THE EFFECT OF REMITTANCES ON EDUCATION IN KYRGYZSTAN

By

Sultan Doolotov

Submitted to Central European University Department of Economics

In partial fulfillment of the requirements for the degree of Master of Arts in Economic Policy in Global Markets

Supervisor: Andrea Weber

Budapest, Hungary

2017

Abstract

Kyrgyzstan is one of the top remittance dependent countries in the world (World Bank 2015). Remittances support many sectors of the economy and households in sustaining livelihood in Kyrgyzstan. It is crucial to analyze how these international transfers are allocated towards the human capital investment, education. Many studies analyzed the effect of remittances on investment in human capital showing different results and conclusions. The paper uses Kyrgyz Integrated Household Survey to find the impact of remittances on expenditure on education and school enrollment. The results of the paper are ambiguous. The analysis showed that remittance recipient households, on average, spend more on education than non-recipient households, while school enrollment is not affected by remittances. Possible policy implications are provided in the concluding part of the paper.

Acknowledgements

I would like to thank my supervisor, Prof. Andrea Weber, for her support and guidance during my thesis writing. I would like to thank CEU Department of Economics for an incredible experience during my two years of studying. Thanks to my family and friends for making my studies possible.

Table of Contents

Chapter 1: Introduction
Chapter 2: Theory and Background Information
2.1 Theoretical Issues
2.2 Migration and Remittances in Kyrgyzstan4
2.3 Education in Kyrgyzstan
Chapter 3: Literature Review
Chapter 4: Data and Methodology
4.1 Data and Descriptive Statistics
4.2 Methodology17
4.2.1 Expenditure on Education: Hausman-Taylor Model
4.2.2 Enrollment in Schools: Logit Model
Chapter 5: Empirical Results
5.1 Expenditure on Education
5.1.1 Expenditure on Education for Nation
5.1.2 Expenditures on Education for Urban/Rural Regions
5.2 Enrollment in Schools
Chapter 6: Conclusion
References
Appendix

Chapter 1: Introduction

Kyrgyzstan was a country where persistent and voluntary mobility was a common lifestyle for most of the households. Trading along the Silk Road and the necessity of finding better lands for grazing was the reason for a frequent and voluntary household mobility. However, migration then was controlled by the central government in Moscow during the period of the Soviet Union (Kroeger and Anderson 2011, 3). As a consequence, pastoral and voluntary migration was eliminated and many of the Kyrgyz ethnic groups were involuntarily moved abroad in order to meet the Soviet policies of mixing the ethnic groups in the country (Korobkov 2007, 171).

After the collapse of the Soviet Union and independence of Kyrgyzstan the migration was no longer dependent on Moscow. Since then, the migration was mostly driven by economic issues. Following the independence, many sectors of the economy have been restructured and most of the enterprises in textile, metal, mining, and machinery industries have shut down which led to a decreased employment in Kyrgyzstan (Schuler 2007, 73). The overall economic performance in Kyrgyzstan was in decline with relatively low wages comparing to Russia and oil-rich Kazakhstan. These countries experienced a lack of labor force due to construction and services boom that could not be covered by the Russian citizens only (Kroeger and Anderson 2011, 4).

During the transition period it is very hard to solve the unemployment problems when economic development slows down. The solution here is to find a better place to compensate for the low incomes and to avoid decrease in the living standards of households. A boom in remittance flows in the last decade encouraged for several studies of how remittances were allocated in Kyrgyzstan. There is a work of the same analysis by Anderson and Kroeger (2014) which found the negative impact of remittances on school enrollment in Kyrgyzstan. Another work proposed by Ukueva and Becker (2010) showed that remittances have been used to promote physical capital accumulation in Kyrgyzstan. The analysis found out that investment in durable goods is more likely with remittances.

Remittances came to play a significant role in the economy of Kyrgyzstan. Many households have remittances as a significant source of their income and it is important to investigate how remittances are allocated towards their investments. The paper uses Kyrgyz Integrated Household Survey introduced in 2003 by the National Statistical Committee to evaluate how remittances affect human capital investment in children, particularly education. Using panel data analysis, the paper examines the effect of remittances on expenditure on education and school enrollment in Kyrgyzstan. The paper estimates the models for the nation as a whole and separately for the urban and rural regions. The empirical results show a positive impact of remittances on expenditure on education, which means that remittance recipient households, on average, spend more on children's education than non-recipient households at the country level. The results vary by urban and rural regions. However, the analysis showed that remittances have no impact on children's school enrollment.

The plan for the paper is the following. The next chapter provides theoretical issues on how migration and remittances can affect education; and provides information on migration, remittances, and education in Kyrgyzstan. Chapter 3 provides the literature review on the topic and chapter 4 reports the methodology of the paper. In chapter 5 the paper discusses the main empirical findings and chapter 6 concludes the paper.

Chapter 2: Theory and Background Information

2.1 Theory

There are several theories which state that a household's decision for optimal investment in children's education is determined by the net rates of return, assuming that a household is able to relax its budget constraint by borrowing (Edwards and Ureta 2003, 431). These rates are mostly determined by how labor market in a particular country values schooling. Obviously, if schooling has a potential for a child to gain benefits in the future the rates of return are high, which motivates parents to invest in child's education. The net rate of return can be also determined by exogenous factors such as individual abilities of a child within a household with more than one child. Economy-wide differences in the rates of return can be determined by the supply of schooling, whether it is a distance to school or its quality, which can be a problem for many household in different regions. Overall, the decision of a household to invest in children's education depends on how schooling can benefit a family in the future taking into consideration all the costs related to schooling.

However, if there is no ability to borrow, parents' decision regarding investment in their children's education will be limited by their own resources (the above theory is still applied in this case) (Edwards and Ureta 2003, 431). According to Becker and Tomes (1976) model, a family with high borrowing constraints invests less than an optimal level in education. However, if marginal return to investment is less than market rate of return a family's desire to invest in education has a positive function of their income. Within such constraints if a family has more than one child it should decide how to allocate the resources among the children. This particular case is very important among the households which have both male and female children because boys and girls are perceived differently in terms of future contribution in different families. In case of Kyrgyzstan, most families perceive male children as perspective

earners; therefore, the priority of education would go for male children if the above constraints take place.

