

EXPLORING EDUCATIONAL ATTAINMENT AND RETURNS TO
EDUCATION IN SELECT TRANSITION ECONOMIES

By

Sibel Selcuk

Submitted to the

Faculty of the College of Arts and Sciences

of American University

in Partial Fulfillment of

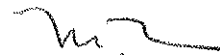
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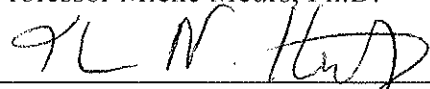
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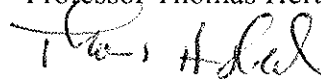
Chair:



Professor Mieke Meurs, Ph.D.



Professor Thomas Hertz, Ph.D.



Professor Thomas Husted, Ph.D.



Dean of the College of Arts and Science

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DEDICATION

I dedicate this dissertation to my loving family, as I would not have accomplished this work without their love and support, and to my late grandfather, Ekrem Ferdi Sarper, who was my inspiration for pursuing this Ph.D.

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ABSTRACT

This dissertation brings together evidence on educational attainment in Bulgaria, Kyrgyzstan and Tajikistan and returns to education in Bulgaria, and explores schooling investment decisions through a qualitative study in Bulgaria. I extend the existing literature to transition economies and examine the trends in the context of countries' exposure to economic crisis years.

Using intergenerational regressions and correlations of educational outcomes of children aged 16 to 20 in relation to parental education, I find that the correlation between children's and parents' education is positive and significant, supporting the earlier findings of the intergenerational mobility literature. I show that exposure to crisis coincided with changes in educational attainment for certain groups of children depending on parental education in Bulgaria and Tajikistan, and an appreciable gender gap in terms of persistence of educational outcomes in Bulgaria. With the grade-for-age trajectories, I demonstrate an increasing attainment gap between the children of poorly-educated parents compared to those of more highly-educated parents for children 12 years old and above.

In the second part, I extend the previous work on returns to education by providing a comprehensive examination of the trends for women and men; different levels of education; and workers at different quantiles of the wage distribution to illustrate which groups are lagging behind in labor market outcomes. Estimating various specifications of the Mincer equation, with ordinary least squares and quantile regressions, I find that while average returns to education increased in Bulgaria in line with the international trends in returns to education, this period was also characterized by a greater disparity in returns to education between workers in lower and higher end of the quantiles of the wage distribution, as well as for different levels of education.

In the last part, I explore what factors influence households' decisions to invest in children's education using qualitative data collected through fieldwork in Bulgaria in 2005. In line with the theoretical framework for schooling decisions, the interviews highlighted the importance of returns to education, ethnic background, gender and social capital in schooling investment decisions. They also revealed other possible factors, such as children's ability and quality of schooling.

ACKNOWLEDGMENTS

I would like to express my sincere appreciation to Professor Mieke Meurs, who has supported and motivated me throughout my Ph.D. education. With patience and tolerance she has guided me throughout the dissertation process and kept me on the right track. I would like to thank Professor Thomas Hertz for his continued guidance and support, in particular for his constructive feedback and insights on the methodological issues and for his guidance on STATA programming. I also would like to express my appreciation to Professor Thomas Husted for his valuable feedback and suggestions on the dissertation.

I am most obliged to thank the Economics Department for funding my fieldwork in Bulgaria without which this study would not have been possible. I also would like to express my gratitude to Stanka Dobрева, Veska Kouzouharova and Eugenia Todorova, who assisted me in carrying out the fieldwork in Bulgaria.

I cannot thank enough my husband, my daughters, and my mother-in-law for their unconditional love and support in this journey. I am also grateful for the love and encouragement I received from my parents. I also would like to thank other members of my family, including my sister and her family, my grandparents, and my aunt and her family for their support and for believing in me. Last but not least, I am indebted to my colleagues at the United Nations and my dearest friends for their support and encouragement throughout this process.

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CHAPTER 1

INTRODUCTION

While the transition from a centrally-planned to a mixed market economy brought economic opportunities to the former socialist economies, many of these countries experienced an economic downturn demonstrated by declining gross domestic product (GDP) and rising unemployment. These changes in turn led to low spending on schools and decline in basic and upper secondary education enrolment in the early years of transition. The concern is that whether such changes have negative impacts on education and labor market outcomes for certain parts of the population, resulting in increased inequalities. If this were the case, policy interventions would be needed to ensure that benefits of transition could be shared by all.

The dissertation examines three questions: (i) Is the degree of exposure to economic crisis years associated with a decline in intergenerational educational mobility in Bulgaria, Kyrgyzstan, and Tajikistan? (ii) What is the trend in returns to education in Bulgaria for women and men, for different levels of education and for workers at different quantiles of the wage distribution? and (iii) How do individuals make schooling investment decisions for their children? The choice of Bulgaria, Kyrgyzstan and Tajikistan, based on the availability of multiple surveys following the transition period, allows us to explore changes in mobility and attainment over time.

The first part uses intergenerational regressions and correlations of educational

outcomes of children aged 16 to 20 in relation to parental education to explore whether the difference in exposure to economic crisis years coincided with a decline in inter-generational educational mobility in these countries, i.e., a rise in the intergenerational regression coefficient. This would imply a higher degree of interdependence between children's education and parents' education. The first part of the study is an extension of the joint work with Professor Thomas Hertz, Professor Mieke Meurs, and other co-authors.¹ The findings demonstrate a decline in intergenerational educational mobility in Bulgaria and Tajikistan over the survey years, while the changes in mobility Kyrgyzstan were found to be negligible and not significant. The sex-disaggregated results suggest different trends in these countries, with an appreciable gender gap in terms of persistence of educational outcomes in Bulgaria, where sons are found to be less mobile than daughters.

In the first part, the grade-for-age trajectories for children aged 7 through 20 are also estimated to investigate the age at which the children of poorly educated parents start to fall behind academically, compared to those born to more highly educated parents. The increasing gap between the attainments of the children of better and less-well educated parents is evident in Bulgaria and Tajikistan.

The second part explores whether the returns to education in Bulgaria increased from 1995 to 2003 and whether the returns are different for women and men, for different

1. Hertz Tom, Tamara Jayasundera, Patrizio Piraino, Sibel Selcuk, Nicole Smith, and Alina Verashchagina (2007). "The Inheritance of Educational Inequality: International Comparisons and Fifty-Year Trends," *The B.E. Journal of Economic Analysis and Policy*: Vol. 7: Iss. 2 (Advances), Article 10 and Hertz, Tom, Meurs, Mieke and Selcuk, Sibel, (2009), *The Decline in Intergenerational Mobility in Post-Socialism: Evidence from the Bulgarian Case*, *World Development*, 37, issue 3, p. 739-752.

levels of education and for workers at various quantiles of the wage distribution. Various specifications of the Mincer equation are estimated using ordinary least squares and quantile regressions. While returns to education in Bulgaria increased from 1995 to 2003, it remained low compared to international estimates. Workers in lower quantiles of the wage distribution and women workers were found to be worse off in terms of returns to education. As expected, returns to education were found to vary depending on the grade level. Contrary to what we would expect from the Mincerian theory, however, returns to primary schooling was lower than returns to secondary or tertiary levels. The results also show that being female, living in rural areas and ethnic background are significant determinants of an individual's wage.

The third part explores the role of expected returns and other factors in households' decisions to invest in education in a rural setting in Bulgaria using qualitative data collected through fieldwork in the Bulgarian town of Troyan and village of Dobrodan in 2005. The interviews revealed a range of factors, such as expected returns to education, ethnic background, being a female, having social capital, children's ability and quality of schools that play a role in households' decisions to invest in education.

The dissertation is organized as follows. The second chapter focuses on intergenerational educational mobility. Returns to education in Bulgaria are explored in Chapter 3. This is followed by the analysis of qualitative study in Bulgaria in Chapter 4. Chapter 5 provides a summary of main findings and their policy implications.

CHAPTER 2

INTERGENERATIONAL EDUCATIONAL MOBILITY

Transition and Crisis Years

Transition from a centrally planned economy to free market did not go smoothly in the Central and Southeastern Europe countries, the Baltic States and the Commonwealth of Independent States (CIS). They all experienced an initial sharp fall in GDP, which was larger than anticipated. The CIS countries experienced a deeper and longer decline in output, with an average of 6.5 years of declining output in the first 10 years of the transition. Bulgaria had 4 consecutive years of output decline, whereas Kyrgyz Republic had 6 and Tajikistan had 7 years. Similarly average poverty rates, measured as percent of population living on less than US\$1 a day, increased from 1.5% in 1990 to 5.1% in 1998 in Eastern Europe and Central Asia. Changes in inequality during the transition period are also quite noteworthy. Inequality, measured as Gini coefficient of income per capita, in Bulgaria increased from 0.23 during 1987-90 to 0.41 during 1996-97, from 0.31 to 0.47 in Kyrgyzstan and from 0.28 to 0.47 in Tajikistan (World Bank, 2002b).

The most important change in the educational environment, however, was the steep decline in available financial resources at the national and local levels during the 1990s. Appendix F shows indices of real GDP, real education spending, education

spending per child, basic education enrollment and employment ratios in these countries. In Bulgaria, the post-socialist economic collapse resulted in a decline in real GDP to 75% of its 1990 level by 1997, the economic low point (UNICEF IRC, 2006). However, following the economic reforms introduced in 1997, Bulgaria's economy recovered, and by 2003 real GDP reached 96 percent of its 1990 level (column 1 in Appendix F). In Kyrgyzstan and Tajikistan, the decline in real GDP was even steeper. By 1995, real GDP in Kyrgyzstan fell to 51% of its 1990 value before recovering to 61% in 1998. Similarly, in Tajikistan, it fell to 47% of its 1992 value in 1997 before recovering to its 1990 value in 2006.

In Bulgaria, educational expenditures as a share of GDP (column 2 in Appendix F) fell dramatically, from 5.0% in 1990 to 3.2% in 1996; they have since partially rebounded, to 4.3% in 2003. As a result, total educational expenditures fell by half between 1990 and 1996 (column 3). This decline in educational spending was partially offset by a steady and ongoing decline in the number of school-age children (column 4). Yet, real educational expenditures per child ages 5 through 17 nonetheless fell by 41% between 1990 and 1996; in 2001, they were 4% below their 1990 levels, but by 2003 they had risen to 22% above the 1990 value (column 5). In Kyrgyzstan, while the education spending as percentage of GDP did not fall as dramatically, the increase in the number of school-age children (column 4) meant that education spending per child declined. Education spending per child was 33% of its 1992 value in 1993 and 31% in 1998. Tajikistan also experienced an increase in the number of school-age children, while its real education spending declined to 8% of its 1992 value in 1997 before rising to 31% in

2006 (column 4). Accordingly, education spending per child in Tajikistan declined to 7% of its 1992 value in 1997 before rising to 25% in 2006 (column 6).

At the same time, quite a number of schools were closed and the quality of education deteriorated. Bulgaria, for example, experienced a 13% reduction in the total number of primary and secondary schools from 1990 to 2000, with the total number declining from 3,458 in 1990-1991, to 3,011 in 1999-2000. Over this period, a 15% decline was also experienced in the total number of general schools present in rural areas, falling from 2,125 to 1,799 (Bulgarian National Institute of Statistics, 1995; 2000b). The closures can be partly explained by the decrease in the school-age population. In addition, however, the closures meant the average distance to school also increased, by 0.9 kilometers between 1995 and 2001 for enrolled students ages 7 through 20, and 0.6 kilometers for students ages 7 through 18 only (Hertz et al., 2009). The interviews of the qualitative work discussed in Chapter 4 highlighted the negative impact of distance to schools on schooling investment decisions. Furthermore, Bulgaria experienced a decline in the quality of education overall, which could impact on enrolment, as suggested by the qualitative findings which point to the impact of declining availability of food and materials in school on enrollment (Kabakchieva and Iliev, 2002). The interviews discussed in Chapter 4 also revealed parents' concern about the declining quality of education in Bulgaria.

