JAME
E-ISSN:2791-7401
Volume : 1, Issue 2, 2021
URL: https://journals.gen.tr/jame

Received: 10.06.2021
Acccepted: 11.12.2021

RESEARCH ARTICLE

Returns to education: Empirical evidence from Kyrgyzstan

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Abstract

The aim of this study is to identify the returns to education in Kyrgyzstan, with special reference to employment type and gender differences. The empirical analysis of this study is based on Life in Kyrgyzstan (LiK) survey data collected in 2016. The sample for analysis is constructed with employees and self-employed persons aged 18-65, who indicated their monthly income from employment. According to the empirical outputs, there is a wage premium for higher education such that the marginal return to education for women is higher than men.

Keywords: Education, Returns, Mincer Wage Model, Kyrgyzstan, Central Asia

JEL Codes: I26, I20, N35

Citation: SULAIMANOVA, B., (2021). Returns to education: Empirical evidence from Kyrgyzstan. *Journal of Applied Microeconometrics (JAME)*. 1(2), 73-84, DOI: 10.53753/jame.1.2.01

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1. INTRODUCTION

The high level of education of the population, being the key to the development of human capital, makes a positive contribution to economic development of the country in the long run. However, the discrepancy between the acquired vocational and qualification skills and the needs of the labor market can have a negative impact on employment indicators and, as a consequence, on economic growth (Ryazantseva 2012; Allen and Van Der Velden 2001).

Kyrgyzstan has a fairly high level of access to education, both school and higher. In particular, over the past 25 years, the number of higher education institutions has rapidly increased. However, the increase in the number of higher education institutions does not meet the demand for skilled labor in the labor market. This problem causes various public discussions in order to reform the education system. This study aims to identify returns on education, whether obtained education pays off at the labor market of Kyrgyzstan. The study uses the nationally representative household survey "Life in Kyrgyzstan" for 2016, which is available from the International Data Service Center of the Institute for Study of Labour (IDSC IZA). Empirical analysis of the impact of education on income are based on the non-linear wage model of Mincer.

This study is structured as follows. Section 2 describes the state of the labor market and the education system in Kyrgyzstan. Section 3 presents the methodology for assessing the mismatch factors and the statistical data obtained. Sections 4 and 5 present the analysis results and conclusions respectively.

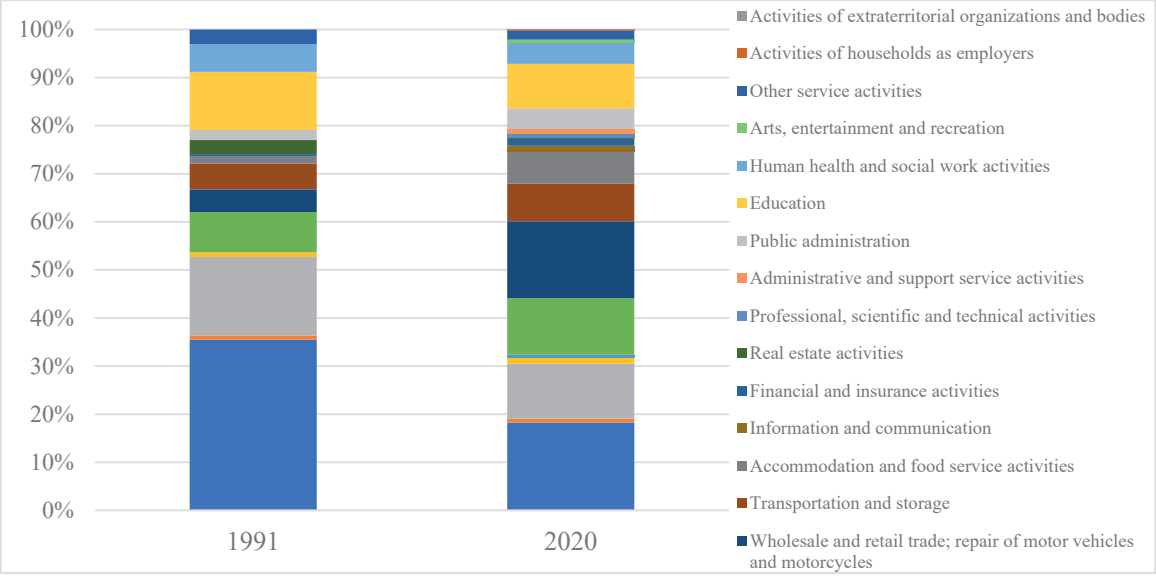
1.1. Education and Labor Market Trends in Kyrgyzstan

As a heritage of the Soviet Union, the employed population of the Kyrgyzstan has a high level of education. According to the National Statistics Committee of Kyrgyz Republic (NSCKR 2018) almost every fifth of the employed population has a higher or incomplete higher education, every tenth has a secondary vocational education. For 2017, the total number of employed women, the proportion of women who had higher professional education was 27% whereas; the share of men with higher professional education was 17%. Furthermore, 16% of women had secondary vocational and this ratio was 7% for men.