The question is whether remittances actually encourage families to invest in education of children. Logically, if remittances are sent home the budget constraint becomes relaxed and there are more opportunities to invest in education. If a family has a child who does not attend school it may use additional resources for him or her to start studying or it can use the resources for further education of currently studying child. The problem here is that absence of one or both of the parents being abroad may have negative effects on children, including education. First of all, when parents are abroad children may have to take parents' responsibilities which take a lot of time that could be spent on education. Second, when parents are abroad children have less supervision and attention which is very important in children's development. Parental absence may undermine the family life which negatively affects children's performance in school. Especially in developing country like Kyrgyzstan, in case of new (young) families, the absence of a father may make a child to be in a bad company outside of home which may lead to the drop-out of the child from school. Finally, when children see the increased family income due to remittance inflows, motivation for schooling can be reduced. For example, children may assume that they will share parents' business which does not require studying. Consequently, children do not consider education as a source of future earnings and as a result, the decision for leaving a school prevails (Nasir, Tariq, and Rehman 2011, 7).

2.2 Migration and Remittances in Kyrgyzstan

Labor migration is currently one of the most important factors in the development of the economy of Kyrgyzstan and the employment of citizens. The main economic effect is the reduction of unemployment and the balance of payments deficit due to the remittance inflows. For many households, remittances are the main source of income which covers family

4

maintenance, current costs of households, education of children, and medication costs. Sustenance of most of the rural population of Kyrgyzstan is highly dependent on remittances. Moreover, remittances support whole sectors of the economy such as trade, construction, transport services, agriculture, etc. Remittances being a significant financial aid for the economy, restrain a decline in the standard of living of the entire population, prevent widespread poverty, and serve as an additional source of foreign exchange earnings (Karabchuk et al., 2015, 5).

According to the World Bank, remittances were 31.3 percent of GDP in 2014, which makes Kyrgyzstan one of the most remittance dependent countries in the world. The country ranks second in the list of countries with a significant share of remittances to GDP. It should be emphasized that recent adverse developments in Russia led to a decrease in remittance inflows in 2014. The net inflow was 5.1 percent lower in 2014 compared to the previous year (National Bank of Kyrgyzstan 2015). The drop in oil prices, depreciation of the Russian ruble, tighter migration policy, and overall adverse economic situation in Russia has negatively affected remittance inflows to Kyrgyzstan. The inflow of remittances is directly depends on the situation in Russia due to the fact that more than 96 percent of all remittances are coming from the country (Seyitov and Jenish 2015, 4).

According to the Central Bank of Russia, in 2016 migrants have transferred about USD 2.8 billion which is 30 percent more than in 2015. After the adverse developments in Russia with the drop in oil prices and implemented sanctions, remittances are started to recover. The Central Bank of Russia expects that remittances sent to Central Asian countries will reach its normal level in 2018. Any drop in remittance inflows to Kyrgyzstan will significantly and adversely affect income of the population and the overall well-being. One of the main reasons of labor migration continues to be a wage differentiation between two countries which creates prerequisites for the movement of labor from a low-income country to a high-income country

(Dustmann 2003, 353). Fortunately for the country, 80 percent of Kyrgyz migrants send remittances back to Kyrgyzstan supporting the economy (Ibragimova, et al 2008, 28). It is important channeling these transfers into investment which can positively contribute to the economic development. One of the ways to improve the function of remittances is to spend them more on human capital investment, particularly on education.

2.3 Education in Kyrgyzstan

For the decades during the Soviet period, educational system in Kyrgyzstan was at its highest level. By the beginning of the transition period in Kyrgyzstan, many problems in education were solved and general literacy of the population was achieved. Enrollment in schools was significantly high; the quality of higher education had been rapidly increasing and the number of students enrolled in universities had increased. Teachers achieved a high level of professionalism which resulted in a high performance of students, especially in the field of mathematics and natural sciences. The resource base was at a high level; the institutions were equipped with the necessary educational and methodical literature and materials (DeYoung 2008, 2-4).

However, for the years of independence, the educational system and conditions has radically changed. The Soviet educational system adequately met the planned system of management and the authoritarian political system of the state power. However, it turned out to be inconsistent with the market economy and open political system. The content and structure of the curricula and textbooks, as well as the methods of instruction that prevailed in the Soviet Union were not always aimed at acquiring the required knowledge and skills. Therefore, the goal was to change the overall educational system to be consistent with an open economy and the world standards (Huttova, Silova, and Voolma, 2002).

External and internal factors induced the country to enter the path of systemic educational reforms. Moreover, at the beginning of the reforms, deep and large-scale problems were not so significantly perceived, which then jeopardized all the achievements left from the Soviet times. These problems are low access and quality of education, weak human, material, and financial resources, and blunder in the state administration and management of the educational system. The socio-economic situation in Kyrgyzstan led to a significant reduction in financing, which affected the budget of educational institutions. Salaries of the pedagogical staff and the condition of the educational and material base of educational institutions had significantly fallen. The inability of sufficient state funding prompts budget organizations to seek additional funds. However, the imperfection of the regulatory and legal framework does not allow the effective use of additional sources of financing. The management system that has successfully implemented during the Soviet times does not meet the current conditions. Therefore, the problem of effective management of individual educational organizations was especially significant. During the transition period and the formation of civil society, there is a need to form a public-government management and strengthen the role of local government (Huttova, Silova, and Voolma, 2002).

Another serious problem is the decreasing quality of teaching and the discrepancy between the number and quality of the graduates and the labor market. From year to year, the number of graduates of higher educational institutions who cannot find a job is growing, which is connected both with the lack of working places and low quality of vocational training of graduates. Imperfection of the current structure of control, licensing and attestation does not guarantee the quality of the education received. Consequently, employers underestimate the degrees of certain universities (International Monetary Fund 2007, 60).