Reductions in GDP and state revenue in Kyrgyzstan and Tajikistan resulted in deteriorating capital infrastructure, pedagogical materials, equipment, and textbooks; a shortage of qualified teachers; and poor-quality education (Open Society Institute, 2002). In Kyrgyzstan, even though 187 new schools were constructed for 59,800 children from

1992 through 2000, some schools in rural areas lacked heating, water, electricity, and/or windows (Open Society Institute, 2002). A large number of children were reportedly quitting school by the age of 14 in rural areas of Kyrgyzstan, because some of the qualified teachers were leaving the school system to sell at the local bazaar (Kuehnast, 2003).

Tajikistan, the poorest among the three countries, also experienced a civil war over the period of 1992 through 1997, which resulted in a loss of 50,000 lives and half a million displaced people within and outside the country. Similar to the experience of Kyrgyzstan, Tajikistan faced an economic decline as a result of the loss of former Soviet market and budgetary subsidies from Moscow. It is estimated that the civil war resulted in the destruction of 20% of schools (Open Society Institute, 2002). The Tajik data in this paper has revealed that the average distance to school increased by 0.30 kilometers between 1999 and 2007 for enrolled children aged 7 through 20, while increasing by 0.10 kilometers for children aged 7 through 18. Even though free education is guaranteed in the Tajik Constitution, schools in towns had a fee system requiring parents to contribute to school repairs and pay for courses such as Chemistry or English, pressuring poor children to move to other schools or to quit (Gomart, 2002). In some small villages, schools closed for lack of funds and teachers. Lack of security was a concern, particularly among young women. One-third of the children aged 7 through 15 in Tajikistan were reported to be out of school for two or more weeks during an academic year as many of them contributed to family work (Asian Development Bank, 2000). Other reasons for non-attendance included perceived irrelevance of education, lack of clothing, insufficient school supplies, and absence of teachers (World Bank, 2000).

Rising costs of schooling may also be a problem. Data from Bulgarian surveys, for example, revealed that the real monthly out-of-pocket costs of schooling increased substantially between 1995 and 2003 for enrolled students in both the 7- to 20-, and the 7- to 18-year age groups.² Out-of-pocket costs also emerged as an obstacle to investment in children's schooling among parents and children interviewed during the fieldwork in Bulgaria, as discussed later in Chapter 4.

During this period, expected returns to education have also been changing. In most post-socialist countries, returns to education have increased with the liberalization of labor markets (Orazem and Vodopivec, 2000; Newell and Reilly, 1999). Chapter 3 provides evidence that returns to education have increased over this period in Bulgaria, but remained low compared to international estimates of returns to education (Orazem and Vodopivec, 2000; Trostell, Walker, and Woolley, 2002; Psacharopoulos, 1994). Brainard (1998) has showed that return to an additional year of education in Russia increased from 3.1 in 1991 to 6.7% in 1994 for men, and from 5.4 to 9.6% for women. For Kyrgyzstan, Anderson and Pomfret (2000) found weak evidence that returns to college education increased from 1993 to 1996, and strong evidence that it decreased for post-secondary vocational training.

The final column of the table in Appendix F shows that employment as a percentage of the population of working age fell steadily in Bulgaria, from 78% in 1990 to 54% in 2001, before recovering somewhat to 63.8% in 2006. The interview findings discussed in Chapter 4 reveal that children believe “who you know counts more than

2. Data on out-of-pocket expenses was not consistently available in Kyrgyz and Tajik surveys.

education in getting a job in the labor market”. The official youth unemployment rate was almost 26.8% in 2003. According to Nenova (2002), people with some education are more likely to be unemployed than those with low or high education. This low expected returns to secondary education could have a negative impact on schooling investment decision. In addition, even the expected accession to the European Union did not have much impact on schooling decisions, as Bulgarians faced labor mobility constraints. The interview results discussed in Chapter 4 reaffirmed this conclusion.

Kyrgyzstan and Tajikistan also experienced a decline in their employment ratios. Note, however, that the figure for Kyrgyzstan may underestimate the decline as official and unofficial unemployment rates estimates differ significantly. Registered unemployed rate varied between 0% and 3% while unofficial estimates are close to 33%. In addition, unemployment among out-of-school youth ages 15 through 24 was 20% in Kyrgyzstan in 1999 (UNICEF, 2000). In Tajikistan, however, unemployment among out-of-school youth ages 15 through 24 was 40% in 1999 (UNICEF, 2000).

Overall, the declining incomes, education spending per child and worsening labor market outcomes in these countries are indicative of a period of economic crisis. The question is whether children’s exposure to the crisis period also resulted in a decline in intergenerational mobility in these countries. In order to explore whether the difference in children’s exposure to crisis years was associated with a decline in intergenerational mobility in these countries, the paper defines the economic crisis period for each survey as a period when real gross domestic product (GDP), education spending per child, and employment ratio were all 10% below their 1990 values for Bulgaria and Kyrgyzstan and 1992 values for Tajikistan (See Appendix F). These years are chosen as the base years, as

they are the earliest year with all the data available for these countries. Accordingly, the crisis period is 1995 through 1999 for Bulgaria, 1994 through 2006 for Kyrgyzstan, and 1996 through 2004 for Tajikistan.

Impact of Transition on Education

In addition to the unfavorable changes in the economy discussed in the prior section, the end of socialism brought similar changes to the educational system. The focus on decentralization shifted the financial responsibility from the central government to local governments. Economic and social transformation during the transition had a negative impact on the educational system through changes in demand for schooling arising from financial constraints and changing labor market conditions.

A recent study by the World Bank argues that economic crisis can have a negative impact on education by reducing the ability of governments and households to invest in education (World Bank, 2009). School attendance, in particular for children from poorer households, can be negatively impacted by declining household incomes, as they may need to take up jobs to contribute additional income to their families and out-of-pocket costs can become a heavier burden on households. By contrast, youth may stay longer in school as a result of decrease in paid work opportunities, as it happened in the United States for college enrollments during the 1968 and 1988 recessions, and in Mexico in 1982-3 and in 1986 (World Bank, 2009).

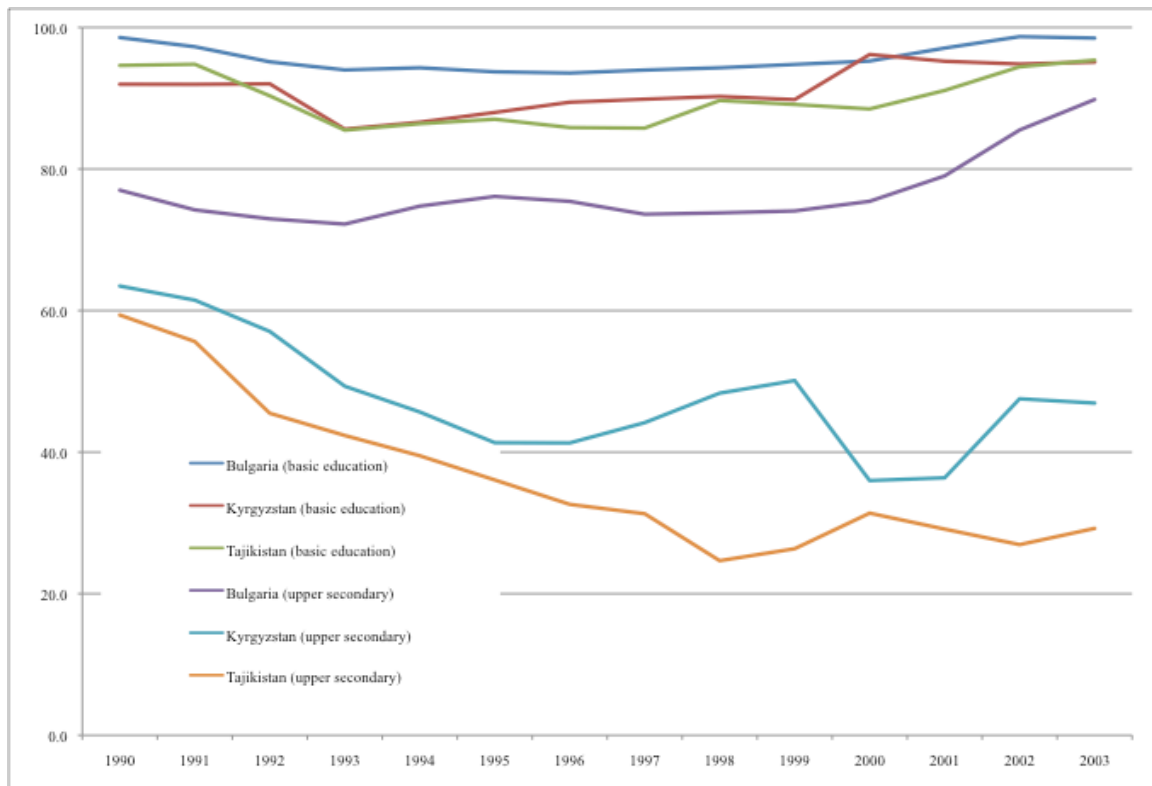
The formerly socially planned economies of Eastern Europe and Central Asia were traditionally known to be well-endowed in education. In 1990, Bulgaria had a (gross) basic education enrolment rate of around 98.6%, Kyrgyzstan 92%, and Tajikistan

94.6%. As Figure 1 below shows, there was a decline in basic education enrollment among 7-14 year olds in Bulgaria and 7-15 year olds in Kyrgyzstan and Tajikistan, and upper secondary enrolment among 15 through 18 year-olds in the early years of transition. In Bulgaria, for example, the total upper secondary education enrolment for 15 through 18 year-olds decreased from 77% in 1990 to 72.2% in 1993. It increased to 76.1% in 1995, before going down to 73.6% in 1997. In Kyrgyzstan, the enrolment rate decreased from 63.5% in 1990 to 41.3% in 1995, before increasing to 50.1% in 1999. In Tajikistan, the upper secondary education enrolment rate declined after transition, to a low of 24.7% in 1998.³

The survey data used in this paper illustrates that average educational attainment for children ages 16-20 also fell significantly in Bulgaria, from 10.03 years of schooling in 1995 to 9.43 in 2003. In Kyrgyzstan, it decreased from 10.36 in 1993 to 10.29 in 1998, and in Tajikistan it increased from 9.58 in 1999 to 9.62 in 2007, but, these changes were not statistically significant. However, educational mobility may still change even when average attainment does not, provided changes in attainment are related to parental background.

The declines in the enrolment rates during the early years of transition, as well as the declines in attainment over the survey years suggest that exposure to crisis years — defined earlier as the period when real GDP, education spending per child and employment rate, were all 10% below their baseline values in each survey— may have

3. According to data sources, Tajik data for 1992-2003 exclude Abkhazia and Tskhinvali.



Note. Based on data from TransMONEE Database (2005). According to data sources, Kyrgyz data on general secondary enrolment for 2000-2001 affected by change in education system, and Tajik data for 1992-2003 exclude Abkhazia and Tskhinvali.

Figure 1. Enrolment in Bulgaria, Kyrgyzstan and Tajikistan.

had a negative impact on children's educational attainment, with long-term consequences on incomes and human capital in adulthood.

The impact of the crisis on the reduction in educational attainment can be explored by comparing the results for children in earlier and later datasets with differing degrees of exposure to the crisis years (1995 to 1999 for Bulgaria, 1991 to 2006 for Kyrgyz Republic, and 1997 to 2007 for Tajikistan). The timing of the surveys generates differences in exposure to these crisis conditions between the two surveys in each country (Tables 1-3).

In Bulgaria, for example, for children aged 16 through 20, who will be the focus in the analysis of the intergenerational persistence of educational outcomes in this paper as explained later, exposure ranges from zero out of their first twelve potential years of observable education (for 20-year-olds) to one out of ten (for 16-year-olds) in 1995. The average number of years of exposure for this group is 0.6, representing just 6% of their potential years of primary and secondary education at the time of the survey. Thus, the educational attainment of those surveyed in 1995 should not have been greatly affected by the poor economic and fiscal conditions of the period 1995 through 1999. On the other hand, 16- to 20-year-olds surveyed in 2003 would have been exposed to as many as five years of the depressed conditions that characterized the period of 1995 through 1999, with an average exposure of five years, or 47% of their potential years of primary and secondary schooling observable to date.⁴ The 16- to 20-year-olds in 2003 would also have faced a slightly worse job market than the 16- to 20-year-olds in 1995, since employment fell steadily from 1990 to 2001 and then slowly recovered. While this reduces the opportunity cost of schooling, the interview evidence suggests that it nonetheless reduced the demand for education (Kabakchieva & Iliev, 2002).⁵ These factors altogether suggest that average educational attainment for 16- to 20-year-olds should have worsened between the 1995 and 2003 surveys.

