future research. Oaxaca-Blinder approach, though being easy in use, has drawbacks. First of all, it relies on restrictive normality assumptions. Secondly, it provides the decomposition at the mean restricting the scope of the analysis at the different quantiles of the wage distribution. Further extension could consider the use of Juhn-Murphy-Pierce decomposition, address the endogeneity problems. Moreover, it would be better to see the effect of the regulatory reform using data of more than three years.

References

- Anderson, K., & Pomfret, R. (2000). Gender Effects of Transition: The Kyrgyz Republic (School of Economics Working Paper No. 2000-08). University of Adelaide, School of Economics. Retrieved from https://ideas.repec.org/p/adl/wpaper/2000-08.html
- Arabsheibani, G. R., & Mussurov, A. (2007). Returns to schooling in Kazakhstan. *Economics* of *Transition*, *15*(2), 341–364. http://doi.org/10.1111/j.1468-0351.2007.00284.x
- Arsena, G., & Suela, K. (2011). MINCER RATES OF RETURN TO EDUCATION IN THE EMERGING ECONOMY OF ALBANIA. *Studies in Business and Economics*, 6(2), 27–36.
- Ashenfelter, O., & Krueger, A. B. (1994). Estimates of the economic return to schooling from a new sample of twins. *The American Economic Review (Evanston)*, 84(05), 1157– 1173.
- Becker, G. S. (1962). Investment in Human Capital: A Theoretical Analysis. *Jpoliecon Journal* of Political Economy, 70(5), 9–49.
- Behrman, J. R., Ross, D., & Sabot, R. (2008). Improving quality versus increasing the quantity of schooling: Estimates of rates of return from rural Pakistan. *Journal of Development Economics*, 85(1–2), 94–104. http://doi.org/10.1016/j.jdeveco.2006.07.004
- Blau, F. D., & Kahn, L. M. (1992). The gender earnings gap: learning from international comparisons. *The American Economic Review*, 82(2), 533–538.
- Blau, F. D., & Kahn, L. M. (1997). Swimming upstream: Trends in the gender wage differential in the 1980s. *Journal of Labor Economics*, 1–42.
- Blau, F. D., & Kahn, L. M. (2007). The Gender Pay Gap: Have Women Gone as Far as They Can? *Academy of Management Perspectives*, *21*(1), 7–23.

Blinder, A. S. (1973). Wage Discrimination: Reduced Form and Structural Estimates. *The Journal of Human Resources*, 8(4), 436–455. http://doi.org/10.2307/144855

Borjas, G. J. (2005). Labor Economics. McGraw-Hill/Irwin.

- Campos, N., & Jolliffe, D. (2007). Earnings, schooling, and economic reform: econometric evidence from Hungary (1986–2004). *The World Bank Economic Review*, 21(3), 509– 526.
- Card, D. (2001). Estimating the Return to Schooling: Progress on Some Persistent Econometric Problems. *Econometrica Econometrica*, 69(5), 1127–1160.
- DeLeire, T., & Levy, H. (2001). GENDER, OCCUPATION CHOICE AND THE RISK OF DEATH AT WORK. *Working Paper Series.*, (8574), ALL.
- Heckman, J. J. (1977a). Sample Selection Bias As a Specification Error (with an Application to the Estimation of Labor Supply Functions) (Working Paper No. 172). National Bureau of Economic Research. Retrieved from http://www.nber.org/papers/w0172
- Heckman, J. J. (1977b). Sample Selection Bias As a Specification Error (with an Application to the Estimation of Labor Supply Functions) (Working Paper No. 172). National Bureau of Economic Research. Retrieved from http://www.nber.org/papers/w0172
- Heckman, J. J. (1979). Sample Selection Bias as a Specification Error. *Econometrica*, 47(1), 153–161. http://doi.org/10.2307/1912352
- Heckman, J. J. (2015). Introduction to A Theory of the Allocation of Time by Gary Becker. *ECOJ The Economic Journal*, *125*(583), 403–409.
- Hersch, J. (1996). Smoking, seat belts, and other risky consumer decisions: Differences by gender and race. *Managerial and Decision Economics*, 17(5), 471–481. http://doi.org/10.1002/(SICI)1099-1468(199609)17:5<471::AID-MDE789>3.0.CO;2-W