The paper specializes mostly on the secondary education of children since it plays a fundamental role for children to gain qualified knowledge and motivation to study at a higher education level. Currently, the secondary education in Kyrgyzstan suffers from shortage of qualified teachers and increased costs of schooling. Decreased government expenditure on education, as well as high inflation made it very costly for families to provide education to their children. In general, increased educational costs and teacher shortages led to the lower enrollments in schools (Anderson, Pomfret, and Usseinova 2004, 133-134).

Education is one of the most efficient and valuable investments into human capital since it provides a fundamental basis for human development, which implies quantitative and qualitative progress of the nation as a whole. Therefore, it is crucial to investigate whether families in Kyrgyzstan invest in their children with main or additional income in terms of remittances.

Chapter 3: Literature Review

Remittances and their effects and impacts are extremely important for many developing countries, where the level of migration is relatively high. For countries in transition, the solution to the problem of remittances and their impact on the economy has become particularly urgent in the last twenty years and is actively studied by experts from various research institutes in the world. According to the literature covered in the paper (including transition economies and developing countries in general), there are three general points on how remittances are used and how economy is affected. The first point is that remittances are treated the same way as any other income. For households, there is no difference of using money from a regular source of income (wage) or remittances. The second point is that remittances are spent more on consumption rather than investments. Remittances in this case change the behavior of spending additional income towards consumption which does not support an economy as investments. The third point is that remittances increase investments. In this case remittances are perceived as a resource to be spent on human or physical capital while a regular income is spent on consumption. Since the paper focuses on the effect of remittances on education, one should look at the empirical evidence on how education has been affected by remittances and migration. There are studies showing positive effect of remittances on education as well as negative results.

Adams and Cuecuecha (2010) showed that remittance recipients in Guatemala marginally spend more on education using two-stage selection model. The findings are believed to be compatible with the permanent income hypothesis meaning that marginal propensity to invest out of additional income is higher than that of a permanent income. The work is based on the previous findings by Adams (1998), who proved that remittances play as a tool for higher

marginal spending on investments rather than on consumption, consequently leading to a higher economic development.

Benedictis, et al. (2010) found out that remittances have a positive and significant effect on education in Ecuador. They argue that additional income as remittances can smooth the behavior of spending more on human capital. Remittances, thus, allow households to invest more on education. However, the positive effect of remittances is restricted by the availability of schooling, for example, distance to school. The study shows that better supply conditions have a positive effect of remittances on education expenditure.

Adams (2005) showed that remittance recipient families in Guatemala spend less on consumption and more on human capital, education and health. The paper discovered that a big portion of remittances received is spent on education. Particularly, remittances recipient households spend 58 percent more on education than non-recipient households which represent a significant accumulation of human capital.

Acosta et al. (2007) analyzed the effect of remittances in eleven Latin American countries. The work discovered that for certain households depending on a country, gender of a child, and region remittances increase children's participation in schools. The interesting point in the study is that this positive impact is bound by previous education of parents. The idea is that lower level of education of parents leads to a lower enrollment in schools of their children. Nasir et al. (2011) found out the same results in Pakistan. The results show that remittances have significant negative impact on education with no parental education. However, the results become insignificant if parents attended school in the past.

Yang (2006) analyzed how certain exogenous shocks to the income of remittances recipient households affect investment decisions and expenditures in Philippines. Particularly, a household experiencing positive exchange rate shocks which raises the wealth of the household, increases investment in education, decreases number of children in the labor force, and keep their children longer in schools. The tendency is good for human capital accumulation since the increase in additional income leads to higher investments in education and lower child labor.

Chaaban and Mansour (2012) used an augmented human capital model with two dependent variables – education attainment and attendance. They used large household survey data for Jordan, Syria, and Lebanon and found out that remittances have positive effect on education attendance and attainment. The same result was obtained by Mansuri (2006) using IV models with village migrant network in Pakistan. The study discovered that migration increases school attainment and the results are especially significant for girls.

Amuedo-Dorantes, et al. (2008) studied the effect of migration and remittances on educational performance of children in Haiti. The paper states that even though, remittances can relax budget constraints of households and increase the probability of a child to be enrolled in school, parental absence can increase social responsibilities which lowers this probability (as discussed in Chapter 2). Therefore, the study separated the migration effect from remittance effect by creating two separate samples. The first sample consists of households who receive remittances and experience the absence of a family member. The second one is the households who do not experience parental absence and still receive additional income from abroad. The analysis confirmed that regardless of a household member being abroad, remittances have a positive effect of a child to attend a school. It means that remittances significantly outweigh the negative impact of a household member absence on the children's school attendance and accumulates the human capital.

However, there are studies which resulted in negative effects of remittances on education. McKenzie and Rapoport (2005) showed a significant negative impact of remittances

on school attendance of 16-18 year old children using bivariate probit model with historic state level migration rate as instruments. Particularly, the effect is stronger for males and for children whose mothers have higher education. The issue is related to the low motivation of studying when male members of households are abroad sending remittances back to their country (discussed in Chapter 2). The expected return on schooling is very low in this case which explains the lack of motivation.

Nasir, Tariq, Faiz-ur-Rehman (2011) using OLS model showed that remittances have significant negative impact on educational attainment. However, including parental education makes this effect insignificant. In addition, other factors like family size, education of parents, and current income are significant determinants of children's performance in school. The same results were obtained by De Brauw and Giles (2016) using the linear probability with instrumental variables (national ID card). They found out that the enrollment in schools is negatively affected by remittances in urban areas of China.