Over the years of independence, the number of higher educational institutions has rapidly increased from 9 in 1990 to 50 in 2016. Most of the higher educational institutions are located in Bishkek (about 64 %), which is due to the presence of a developed network of state educational institutions of higher professional education (NSCKR 2018).

According to the structure of student's specialties they receive, the most popular professions are economist, translator from a foreign language, doctor, lawyer, engineer, IT programmer, builder and manager. Thus, according to NSCKR the distribution of students of higher educational institutions by groups of specialties for 2017 is as follows: more than half of the students (53%) study in the humanities (i.e., the professions of economist, manager, lawyer, etc.), natural sciences -3.4%, education - 14.7%, healthcare - 6.7%, technical sciences - 19.6%, agricultural sciences - 1%, service - 0.3%, interdisciplinary sciences - 1.7%.

Figure 1. Employed Population by Type of Economic Activity



Source: NSCKR, (www.stat.kg/ru/statistics/zanyatost/ - accessed 15 July 2021)

However, obtaining a specialty is not always guaranteed by employment in the labor market. Thus, according to the NSCKR, in 2018 the total unemployment rate in the country was 6.2%, whereas about 40 % of those unemployed have tertiary or technical education. This fact indicates that it is rather difficult for graduates to get a job after receiving a diploma. This particularly shows that with high growth rates of tertiary education leads to an oversupply of highly skilled labor in Kyrgyzstan. This could be a result of the weaknesses of the education system and one of the labor market features of transition economies. Hence, in post-Soviet countries, the rapid job reallocation and slow creation of jobs in high productivity sectors, result in difficulty for individuals to join the labor market and put their skill to use (Kupets 2016). Consequently, in Kyrgyzstan in the years of independence, the structure of the employed population underwent significant changes, where the share of people employed in agriculture decreased, while in trade, services and construction increased. This could be seen in the Figure 1. In 1991, the economy of Kyrgyzstan prevailed with agriculture, manufacturing and education sectors, while in 2020 the services sectors, such as trade, construction, accommodation and food service activities prevailed. Also, another factor that led to such changes is labor migration, when migrants, leaving work in agriculture, move to trade and services or construction at the place of their new residence. (NSCKR 2016).

Over the past 5 years, the share of expenditures allocated to education in the expenditures of the state budget of Kyrgyzstan was quite significant (average from 21% to 24%). The bulk of education spending is on secondary education (57% on average) and tertiary vocational education (13%) (NSCKR 2018). Considering, the high cost of education as for individuals, and public investment in education in Kyrgyzstan, the analysis of return for education is very important.

1.2. Literature Review

The bulk of research that studies returns to education is mainly based on the theory of human capital. The theory stresses the importance of education for improving productivity. The main argument of human capital theory is that better educated people are generally more skilled and are expected to be more productive than people with lower levels of education, thus skilled workers will earn more (Joseph 2020; Wang et al. 2019). That is why the quantity of years of study is used as one of the key factors determining the level of earnings of employees (Rizk 2019). Even though the empirical literature has been dominantly presented with the interpretation within human capital theory, the alternative literature asserts that education may have effect over wages not because of productivity of worker, but for other reasons. For instance, education may act as an instrument signaling the ability or productivity of worker (Gunderson and Oreopolous 2020; Harmon et al. 2003). In this case one may see differences between education as productivity measurement or signaling instrument by comparing the returns to education of employees and self-employed workers. While education does not have any values as signal for self-employed individuals,

since they know their own productivity and do not need to get more education; it will have significant effect on wages of employees (Harmon et al. 2003).

Analysis of the impact and establishment of return to education, shows that there are significant differences across wage distributions. Hence wage premium from higher education for individuals from low decile of income distribution is considerably less than for those from higher-income backgrounds (Bartik and Hershbein 2018; Harmon et al. 2003).

It should be noted that the marginal return on education among women is invariably higher than among men, which also makes it important to study the return on education separately by gender.