- Longhi, S., Nicoletti, C., & Platt, L. (2013). Explained and unexplained wage gaps across the main ethno-religious groups in Great Britain. Oxford Economic Papers, 65(2), 471– 493. http://doi.org/10.1093/oep/gps025
- Mincer, J. (1974). *Schooling, experience, and earnings*. New York: National Bureau of Economic Research; distributed by Columbia University Press.
- Neumark, D. (1988). Employers' discriminatory behavior and the estimation of wage discrimination. *Journal of Human Resources : JHR*, 23(3).
- Nordin, M., Dackehag, M., & Gerdtham, U.-G. (2013). Socioeconomic inequalities in drug utilization for Sweden: evidence from linked survey and register data. *Social Science & Medicine*, 77, 106–117.
- Oaxaca, R. (1973). Male-Female Wage Differentials in Urban Labor Markets. *International Economic Review*, *14*(3), 693–709.
- Reid, C. E. (1985). The effect of residential location on the wages of black women and white women. *Journal of Urban Economics*, 18(3), 350–363. http://doi.org/10.1016/0094-1190(85)90008-7
- Taubman P. (1976). Earnings, education, genetics, and environment. *The Journal of Human Resources*, *11*(4), 447–61.

Appendices

Appendix 1. Graph 1. Wage ratio of women to men, %.



Source: National Statistic Committee "Jenshiny I myjchiny Kyrgyzskoi Respubliki , 2005, 2010

Appendix 2. Graph 2. Female labor participation rate in Kyrgyzstan, %.



Source: World Bank



Appendix 3. Graph 3. Wage ratio of women to men, %.

Source: Own calculations from the sample

Appendix 3. Table 5. Results of earnings equation for 2010

	0	Heckman	
VARIABLES	Men	Women	Women
	lwage	lwage	lwage
educ	0.0692***	0.0893***	0.070***
	(0.0147)	(0.0135)	(0.0263)
exper	-0.0172	0.0140	0.0066
	(0.0199)	(0.0166)	(0.0186)
exper_sq	0.0265	-0.0467	-0.0296
	(0.0481)	(0.0413)	(0.0457)
city	0.274***	0.274***	0.2601***
	(0.0726)	(0.0627)	(0.0644)
Issykkul	0.321	0.192	0.182
	(0.240)	(0.193)	(0.192)
Jalalabad	0.0845	0.0348	0.0245
	(0.230)	(0.182)	(0.181)
Talas	0.566*	0.430**	0.422*
	(0.292)	(0.217)	(0.216)
Oshskaya	0.199	-0.0478	-0.044
	(0.223)	(0.179)	(0.178)
Batken	0.340	-0.172	-0.167
	(0.240)	(0.212)	(0.211)
Chui	0.460**	0.344**	0.314*
	(0.212)	(0.170)	(0.173)
Constant	3.604***	2.686***	3.155***
	(0.329)	(0.291)	(0.624)
Mills			-0.132
			(0.155)
Observations	528	543	543

R-squared	0.142	0.227	0.227		
Standard errors in parentheses					
*** p<0.01, ** p<0.05, * p<0.1					

Appendix 4. Table 6. Results of earnings equation for 2011

	OLS		Heckman
VARIABLES	Men	Women	Women
	lwage	lwage	lwage
educ	0.0999***	0.120***	0.0676***
	(0.0159)	(0.0141)	(0.0232)
exper	0.0250	0.0140	-0.012
	(0.0224)	(0.0169)	(0.0197)
exper_sq	-0.0823	-0.0435	-0. 0143
	(0.0538)	(0.0415)	(0.0474)
city	0.300***	0.0662	0.0038
	(0.0769)	(0.0686)	(0.0745)
Issykkul	0.420*	-0.200	-0.208
	(0.254)	(0.192)	(0.197)
Jalalabad	0.419*	0.0422	0. 025
	(0.235)	(0.178)	(0.183)
Talas	0.745**	-0.109	-0.25
	(0.314)	(0.214)	(0.183)
Oshskaya	0.455**	-0.0965	-0.093
	(0.230)	(0.176)	(0.180)
Batken	0.771***	-0.271	-0.238
	(0.252)	(0.209)	(0.215)
Chui	0.602***	-0.0144	-0.085
	(0.221)	(0.168)	(0.174)
Constant	2.786***	2.960***	4.387***
	(0.370)	(0.297)	(0.582)
Mills			-
			0.4877***
			(0.167)
Observations	521	566	566
R-squared	0.182	0.165	0.165