There are several studies that analyzed the effect of migration and remittances on educational outcomes in Central Asia. Anderson and Mirkasimov (2010) examined household data in Tajikistan for 2007 by creating two datasets of remittance recipient and non-recipient households. Overall, children are better off with remittances and migration. However, in case of Tajikistan, older children have higher probability to be enrolled in school and complete education while younger members of the households are less likely to be enrolled in school and complete it. The study found that the positive impact of remittances on education is almost equally distributed by male and female children. Remittance recipients households tend to spend more on education but the expenditure are not related to school fees but school materials like books and uniforms. The opposite results were found by Brown, Olimova, and Boboev (2008) in Tajikistan using Asian Development Bank remittance survey. The results showed that school enrollment is lower in remittance receiving households than in other households. The paper explains the negative effects by the low level of confidence about the future returns and good employment opportunities.

There are several works which studied remittances effect in Kyrgyzstan. Ukueva and Becker (2010) analyzed the effect of remittances on durable goods in Kyrgyzstan using Kyrgyz Integrated Household Survey. The results showed that households receiving remittances, on average, spend more on durable goods rather than on consumption goods. It means that investment goods are in preference for remittance recipient households which can positively contribute to the capital accumulation of the households.

Anderson and Kroeger (2014) using Kyrgyzstan Integrated Household Survey (KIHS) and fixed effects model analyzed how remittances affect children's school enrollment and households' expenditure on education. They found out that remittances negatively affects school enrollment at a national level. However, gender matters in this case – female children are not affected by migration and remittances while male children aged 14-18 in remittance recipient households has lower probability to be enrolled in schools than in other families. For the expenditure on education, households receiving remittances tend to spend less on education than non-recipient households. The expenditures on education in the study are books, uniforms, school and library fees, etc. However, it should be emphasized that the negative effects of remittances are spread across the whole country except the northern part, the wealthiest region in the country. In the north, households use remittances for human capital positively affecting school enrollment and increasing education expenditures.

The importance of education as a human capital investment and remittances being topical for many developing countries encouraged many studies to analyze how remittances affect education. The question whether education is positively affected by remittances has no unique answer. There are different theories which contradict to each other and it is hard to give a sole and proper answer on the impact. According to the empirical evidences, there is no strict and sole relationship between remittances and education. Many works showed that household income, education of parents, region, gender, and family size are of the highest importance when determining expenditure on education. In addition, a lot of papers explained that particular factors as geographical location of school, supply education and quality, and other socio-economic characteristics make results vary across different countries, regions, and households. It means that remittances should be analyzed with respect to the factors that have significant relationship when determining the level of school expenditures and enrollment.

Chapter 4: Data and Methodology

4.1 Data and Descriptive Statistics

To analyze the effect of remittances on education in Kyrgyzstan, the paper uses data from Kyrgyz Integrated Household Survey (KIHS) introduced by National Statistical Committee in 2003. KIHS is aimed to collect detailed information on consumption and expenditure of households with the sample size of 5000 respondents. In addition to consumption and expenditure, the survey collects detailed information on household composition, income, education, migration, health, assets, and labor force. KIHS represents the data at the national, rural/urban, and oblast levels. KIHS has the biggest data on households' consumption and income in Kyrgyzstan. Thus, it is one of the most important tools to analyze the socio-economic developments in the country (Esenaliev, Kroeger, and Steiner 2011).

Unfortunately, the paper has no available data on the labor force survey. Therefore, there is no information about migrant's household status, age, gender, education, and income earned abroad. To identify if a household has a migrant working away from home, the paper uses a question in the survey with respect to remittances: "what aid did your family receive from your relatives or acquaintances and including wages from outside the territory of Kyrgyzstan?" (KIHS 2005) Based on the answer, the paper can identify whether a certain household receives remittances or not. Thus, having the data on remittances and expenditure on education of each household, the paper can estimate if remittances affect education in Kyrgyzstan.

Education expenditure section in KIHS has about eight types of expenditures that households might have: educational fee (a monthly fee a household should pay for its child to attend a school), rent of books, fee for usage of library services, payment for tutoring, payment for school maintenance, for gifts, transportation costs, other fees, and total expenditure (sum of all payments) (KIHS 2005). The paper includes only total expenditure as an independent variable in estimation since most of the schools in Kyrgyzstan maintain all the expenditure types presented above.

For remittances, the paper creates a dichotomous variable to identify remittance recipient households. Each household that receives any amount of remittances takes the value of one in the dataset which means that household is remittance recipient one. The choice for using a dichotomous variable is based on the fact that remittances can be treated as an ordinary source of income, like wage. Moreover, income variable is included in the model, which would show us the absolute effect of having certain amount of money on expenditure on education. In contrast, the aim of the paper is to find how different remittance recipient households are from the non-recipient households in terms of decision-making on education of their children. This approach would help to identify how the presence of remittances and a family member being abroad affects a family's decision on children's education.

The total amount of observations in the analysis is 14401 households. Tables 1, 2, and 3 in Appendix presents the summary statistics on the amount of remittances received, household size, age of household head, total income, and total expenditure on education by year (2005-2007) and the region respectively. There is an increasing trend in the amount of remittances received from 2005 to 2007. According to the summary, the largest part of remittances received is in southern regions of Kyrgyzstan. The average amount of remittances received increased from 2005 to 2007 from 3442 soms to 5048 soms. According to the Table 4 in Appendix, households are different depending on the region. The paper creates 7 oblast variables: Bishkek, Chui, Talas, Naryn, Issyk-Kul, Osh, and Jalal-Abad. One may notice that the biggest part of remittance receiving households live in the south of Kyrgyzstan (Osh and Jalal-Abad). This is due to the worse economic situation in the south where unemployment is very high and wages are relatively low. The situation makes many household members to leave home and work

abroad. Households living in southern regions have lower income and wealth, as well as supply of education. One may conclude that differences in terms of economic conditions are significant; therefore, the paper estimates the effect of remittances on education expenditure and school enrollment separately for the regions and the country as a whole.