To our best knowledge, one of the first empirical studies of the impact of education on the wages in Kyrgyzstan is the study of Karymshakov and Sulaimanova (2019). They have investigated the impact of the education-job mismatch on the wages of youth in Kyrgyzstan, based on the International Labor Organization school-to-work transition survey for Kyrgyzstan. According to the empirical results, overeducated young men receives lower wage compared to their counterparts that are well matched with education and job position. The other study of Çağlayan Akay et al. (2019) used Mincer's earnings model to assess the impact of education on the wages of women working in the developed shopping and business center of Bishkek city (capital of Kyrgyzstan). The study sample consists of 675 employed women. The results of the study show that the return on education for female employees in the private sector is higher than in the public sector. Moreover, the total number of years of study has a strong causal effect on wages. The authors recommended paying sufficient attention to the education of women in Kyrgyzstan.

The main contribution of our study for the literature of analysis of returns to education will be in three ways. First of all, we will conduct a more detailed analysis of the impact of education on the income of the workers, with a nationally representative household survey for Kyrgyzstan. The use of representative data for Kyrgyzstan makes it possible to generalize the empirical results obtained for the entire population of the country. Also, a large number of observation units makes it possible to analyze the influence of education on the earnings by such subgroups as employment type and gender differences. Secondly, in contrast to the previous empirical works on Kyrgyzstan, our study aims to analyze returns by the level of education, rather than the total number of years spent on education. This may show a wage premium for fulfilling a particular year of education, like the last year of high school or high school (Harmon et al. 2003; Churchill and Mishra 2018), and make recommendations based on variations in the results. Thirdly, we investigate how particular field of education affects the earnings of workers.

3. METHODOLOGY

3.1. Data and descriptive statistics

This study uses the "Life in Kyrgyzstan" survey for 2016, which is a research-based, open access, multi-topic longitudinal survey of households and individuals in Kyrgyzstan. The survey is conducted by the German Institute for Economic Research, DIW Berlin and Stockholm International Peace Research Institute, and available from the International Data Service Center of the Institute for Study of Labour (IDSC IZA). This survey provides data at the national level as well as for urban and rural areas of Kyrgyzstan and contains a wide range of data including information on household characteristics (composition, dwelling, children, health etc.), assets, shocks, social networks, income, and expenditure of households. In addition, the survey allocates a particular section on employment and education of individuals.

To investigate the effect of education on income, the sample for analysis included employees and self-employed individuals aged 18-65, who indicated their monthly income from employment. The income variable consists of the monthly wages of employees and the monthly income of individual workers in KGS (national currency of Kyrgyzstan). The total sample for estimation consists of 3074 observations.

The average income in sample is 10588 KGS, and men workers earn on average for 2000 KGS more than women. The average age of the workers is 39 years, and most of them are married. While nearly half of workers are with secondary education, almost every fourth female worker holds tertiary education, and for male this share is 14.7%.

Men are more likely to have completed engineering, economics and law, while women are more likely to hold education, medicine and economics diploma.

Table 1. Descriptive Statistics

	TOTAL SAMPLE		MEN		WOMEN	
	N	Mean	N	Mean	N	Mean
Earnings	3,074	10588.39	1,928	11235.94	1,146	9498.967
Age	3,074	38.61451	1,928	38.2666	1,146	39.19983
Marital status (1=married)	3,074	0.715029	1,928	0.771266	1,146	0.620419
Education level:						
▪ Secondary	3,074	0.437215	1,928	0.458506	1,146	0.401396
▪ Technical	3,074	0.129148	1,928	0.121888	1,146	0.141361
▪ Tertiary	3,074	0.182173	1,928	0.147822	1,146	0.239965
Education field:						
▪ Natural science	3,074	0.009434	1,928	0.00778	1,146	0.012216
▪ Education	3,074	0.054001	1,928	0.025934	1,146	0.101222
▪ Medicine	3,074	0.031555	1,928	0.013486	1,146	0.061955
▪ Engineering	3,074	0.068966	1,928	0.088693	1,146	0.035777
▪ Computer	3,074	0.00553	1,928	0.007261	1,146	0.002618
▪ Agriculture	3,074	0.013663	1,928	0.01971	1,146	0.00349
▪ Economics	3,074	0.064737	1,928	0.042531	1,146	0.102094
▪ Law	3,074	0.018543	1,928	0.021784	1,146	0.013089
▪ International relations	3,074	0.004554	1,928	0.003631	1,146	0.006108
▪ Languages	3,074	0.009434	1,928	0.003631	1,146	0.019197
Residence (1=rural)	3,074	0.556279	1,928	0.60166	1,146	0.47993
Regions:						
▪ Issyk-Kul	3,074	0.091087	1,928	0.095954	1,146	0.082897
▪ Jalal-Abad	3,074	0.234548	1,928	0.231328	1,146	0.239965
▪ Naaryn	3,074	0.048146	1,928	0.056017	1,146	0.034904
▪ Batken	3,074	0.087508	1,928	0.091805	1,146	0.080279
▪ Osh	3,074	0.101496	1,928	0.111515	1,146	0.084642
▪ Talas	3,074	0.05823	1,928	0.063278	1,146	0.049738
▪ Chui	3,074	0.13175	1,928	0.133817	1,146	0.128272
▪ Bishkek city	3,074	0.182498	1,928	0.147822	1,146	0.240838
▪ Osh city	3,074	0.064737	1,928	0.068465	1,146	0.058464