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

	0	Heckman	
VARIABLES	Men	Women	Women
	lwage	lwage	lwage
educ	0.0630***	0.0787***	0.0756***
	(0.0133)	(0.0123)	(0.0197)
exper	0.0320*	0.0198	0.0183
	(0.0189)	(0.0160)	(0.0173)
exper_sq	-0.0943**	-0.0517	-0.0484
	(0.0451)	(0.0388)	(0.0416)
city	0.0783	0.0897	0.0888
	(0.0671)	(0.0638)	(0.0632)
Issykkul	0.249	-0.291*	-0.290*
	(0.226)	(0.159)	(0.157)
Jalalabad	0.206	-0.0675	-0.067
	(0.215)	(0.149)	(0.147)
Talas	0.355	-0.449**	-0.459**
	(0.265)	(0.177)	(0.182)
Oshskaya	0.259	0.0559	0.0558
	(0.212)	(0.149)	(0.148)
Batken	0.206	-0.308	-0.304
	(0.232)	(0.190)	(0.189)
Chui	0.412**	0.0499	0.0489
	(0.204)	(0.140)	(0.139)
Constant	3.697***	3.563***	3.638***
	(0.311)	(0.267)	(0.457)
Mills			-0.025
			(0.124)
Observations	464	535	535
R-squared	0.129	0.148	0.148

Appendix 5. Table 7. Results of earnings equation for 2012

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Appendix 6. Table 8. Results of earnings equation using the pooled sample

	pooled
VARIABLES	lwage
educ	0.0857***
	(0.00576)
exper	0.0141*

	(0.00755)
exper_sq	-0.0480***
	(0.0184)
city	0.177***
	(0.0281)
Issykkul	0.0678
	(0.0851)
Jalalabad	0.0763
	(0.0800)
Talas	0.157
	(0.0984)
Oshskaya	0.0882
	(0.0787)
Batken	0.0753
	(0.0899)
Chui	0.258***
	(0.0749)
year_2011	0.131***
	(0.0448)
year_2012	0.306***
	(0.0462)
Female*2011	0.218***
	(0.0625)
Female*2012	0.184***
	(0.0639)
gendert	-0.501***
	(0.0446)
Constant	3.329***
	(0.129)
Observations	3,157
R-squared	0.201

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Appendix 7. Table 9. Mean wage decomposition using OLS.

	2010	2011	2012
Group 1 (males)	4.787***	4.910***	5.085***
	(0.0371)	(0.0398)	(0.0322)
Group 2 (females)	4.375***	4.672***	4.814***
	(0.0325)	(0.0332)	(0.0297)
Difference	0.412***	0.238***	0.272***
	(0.0493)	(0.0518)	(0.0438)
explained	-0.0774***	-0.0484*	-0.0295
	(0.0231)	(0.0253)	(0.0187)