4.2 Methodology

The paper uses panel data analysis in order to mitigate certain econometric issues. The problem is that remittances may be correlated with the error term in the model which means that both receipt of remittances and schooling may be driven by certain factors inside of a household. For example, a certain tradition in a family might equally influence a decision to have remittances and a decision to invest in human capital. Another problem is that remittance receiving households might differ from non-receiving households by unobservable characteristics. The key point in the dataset is that respondent households in the survey are not replaced over time, which means that there are repeated observations for the same households. Using KIHS, the paper can control individual unobserved fixed effects that may be correlated with both educational and remittance decisions. Therefore, it is possible to partially solve omitted variable bias driven by time invariant unobservable characteristics (Kroeger and Anderson 2011, 17).

Individual, household, and regional factors and characteristics might significantly influence the results on the effect of remittances on education in Kyrgyzstan. To control these factors, the paper has three sets of different variables included in the model. The first set of variables includes household information such as age, gender and education of household head and household's size. The second one provides total income and remittances received by a household. The third one provides regional dummies by oblasts, rural/urban, and region. Because of the household characteristics, the analysis is likely to have endogeneity problems

and panel data cannot solve the problem solely. It is likely that some individual-specific unobservable effects are correlated with other independent variables. Therefore, it has been considered to estimate one of the models by Hausman Taylor estimation.

4.2.1 Expenditure on Education: Hausman-Taylor Model

The paper assumes fixed effect in the panel data. However, it would not be efficient to use Fixed Effects (FE) or First Difference (FD) methods since the paper cannot meet the assumption that unobservable characteristics that might influence both dependent and independent variables are time invariant. FE and FD methods give proper estimates only for time variant variables, but not for time invariant ones. Therefore, the paper uses Hausman-Taylor method, which can properly estimate time-invariant variables and control for individualspecific effects. One of the key features of using Hausman-Taylor estimation is that there is no need to include the external instrumental variables into the model. In turn, it uses the existing variables as instruments in the model (Indiana University 2014).

The following model is used for Hausman Taylor estimation.

$$y_{it} = X_{1it}\beta_1 + X_{2it}\beta_2 + Z_{1i}\delta_1 + Z_{2i}\delta_2 + \mu_i + \epsilon_{it}$$

For i=1,....,n and for each i, t=1,....,Ti, of which Ti periods are observed, n is the number of observations in the sample. X is the set of variables which are time-variant and Z is the set of time-invariant variables. X and Z sets are split in two parts. The variables in X1 and Z1 are assumed to be uncorrelated with mi and ϵ_{it} , while the variables in X2 and Z2 are allowed to be correlated with μ_i but not with ϵ_{it} .¹

¹ Xthtaylor – Hausman-Taylor estimator for error-components models. Available at: <u>http://www.stata.com/manuals13/xtxthtaylor</u>. Accessed June 3, 2017

Hausman-Taylor model solves the problem of correlation between the independent variables and individual specific effects which is topical in our case. The within point estimate of the model can properly find β 1 and β 2, consequently finding the within residuals. To estimate δ 1 and δ 2 the method regresses the within residuals on Z_{1i} and Z_{2i} applying X_{1i} and Z_{1i} as instrumental variables. As a consequence, β 1, β 2, δ 1, and δ 2 estimates are used to find overall and within residuals; then, residuals are used to find the variance components to perform GLS transformation on the regressors. Finally, instrumental variable regression can be used to obtain the results. Basically, the idea is to use both the between and within variation of the existing time-variant variables that are not correlated with the unobserved specific effects in the model as instrumental variables. The approach helps to obtain consistent coefficients while controlling for the individual specific effects.²

Because of the repeated time values in the panel data (equal expenditures of two or more children in a household in one year over time) it has been considered to estimate the model at a household level. As a result, there is no gender or age of a child would be available in the model. However, the presence of household information would control individual characteristics that might affect the results.

The Hausman-Taylor model for the paper can be written as:

 $\int LnExpEd_{it} = \beta_0 + \beta_1 h_a ge_{it} + \beta_2 h_a ge_{it}^2 + \beta_3 hgender_{it} + \beta_4 remitt_{it} + \beta_5 tot_{inc_log_{it}} + \beta_6 hsize_{it} + \sum \beta_7 h_e duc_{it} + \sum \beta_8 oblast_i + \beta_9 urban_i + \beta_{10} north_i + \mu_i + \varepsilon_{it}$

LnExpEduc represents the natural logarithm of the total expenditure of a household on education and is the dependent variable in the Hausman-Taylor estimation. Time varying exogenous variables are the following: h_age represents the age of a household head and h_age²

² Xthtaylor – Hausman-Taylor estimator for error-components models. Available at: <u>http://www.stata.com/manuals13/xtxthtaylor</u>. Accessed June 3, 2017

is the age squared of a household head, hgender represents a gender of a household head. H_educ represents the set of dichotomous variables which represent whether the household head has higher, incomplete higher, special secondary, secondary general, elementary, or no education. H_size is the size of a household (number of people in a family). Time varying endogenous variables are the following: remitt is a dichotomous variable taking the value of 1 if the family reports receiving remittances and zero otherwise. Tot_inc_log represents the yearly natural logarithm of total income of a household; Time invariant exogeneous variables are Oblast variable which consists of 7 dichotomous variables each representing the residence of a household (Bishkek, Chui, Naryn, Jalalabad, Osh, Talas, and Issykkul); urban is a dummy variable taking the value of 1 if a household lives in urban area and value of 0 if a household lives in a rural area. North is a dichotomous variable taking the value of 1 if a household lives in north of a country and the value of 0 if in the south.

4.2.2 Enrollment in Schools: Logit Fixed Effects Model

Since the paper assumes a fixed effect in the panel data and there are some unobservable characteristics like individual culture or traditions within a household, the paper uses Logit Fixed Effect model in order to control for the unobserved factors. Unfortunately, in this model we will lose time-invariant explanatory variables like oblast and region dummies. However, it is crucial to use Logit Fixed Effect model instead of a general Logit to obtain proper results. The dependent variable in the model is a dichotomous variable taking the value of 1 if a child is enrolled in school and 0 otherwise. The Logit model for the analysis can be written as follows.