Source*:* Authors calculations, LiK 2016

About 55% employees and employers are working in rural areas; this share is smaller for female sub-sample. According to regional distribution of workers, the concentration of women self-employed and employee is seen in the Bishkek city, the capital city of Kyrgyzstan.

3.2. Empirical Model

Analysis of the impact of education on income are based on the non-linear wage model of Mincer, which has the following form:

$$lnY_i = \alpha_i + \beta_i X_i + \gamma_i EDU_i + \varepsilon_i \quad (1)$$

where the dependent variable is the logarithmic value of the employee's and employer's income, estimated by set of independent variables such as age, gender, marital status, and place of residence, occupation characteristics () (see detailed description of variables in Annex Table 1). The education variable - , represents the level of education and field of education. Education level variable denotes a certain level of education, such as: secondary general education, vocational, higher education and a group of young people with incomplete, primary education or without education (the last category of education in the model is the base for comparison). Using dummies for educational attainment has an advantage over using the total number of years spent in education, where the marginal return varies with educational attainment, and when the aim of the study is to examine the different influences of educational levels (Purnastuti et al. 2013). While the variable showing the field of education denotes: Natural science, Education, Medicine, Engineering, Computer, Agriculture, Economics, Law, International relations, Languages and other fields of study (the last category in the model is the reference group). Differentiating returns to education by field of study will give some insights on which educational programs pays-off most.

4. EMPIRICAL RESULTS

4.1. Returns to the Level of Education

The results of the returns to education presented in Table 2. These models are estimated using the least squares method, and corrected for heteroscedasticity of random residuals. The main variable of interest the educational attainment has a positive impact over earnings of workers. Hence individuals with tertiary education earn more than those who has an incomplete or primary education, or has no education at all. This result supports the college premium hypothesis and indicates that returns to tertiary education is higher than the lower levels of education (Wang et al. 2019; Mitra 2019). Whilst analyzing returns of education across gender, one may see that the tertiary education has a highly significantly impact on women earnings.

Further, when analyzing occupational differences in the return on education among workers, it can also be noted that employees with higher education demonstrate significantly higher returns, while education level does not have any impacts over earnings of self-employed. These results accept Signaling theory, and indicates that in Kyrgyzstan especially in cases where employers cannot easily observe the abilities or performance of workers, they rely on educational attainment as a signaling instrument in hiring decisions.

The other control variables have expected statistically significant signs. With increase of age, the earnings also increase with diminishing returns. The marital status has a statistically significant positive effect over earnings of men, supporting the specialization hypothesis stating marriage affects men's wages positively (Purnastuti et al. 2013). Since male workers who are married, can devote more time and effort to activities in the labor market and, as a result, this increases their earnings (Purnastuti et al. 2013). Kyrgyz workers on average earn less than other nationalities; this is particularly true for Kyrgyz self-employed men.

Estimates of the dummy variable for rural areas of residence show that, on average, rural residents earn significantly less than urban residents do. One may also see that there is a regional imbalance in the level of income. Thus, in regions located in north part of the country, this is Talas, Naryn and Issyk-Kul oblast, earnings are much lower than in Bishkek city or Chuy oblast. While senior official and manager earn much higher income than others; workers from agriculture, education and health sector earn less than in other economic sectors.