unexplained	0.489***	0.287***	0.301***
1	(0.0468)	(0.0490)	(0.0427)
Explained:	, ,		
Education	-0.0545***	-0.0450***	-0.0353***
	(0.0154)	(0.0162)	(0.0122)
Experience	-0.00774	0.00243	0.00149
L	(0.0124)	(0.0124)	(0.0162)
Experience squared	0.00678	8.14e-05	-0.000274
r · · · · · · ·	(0.0135)	(0.0166)	(0.0198)
City	-0.0153*	-0.0117	-0.000109
	(0.00927)	(0.00959)	(0.00248)
Issykkul	-0.000494	-0.00511	-0.00396
5	(0.00529)	(0.00740)	(0.00569)
Jalalabad	-0.000820	-0.000514	-0.00218
	(0.00280)	(0.00885)	(0.00504)
Talas	-0.00685	-0.0143	-0.00787
	(0.00723)	(0.0102)	(0.00736)
Osh	0.00497	0.00894	0.00884
	(0.00710)	(0.0113)	(0.00937)
Batken	0.0114	0.0181	0.00479
	(0.00945)	(0.0127)	(0.00611)
Chui	-0.0148	-0.00131	0.00513
	(0.0156)	(0.0183)	(0.0133)
Unexplained:			
Education	-0.286	-0.278	-0.218
	(0.292)	(0.294)	(0.251)
	(0.283)	(0.277)	(0.251)
Experience	-0.656	0.239	0.266
Experience	-0.656 (0.546)	0.239 (0.609)	0.266 (0.542)
Experience Experience squared	-0.656 (0.546) 0.370	0.239 (0.609) -0.209	0.266 (0.542) -0.232
Experience Experience squared	-0.656 (0.546) 0.370 (0.321)	$\begin{array}{c} (0.294) \\ 0.239 \\ (0.609) \\ -0.209 \\ (0.366) \end{array}$	$\begin{array}{c} (0.231) \\ 0.266 \\ (0.542) \\ -0.232 \\ (0.324) \end{array}$
Experience Experience squared City	(0.283) -0.656 (0.546) 0.370 (0.321) -3.40e-05	0.239 (0.609) -0.209 (0.366) 0.128**	0.266 (0.542) -0.232 (0.324) -0.00617
Experience Experience squared City	(0.283) -0.656 (0.546) 0.370 (0.321) -3.40e-05 (0.0549)	$\begin{array}{c} (0.2)4) \\ 0.239 \\ (0.609) \\ -0.209 \\ (0.366) \\ 0.128^{**} \\ (0.0566) \end{array}$	$\begin{array}{c} 0.251 \\ 0.266 \\ (0.542) \\ -0.232 \\ (0.324) \\ -0.00617 \\ (0.0500) \end{array}$
Experience Experience squared City Issykkul	$\begin{array}{c} (0.283) \\ -0.656 \\ (0.546) \\ 0.370 \\ (0.321) \\ -3.40e-05 \\ (0.0549) \\ 0.0102 \end{array}$	$\begin{array}{c} (0.2)4) \\ 0.239 \\ (0.609) \\ -0.209 \\ (0.366) \\ 0.128^{**} \\ (0.0566) \\ 0.0504^{*} \end{array}$	$\begin{array}{c} (0.231) \\ 0.266 \\ (0.542) \\ -0.232 \\ (0.324) \\ -0.00617 \\ (0.0500) \\ 0.0505* \end{array}$
Experience Experience squared City Issykkul	$\begin{array}{c} (0.283) \\ -0.656 \\ (0.546) \\ \hline 0.370 \\ (0.321) \\ \hline -3.40e-05 \\ (0.0549) \\ \hline 0.0102 \\ (0.0244) \end{array}$	$\begin{array}{c} (0.2)4) \\ 0.239 \\ (0.609) \\ -0.209 \\ (0.366) \\ 0.128^{**} \\ (0.0566) \\ 0.0504^{*} \\ (0.0268) \end{array}$	$\begin{array}{c} (0.251) \\ 0.266 \\ (0.542) \\ -0.232 \\ (0.324) \\ -0.00617 \\ (0.0500) \\ 0.0505* \\ (0.0267) \end{array}$
Experience Experience squared City Issykkul Jalalabad	$\begin{array}{c} (0.283) \\ -0.656 \\ (0.546) \\ 0.370 \\ (0.321) \\ -3.40e-05 \\ (0.0549) \\ 0.0102 \\ (0.0244) \\ 0.00622 \end{array}$	$\begin{array}{c} (0.2)4)\\ 0.239\\ (0.609)\\ -0.209\\ (0.366)\\ 0.128^{**}\\ (0.0566)\\ 0.0504^{*}\\ (0.0268)\\ 0.0532\\ \end{array}$	$\begin{array}{c} 0.266\\ (0.542)\\ -0.232\\ (0.324)\\ -0.00617\\ (0.0500)\\ 0.0505*\\ (0.0267)\\ 0.0389\end{array}$