 $Enrollment = \beta_0 + \beta_1 age_{it} + \beta_2 age_{it}^2 + \beta_3 gender_i + \beta_4 h_a ge_{it} + \beta_5 h_a ge_{it}^2 + \beta_6 h_a ge_{it}^2 +$

Age represents the age of a child and age² is the square age of a child. Gender represents whether a child is male or female. H_age is the age of a household head and h_age² is the square age of household head; hgender represents a gender of a household head. Remittances in this model is an absolute value representing the amount of remittances received in one year. Tot_inc_log represents the yearly natural logarithm of total income of a household; h_educ represents the education of household head taking the value of 1 if a household head has higher education and 9 if illiterate. H_size is the size of a household. Logit fixed effect model omits all the time invariant variables in the model.

The problem here in the model is that education of a household head and gender of a household head has very insignificant change over the observation period, which is 3 percent change from 2005 to 2007. Logit fixed effect model omits all the time invariant variables; however, in this case the model kept these insignificantly variant regressors. Therefore, the coefficients may not be interpreted with regard to the analysis and is the flaw in the analysis.

Chapter 5: Empirical Results

5.1 Expenditure on Education

5.1.1 Expenditure on Education for Nation

The paper used Hausman-Taylor model in order to analyze the effect of remittances on education expenditures. The dependent variable is the natural logarithm of the total expenditure of a household on education. Remittances are presented in dichotomous values in the set of explanatory variables. The results for the country as a whole confirm the positive and 5% level significant effect of remittances on education expenditures (see Table 5 in Appendix). According to the results, remittance recipient households, on average, spend 11% more on education than non-recipient households. The results show that nevertheless, having a family member being abroad, remittance recipient households, on average, spend more on children's education. The absence of a family member (usually fathers or elder brothers) creates additional pressure on the family in terms of social responsibilities. However, the results show that positive effects of remittances outweigh the negative effects of a family member absence. In addition, the results show that 1% higher income is associated with 5% higher expenditure on education, on average. It means that remittances are likely to be a significant source of relaxing budget constraint which leads to a higher education expenditures.

5.1.2 Expenditure on Education for Urban/Rural Regions

The regions of the country are highly different in terms of socio-economic characteristics. Therefore, it has been considered to estimate the model by urban and rural regions separately. The results confirm negative and significant at 5% level effect of remittances on education expenditure in rural areas (see Table 6 in Appendix). The fact that education is less costly in rural areas makes it reasonable to take the results into consideration. Households

have no need to spend much money on education in rural areas; therefore, additional income in terms of remittances may have no effect on increasing education expenditure. The insignificant effect of total income on the expenditures in rural areas supports the obtained results. However, it should be also emphasized that education is more popular in urban areas than in rural regions in Kyrgyzstan. About 65 percent of the population resides in rural regions with poor infrastructure (World Bank 2015). These regions have no or little access to social or financial services with very low supply of education. Livestock breeding is the main activity for many of the rural households (Rural Poverty Portal, 2014). As a consequence, education is believed to be a weak investment with low returns in the future.

5.2 Enrollment in School

The effect of remittances on school enrollment is analyzed using logit fixed effect model. The regression for the nation as a whole showed that remittances and income in line with budget constraints have no effect on school enrollment (see Table 7 in Appendix). The results can be explained by the fact that nine grades of schooling are mandatory in Kyrgyzstan which means that children aged 6-15 are not affected by the receipt of remittances. For the older children, the results remain the same – remittances do not affect school enrollment for this age category. It should be emphasized that it is quite uncommon for children to stop studying after completing nine grades in school. Usually, if a child leaves a school he or she proceeds with vocational college meaning that he or she is still enrolled in the survey.

Chapter 6: Conclusion

The paper analyzed the effect of remittances on household decision to invest in human capital of children in Kyrgyzstan. Kyrgyzstan being one of the top remittance receiving countries is highly dependent on remittance inflows. The aim of the paper was to analyze whether the relaxed budget constraints obtained through the receipt of remittances leads to a higher expenditure on education and school enrollment. The results showed that on average, remittance recipient households spend more on education than non-recipient households. The positive effect of remittances on the expenditures was obtained while controlling for other socio-economic determinants of educational expenditure that might influence the results. At a regional level, the paper found out that remittance recipient households who reside in rural regions, on average, spend less than non-recipient households. This effect can be explained by the fact that education is less costly in rural regions and is believed to be a poor investment with low returns. The opposite results are obtained for urban regions where remittance recipient households, on average, spend more on education. For the school enrollment, the results showed that remittances have no effect on a child to be enrolled in school. It is quite uncommon for children to leave schools since the basic education is mandatory in Kyrgyzstan. Therefore, one may conclude that change in income which tightens or relaxes the budget constraint has no impact on children's school enrollment.

There are a lot of studies that found positive effects of remittances on education. However, this goes in line with the concerns about the effects of migration such as parental absence with all its consequences on human capital formation. Investments in human capital have an important role in promoting economic growth and productivity. Highly qualified and educated people are the source of effective and continuous development of nations. From a policy perspective, it would be efficient to increase public expenditures on education to reach higher teachers' salary and better supply of education, particularly in the poor regions. The increased public expenditure should be used to improve infrastructure in schools with proper equipment and technical support; increase supply of books and educational materials; modernize the curricula to have competence-based perspectives; improve financial management of schools to maximize the efficiency of teaching and studying. This strategy will help to improve the quality of education and increase the incentives of schooling. Education will be treated as one of the best investments which give high returns. As a consequence, investments in human capital of children would increase leading to economic growth prospects and prosperity of the nation.