Table 2. Returns to the Level Education

	TOTAL SAMPLE			EMPLOYEE			SELF-EMPLOYED		
	Total	***Women***	***Men***	***Total***	***Women***	***Men***	***Total***	***Women***	***Men***
Education level:									
▪ *Secondary*	-0.0651**	0.00563	-0.0798**	-0.0341	0.00355	-0.0240	-0.145***	-0.0688	-0.156***
	(0.0277)	(0.0441)	(0.0349)	(0.0311)	(0.0453)	(0.0420)	(0.0506)	(0.117)	(0.0562)
▪ *Technical*	0.00205	0.0898	-0.0406	0.0369	0.0819	0.0161	-0.112	-0.0361	-0.136
	(0.0410)	(0.0681)	(0.0500)	(0.0473)	(0.0734)	(0.0608)	(0.0776)	(0.183)	(0.0847)
▪ *Tertiary*	0.165***	0.330***	0.0496	0.236***	0.327***	0.154***	-0.0854	0.232	-0.151
	(0.0331)	(0.0499)	(0.0450)	(0.0341)	(0.0515)	(0.0455)	(0.0818)	(0.173)	(0.0947)
Log of age	0.589***	0.818***	0.476***	0.524***	0.593***	0.497***	0.565***	1.316***	0.403*
	(0.107)	(0.145)	(0.150)	(0.120)	(0.150)	(0.182)	(0.196)	(0.434)	(0.230)
Log of squared age	-0.00230***	-0.00292***	-0.00200***	-0.00220***	-0.00237***	-0.00215***	-0.00200***	-0.00397***	-0.00166**
	(0.000383)	(0.000523)	(0.000519)	(0.000426)	(0.000544)	(0.000642)	(0.000678)	(0.00153)	(0.000765)
Marital status (1=married)	0.0903***	-0.0211	0.137***	0.0822***	-0.0265	0.140***	0.0722	0.0133	0.102
	(0.0270)	(0.0364)	(0.0418)	(0.0297)	(0.0386)	(0.0480)	(0.0550)	(0.0916)	(0.0731)
Ethnicity (1=Kyrgyz)	-0.0888***	-0.00814	-0.125***	-0.0208	-0.00210	-0.0232	-0.194***	-0.0423	-0.236***
	(0.0240)	(0.0394)	(0.0298)	(0.0276)	(0.0414)	(0.0356)	(0.0455)	(0.106)	(0.0501)
Residence (1=rural)	-0.227***	-0.190***	-0.268***	-0.166***	-0.198***	-0.159***	-0.427***	-0.286**	-0.470***
	(0.0235)	(0.0367)	(0.0297)	(0.0254)	(0.0375)	(0.0337)	(0.0505)	(0.118)	(0.0535)
Regions:									
▪ North	-0.319***	-0.281***	-0.363***	-0.205***	-0.206***	-0.217***	-0.480***	-0.573***	-0.453***
	(0.0354)	(0.0533)	(0.0458)	(0.0396)	(0.0557)	(0.0556)	(0.0679)	(0.144)	(0.0765)
▪ South	0.0219	0.0166	-0.000570	-0.0195	-0.0555	-0.0294	0.0100	0.115	-0.00826
	(0.0272)	(0.0431)	(0.0348)	(0.0300)	(0.0450)	(0.0396)	(0.0581)	(0.112)	(0.0671)
Economic sector:									
▪ Agriculture and fishing	-0.153***	-0.273***	-0.136***	-0.128	-0.311**	-0.0931	-0.116**	-0.311**	-0.0728
	(0.0396)	(0.0911)	(0.0449)	(0.119)	(0.151)	(0.145)	(0.0490)	(0.123)	(0.0537)
▪ Education	-0.230***	-0.155***	-0.159***	-0.217***	-0.0726*	-0.180***	-0.553	-0.469	-
	(0.0271)	(0.0371)	(0.0480)	(0.0286)	(0.0397)	(0.0492)	(0.520)	(0.500)	
▪ Health and social work	-0.149***	-0.0650	-0.0663	-0.119***	0.0165	-0.0867	-0.648**	-0.926***	-0.268***
	(0.0355)	(0.0472)	(0.0607)	(0.0365)	(0.0494)	(0.0617)	(0.328)	(0.341)	(0.0633)
Senior official and manager	0.419***	0.456***	0.400***	0.239**	0.389***	0.184	0.560***	0.501**	0.563***
	(0.0803)	(0.151)	(0.0919)	(0.103)	(0.135)	(0.127)	(0.105)	(0.250)	(0.117)
Constant	7.472***	6.525***	7.943***	7.567***	7.224***	7.703***	7.908***	5.108***	8.510***
	(0.337)	(0.458)	(0.467)	(0.374)	(0.471)	(0.567)	(0.623)	(1.422)	(0.723)
N	3074	1146	1928	1928	916	1012	1146	230	916
Log likelihood	-2764.9	-927.9	-1783.1	-1480.5	-667.4	-772.4	-1175.6	-223.2	-938.9