Experience Experience squared City Issykkul Jalalabad	$\begin{array}{c} (0.283) \\ -0.656 \\ (0.546) \\ 0.370 \\ (0.321) \\ -3.40e-05 \\ (0.0549) \\ 0.0102 \\ (0.0244) \\ 0.00622 \\ (0.0367) \end{array}$	$\begin{array}{c} (0.2)4)\\ 0.239\\ (0.609)\\ -0.209\\ (0.366)\\ 0.128^{**}\\ (0.0566)\\ 0.0504^{*}\\ (0.0268)\\ 0.0532\\ (0.0420)\\ \end{array}$	$\begin{array}{c} (0.251) \\ 0.266 \\ (0.542) \\ -0.232 \\ (0.324) \\ -0.00617 \\ (0.0500) \\ 0.0505* \\ (0.0267) \\ 0.0389 \\ (0.0374) \end{array}$
Experience Experience squared City Issykkul Jalalabad Talas	$\begin{array}{c} (0.283) \\ -0.656 \\ (0.546) \\ 0.370 \\ (0.321) \\ -3.40e-05 \\ (0.0549) \\ 0.0102 \\ (0.0244) \\ 0.00622 \\ (0.0367) \\ 0.00552 \end{array}$	$\begin{array}{c} (0.2)4)\\ 0.239\\ (0.609)\\ -0.209\\ (0.366)\\ 0.128^{**}\\ (0.0566)\\ 0.0504^{*}\\ (0.0268)\\ 0.0532\\ (0.0420)\\ 0.0377^{**} \end{array}$	$\begin{array}{c} 0.266\\ (0.542)\\ -0.232\\ (0.324)\\ -0.00617\\ (0.0500)\\ 0.0505*\\ (0.0267)\\ 0.0389\\ (0.0374)\\ 0.0421** \end{array}$
Experience Experience squared City Issykkul Jalalabad Talas	$\begin{array}{c} (0.283) \\ -0.656 \\ (0.546) \\ 0.370 \\ (0.321) \\ -3.40e-05 \\ (0.0549) \\ 0.0102 \\ (0.0244) \\ 0.00622 \\ (0.0367) \\ 0.00552 \\ (0.0148) \end{array}$	$\begin{array}{c} (0.2)4)\\ 0.239\\ (0.609)\\ -0.209\\ (0.366)\\ 0.128^{**}\\ (0.0566)\\ 0.0504^{*}\\ (0.0268)\\ 0.0532\\ (0.0420)\\ 0.0377^{**}\\ (0.0183)\\ \end{array}$	$\begin{array}{c} 0.266\\ (0.542)\\ -0.232\\ (0.324)\\ -0.00617\\ (0.0500)\\ 0.0505*\\ (0.0267)\\ 0.0389\\ (0.0374)\\ 0.0421^{**}\\ (0.0184)\\ \end{array}$
Experience Experience squared City Issykkul Jalalabad Talas Osh	$\begin{array}{c} (0.283) \\ -0.656 \\ (0.546) \\ 0.370 \\ (0.321) \\ -3.40e-05 \\ (0.0549) \\ 0.0102 \\ (0.0244) \\ 0.00622 \\ (0.0367) \\ 0.00552 \\ (0.0148) \\ 0.0355 \end{array}$	0.239 0.239 (0.609) -0.209 (0.366) 0.128** (0.0566) 0.0504* (0.0268) 0.0532 (0.0420) 0.0377** (0.0183) 0.0887*	$\begin{array}{c} 0.251)\\ 0.266\\ (0.542)\\ -0.232\\ (0.324)\\ -0.00617\\ (0.0500)\\ 0.0505*\\ (0.0267)\\ 0.0389\\ (0.0374)\\ 0.0421**\\ (0.0184)\\ 0.0281\\ \end{array}$
Experience Experience squared City Issykkul Jalalabad Talas Osh	$\begin{array}{c} (0.283) \\ -0.656 \\ (0.546) \\ 0.370 \\ (0.321) \\ -3.40e-05 \\ (0.0549) \\ 0.0102 \\ (0.0244) \\ 0.00622 \\ (0.0367) \\ 0.00552 \\ (0.0148) \\ 0.0355 \\ (0.0413) \end{array}$	0.239 0.239 (0.609) -0.209 (0.366) 0.128** (0.0566) 0.0504* (0.0268) 0.0532 (0.0420) 0.0377** (0.0183) 0.0887* (0.0473)	$\begin{array}{c} (0.251) \\ 0.266 \\ (0.542) \\ -0.232 \\ (0.324) \\ -0.00617 \\ (0.0500) \\ 0.0505* \\ (0.0267) \\ 0.0389 \\ (0.0374) \\ 0.0421** \\ (0.0184) \\ 0.0281 \\ (0.0360) \end{array}$
Experience Experience squared City Issykkul Jalalabad Talas Osh Batken	$\begin{array}{c} (0.283) \\ -0.656 \\ (0.546) \\ 0.370 \\ (0.321) \\ -3.40e-05 \\ (0.0549) \\ 0.0102 \\ (0.0244) \\ 0.00622 \\ (0.0367) \\ 0.00552 \\ (0.0148) \\ 0.0355 \\ (0.0413) \\ 0.0226 \end{array}$	$\begin{array}{c} (0.2)4)\\ 0.239\\ (0.609)\\ -0.209\\ (0.366)\\ 0.128^{**}\\ (0.0566)\\ 0.0504^{*}\\ (0.0268)\\ 0.0532\\ (0.0420)\\ 0.0377^{**}\\ (0.0183)\\ 0.0887^{*}\\ (0.0473)\\ 0.0515^{***}\\ \end{array}$	$\begin{array}{c} 0.251)\\ 0.266\\ (0.542)\\ -0.232\\ (0.324)\\ -0.00617\\ (0.0500)\\ 0.0505*\\ (0.0267)\\ 0.0389\\ (0.0374)\\ 0.0421**\\ (0.0184)\\ 0.0281\\ (0.0360)\\ 0.0202\\ \end{array}$