4. A 16-year-old in 2003 was born in 1987 and should have started first grade at age 7, in 1994. Grades 2 through 6 would then correspond to the crisis period, 1995 to 1999, accounting for 5 out of 10 of their potential years of schooling observable by 2003. A 20-year-old, born in 1983, would have spent 6th through 11th grade in the 1995 through 1999 period, or 5 of their 12 potential years of education. Similar calculations are used to estimate exposure for younger students, discussed later in the paper.

5. The qualitative survey of education was conducted in January-February 2002 for the 2002 World Bank Poverty Assessment Report for Bulgaria. Ten communities with geographic, ethnic and socioeconomic diversity were included in the study to analyze the obstacles to participation in education.

Table 1. Bulgaria - Exposure to the Crisis (1995-1999)

Age in 1995	Year start school	Exposure in 1995 survey (years)	Ratio of exposure years to number of potential years in school (%)	Age in 2003	Year start school	Exposure in 2003 survey	Ratio of exposure years to number of potential years in school (%)
16	1986	1	11	16	1994	5	56
17	1985	1	10	17	1993	5	50
18	1984	1	9	18	1992	5	45
19	1983	0	0	19	1991	5	42
20	1982	0	0	20	1990	5	42
Average for 16-20 year-olds		0.6	6			5	47

As for Kyrgyzstan, for children aged 16 through 20 in 1993, there is no exposure to the crisis period (1994 through 2006). On the other hand, 16- to 20-year-olds surveyed in 1998 would have been exposed to as many as five years of the depressed conditions that characterized the 1994 through 2006 period, with an average exposure of five years, or 47% of their potential years of primary and secondary schooling observable to date. The 16- to 20-year-olds in 1999 would also have faced a worse job market than the 16- to 20-year-olds in 1993, since employment fell from 1993 through 1998. In other words, we would expect average educational attainment for 16- to 20-year-olds in Kyrgyzstan to have worsened between the 1993 and 1998 surveys.

Table 2. Kyrgyz - Republic Exposure to the Crisis (1994-2006)

Age in 1993	Year start school	Exposure in 1993	Ratio of exposure years to number of potential years in school (%)	Age in 1998	Year start school	Exposure in 1998	Ratio of exposure years to number of potential years in school (%)
16	1984	0	0	16	1989	5	56
17	1983	0	0	17	1988	5	50
18	1982	0	0	18	1987	5	45
19	1981	0	0	19	1986	5	42
20	1980	0	0	20	1985	5	42
Average for 16-20 year-olds		0	0			5	47

In Tajikistan, for children aged 16 through 20 in 1999, exposure to the crisis period (1993 through 2006) was four out of their first 12 potential years of observable education for both 16- and 20-year-olds, representing 37.2% of their potential years of primary and secondary education at the time of the survey. On the other hand, 16- to 20-year-olds surveyed in 2007 would have been exposed to as many as 9 years of the depressed conditions that characterized the 1993 through 2006 period, with an average exposure of 7.8 years, or 72% of their potential years of primary and secondary schooling observable to date. Similar to the experience of Bulgaria and Kyrgyzstan, the 16- to 20-year-olds in 2007 would also have faced a slightly worse job market than the 16- to 20-year-olds in 1999. We would also expect the average educational attainment for 16- to 20-year-olds in Tajikistan to have worsened between the 1999 and 2007 surveys.

Table 3. Tajikistan - Exposure to the Crisis (1996-2004)

Age in 1999	Year start school	Exposure in 1999	Ratio of exposure years to number of potential years in school (%)	Age in 2007	Year start school	Exposure in 2007	Ratio of exposure years to number of potential years in school (%)
16	1990	4	44	16	1998	6	67
17	1989	4	40	17	1997	7	70
18	1988	4	36	18	1996	8	73
19	1987	4	33	19	1995	9	75
20	1986	4	33	20	1994	9	75
Average for 16-20 year-olds		4	37.2			7.8	72

Evidence on Intergenerational Persistence of Educational Outcomes

The current economic and financial crisis, which is affecting both developed and developing countries around the world, makes it very timely to look at previous economic downturns and the possible changes in educational outcomes of children. One question is whether the crisis will affect all children in a similar way, or whether certain groups of children will experience a greater impact. The evidence on possible impact of a crisis on educational outcomes of children suggests that it can also affect intergenerational persistence of educational outcomes. Comparing intergenerational regression coefficients or correlation coefficients for older children allows us to explore the change in the degree of equality of opportunity—or intergenerational educational mobility—to unpack the impact of the economic crisis on educational attainment.

Among the articles examined for the literature review, however, only Hertz et al. (2009) has dealt with crisis on Bulgaria. It documented a near-doubling of the statistical association between parents' and children's schooling in Bulgaria between 1995 and 2001 and concluded that the economic and fiscal crisis of the 1990s led to a sharp decline in educational mobility.

It is well established that the correlation between the socio-economic status of parents and their children is positive and significant, regardless of the measure used in the analysis, such as long-run average income, earnings, occupation, and education. The intergenerational persistence of socio-economic status is important because it can shed light on the character of inequality in a society (Solon, 1999). Two societies, for example, can display the same degree of inequality within a generation even if they have different

characters of inequality, depending on how closely one's relative position in the distribution is inherited from one's parents (Solon, 1999). This is not a question about inequality in the distribution of socio-economic outcomes or about changes in means from one generation to the next, but a question about the intergenerational links between the distributions of two generations and whether one's relative position in the distribution is inherited precisely from one's parents.

Education has been increasingly used in the economic literature as a measure of social status. It is considered to be a more reliable measure of socioeconomic status than earnings and income, which tend to be volatile and less comparable. Intergenerational persistence of educational outcomes measures the degree of interdependence between children's education and their parents' education. Lower intergenerational persistence of educational outcomes implies that children of less-educated parents can have the opportunity to receive more years of schooling and to secure better paying jobs to have a better life.

It is widely acknowledged that, with economic growth and development, younger generations are expected to achieve a higher average in educational attainment, resulting in absolute upward mobility in terms of schooling. Nevertheless, absolute mobility does not necessarily imply relative mobility, and vice versa. Relative mobility indicates the positional change in educational outcomes between generations. In other words, relative mobility allows one to observe how children are doing in terms of schooling, compared to their own parents. If average schooling were to decline by half for children at all points in the distribution, this would indicate downward absolute mobility with no relative mobility as there would be no positional change within the sample, implying that children

of both highly educated and less educated parents would experience the same decline in educational attainment. As Behrman, Gaviria, and Szekely (2001) point out, upward absolute mobility is usually a sign of the general rise in mean attainment resulting from economic development. Relative mobility, on the other hand, is indicative of the distribution of opportunities in a country.

In the economic literature for intergenerational mobility in developed countries long-run average incomes of children and their parents are often used to estimate mobility (See surveys by Solon (1999) and Corak (2006)). While the intergenerational coefficients can not be used to determine causality —impact of parental income on children's income, they can still provide a descriptive measure of the persistence of socio-economic status across generation. For example, higher coefficients suggests lower intergenerational mobility. . Due to the limited availability of longitudinal panel datasets, such as the ICRISAT survey of India and RAND Corporation's Malaysian Family Life Survey, and the annual income fluctuations — resulting in poor estimates of mobility (Solon, 1992; Zimmerman, 1992; Mazumder, 2005), education as a more stable and more available variable, has become widely used in intergenerational mobility studies.⁶ Intergenerational educational mobility studies have often been used by sociologists. For example Ganzeboom and Nieuwbeerta (1999) and Wong (2004) have estimated these for some socialist countries. Economists are also increasingly applying this methodology to explore mobility in different countries and period. These include, for example, South

6. The analysis by Hertz et al. (2007) show that while intergenerational regression estimates for education and income are related, many other factors can impact this relationship, including the returns to education, the share of the variance of income that is explained by education, and the correlation between parental income and children's education. In other words, education mobility estimates should not be taken as a close proxy for income, but rather as another measure of socio-economic status.

Africa (Thomas, 1996) and a handful of Latin American nations (Behrman, Gaviria, and Székely, 2001). Through a survey of 42 countries, Hertz et al. (2007) have found low intergenerational educational mobility estimates over the past 50 years in Latin America, somewhat higher in Asia, the West, and the transition economies, and highest in the Nordic nations.

One component of the research on intergenerational educational mobility focuses on the impact of parental education on children's educational outcomes within a country (Blake, 1985; Lam and Schoeni, 1993; Lillard and Willis, 1994; Dearden et al., 1997; Binder and Woodruff, 2002; Sato and Shi 2007). Besides specific country studies, research includes cross-country comparisons of intergenerational mobility, which established the importance of parents' schooling in explaining intergenerational educational mobility (Shavit and Blossfeld, 1993; Checchi et al., 1997; Chevalier et al., 2003; Lauer, 2003; Hertz et al., 2007; de Broucker and Underwood, 1998; Behrman, Gaviria, and Székely, 2001; Andersen, 2001; and Ganzeboom and Nieuwbeerta, 1999). While Ganzeboom and Nieuwbeerta (1999) exclusively focused on educational mobility within former socially planned economies, a limited number of studies, including Chevalier et al. (2003) and Hertz et al. (2007) have included a number of these countries in their broader analysis.

Appendix A includes a summary table of findings from the literature review, which provides succinct information per article reviewed on countries studied, datasets involved, sample size, age restriction, methodology used, variables explored, and main results. The extent of persistence of outcome, which has been calculated as the effect of parental education on that of the child or the schooling correlation between parents and

children, has, however, varied from 0.01 to 1.27 depending on country, methodology, sample size, and the way variables are constructed in a dataset.

With the exception of a few, many studies used years of schooling or levels of schooling in their analysis. The exceptions include Behrman et al. (2000), who used schooling gaps for students, measured as the difference between the theoretical educational attainment of a student without any grade repetition and the actual educational attainment and Dahan and Gaviria (2001), who used an indicator of socio-economic success or failure by comparing the number of years of schooling of children and the average years of schooling of their cohorts.

Most studies examined the persistence of educational outcomes without looking at daughters and sons specifically. There is, however, well-established evidence that girls and boys have different educational outcomes. Opportunity costs of girls' schooling for households, for example, are often higher than those of boys' schooling, as girls often undertake responsibility for unpaid work at home, such as caring for younger siblings, fetching water and firewood, and other household chores (Oxaal, 1997). A review of the returns to investment in education in 98 countries found that, even though returns to schooling are higher for women on average, returns to primary schooling are higher for men than for women, and returns to secondary schooling are higher for women than for men (Psacharopoulos and Patrinos, 2002). This low return in primary schooling can be a disincentive for some households to send girls to school. In addition, the private return to the household may be perceived as being less due to wage differentials between women and men and the expectation that women would leave the household upon marriage (Oxaal, 1997). We would expect these to have an impact not only on levels of education,

but also on correlations if the disincentives to send girls to school are stronger or weaker from one generation to the next.

A few studies in Appendix A, including Dearden et. al. (1997), Ganzeboom and Nieuwbeerta (1999), and Lillard and Willis (1994), have explored the gender dimensions of the intergenerational transmission of educational outcomes. As can be seen from the table in Appendix A, the magnitudes for the coefficient estimates for women range from 0.0140 in Malaysia to 0.595 in the Czech Republic. When results for women and men were compared, there was no consistent pattern of more mobile or less mobile women. The analysis by Behrman, Gaviria, and Székely (2001), for example, illustrated that women are more mobile than men in Brazil and Colombia, whereas men were found to be more mobile in the United States, Mexico, and Peru, yet the difference was not very significant in Brazil and the United States.

A theoretical framework of schooling investment decisions, such as the one discussed later in Chapter 4, can help explore how these intergenerational educational correlations may be affected by the economic and policy environment. Government policies, including monetary and fiscal policies, labor market policies and education policies, determine the context in which parents and children make schooling investment decisions. Parents and children then take into account the costs and benefits of an additional year of schooling in an environment determined by governments' policy choices. Their decisions can be constrained by the limited availability of credit in financial markets (Becker and Tomes, 1979), particularly at higher levels of education. .