Note: Standard errors in parentheses: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.010$.
Source: Authors calculations, LiK 2016

4.2. Returns to the Field of Education

This research studies the influence of education specialties on earnings, to determine which field of study pays off much in Kyrgyzstan. Table 3 reports the results of this analysis.

The greatest return on specialties relates to law and jurisprudence. On average, lawyers earn 29.2% more than other specialties. Gender differences are noticeable, for instance, female lawyers earn on average 42.5% more than other women, while male lawyers earn 20.8% more than other men. Both employees and self-employers with law are more likely to earn more than other specialties.

A significant high share of returns from the field-of-study was demonstrated in such areas as economics, management and banking. Consequently, on average, graduates of these areas earn more by 13.5%. It is noteworthy that the return on these specializations is significantly high among economist employees, while self-employed economists have no such causal relationships.

Graduates from education and pedagogy also earn comparatively more. However, statistically significant results were found only for employees. In other words, only wage employed graduates from education field earn on average 26% more than graduates in other specialties, and in the subsample of women these returns are much higher.

While in above given education fields the returns demonstrated evenly among gender, one may see that in some specialties the earnings with respect to education differ across gender. Thus, the highest female returns on specialties is demonstrated in the field of computer science for employee women. The same results found for women with medical education. Great returns have also been demonstrated among International relations graduates, which is significant only for men. That is, on average, a wage employed man with a specialization in the international relations earns 29.6% more than other men, while in self-employment this impact increase to 78.2%. Women graduate from languages field are more likely to earn than their counterparts.

This analysis of returns to specialties shows the relationship between the popularity of different specializations in Kyrgyzstan. The statistically significant differences in income by profession explains the choice of certain professions in Kyrgyzstan. Therefore, today the profession associated with computer skills is very popular, which (according to the analysis results) has a fairly high return. Also popular are the specialties of lawyer and economist, which have statically significant levels of return. International relation, medicine and education professions have gender differentiated returns. It can be concluded that the demand for the chosen profession in the labor market is positively correlated with the possible level of wages.