References

- Acosta, Pablo A., Pablo Fajnzylber, and Humberto Lopez. "The impact of remittances on poverty and human capital: evidence from Latin American household surveys." (2007).
- 2. Adams, Richard H., and Alfredo Cuecuecha. "Remittances, household expenditure and investment in Guatemala." *World Development* 38, no. 11 (2010): 1626-1641.
- 3. Adams, Richard H., and Alfredo Cuecuecha. "Remittances, household expenditure and investment in Guatemala." *World Development* 38, no. 11 (2010): 1626-1641.
- 4. Amuedo-Dorantes, Catalina, Annie Georges, and Susan Pozo. "Migration, remittances, and children's schooling in Haiti." *The ANNALS of the American Academy of Political and Social Science* 630, no. 1 (2010): 224-244.
- Anderson, Kathryn H., and Antje Kroeger. "Remittances and Children's Capabilities: New Evidence from Kyrgystan, 2005-2008." (2011).
- Anderson, Kathryn H., and Bakhrom Mirkasimov. "Migration, Remittances, and the Human Capital of Children: A Case Study of Tajikistan." In *Fourth Southeastern International/Development Workshop, December*, vol. 3. 2010.
- Anderson, Kathryn H., Richard Pomfret, and Natalia Usseinova. "Education in Central Asia during the transition to a market economy." *The Challenges of Education in Central Asia. Information Age Publishers: Greenwich, CT* (2004): 131-152.
- Benedictis, Geovanna, Germán Calfat, and Karina Jara. Assessing the Impact of Remittances on Child Education in Ecuador: The role of educational supply constraints. No. 2010.06. Universiteit Antwerpen, Institute of Development Policy and Management (IOB), 2010.
- Brown, Richard, Saodat Olimova, and Muhammadi Boboev. "A Study on International Migrants' Remittances in Central Asia and South Caucasus–Country Report on Remittances of International Migrants in Tajikistan." *Manila, The Philippines: Asian Development Bank* (2008).
- 10. Chaaban, Jad, and Wael Mansour. "The impact of remittances on education in Jordan, Syria and Lebanon." In *Economic Research Forum: Workign Paper*, vol. 684. 2012.
- 11. De Brauw, Alan, and John Giles. "Migrant opportunity and the educational attainment of youth in rural China." *Journal of Human Resources* (2016).

- 12. DeYoung, Alan J. "Conceptualizing paradoxes of post-socialist education in Kyrgyzstan." *Nationalities papers* 36, no. 4 (2008): 641-657.
- 13. Dustmann, Christian. "Return migration, wage differentials, and the optimal migration duration." *European Economic Review* 47, no. 2 (2003): 353-369.
- Edwards, Alejandra Cox, and Manuelita Ureta. "International migration, remittances, and schooling: evidence from El Salvador." *Journal of development economics* 72, no. 2 (2003): 429-461.
- 15. Esenaliev, Damir, Antje Kroeger, and Susan Steiner. *The Kyrgyz Integrated Household Survey (KIHS): A Primer*. No. 62. Data Documentation, 2011.
- 16. Huttova, J., I. Silova, and H. Voolma. "Education development in Kyrgyzstan, Tajikistan and Uzbekistan: Challenges and ways forward." *Budapest, Hungary: Open Society Institute Education Support Program. Retrieved June* 25 (2002): 2007.
- Ibragimova, Shamsia. "Remittances and Poverty in Central Asia and South Caucasus. Country Report on International Migrants' Remittances and Poverty in the Kyrgyz Republic." (2008).
- Indiana University "In Stata, How Do I Estimate the Coefficients of Time-invariant Variables in the Panel FE Model, Using the Xthtaylor Command?" N.p., n.d. Web. 02 May 2017. <u>https://kb.iu.edu/d/bcfo</u>
- International Monetary Fund. Kyrgyz Republic: Poverty Reduction Strategy Paper— Country Development Strategy (2007–2010) *IMF* (2007)
- 20. Karabchuk, et al. "Trudovaya Migraciya i Trudoemkie Otrasli v Kyrgyzstane i Tajikistane: Vozmozhnosti dlya Chelovecheskogo Razvitiya v Centralnoi Azii" [Labor Migration and Labor-Intensive Industries in Kyrgyzstan and Tajikistan: Opportunities for Human Development in Central Asia]. Eurasian Development Bank (2015)
- 21. Korobkov, Andrei V. "Migration trends in Central Eurasia: Politics versus economics." *Communist and Post-Communist Studies* 40, no. 2 (2007): 169-189.
- Kroeger, Antje, and Kathryn H. Anderson. "Remittances and the human capital of children: New evidence from Kyrgyzstan during revolution and financial crisis, 2005– 2009." *Journal of Comparative Economics* 42, no. 3 (2014): 770-785.
- Mansuri, Ghazala. "Migration, school attainment, and child labor: evidence from rural Pakistan." (2006).
- 24. Nasir, Muhammad, Muhammad Salman Tariq, and Faiz-ur-Rehman Faiz-ur-Rehman.
 "The effect of foreign remittances on schooling: Evidence from Pakistan." Working Papers & Research Reports 2011 (2011).

- 25. Personal Remittances, Received (% of GDP). *Personal Remittances, Received (% of GDP) / Data*. World Bank 2016 Web. 05 June 2017.
- 26. Rural Poverty Portal. 2014 N.p., n.d. Web. 04 June 2017. http://www.ruralpovertyportal.org/web/rural-povertyportal/country/home/tags/kyrgyzstan
- 27. Schuler, Martin. "Migration patterns of the population in Kyrgyzstan." *Espace populations sociétés. Space populations societies* 2007/1 (2007): 73-89.
- 28. Seyitov, Tchoro, and Nurbek Jenish. "Remittances and Expenditure Patterns of Households in the Kyrgyz Republic." (2015).
- Yang, Dean. "International migration, remittances and household investment: Evidence from Philippine migrants' exchange rate shocks." *The Economic Journal* 118, no. 528 (2008): 591-630.