In line with the theoretical framework, effects of both government policies and economic conditions on intergenerational educational mobility have been highlighted in

some studies. Several studies, including Bowles et al. (2002), Harding et al. (2005), Roemer (2004), and Jencks et al. (2006), have gone beyond the descriptive analysis of mobility and proposed a range of policy responses to address the inheritance of social status. Governmental interventions in Malaysia, for example, were found to significantly reduce the effect of parents' education over the period 1950 to 1980 (Lillard and Willis, 1994). A massive school construction program in Indonesia is found to have a positive impact on both attainment (Duflo, 2001) and mobility (Hertz and Jayasundera, 2007). In China, anti-elite policies of the Chinese Cultural Revolution were found to reduce intergenerational educational transmission in the short run (Deng and Treiman, 1997). Increased government spending on primary schooling, and increases in the level of education of teachers were found to have had positive effects on educational mobility in 16 Latin American countries (Behrman, Birdsall, and Székely, 2000). Behrman et. al. (2000) also argue that macroeconomic variables can be important and find financial depth (M2 over GDP) to be a determinant for mobility.

Some authors, including Belzil and Hansen (2003), and Jaeger and Holm (2007), have tried to identify the mechanisms behind the intergenerational transmission of educational attainment. This, however, is beyond the scope of this paper, because of lack of availability of data required for such analysis (for example, grade point averages of the individuals).

Promoting educational mobility, by increasing educational attainment of children of less-educated parents and discriminating against children of more educated parents, was a common strategy in the former socialist countries. Empirical evidence for that period, however, is not conclusive. On the one hand, evidence suggests this strategy was

not successful, in particular for children's participation in secondary and tertiary education in Eastern Europe (Wong, 2004). However, an earlier study by Ganzeboom and Nieuwbeerta (1999) shows that the relationship between parents' and children's years of schooling was weakened by about one-third in Bulgaria over the period 1940 to 1985.

In view of this inconclusive overall evidence, this chapter demonstrates exposure to the economic crisis years following the transition into a mixed market economy coincided with a decline in intergenerational educational mobility in Bulgaria—with children of less-educated parents faring worse off in terms of educational attainment compared to children with highly-educated parents.

The paper extends the analysis already undertaken by Hertz et al. (2009) on Bulgaria. Using 1995 and 2001 LSMS datasets for Bulgaria, Hertz et al. (2009) documented that institutional and economic changes in Bulgaria coincided with a sharp reduction in educational mobility. Using a more recent dataset (2003) for Bulgaria in the paper will help determine whether the decline in mobility continued.

The analysis in this dissertation also adds to the empirical evidence on the intergenerational persistence of educational attainment in transition by adding an examination of Kyrgyzstan, and Tajikistan, which is limited so far. While most studies provide a comparison across countries at a point in time, this paper also allows us to explore the changes in the intergenerational persistence over a period of time in a country.

Data and Methods

Using intergenerational regressions and correlations, educational outcomes of children aged 16 to 20 will be considered in relation to parental education to explore the change in the degree of educational opportunity. In order to explore the persistence of educational outcomes between generations in transition economies, data on schooling of parents and children are needed. Ideally, we would want to have information on schooling outcomes of all parents, including non-resident parents. Unfortunately, these data are not available in many countries. Therefore, the sample is restricted to 16- to 20-year-olds in each survey. This age group allows us to observe children who are old enough to have completed most of their education, but still young enough to be observed in their parents' households. The data in this sample are likely to be censored, as many of the children would still be in school during the year of the survey. The resulting bias in the intergenerational coefficient, however, is not likely to be considerable. While the children of better-educated parents probably have not completed their schooling (resulting in a downward bias in the coefficient), children of parents with less education probably would take longer to complete their schooling, due to grade repetition (resulting in an upward bias in the coefficient) (Hertz et al., 2009).

The paper will also investigate the age at which the children of poorly educated parents start to fall behind academically, compared to those born to more highly educated parents. For this purpose, the paper will extend the analysis to 7- to 20- year olds' to explore their grade-for-age trajectories as a function of parental education.

The study uses the Living Standard Measurement Study Surveys (LSMS) conducted by the World Bank and national statistical offices of countries, which contain

information on resident parents, to provide an analysis of transmission of schooling across generations and allow a meaningful comparison within and across countries. LSMS contain many dimensions of well-being and household behavior, such as consumption, income, health, migration, employment, and housing. Overviews of each survey, the list of variables used in the analyses and data issues, such as missing values and errors, are discussed in detail in Appendices B through E.

Respondents, usually the head of household or spouse, are asked to report on education for each household member. The first question identifies the education category, and the second one identifies the highest grade attained.⁷ These countries offer two types of education after compulsory schooling; a vocational/technical track and a general secondary track. As explained in detail in Appendix D, all of this information is converted to years of schooling to make it comparable across countries. Parents' education is computed by taking the average of mothers' and fathers' years of schooling. Smith (2008) illustrates that average value of parental education is a better regressor as it produces reliability values closer to one compared to individual values of education of mother and fathers.

Note that the regression coefficients indicate the strength of association between children's and parent's education, and are not affected by the changes in means. In other

7. Measurement error is a major problem in the empirical measurement of intergenerational educational mobility because it overstates the variances of the true attainment and may show more mobility than present. Unfortunately, this remains a problem in this study due to lack of alternate measures of reported schooling. Earlier LSMS datasets for Bulgaria have allowed us to assess the measurement error in education for Bulgaria (10%) as the Bulgaria sample for 1997 consisted of re-interviews for 2,000 households of the 1995 dataset. In other words, 10% of education data collected was not correct, either due to misreporting by respondents or input errors. Measurement error can, however, lead to attenuation of coefficients, that is to say, the coefficients being biased towards zero (Deaton, 1997).

words, if everyone had felt the negative impact of the economic crisis equally, mobility estimates would not change.. Therefore, as mentioned earlier, the main question is whether this difference in exposure to the crisis years was associated with a decline in intergenerational educational mobility, i.e., a rise in the intergenerational regression coefficient. This would imply a higher degree of interdependence between children's education and parents' education.

To answer this question for Bulgaria, Kyrgyzstan, and Tajikistan, first the correlation coefficients are estimated for parental and child schooling, which gives a direct measure of the effect of parents' schooling on that of their children. Second, the intergenerational transmission of schooling is modeled as a first-order linear approximation—a Markov process—to explore intergenerational persistence of educational outcomes. The use of Markov processes to model mobility over generations in a society in sociology studies goes back as far as McGinnis (1968). This was followed by other studies by Boudon (1973), MacFarland (1970), and White (1970). In economic research, Becker and Tomes (1979) were among the first to introduce linear approximation to model intergenerational transmission of wealth.

The transmission of educational outcomes from parents to children will be modeled as a simple first-order Markov process as follows:

$$S_1 = \alpha + \beta \cdot S_0 + w_i \quad [1]$$

where β is a measure of immobility, S_1 is years of schooling of the respondent, S_0 is years of schooling of the respondent's parent, and w_i is the error term. An additional year of parental schooling would increase the child's education level by β ; the higher the levels of β , the higher the intergenerational persistence of educational outcomes and the lower

the intergenerational educational mobility. On the other hand, lower values of β imply a higher intergenerational educational mobility.

By standardizing these regression coefficients into correlation coefficients, that illustrate the relationship between a one-standard-deviation difference in parental education and the corresponding difference in children's education. This would create a unit-free measure of mobility, as changes in the variance of schooling from one generation to the next are adjusted, allowing for a meaningful comparison with other measures of mobility.

This part of the dissertation does not attempt to decompose the causal components of intergenerational persistence measure (β), such as wealth constraints or cultural or genetic endowments, but rather compares the extent of persistence of educational outcomes across these countries and over time within them. If the variance of child's schooling and parents' schooling is equal, then the regression coefficient will equal the correlation coefficient. A high correlation would imply that people born to less-educated parents have a smaller chance to get more education than those born to highly educated parents. A zero correlation would imply a high degree of mobility and more equal opportunities. Note, however, that while these methods can illustrate what happens to intergenerational transmission of schooling on average, they do not specify the direction of mobility. In other words, mobility can be either upward or downward.

The paper also extends the scope to children aged 7 to 20, to investigate the age at which fall behind academically depending on parental education. This is explored by estimating grade-for-age trajectories as a function of parental education, in each survey year. Control variables are included to ensure consistency between the two surveys

within a country. The grade-for-age profiles of the children of by parental education are presented for both survey years for each country. This analysis will help identify whether there is increasing inequalities in attainment based on one's parental education, and will complement the findings from the intergenerational mobility regressions of equation [1], .

Similar to the experience of the 16- to 20-year-olds, we observe an increase in students' exposure to the crisis period between the two surveys in each country. Those aged 7 through 20 in 1995 in Bulgaria, for example, had an average of 0.8 years of exposure, representing 22% of their potential years of primary and secondary education, while those of the same age group in the 2003 survey had an average exposure of 2.9 years, which represented 33% of their potentially observable years of primary and secondary schooling. Those aged 7 through 20 in 1999 in Kyrgyzstan had an average of 2.8 years of exposure, representing 52.2% of their potential years of primary and secondary education, while those of the same age group in the 1998 survey had an average exposure of six years, which represented 88.7% of their potentially observable years of primary and secondary schooling. Those aged 7 through 20 in 1999 in Tajikistan, on the other hand, had an average of 5.5 years of exposure, representing 83.9% of their potential years of primary and secondary education, while those of the same age group in the 2007 survey had an average exposure of 7.3 years, which represented 100% of their potentially observable years of primary and secondary schooling.

The regression used to predict attainment, which was run separately for each survey year, was as follows (full results are reported in the Appendix H):

$$S_1 = \sum_{t=7}^{20} \delta_t D_t + \sum_{t=7}^{20} \beta_t (D_t \times S_0) + \alpha(Months) + \tau(IntDate) + \gamma(Female) + \rho(Rural) \quad [2]$$

$$+ EthnicityDummies + DistrictDummies + u$$

Here the child's education (S_1) is estimated as a function of, first, a full set of age dummies, where t indexes age in years, the D_t are the age dummies, and the δ_t are their associated coefficients; because all age dummies are included, the intercept is suppressed. Next, each age dummy is interacted with S_0 , or average parental schooling. Creating dummy variables for age helps capture the non-linear effect of parental education in the regression analysis by allowing the effect of parental education to differ with full flexibility by age. The next variable, *Months*, is the number of months of age within the year (from 0 through 11), which is included, when available, to capture the fact that children with slightly earlier birthdays may be able to enroll a full year earlier. As the results in Appendix H show, the number of months of age is in fact significant at the 0.1% level — each extra month of age adds about 0.04 and 0.07 years to average attainment in Bulgaria in 1995 and 2003 respectively and 0.06 in Tajikistan in 1999.

The variable *IntDate* measures the month and day on which the household was interviewed. This is needed because interviews for each survey can be conducted at different times, such as when school is still in session or when the school year has ended for most students. If currently attending respondents had taken the phrase “highest level completed” at face value, then those who were interviewed in April in a year should have responded with last year's grade level, whereas had they been interviewed in late June or early July, they should have reported that they had just completed another grade. This would bias reported educational attainment in the survey downward in relation to the

survey conducted when the school year has ended for most students. As can be seen in the Appendix H, the interview date (when the information was available in a survey) effect is not statistically significant.

The final control variables include indicators for women, for those living in rural areas and in each of the countries' major districts, and for the principal ethnic groups in each survey. These are included to prevent changes in the sample's composition over time (whether due to sampling variability or to actual changes in the population) from biasing our comparison of the grade-for-age profiles.

Intergenerational Persistence of Educational Outcomes

Tables in Appendix G report the means and standard deviations for all variables used to estimate equations [1] (for 16- to 20-year-olds) and [2] (for 7- to 20-year-olds), and the corresponding sample sizes. Tables 4 through 6 below report the results of estimating equation [1], for each survey year, for daughters and sons between the ages of 16 and 20. The first row in the upper panel reports the intergenerational educational correlation, for both enrolled and not-enrolled students, and the second row reports the corresponding regression coefficient. It should be kept in mind, however, the average exposure of children aged 16 through 20 to crisis years ranged from 0.6 year in 1995 to 5 years in 2003 in Bulgaria, from 0 in 1993 to 5 years in 1999 in Kyrgyzstan, and 4 in 1999 to 7.8 years in 2007 in Tajikistan.