Experience Experience squared City Issykkul Jalalabad Talas Osh Batken	$\begin{array}{c} (0.283) \\ -0.656 \\ (0.546) \\ 0.370 \\ (0.321) \\ -3.40e-05 \\ (0.0549) \\ 0.0102 \\ (0.0244) \\ 0.00622 \\ (0.0367) \\ 0.00552 \\ (0.0148) \\ 0.0355 \\ (0.0413) \\ 0.0226 \\ (0.0149) \end{array}$	0.239 0.239 (0.609) -0.209 (0.366) 0.128** (0.0566) 0.0504* (0.0268) 0.0532 (0.0420) 0.0377** (0.0183) 0.0515*** (0.0188)	$\begin{array}{c} (0.251) \\ 0.266 \\ (0.542) \\ -0.232 \\ (0.324) \\ -0.00617 \\ (0.0500) \\ 0.0505* \\ (0.0267) \\ 0.0389 \\ (0.0374) \\ 0.0421** \\ (0.0184) \\ 0.0281 \\ (0.0360) \\ 0.0202 \\ (0.0125) \\ \end{array}$
Experience Experience squared City Issykkul Jalalabad Talas Osh Batken Chui	$\begin{array}{c} (0.283) \\ -0.656 \\ (0.546) \\ 0.370 \\ (0.321) \\ -3.40e-05 \\ (0.0549) \\ 0.0102 \\ (0.0244) \\ 0.00622 \\ (0.0367) \\ 0.00552 \\ (0.0148) \\ 0.0355 \\ (0.0413) \\ 0.0226 \\ (0.0149) \\ 0.0624 \end{array}$	$\begin{array}{c} (0.2)4)\\ 0.239\\ (0.609)\\ -0.209\\ (0.366)\\ 0.128^{**}\\ (0.0566)\\ 0.0504^{*}\\ (0.0268)\\ 0.0532\\ (0.0420)\\ 0.0377^{**}\\ (0.0183)\\ 0.0887^{*}\\ (0.0473)\\ 0.0515^{***}\\ (0.0188)\\ 0.299^{**}\\ \end{array}$	$\begin{array}{c} (0.251) \\ 0.266 \\ (0.542) \\ -0.232 \\ (0.324) \\ -0.00617 \\ (0.0500) \\ 0.0505* \\ (0.0267) \\ 0.0389 \\ (0.0374) \\ 0.0421** \\ (0.0184) \\ 0.0281 \\ (0.0360) \\ 0.0202 \\ (0.0125) \\ 0.177 \end{array}$
Experience Experience squared City Issykkul Jalalabad Talas Osh Batken Chui	$\begin{array}{c} (0.283) \\ -0.656 \\ (0.546) \\ 0.370 \\ (0.321) \\ -3.40e-05 \\ (0.0549) \\ 0.0102 \\ (0.0244) \\ 0.00622 \\ (0.0367) \\ 0.00552 \\ (0.0148) \\ 0.0355 \\ (0.0413) \\ 0.0226 \\ (0.0149) \\ 0.0624 \\ (0.146) \end{array}$	$\begin{array}{c} (0.2)4)\\ 0.239\\ (0.609)\\ -0.209\\ (0.366)\\ 0.128^{**}\\ (0.0566)\\ 0.0504^{*}\\ (0.0268)\\ 0.0532\\ (0.0420)\\ 0.0377^{**}\\ (0.0183)\\ 0.0887^{*}\\ (0.0473)\\ 0.0515^{***}\\ (0.0188)\\ 0.299^{**}\\ (0.135)\\ \end{array}$	$\begin{array}{c} 0.266\\ (0.542)\\ -0.232\\ (0.324)\\ -0.00617\\ (0.0500)\\ 0.0505*\\ (0.0267)\\ 0.0389\\ (0.0374)\\ 0.0421**\\ (0.0184)\\ 0.0281\\ (0.0360)\\ 0.0202\\ (0.0125)\\ 0.177\\ (0.121)\\ \end{array}$
Experience squared Experience squared City Issykkul Jalalabad Jalalabad Cosh Batken Chui Constant	$\begin{array}{c} (0.283) \\ -0.656 \\ (0.546) \\ 0.370 \\ (0.321) \\ -3.40e-05 \\ (0.0549) \\ 0.0102 \\ (0.0244) \\ 0.00622 \\ (0.0367) \\ 0.00552 \\ (0.0148) \\ 0.0355 \\ (0.0413) \\ 0.0226 \\ (0.0149) \\ 0.0624 \\ (0.146) \\ 0.918** \end{array}$	$\begin{array}{c} (0.2)4)\\ 0.239\\ (0.609)\\ -0.209\\ (0.366)\\ 0.128^{**}\\ (0.0566)\\ 0.0504^{*}\\ (0.0268)\\ 0.0532\\ (0.0420)\\ 0.0377^{**}\\ (0.0183)\\ 0.0887^{*}\\ (0.0473)\\ 0.0515^{***}\\ (0.0188)\\ 0.299^{**}\\ (0.135)\\ -0.174\\ \end{array}$	$\begin{array}{c} (0.251) \\ 0.266 \\ (0.542) \\ -0.232 \\ (0.324) \\ -0.00617 \\ (0.0500) \\ 0.0505* \\ (0.0267) \\ 0.0389 \\ (0.0374) \\ 0.0421** \\ (0.0184) \\ 0.0281 \\ (0.0360) \\ 0.0202 \\ (0.0125) \\ 0.177 \\ (0.121) \\ 0.134 \end{array}$