Appendix

Year	Remittances	Household	Age of	Total	Total
		Size	Household Head	Income	Expenditure on
					Education
2005	3442.798	4.010899	49.82582	35729.11	1011.094
2006	4522.324	3.944893	50.57323	43433.88	1124.444
2007	5048.51	3.857589	50.84572	51943.64	1105.927
Total	4340.174	3.937643	50.4165	43719.48	1080.716

Table 1 Summary Statistics for Variables (by year)

Table 2 Summary Statistics for Variables (by region)

Region	Remittances	Household	Age of	Total	Total
_		Size	Household Head	Income	Expenditure on
					Education
Urban	4455.668	3.538462	49.97147	48941.47	1048.657
Rural	4160.716	4.5579	51.108	35605.44	1130.528
Total	4340.174	3.937643	50.4165	43719.48	1080.716

Table 3 Summary Statistics for Variables (by region)

Region	Remittances	Household Size	Age of	Total Income
			Household Head	
Urban North	4135.143	3.289324	50.63505	48418.32
Rural North	4132.572	4.311575	51.7418	33544.75
Urban South	5028.981	3.984087	48.78453	49877.21
Rural South	4204.973	4.945255	50.11131	38845.94

Table 4 Summary Statistics for Variables (by Oblasts)

Oblast	Remittances	Household	Age of	Total Income	Total
		Size	Household		Expenditure
			Head		on Education
Issyk-kul	3786.45	3.765317	51.73364	36666.23	1015.671
Djalal-Abad	2741.932	4.27531	49.52686	38473.88	1036.088
Naryn	4430	4.503018	50.47015	41378.25	1220.249
Batken	6751.679	4.467577	49.95154	47852.82	797.6177
Osh	5079.55	4.415934	48.66115	50323.17	938.1195
Talas	5500.762	4.217474	48.92347	31676.96	1232.708
Chui	4235.927	3.384656	51.98003	47530.04	1170.562
Bishkek	3166.813	2.904084	51.58467	52917.14	1211.373
Total	4340.174	3.937643	50.4165	43719.48	1080.716

Table 5 Hausman-Taylor Estimation for Nation

Dependent Variable:

Expenditure on Education (log)

	Nation	
Independent Variables	Coefficient	Standard Error
Time variant endogenous variables		
Remittances Recipient	0.1094**	(0.0309)
Total Income (log)	0.0519**	(0.0282)
Time variant exogenous variables		
Household Size	0.5184***	(0.0201)
Age of Household Head	0.0658***	(0.0218)
Age ² of Household Head(HH)	-0.0011***	(0.0001)
Gender of Household Head (M)	-0.0138	(0.0739)
Higher Educ of HH	0.4059***	(0.1191)
Incomplete Higher Educ of HH	0.9358***	(0.2924)
Special Secondary Educ of HH	0.2713**	(0.1189)
Secondary General Educ of HH	-0.0479	(0.0995)
Elementary Educ of HH	-0.0042	(0.1747)
No Educ of HH	0.2106	(0.3068)
Time invariant endogenous variables	5	
Issyk-Kul	1.5059***	(0.1543)
Jalal-Abad	-1.3678***	(0.1606)
Naryn	1.8125***	(0.1644)
Osh	2.1524***	(0.1602)
Chui	2.1521***	(0.1551)
Bishkek	2.2471***	(0.1574)
Urban	0.5327***	(0.0875)
North	2.6181***	(0.1699)
n	14401	

*** significant at 1% level, **significant at 5% level, *significant at10% level *n* is the number of observations

Table 6 Hausman-Taylor Estimation for Urban/Rural Regions

Dependent Variable:

Expenditure on Education (log)

	Urban		Rural	
Independent Variables	Coefficient	Standard Error	Coefficient	Standard Error
Time variant endogenous variables				
Remittances Recipient	0.1345*	(0.0775)	-0.0924**	(0.0206)
Total Income (log)	0.2927***	(0.0708)	0.0338	(0.0434)
Time variant exogenous variables				
Household Size	0.6692***	(0.0283)	-0.1471	(0.0143)
Age of Household Head	0.0783***	(0.0265)	0.0788***	(0.0165)
Age ² of Household Head(HH)	-0.0012***	(0.0002)	-0.0008***	(0.0001)
Gender of Household Head (M)	-0.1434	(0.0984)	0.2094***	(0.0496)
Higher Educ of HH	0.3864**	(0.1508)	0.4594**	(0.0757)
Incomplete Higher Educ of HH	0.9152***	(0.3245)	0.9890***	(0.1708)
Special Secondary Educ of HH	0.1947	(0.1544)	0.2553**	(0.0765)
Secondary General Educ of HH	0.0476	(0.1366)	0.1018	(0.0641)
Edlementary Educ of HH	0.0048	(0.1798)	-0.1182	(0.1408)
No Educ of HH	0.8562	(0.4527)	0.3684	(0.2180)
Time invariant endogenous variables				
Issyk-Kul	-0.5055**	(0.2188)	0.2656**	(0.1117)
Jalal-Abad	-0.9164***	(0.2162)	-0.5011***	(0.0934)
Osh	0.5505**	(0.1604)	-0.1642*	(0.0918)
Chui	-0.2325	(0.1556)	0.6866***	(0.1556)
Bishkek	0.1784	(0.1571)	1.3152***	(0.1137)
North	0.0521	(0.1691)	-0.5368***	(0.1127)
n	8762		5639	

*** significant at 1% level, **significant at 5% level, *significant at10% level *n* is the number of observations

Table 7 Logit Fixed Effects Estimation

Dependent Variable

Enrollment in Schools

	Nation	
Independent Variables	Coefficient	Standard Error
Remittances	0.2738	(0.3687)
Total Income (log)	0.1079	(0.1548)
Household Size	0.0115	(0.3350)
Age of a Child	14.195***	(1.4343)
Age of Household Head	0.0743	(0.0450)
Age ² of a Child	-0.4841***	(0.0570)
Gender of a Child (M)	-1.7865	(1.0615)
Gender of HH (M)	-0.1078	(1.1141)
Education of HH (1-higher, 9-illitirate)	-0.0542	(0.4857)
n	11958	

*** significant at 1% level, **significant at 5% level, *significant at10% level *n* is the number of observations