The pooled results for Bulgaria in Table 4 show that the correlation between child's and parents' education increased from 0.31 in 1995 to 0.45 in 2003, while the regression coefficients increased from 0.21 to 0.37 over the same period. We also see that

for Bulgaria, the correlation rose from 0.33 to 0.53 for sons between 1995 and 2003, while the regression coefficient increased from 0.24 to 0.46. For girls, the correlation rises from 0.25 to 0.34, while the regression coefficient rises from 0.15 to 0.25. All the results, with the exception of the regression coefficient for all daughters in 1995, are statistically significant at the 0.01% level or better. The regression coefficients imply that an extra year of parental education was associated with an additional 0.21 years of education for their children in 1995, but 0.37 years in 2003 for Bulgaria. With the exception of the differences in coefficients for all daughters over this period, the differences in correlation and regression coefficients were significant at 5% level or better, as can be seen from the t-statistics of differences presented in Table 4.

The same conclusions are obtained in the lower panel, which drops those that are currently enrolled in school. Both the correlation coefficients and the regression coefficients increased over this period for children not enrolled in school. The increase in persistence of educational outcomes was greater for children not enrolled in school. In addition, there is clearly a difference between sons' and daughters' experience over this period. While both the correlation coefficients and regression coefficients increased for sons and daughters from 1995 to 2003, they increased more for sons than for daughters. While the differences in correlation coefficients for daughters and sons not enrolled in school over this period were not significant the increases in regression coefficients was significant for both sons and daughters not enrolled in school. Furthermore, the increase was more for sons than for daughters that were not enrolled in school.

The correlations do not increase by as great a proportion as the regression coefficients as the standard deviation of children's education increased more rapidly

between 1995 and 2003 than did that of their parents, as documented in Appendix G. The persistence of educational status across generations increased significantly in Bulgaria.

However, this increase is less when compared to the results obtained in Hertz et al.

(2009) for the years 1995 and 2001.

Table 4. Estimates of the Intergenerational Correlations and Regression Coefficients, Children Aged 16 through 20, 1995 Versus 2003–Bulgaria

<i>All children</i>	1995 All n=351	2003 All n=384	t-stat. of diff.	1995 Daughters n=174	2003 Daughters n=181	t-stat. of diff.	1995 Sons n=177	2003 Sons n=203	t-stat. of diff.
Correlation between child's and parents education	0.31	0.45	1.99*	0.25	0.34	1.06	0.33	0.53	2.17*
Regression coefficient: "effect" of an extra year of parental education	0.21**	0.37**	2.26*	0.15*	0.25**	1.18	0.24**	0.46**	2.39*
(Robust standard error) ^a	(0.05)	(0.05)		(0.06)	(0.06)		(0.07)	(0.06)	
<i>Children not enrolled in school</i>	n=185	n=148		n=87	n=64		n=98	n=84	
Correlation between child's and parents education	0.49	0.70	2.12*	0.49	0.65	1.15	0.48	0.72	1.78
Regression coefficient	0.36**	0.73**	3.74**	0.31**	0.65**	2.45*	0.38**	0.77**	2.90**
(Robust standard error) ^a	(0.07)	(0.07)		(0.07)	(0.12)		(0.10)	(0.09)	

^a Standard error robust to heteroskedasticity and clustering at the level of the primary sampling unit

* significant at 5%; ** significant at 1%

The pooled results for Kyrgyzstan in Table 5 below show little or no change in correlation and regression coefficients. The correlation coefficients were 0.19 in 1993 and 0.17 in 1998 for all children and 0.16 in 1993 to 0.15 in 1999 for children not enrolled in school. The regression coefficient was 0.09 for all children and 0.07 for children not enrolled in school in both years. With the exception of the difference in correlation coefficients for all daughters, the differences in coefficients over this period were not statistically significant. The correlation coefficients declined from 0.21 to 0.12 for all daughters, which was statistically significant.

Both the correlation coefficients and regression coefficients were higher for daughters than for sons in 1993. In 1998, however, this is reversed as the correlation coefficients and the regression coefficients for daughters decreased substantially. This suggested increase in educational mobility of daughters —i.e. the weakening of the impact of parental education on children's educational attainment— may be the result of daughters being systematically educated less, and the parental education losing its importance in girls' educational attainment. Note, however, that the regression coefficient result for daughters in 1998 is not significant for children not enrolled in school. The insignificant coefficient suggests that other factors, such as ability, family background, composition and situation, income or neighborhood effects, and stereotypical gender-based expectations, may have become more important in daughters' educational attainment. Low correlations and coefficients also raise questions about the quality of the data, and may have resulted from noisy or fabricated data.

Table 5. Estimates of the Intergenerational Correlations and Regression Coefficients, Children Aged 16 to 20, 1993 Versus 1998–Kyrgyzstan

<i>All children</i>	1993 All n=670	1998 All n=1111	t-stat of diff.	1993 Daughters n=312	1998 Daughters n=529	t-stat of diff.	1993 Sons n=358	1998 Sons n=582	t-stat of diff.
Correlation between child's and parents education	0.19	0.17	-0.71	0.21	0.12	-2.12*	0.17	0.21	0.94
Regression coefficient : "effect" of an extra year of parental education	0.09**	0.09**	0	0.10**	0.07*	-0.71	0.09**	0.10*	0.24
(Robust standard error) ^a	(0.02)	(0.02)		(0.03)	(0.03)		(0.03)	(0.03)	
<i>Children not enrolled in school</i>	n=411	n=650		n=171	n=282		n=240	n=368	
Correlation between child's and parents education	0.16	0.15	0.28	0.19	0.11	-1.6	0.14	0.18	0.94
Regression coefficient	0.07**	0.07*	0	0.08**	0.06	-0.4	0.06*	0.07*	0.24
(Robust standard error) ^a	(0.02)	(0.03)		(0.03)	(0.04)		(0.03)	(0.03)	

^a Standard error robust to heteroskedasticity and clustering at the level of the primary sampling unit

* significant at 5%; ** significant at 1%

For Tajikistan, the regression coefficient increased from 0.08 in 1999 to 0.20 in 2007 for all children, which was statistically significant at the 1% level, and is similar, and significant, for both daughters and sons. The correlation coefficients were 0.14 in 1999 and 0.21 in 2007 for all children. For sons, the correlation coefficients and the

regression coefficient increased from 0.10 in 1999 to 0.20 in 2007, and from 0.06 in 1999 to 0.17 in 2007 respectively. For sons not enrolled in school, the correlation coefficients were 0.14 in 1999 and 0.17 in 2007, and the regression coefficients were 0.08 in 1999 and 0.19 in 2007. When the results for sons and daughters are compared, there is no statistically significant difference between the coefficients.

Table 6. Estimates of the Intergenerational Correlations and Regression Coefficients, Children Aged 16 to 20, 1999 Versus 2007–Tajikistan

<i>All children</i>	1999 All n=1230	2007 All n=3748	t-stat. of diff.	1999 Daughters n=554	2007 Daughters n=1494	t-stat. of diff.	1999 Sons n=676	2007 Sons n=1563	t-stat. of diff.
Correlation between child's and parents education	0.14	0.21	1.94	0.18	0.22	0.94	0.10	0.20	2.77*
Regression coefficient: "effect" of an extra year of parental education	0.08**	0.20**	3.33*	0.11**	0.23**	2.82**	0.06*	0.17**	3.05**
(Robust standard error) ^a	(0.02)	(0.03)		(0.03)	(0.03)		(0.03)	(0.02)	
<i>Children not enrolled in school</i>	n=813	n=1982		n=410	n=880		n=403	n=657	
Correlation between child's and parents education	0.16	0.15	-0.17	0.18	0.15	-0.47	0.14	0.17	0.47
Regression coefficient	0.11**	0.19**	1.37	0.12**	0.19**	1.09	0.08*	0.19**	1.72
(Robust standard error) ^a	(0.03)	(0.05)		(0.04)	(0.05)		(0.04)	(0.05)	

^a Standard error robust to heteroskedasticity and clustering at the level of the primary sampling unit

* significant at 5%; ** significant at 1%

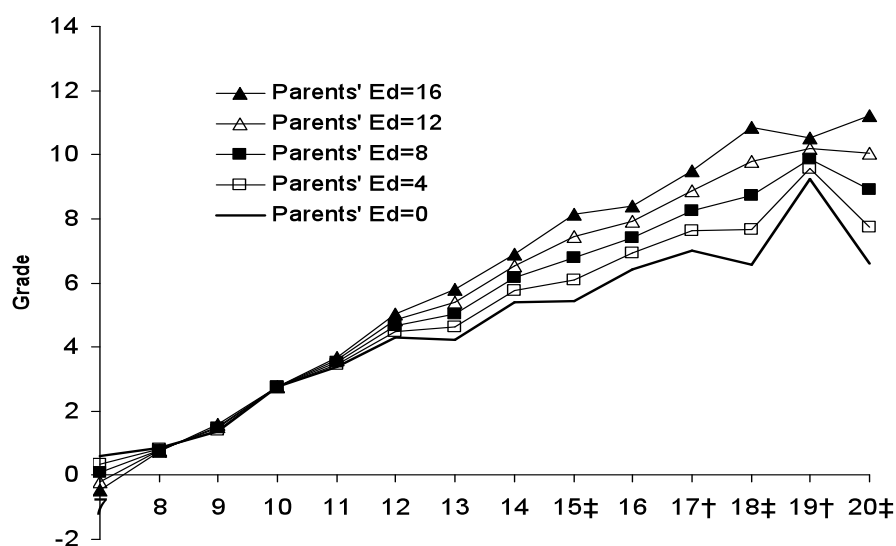
When we look at the trend in not-enrolled children, we see that a higher portion of daughters (74% in 1999 and 59% in 2007) is not enrolled in school compared to sons (60% in 1999 and 42% in 2007). It suggests that daughters are being systematically educated less, and the parental education may be losing its importance in girls' educational attainment—similar to the situation in Kyrgyzstan. Girls' non-attendance and dropout rates in Tajikistan have drawn the attention of the United Nations Committee on the Elimination of Discrimination against Women. In its concluding observations in 2007, the Committee expressed its concern that “owing to a number of factors, including dire poverty and social stereotypes concerning women's roles and responsibilities, there [was] a noted rate of non-attendance by girl children at the primary school level and there [was] a sharp decline in the enrollment of girls at the secondary school level” (CEDAW, 2007: 6).

When we compare the results in this chapter with the estimates for other countries in Hertz et al. (2007), Bulgaria's 1995 value of 0.31 ranks 37th and 2003 value of 0.45 ranks 18th out of 42 countries in the global ranking of intergenerational educational immobility. Note, however, the survey years of countries in this study were between 1994 and 2004, and the regression sample included 20 to 24 years old cohorts as there was education information for non-resident parents. Hertz et al. (2007) had included Kyrgyzstan in their analysis, but they obtain a slightly higher result for correlation in Kyrgyzstan (0.28) in 1998 ranking it as the fortieth country by average parent-child schooling correlations, compared to the result of 0.19 in this paper. This is probably due to the different age restriction (16 through 20 instead of 20 through 24). Nonetheless, even by this measure, only one country had a lower correlation than Kyrgyzstan's 1993

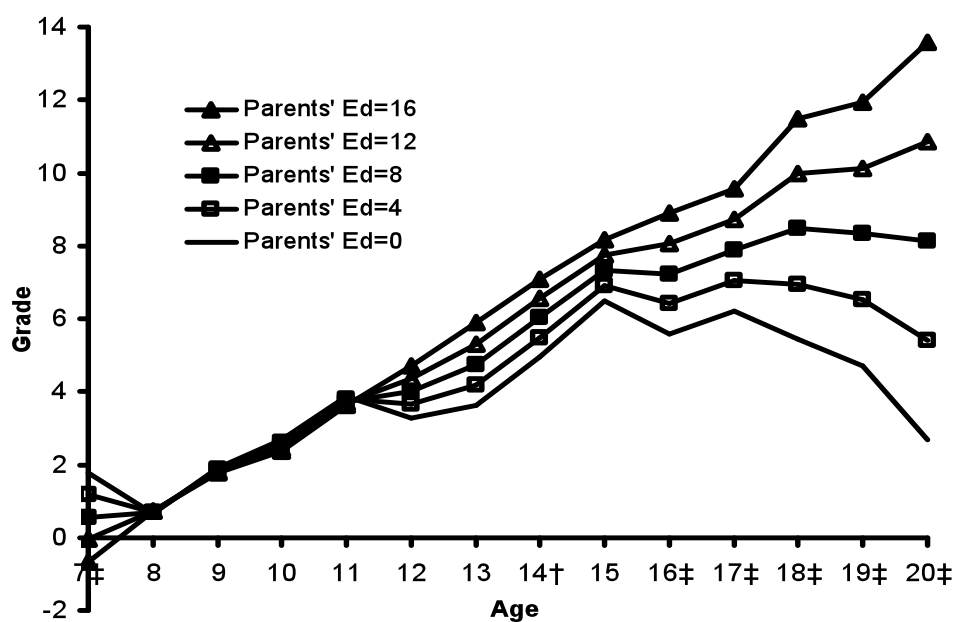
value of 0.19 and 1998 value of 0.17. As for Tajikistan, only one country had a lower correlation than its 1999 value of 0.14 and two had lower than its 2007 value of 0.21. In summary, both Kyrgyzstan and Tajikistan have much lower intergenerational persistence of education, i.e. higher mobility, compared to Bulgaria.