results (2010, 2011, 2012 in ascending order)



0.5

0.0

1.0

Talas Oshskaya Batken Chui

-0.5

Appendix 9. Table 9. Selectivity-corrected results of earnings equation

	2010	2011	2012
Group 1 (males)	4.787***	4.910***	5.085***
	(0.0371)	(0.0398)	(0.0322)
Group 2 (females)	4.477***	5.045***	4.830***
	(0.124)	(0.133)	(0.0880)
Difference	0.310**	-0.135	0.255***
	(0.130)	(0.139)	(0.0937)
explained	-0.0774***	-0.0484*	-0.0295
	(0.0231)	(0.0253)	(0.0187)
unexplained	0.387***	-0.0868	0.285***
	(0.129)	(0.139)	(0.0933)
Explained:			
Education	-0.0545***	-0.0450***	-0.0353***
	(0.0154)	(0.0162)	(0.0122)
Experience	-0.00774	0.00243	0.00149
	(0.0124)	(0.0124)	(0.0162)
Experience squared	0.00678	8.14e-05	-0.000274
	(0.0135)	(0.0166)	(0.0198)
City	-0.0153*	-0.0117	-0.000109
	(0.00927)	(0.00959)	(0.00248)
Issykkul	-0.000494	-0.00511	-0.00396
	(0.00529)	(0.00740)	(0.00569)
Jalalabad	-0.000820	-0.000514	-0.00218
	(0.00280)	(0.00885)	(0.00504)
Talas	-0.00685	-0.0143	-0.00787
	(0.00723)	(0.0102)	(0.00736)
Osh	0.00497	0.00894	0.00884
	(0.00710)	(0.0113)	(0.00937)
Batken	0.0114	0.0181	0.00479
	(0.00945)	(0.0127)	(0.00611)
Chui	-0.0148	-0.00131	0.00513
	(0.0156)	(0.0183)	(0.0133)
Unexplained:			
Education	-0.0120	0.446	-0.174
	(0.428)	(0.390)	(0.330)
Experience	-0.501	0.804	0.298
	(0.574)	(0.649)	(0.562)
Experience squared	0.284	-0.521	-0.249
~	(0.336)	(0.387)	(0.334)
City	0.00797	0.162***	-0.00570
T 11 1	(0.0556)	(0.0590)	(0.0498)
Issykkul	0.0110	0.0511*	0.0505*
T 1 1 1 1	(0.0244)	(0.02/1)	(0.0266)
Jalalabad	0.00751	0.0556	0.0388
	(0.0367)	(0.0424)	(0.03/3)
Talas	0.00583	0.0440**	0.0426**