Table 3. Returns to the Field of Education

	TOTAL SAMPLE			EMPLOYEE			SELF-EMPLOYED		
	Total	*Women*	*Men*	*Total*	*Women*	*Men*	*Total*	*Women*	*Men*
Field of study:									
▪ Natural science	0.225**	0.128	0.278**	0.146	0.000232	0.239*	0.345***	0.485***	0.229
	(0.0946)	(0.140)	(0.115)	(0.108)	(0.138)	(0.143)	(0.119)	(0.155)	(0.171)
▪ Education	0.231***	0.319***	0.109	0.268***	0.327***	0.185**	0.0541	0.258*	-0.00950
	(0.0407)	(0.0454)	(0.0777)	(0.0416)	(0.0481)	(0.0796)	(0.105)	(0.135)	(0.154)
▪ Medicine	0.117*	0.172***	0.0617	0.139**	0.166**	0.0681	-0.0538	-0.0287	-0.00170
	(0.0645)	(0.0647)	(0.155)	(0.0641)	(0.0651)	(0.192)	(0.182)	(0.276)	(0.245)
▪ Engineering	0.0219	-0.0786	-0.00887	0.0636	0.00402	0.0183	-0.0852	-0.844**	-0.0621
	(0.0419)	(0.104)	(0.0458)	(0.0471)	(0.105)	(0.0530)	(0.0872)	(0.401)	(0.0840)
▪ Computer	0.246	1.168*	-0.0213	0.454*	1.730**	0.136	-0.467**	-0.151	-0.576**
	(0.209)	(0.655)	(0.170)	(0.245)	(0.702)	(0.190)	(0.226)	(0.139)	(0.257)
▪ Agriculture	0.0402	-0.190	0.00376	0.122	-0.665	0.176**	-0.0175	1.924***	-0.103
	(0.114)	(0.665)	(0.103)	(0.149)	(0.667)	(0.0772)	(0.154)	(0.174)	(0.154)
▪ Economics	0.135***	0.239***	0.0899	0.207***	0.257***	0.234***	-0.0828	0.0630	-0.134
	(0.0494)	(0.0619)	(0.0808)	(0.0471)	(0.0628)	(0.0690)	(0.132)	(0.228)	(0.168)
▪ Law	0.292***	0.425***	0.208***	0.269***	0.379**	0.170**	0.305**	0.432**	0.290*
	(0.0620)	(0.147)	(0.0671)	(0.0711)	(0.181)	(0.0729)	(0.125)	(0.202)	(0.156)
▪ International relations	0.308**	0.188	0.439***	0.253***	0.188	0.296**	0.854***	-	0.782***
	(0.121)	(0.129)	(0.160)	(0.0950)	(0.125)	(0.135)	(0.104)		(0.115)
▪ Languages	0.200**	0.355***	-0.140	0.203**	0.342***	-0.217**	0.227***	0.322**	0.177
	(0.0888)	(0.106)	(0.136)	(0.0981)	(0.119)	(0.0872)	(0.0725)	(0.162)	(0.129)
Log of age	0.583***	0.823***	0.484***	0.529***	0.624***	0.499***	0.582***	1.295***	0.446*
	(0.107)	(0.148)	(0.149)	(0.120)	(0.151)	(0.182)	(0.196)	(0.450)	(0.230)
Log of squared age	-0.0023***	-0.0029***	-0.00205***	-0.00223***	-0.00247***	-0.00212***	-0.00218***	-0.00411**	-0.00189**
	(0.000381)	(0.000530)	(0.000514)	(0.000431)	(0.000548)	(0.000648)	(0.000677)	(0.00160)	(0.000762)
Marital status (1=married)	0.0948***	-0.0212	0.139***	0.0820***	-0.0342	0.137***	0.0793	0.0547	0.0985
	(0.0271)	(0.0356)	(0.0419)	(0.0300)	(0.0370)	(0.0487)	(0.0554)	(0.0998)	(0.0741)
Ethnicity (1=Kyrgyz)	-0.0887***	-0.0136	-0.132***	-0.0156	-0.000258	-0.0268	-0.188***	-0.0746	-0.235***
	(0.0239)	(0.0392)	(0.0298)	(0.0275)	(0.0406)	(0.0354)	(0.0460)	(0.104)	(0.0510)
Residence (1=rural)	-0.232***	-0.193***	-0.271***	-0.170***	-0.189***	-0.166***	-0.433***	-0.317**	-0.465***
	(0.0236)	(0.0362)	(0.0299)	(0.0253)	(0.0358)	(0.0340)	(0.0510)	(0.123)	(0.0539)
Regions:									
▪ North	-0.336***	-0.301***	-0.378***	-0.220***	-0.228***	-0.226***	-0.497***	-0.541***	-0.476***
	(0.0358)	(0.0535)	(0.0463)	(0.0402)	(0.0561)	(0.0567)	(0.0691)	(0.144)	(0.0784)
▪ South	0.00903	-0.0189	-0.00722	-0.0337	-0.0870**	-0.0399	0.00487	0.103	-0.0137
	(0.0278)	(0.0424)	(0.0358)	(0.0306)	(0.0442)	(0.0415)	(0.0591)	(0.111)	(0.0688)
Economic sector:									
▪ Agriculture and fishing	-0.154***	-0.265***	-0.136***	-0.126	-0.293**	-0.103	-0.111**	-0.336***	-0.0666
	(0.0395)	(0.0916)	(0.0448)	(0.117)	(0.149)	(0.143)	(0.0493)	(0.125)	(0.0540)
▪ Education	-0.239***	-0.141***	-0.176***	-0.220***	-0.0683*	-0.196***	-0.471	-1.005***	-
	(0.0283)	(0.0370)	(0.0498)	(0.0301)	(0.0390)	(0.0526)	(0.499)	(0.148)	
▪ Health and social work	-0.154***	-0.0709	-0.0596	-0.127***	0.00572	-0.0770	-0.610*	-0.964***	-0.164***
	(0.0407)	(0.0501)	(0.0684)	(0.0419)	(0.0523)	(0.0729)	(0.365)	(0.313)	(0.0527)
Senior official and manager	0.450***	0.461***	0.419***	0.287***	0.399***	0.231*	0.569***	0.521*	0.562***
	(0.0815)	(0.149)	(0.0925)	(0.107)	(0.134)	(0.129)	(0.109)	(0.270)	(0.123)
Constant	7.469***	6.544***	7.885***	7.546***	7.152***	7.697***	7.773***	5.191***	8.284***
	(0.335)	(0.461)	(0.464)	(0.374)	(0.470)	(0.568)	(0.618)	(1.460)	(0.719)
N	3074	1146	1928	1928	916	1012	1146	230	916
Log likelihood	-2766.6	-922.1	-1781.6	-1483.8	-655.2	-769.5	-1174.6	-217.1	-939.0