The results of regression equation [2], reported in Appendix H, are plotted in Figure 2 below to demonstrate the changing relation between parents' and children's educational attainment in Bulgaria, and to determine the age at which the effects of parental education start to become significant. Using the regression equation [2], the upper graph plots the estimated number of years of schooling completed, by age and at various levels of parents' education, for 1995, and the lower graph plots the same results for 2003. The 2003 trajectories, compared to the 1995 results, illustrate that the gap between the attainments of the children of better- and less-educated parents has grown substantially, suggesting that parental education matters more than before. In 1995, parents' education has no statistically or practically significant effect at age 7 through 14, as well as at age 16. The relevant t-tests, reported in Appendix H, are those associated with the parental-education variables for each age. Thereafter, it is significant at the 5% level or better at ages 15, and 17 through 20. In 2003, the gaps were much larger, and uniformly significant at the 1% level or better, at ages 7 and 14, and from age 16 through 20. For example, in Appendix H, it can be observed that the effect of an extra year of parental education at age 17 rose from 0.15 years in 1995 to 0.21 years in 2003; at age 20, it rose from 0.29 to 0.68 years over the same period.

1995 Survey



2003 Survey



Source: Calculations based on 1995 and 2003 household surveys.

† Significant effect of parents' education at 5% level.

‡ Significant effect of parents' education at 1% level.

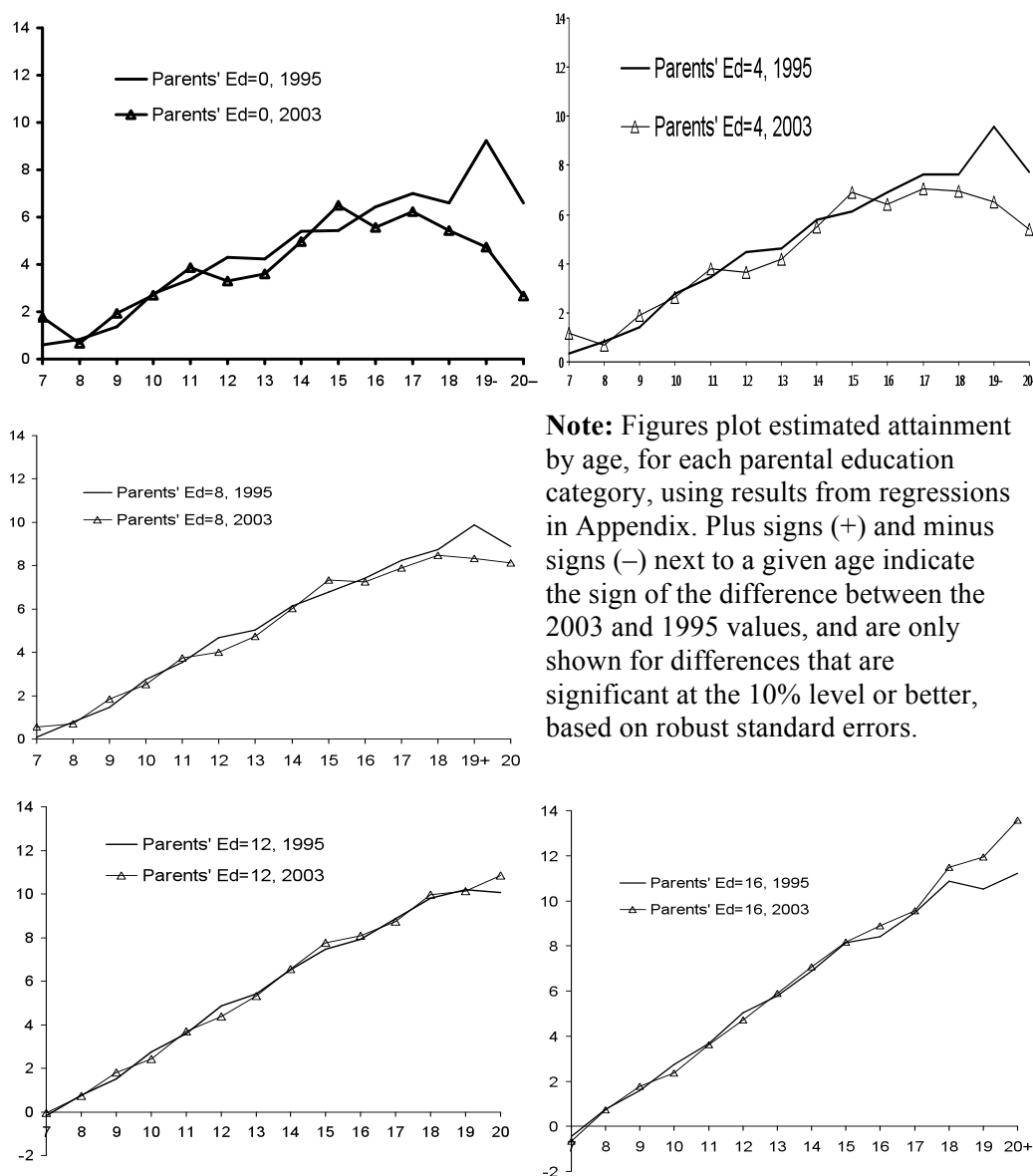
Figure 2. Grade-for-age by parents' education in Bulgaria: 1995 versus 2003.

The difference in predicted attainment between the child of college-educated parents and the child whose parents have no schooling increases from 2.69 years in 1995 but to 4.94 years in 2003. Note, however, only 3% of parents had college degrees, and only 0.5% had zero education. Even if we look at children with parental education levels 8 and 12, results demonstrate a doubling of the attainment gap, from 0.67 years in 1995 to 1.24 years in 2003.

Figure 3 below presents the same results by showing the 1995 and 2003 estimates at each level of parental education, to illustrate whether the average levels of educational attainment in Bulgaria have risen or fallen between the two surveys for children from a given parental background. The panel for the children of college-educated parents, for example, demonstrates that these children had somewhat less education at young ages in 2003 than in 1995, but the differences were not significant. For ages 16 and above, however, they improved between the two surveys, with significant differences emerging at age 20.⁸ As we move to parental education levels 8, 4, and 0, we see that absolute attainment for those aged 16 through 20 has, indeed, fallen over time and has fallen the most (in both absolute and proportional terms) for the children of the least-well-educated parents.

To summarize, the increase in the association between the educational levels of parents and children from 1995 to 2003 has manifested itself in the form of small educational gains for the children of college-educated parents, and educational losses for

8. These tests of significance do not appear in the Appendix but are straightforward tests of differences between the estimated coefficients, given their standard errors, and given that the two surveys are independent cross-sections.



Source: Calculations based on 1995 and 2003 household surveys.

Figure 3. Grade-for-age in 1995 versus 2003 in Bulgaria, by parents' education level.

the children of non-college-educated parents, with the largest (negative) changes occurring for those whose parents had the least schooling. Recall that this result is obtained after controlling for demographic and geographic differences, as well as age in

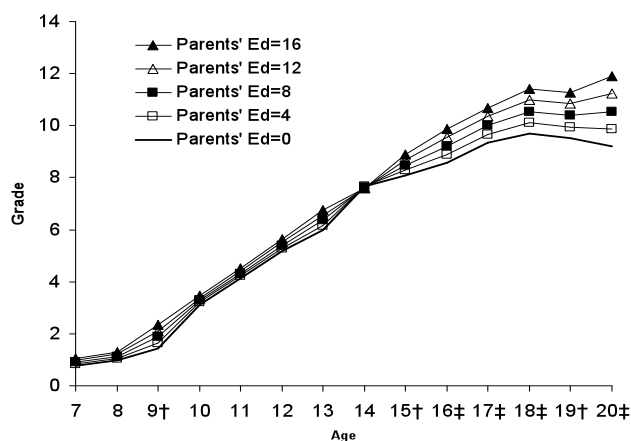
both years and months, and the spurious effect of the month of interview mentioned earlier.

Several other findings emerge from the regression results of equation [2] for Bulgaria, presented in Appendix H. In particular, the indicators for Turkish and Roma ethnicity display the expected negative association with attainment. This penalty increased for Roma children between 1995 and 2003. This is not surprising as Roma population constituted a large portion of those parents with four years of education or less— around 55% in 1995 and 65% in 2003. While being female had a positive impact on attainment, which was significant at 1% in 1995, it was not significantly associated with higher attainment in 2003. Rural location was not significantly associated with lower attainment in either year, implying that parental education was a better predictor than location.

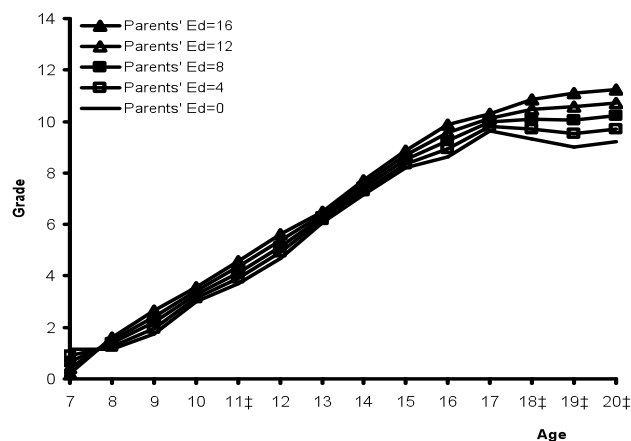
Figure 4 below uses the results of regression equation [2] for Kyrgyzstan, presented in Appendix H. There is not a clear distinction between the 1993 and 1998 trajectories; the gap between the attainments of the children of better- and less-well educated parents has not changed over this period. In 1993, parents' education has significant effects at the 5% level or better at ages 9 and 15 through 20. In 1998, the results are significant at ages 11 and 18 through 20. It can be seen from the results in Appendix H that the effect of an extra year of parental education at age 9 decreased slightly from 0.057 in 1993 to 0.045 in 1998. At age 18, however, it increased from 0.109 in 1993 to .159 in 1998. On average, for children aged 16 through 20, the difference in predicted attainment between the child of college-educated parents and the child whose parents have no schooling decreased from 1.37 years in 1993 to 1.25 in 1998. Similarly

for students aged 16 through 20, the difference in attainment between the child with parental education levels 8 and 12 decreased slightly from 0.34 to 0.31.