	(0.0148)	(0.0192)	(0.0186)
Osh	0.0350	0.0881*	0.0279
	(0.0412)	(0.0477)	(0.0359)
Batken	0.0224	0.0499***	0.0200
	(0.0148)	(0.0188)	(0.0125)
Chui	0.0782	0.334**	0.178
	(0.147)	(0.137)	(0.121)
Constant	0.449	-1.601**	0.0588
	(0.705)	(0.690)	(0.552)

Appendix 10. Table 10. Probit results from participation equation

	2010	2011	2012
VARIABLES	employment	employment	employment
educ	0.214***	0.1652***	0.2283***
	(0.0174)	(0.0174)	(0.0192)
exper	0.0656***	0.0569***	0.0745***
	(0.0216)	(0.0213)	(0.024)
exper_sq	-0.173***	-0.1415***	-0.177***
	(0.0514)	(0.0497)	(0.0560)
city	0.109***	0.184**	0.053
	(0.0842)	(0.0835)	(0.0929)
Issykkul	-0.041	-0.101	-0.123
	(0.2214)	(0.2121)	(0.225)
Jalalabad	0.1614	0.1027	-0.0484
	(0.2046)	(0.1934)	(0.203)
Talas	0.0756	0.477**	0.0762
	(0.2538)	(0.265)	(0.3198)
Oshskaya	0.0323	0.0945	-0.0784
	(0.2014)	(0.1915)	(0.2045)
Batken	0.592	-0.0582	-0.238
	(0.2348)	(0.2252)	(0.253)
Chui	0.295	0.0956	-0.0804
	(0.1949)	(0.1859)	(0.1974)
Married	-0.498***	-0.4027***	-0.648***
	(0.1095)	(0.105)	(0.1162)
Number_kids1	-0.385***	-0.494***	-0.536***
	(0.095)	(0.0901)	(0.113)
Number_kids6	-0.253***	-0.2635***	-0.249***
	(0.0596)	(0.0568)	(0.0601)
Total assets	-5.93e-07	-5.93e-07	-7.83e-06
	(2.43e-06)	(2.43e-06)	(2.47e-06)
Spouse income	0.0001	0.0003	0.0007
	(0.0004)	(0.0003)	(0.0003)
Constant	-3.180***	-2.4035***	-2.734***
	(0.401)	(0.388)	(0.425)

	Oaxaca decomposition within primary sector		
	2010	2011	2012
Group 1 (males)	4.949***	4.910***	5.085***
	(0.135)	(0.0396)	(0.0320)
Group 2 (females)	3.984***	4.672***	4.814***
	(0.249)	(0.0330)	(0.0295)
Difference	0.965***	0.238***	0.272***
	(0.283)	(0.0516)	(0.0436)
explained	-0.105	-0.0572**	-0.0361
	(0.120)	(0.0228)	(0.0160)
unexplained	0.859***	0.295***	0.308***
	(0.265)	(0.0482)	(0.0420)

Appendix 11. Table 11. Wiithin-sector mean wage decompositions

	Oaxaca decomposition within secondary sector		
	2010	2011	2012
Group 1 (males)	4.775***	4.928***	5.108***
_	(0.0609)	(0.0551)	(0.0470)
Group 2 (females)	4.557***	4.737***	4.874***
	(0.0926)	(0.0683)	(0.0549)
Difference	0.218**	0.191**	0.234***
	(0.111)	(0.0878)	(0.0723)
explained	-0.0828*	-0.0510	-0.0129
	(0.0447)	(0.0405)	(0.0291)
unexplained	0.301***	0.242***	0.247***
	(0.112)	(0.0921)	(0.0760)

	Oaxaca decomposition within tertiary sector		
	2010	2011	2012
Group 1 (males)	4.851***	5.052***	5.092***
	(0.0453)	(0.0523)	(0.0448)
Group 2 (females)	4.395***	4.778***	4.845***
	(0.0323)	(0.0317)	(0.0317)
Difference	0.456***	0.275***	0.248***
	(0.0556)	(0.0612)	(0.0549)
explained	-0.0474**	-0.00664	-0.0178
	(0.0235)	(0.0272)	(0.0220)
unexplained	0.504***	0.281***	0.265***
	(0.0523)	(0.0566)	(0.0518)