Note: Standard errors in parentheses
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.010$
Source: Authors calculations, LiK 2016

5. CONCLUSION

Decent work and employment in Kyrgyzstan are one of the main socio-economic problems of the country. Against the background of the high level of unemployment among tertiary educated, the study of the impact of education on employment is becoming one of the most pressing topics. In recent years, there has been a tendency in the development of state policy in the field of reforming the higher education system in Kyrgyzstan. Policy measures are focused on improving the effectiveness of higher education, increasing youth participation in the vocational education process, updating curricula and integrating with the international education system. Nevertheless, the problems of unemployment, the transition from education to employment and the discrepancy between the skills acquired in educational institutions and the needs of the labor market remain unresolved. Taking this into account, this study is of great importance for studying the returns of education in Kyrgyzstan. In particular, this study has empirical results suggesting that the level of education affects the income of people significantly.

Based on the empirical analysis of the household survey data “Life in Kyrgyzstan” for 2016, the following conclusions can be drawn. First, the investment in education, in particular in higher education, pays off. Second, the marginal return on education for women is higher than for men. It can also be said that, given the higher return on education for women, efforts should be made to improve the educational level of women, since the participation of more educated women in the labor market is rewarded with a higher income. Third, the statistically significant and high rate of return on education for employees, compared to the self-employers, indicates the importance of higher education for entering labor market, or employee to be hired. It is also worth noting that this effect is significantly higher for wage employed women. It is appropriate here to recommend investing in education of women, by expanding access to education. Fourth, based on the results of the study of returns to specialization, it can be concluded that the popularity of certain specialties in Kyrgyzstan is closely related to the expected income from these specialties. Thus, according to the results of empirical analysis, the highest share of return on specialties falls on the most popular educational areas, such as computer science, economics and law.

Funding

The author declares that this study has no financial support.

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APPENDIX

Table A1. Description of Variables

DEPENDENT VARIABLE	
Earnings	Monthly income of employees, own-account workers in Soms (KGS)
INDEPENDENT VARIABLE	
Age	Full age in years
Married	1 = if individual is married, 0 = otherwise
Education level	
▪ Secondary education	1 = if individual obtained secondary level of education, 0 = otherwise
▪ Technical education	1 = if individual obtained technical level of education, 0 = otherwise
▪ Tertiary education	1 = if individual obtained tertiary level of education, 0 = otherwise
Field-of-study	
▪ Natural science	1 = if individual graduated from Natural science, 0 = otherwise
▪ Education	1 = if individual graduated from Education, 0 = otherwise
▪ Medicine	1 = if individual graduated from Medicine, 0 = otherwise
▪ Engineering	1 = if individual graduated from Engineering, 0 = otherwise
▪ Computer	1 = if individual graduated from Computer, 0 = otherwise
▪ Agriculture	1 = if individual graduated from Agriculture, 0 = otherwise
▪ Economics	1 = if individual graduated from Economics, 0 = otherwise
▪ Law	1 = if individual graduated from Law, 0 = otherwise
▪ International relations	1 = if individual graduated from International relations, 0 = otherwise
▪ Languages	1 = if individual graduated from Languages, 0 = otherwise
Ethnicity	
▪ Kyrgyz	1 = if individual is Kyrgyz, 0 = otherwise
Residence	1 = if individual reside in rural area, 0 = urban area
Regions	
▪ North	1 = if individual reside in Issyk-Kul, Naryn orTalas oblast, 0 = otherwise
▪ South	1 = if individual reside in Jalal-Abad, Batken or Osh oblast, 0 = otherwise
▪ Central	1 = if individual reside in Bishkek city or Chuy oblast, 0 = otherwise
Sector	
▪ Agriculture and fishing	1 = if individual employed in Agriculture and fishing sector, 0 = otherwise
▪ Education	1 = if individual employed in Education sector, 0 = otherwise
▪ Health and social work	1 = if individual employed in Health and social work sector, 0 = otherwise
Position	
▪ Senior official and manager	1 = if individual works as Senior official and manager, 0 = otherwise