1993 Survey



1998 Survey



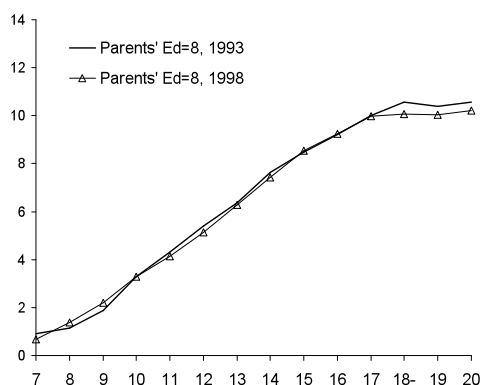
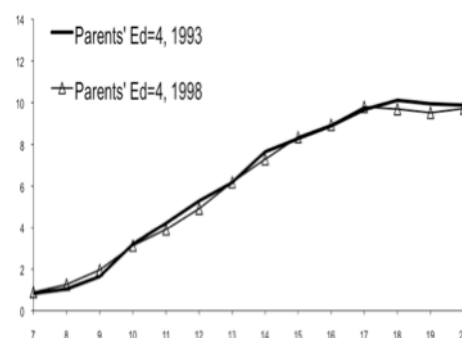
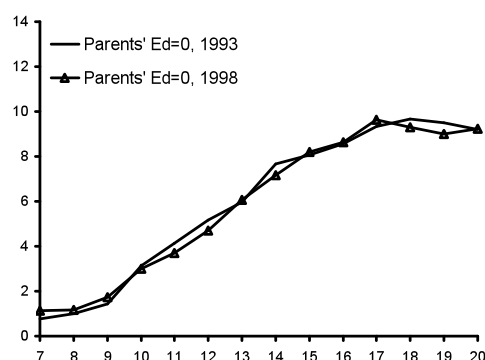
Source: Calculations based on 1993 and 1998 household surveys.

† Significant effect of parents' education at 5% level.

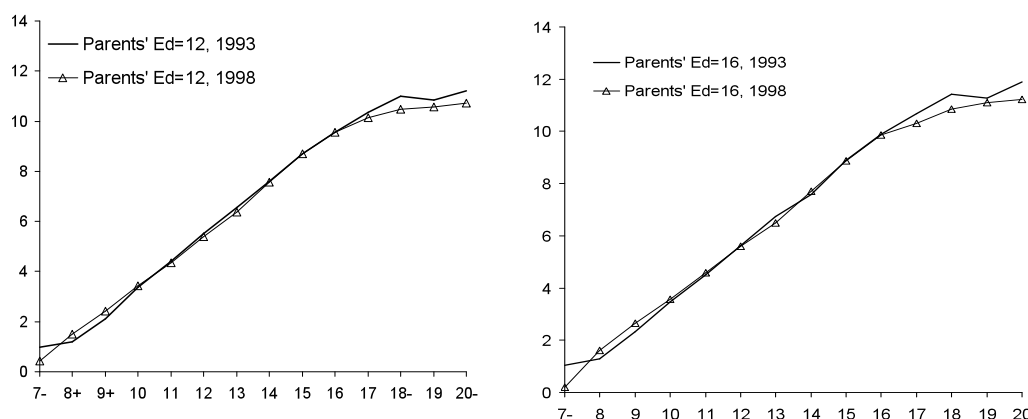
‡ Significant effect of parents' education at 1% level.

Figure 4. Grade-for-Age by Parents' Education in Kyrgyzstan: 1993 versus 1998.

Figure 5 plots the same results by pairing the 1993 and 1998 estimates at each level of parental education. While children with parental education levels of 0 and 4 had somewhat less education at young ages in 1998, the differences in most cases are not significant. Children with parental education level of 8 years of schooling were worse off in 1998 compared to 1993 at ages 18 through 20, with the difference being significant for children aged 18. Similarly, children with parental education level of 12 years of schooling were worse off at ages 17 through 20, with the difference being significant for children aged 18 and 20. Results illustrate that older children in 1998 attain less education compared to older children in 1993, suggesting similar attainment effect across groups in Kyrgyzstan.



Note: Figures plot estimated attainment by age, for each parental education category, using results from regressions in Appendix. Plus signs (+) and minus signs (−) next to a given age indicate the sign of the difference between the 1993 and 1998 values, and are only shown for differences that are significant at the 10% level or better, based on robust standard errors.



Source: Calculations based on 1993 and 1998 household surveys.

Figure 5. Grade-for-age in 1993 versus 1998 in Kyrgyzstan, by parents' education level.

Regression results of equation [2] for Kyrgyzstan, presented in Appendix H, show that being a female had positive and significant association with attainment in 1993.

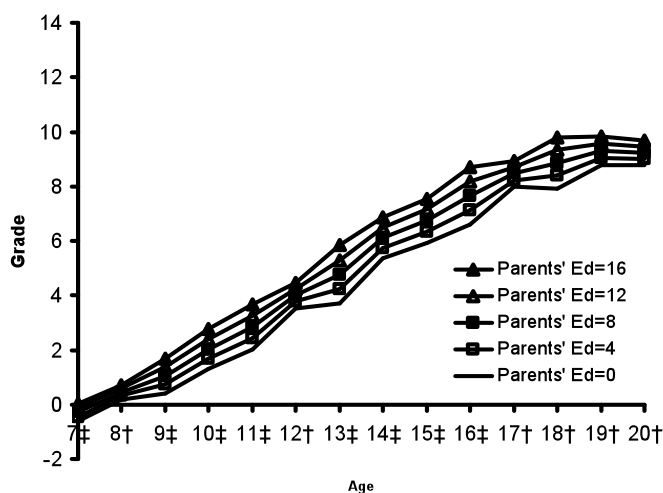
While the estimated association decreased from 1993 to 1998, the coefficient was not significant in 1998. The results for ethnic groups were not significant. On the other hand, rural location was positive, but not significant, in 1993, while it had the expected negative association with attainment in 1998.

Figure 6 below illustrates the regression results of equation [2] for Tajikistan presented in Appendix H, which clearly illustrates the increasing gap between the attainments of the children of better and less-well educated parents. The widening trajectories suggest that parental education matters more than before, similar to the results in Bulgaria. The regression results in Appendix H illustrate that the effect of an extra year of parental education at age 12 rose from 0.059 years in 1999 to 0.061 years in 2007; at age 17, it rose from 0.060 to 0.128. On average, for students aged 16-20, the difference in predicted attainment between the child of college-educated parents and the child whose

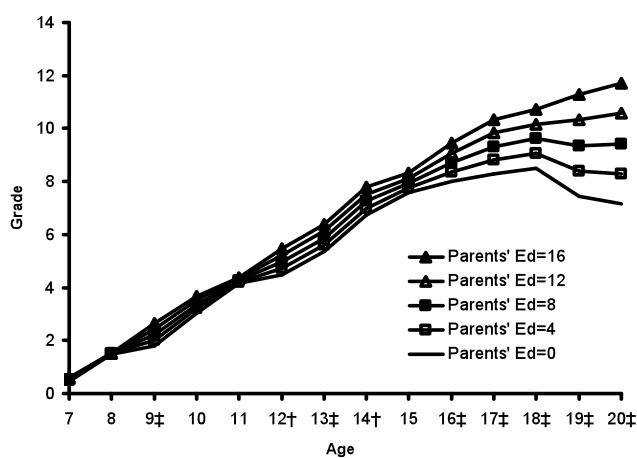
parents have no schooling was 1.43 years in 1999, but increased to 2.77 years in 2007.

Furthermore, the difference in predicted attainment between the child with parental education levels 8 and 12 increased from 0.36 to 0.57 over this period.

1999 Survey



2007 Survey



Source: Calculations based on 1999 and 2007 household surveys.

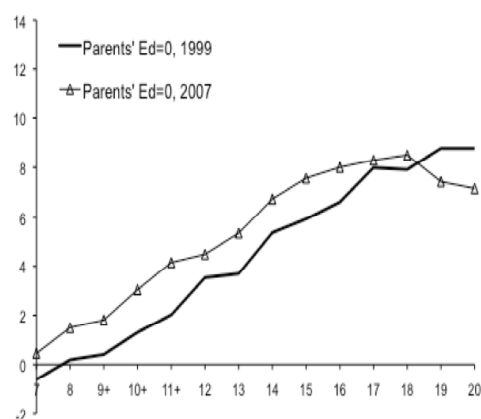
† Significant effect of parents' education at 5% level.

‡ Significant effect of parents' education at 1% level.

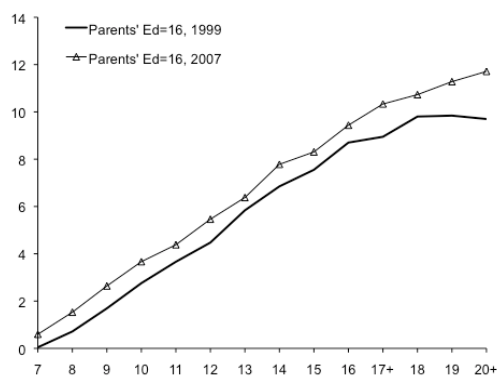
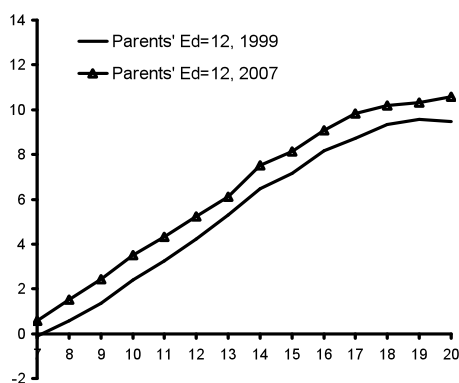
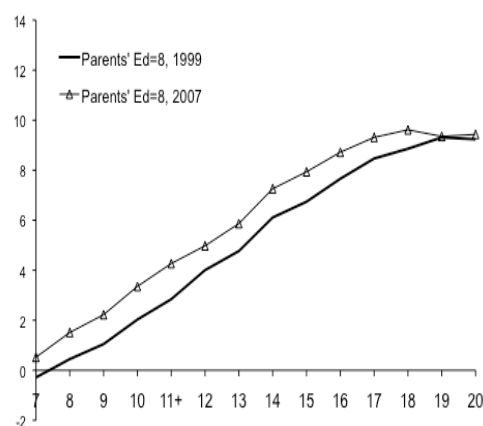
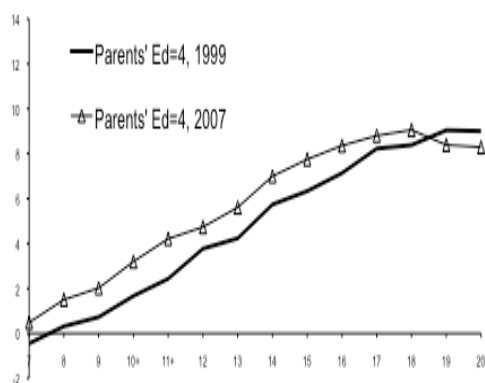
Figure 6. Grade-for-age by parents' education in Tajikistan: 1999 versus 2007.

While the widening trajectories for Tajikistan in Figure 6 is similar to the case of Bulgaria, the results diverge from the experience of Bulgaria when the estimates from 1999 and 2007 are paired at each level of parental education. As Figure 7 below shows, in all panels, children in Tajikistan had somewhat more education at younger ages in 2007 than in 1999. This is also the case for older children with parental education levels of 12 and 16 years of schooling. For older children with less-well educated parents (with education levels of 0 and 4 years of schooling), the absolute attainment for 19 and 20 year olds has fallen over time, but these differences were not significant. On the other hand, for children with parental education level of 16 years of schooling, the absolute attainment increased overtime at all ages, with the difference being significant only for 20 year olds. This is an example of rising average attainment, but falling educational mobility.

Some other findings that emerge from the regression results of equation [2] for Tajikistan, presented in Appendix H, are noteworthy. Regression results for rural location illustrate the expected negative association with attainment in 2007, while it was positive, but not significant, in 1999. Being a female had negative and significant association with attainment in both years and its penalty increased between 1999 and 2007. The indicators for Uzbek and Russian ethnicity displayed positive results for both 1999 and 2007, with 2007 results being significant. On the other hand, the indicator for Kyrgyz ethnicity was negative for both years, with 1999 result being significant.



Note: Figures plot estimated attainment by age, for each parental education category, using results from regressions in Appendix. Plus signs (+) and minus signs (–) next to a given age indicate the sign of the difference between the 2007 and 1999 values, and are only shown for differences that are significant at the 10% level or better, based on robust standard errors.



Source: Calculations based on 1999 and 2007 household surveys.

Figure 7. Grade-for-Age in 1999 versus 2007 in Tajikistan, by Parents' Education Level.

Discussion

This chapter has demonstrated that the change in the degree of the persistence of educational outcomes has varied across these three transition economies that had to cope with the crisis years, as well as amongst different groups in them. While all three of these countries faced economic and political instability as a result of the transition, they remain diverse both in terms of economic development and transition experiences. As illustrated in Appendix F, these countries have differed in their economic prosperity and development.

Table 7 below presents an overview of the pooled results for all three countries presented earlier in Tables 4-6. As indicated earlier, the average exposure to crisis years for 16- to 20-year olds has increased from 0.6 years in 1995 to 5 years in 2003 in Bulgaria, from 0 in 1993 to 5 years in 1998 in Kyrgyzstan, and from 4 in 1999 to 7.8 years in 2007 in Tajikistan. The table illustrates that both Bulgaria and Tajikistan experienced an increase in intergenerational correlation and regression coefficients over the respective survey years, with the exception of the correlation coefficient for Tajik children not enrolled in school. The fact that an increased correlation is visible only when we include 16-20 year olds who are still enrolled suggests that parental education is increasingly important as a determinant of upper secondary and college attainment, but not more important as a determinant of primary education attainment than it was in the past. This is consistent with the pattern seen in the grade-for-age profiles as well. While the changes for all children in Kyrgyzstan from 1993 to 1998 were negligible, educational mobility did decline among sons in Kyrgyzstan, similar to the pattern in Bulgaria and Tajikistan.

Table 7: Summary of Estimates of the Intergenerational Correlations and Regression Coefficients for Bulgaria, Kyrgyzstan and Tajikistan

	Bulgaria			Kyrgyzstan			Tajikistan		
<i>All children</i>	1995	2003	t-stat of diff.	1993	1998	t-stat of diff.	1999	2007	t-stat of diff.
Correlation between child's and parents education	0.31	0.45	1.99*	0.19	0.17	-0.71	0.14	0.21	1.94
Regression coefficient: "effect" of an extra year of parental education	0.21**	0.37**	2.26**	0.09* *	0.09* *	0	0.08**	0.20* *	3.33**
<i>Children not enrolled in school</i>									
Correlation between child's and parents education	0.49	0.70	2.12*	0.16	0.15	0.28	0.16	0.15	-0.17
Regression coefficient: "effect" of an extra year of parental education	0.36**	0.73**	3.74**	0.07* *	0.07* *	0	0.11**	0.19* *	1.37

* significant at 5%; ** significant at 1%

The results for Bulgaria and Tajikistan imply a decline in intergenerational social mobility, where the cohort of children and young adults surveyed in later years, who, unlike cohorts surveyed in earlier surveys, were educated primarily during a period of economic depression and significant reductions in public spending on education. The cuts in spending led to school closures and shortages of materials, along with increases in out-of-pocket costs and distances to school. Interview evidence in Bulgaria also suggests that the rise in unemployment among those with secondary education has lowered the expected benefits of schooling in Bulgaria. We also observe that changes in regression coefficients are more than the changes in correlation coefficients in magnitude in both Bulgaria and Tajikistan. This can be explained by the fact that correlation coefficients are

less sensitive to small differences in the ways samples and variables are defined (Hertz et al., 2007).

The negligible changes for Kyrgyzstan, however, are surprising, as the average exposure to the crisis years has increased from 0 to 5 years of schooling for 16- to 20-year olds in the Kyrgyz datasets. One possible reason why the expected increase in the persistence is not observed may be that the impact of the crisis years has not been fully felt by children, because of the closeness of the Kyrgyz survey years (1993 and 1998), compared to longer periods between surveys of 8 years in both Bulgaria and Tajikistan. The results in Kyrgyzstan may also be the result of poor data as mentioned earlier in this chapter.

It is also informative to compare the levels of persistence of educational outcomes across these three countries. Bulgaria, with higher coefficients, seems to have less intergenerational mobility compared with Kyrgyzstan and Tajikistan. One possible explanation for this may be the extent of exposure to globalization in these countries. The greater exposure to transition effects experienced in some of former socialist countries, such as Bulgaria, might have resulted in increased opportunities as well as an increase in unequal distribution of these opportunities.

Grade-for-age trajectories for children aged 7 through 20 show that while the children of college-educated parents in Bulgaria experienced an increase in educational attainment, children whose parents had the least schooling witnessed the largest negative change over this period. The expected negative association of Roma ethnicity with educational attainment also increased over this period. As for Tajikistan, the increasing gap between the attainments of the children of better and less-well educated parents is

also evident among older children (see Figure 6). Note, however, older children with parental education levels of 12 and 16 years of schooling and younger children in Tajikistan had somewhat more education in 2007 than in 1999.

The sex-disaggregated results for daughters and sons illustrate different trends in these countries, with an appreciable gender gap in terms of persistence of educational outcomes. In Kyrgyzstan, coefficients were higher for daughters than for sons in 1993, but lower for daughters than for sons in 1998. In Bulgaria, coefficients are higher for sons than for daughters in both survey years, suggesting that sons are less mobile than daughters. On the other hand, in Tajikistan, the coefficients are lower for sons than for daughters, with sons having more mobility than daughters. In this regard, the Tajik regression results also showed that being a female had a negative and significant association with attainment in both survey years, while its penalty increased between 1999 and 2007. Recall, however, in Kyrgyzstan and Bulgaria, being female had a significant positive impact on attainment only in 1993 and 1997 respectively. As mentioned earlier, Tajikistan had a high dropout rates for girls. It is possible that discriminatory socio-cultural norms, responsibility of domestic work and concerns about safety at and on the way to school in conflict-affected areas in the 1990s may have had an impact on girls' access to education. Further research can be done to explore the extent to which cultural and social norms affect the persistence of educational outcomes for daughters.

The results for Bulgaria and Kyrgyzstan may be compared to those of other studies. According to Ganzeboom and Nieuwbeerta (1999) the intergenerational educational regression coefficient in Bulgaria declined by about 0.035 per decade from

1940 to 1985. On the other hand, Wong (2004) finds the decline to be not of a significant magnitude. The findings in this chapter suggest that while the educational attainment of 16- through 20-year-olds was weakly correlated with that of their parents in 1995 in comparison to international estimates; in 2003, the intergenerational persistence of education had almost doubled. In addition, the gap between educational attainment of children of less-educated and well-educated parents has increased. It is, however, encouraging to see that, compared to the result of Hertz et al. (2009), the increase in intergenerational persistence of education in Bulgaria was not as steep. This suggests that the economic and social policies might have taken a deeper toll on education for a limited number of years in Bulgaria. In the case of Kyrgyzstan, the results are a bit lower than those obtained in Hertz et al. (2007), as mentioned earlier, probably reflecting the different age restriction for the sample used in the analysis.

Intergenerational persistence of educational outcomes implies that family background is a key factor in determining children's education level. As inequality of opportunities increases, we might see more children of less-fortunate backgrounds, and of less-educated parents, left behind in education. Results for Bulgaria and Tajikistan, therefore, raise concern about future educational trends in economies that experience economic downturn.

It is vital to reduce this link between parents' education and children's education if a country is to achieve a fair distribution of educational opportunities and promote economic growth. Jencks and Tach (2005, p. 2) have argued that "the size of the correlation between the economic status of parents and their children is not a good indicator of how close a society has come to equalizing opportunity," and described

situations in which increases in opportunity may coincide with increased persistence. Even if status persistence is an imperfect measure of the lack of opportunity, large differences in persistence among nations and over time are still informative about descriptive mobility patterns in these nations.

While acknowledging that using educational attainment as a measure of social status gives us an imperfect measure of inequalities in the distribution of socio-economic outcomes, this comparative analysis still provides a useful overview of the persistence of educational outcomes over time in these countries as well as across them. As D’Addio puts it, “If the degree of intergenerational transmission of disadvantage can be reduced, the aptitudes and abilities of everyone in society are more likely to be used efficiently, so promoting both growth and equity” (D’Addio, 2007: 11).

Depending on the measure used for intergenerational mobility, however, the results can be different even for the same dataset, as evidenced in this paper. It should also be noted that these measures do not take into account differences in mean schooling across generations, countries or cohorts, or the direction of mobility, whether it is upward or downward. Additional research to unpack the dynamics is imperative in order to promote equality of opportunities among girls and boys. In this regard, qualitative studies can be helpful in highlighting issues of importance to intergenerational mobility that cannot be seen in numerical analysis.

Particular attention should be paid to the transmission mechanisms that underlie the persistence of socio-economic status to determine the kinds of policies that are necessary to ensure girls’ and boys’ equal access to, and participation in, education. Eliminating school fees and having financial incentives targeted at families, for example,

may help decrease the persistence of intergenerational educational outcomes in these countries. Despite legally guaranteed free education, primary school fees continue to be charged in Bulgaria, Kyrgyzstan, and Tajikistan, according to a World Bank survey (2002b). This may not only have a negative impact upon children's enrollment in school, but also have a differential impact on girls' and boys' access to schools. Further research on measures of learning achievement, such as standardized test scores, could also help explore this issue in more detail. Test score data linked to household characteristics, however, are limited.

CHAPTER 3

RETURNS TO EDUCATION IN BULGARIA

This section of the dissertation aims to explore one of the underlying factors in schooling investment decisions —the returns to education, in Bulgaria in 1995 and 2003 and capture the heterogeneity in returns to education between women and men, among different levels of education and among the different quantiles of the wage distribution. Exposure to economic crisis years in Bulgaria coincided with a steep decline in intergenerational educational mobility during this period; an increase in the degree of interdependence between children's education and parents' education. In the empirical literature, returns to schooling has been used as an indicator of the incentive for individuals to invest in human capital. Therefore, analyzing the trend in returns to education would help us explore one of the factors underlying individuals' decisions about attainment and investigate if exposure to economic crisis years also coincided with inequalities in returns to education in the labor market. Having a comprehensive analysis of returns to education in Bulgaria will help us determine which groups, depending on their education level, position in the wage distribution, ethnicity or sex, are lagging behind in labor market outcomes, as measured by returns to education, and not enjoying the benefits of transition. The findings can help formulate targeted policy interventions to create a level playing field for all individuals.

The chapter demonstrates that while average returns to education increased in

Bulgaria over the survey years in line with the international trends in returns to education, this period was also characterized by a greater disparity in returns to education between workers in lower and higher end of the quantiles of the wage distribution. The findings suggest that exposure to crisis years coincided with education becoming increasingly more important for individuals with more education as well as for individuals at the top of the wage distribution. In addition, the results illustrate the increasing influence on returns to education of factors beyond years of schooling and experience — factors that are beyond control of an individual.

As mentioned briefly in Chapter 2, many post-socialist countries experienced an increase in returns to education after the liberalization of labor markets, but Bulgaria remained among the ones with the lowest returns to education. A number of studies have looked at returns to education in Bulgaria (Trostel et al., 2002; Flabbi et al., 2007; Jones and Simon, 2004 ; and Staneva et al., 2010). Trostel et al. (2002), for example, examined multiple cross-sections of data for 28 countries using the Social Survey Programme data for 1985-1995, and found returns to education to range from 1.9% for women in the Netherlands to 19.2% for women in the Philippines, with 4% and 5.7% returns for men and women respectively in Bulgaria. Using the instrumental-variable estimates, the study also showed that the ordinary least squares estimate of the traditional Mincer equation was biased downward by about a percentage point, contrary to the argument by Card (1999). According to Card (1999), individuals with higher returns to education would tend to invest more years in schooling, leading to an upward-biased estimate of the average marginal return to schooling —endogeneity of schooling.

Using the same dataset as Trostel et al. (2002) for a different period, the comparative study on transition economies by Flabbi et al. (2007) found that returns to education for Bulgaria to be in the moderate range, varying from 4.7% in 1992 to 7.2% in 2002. They also found that while workers with lower wages had higher returns than workers with higher wages over the period 1991-1996, workers with lower wages had lower returns than workers with higher wages over the period 1997-2002. The authors, however, noted that they refrained from making any gender-specific estimations due to small regressions sample size of about 500 individuals per country per year.

More recently, Staneva et al. (2010) looked at returns to education across the conditional wage distribution in Bulgaria using the 2003 LSMS dataset. They raise the issue of pre-selection into employment, indicating that this might ‘not be a randomly selected sample from the overall population, which can lead to biased estimates of the earning equation’ (2010: 7). However, their comparison of selectivity-adjusted estimates illustrate that the selection effects were not an issue in Bulgaria. Their estimates also reiterated the higher returns for workers at the higher end of the wage distribution in Bulgaria. Using a different dataset of employer-employee data for Bulgaria, Jones and Simon (2004) found much larger returns to an additional year of schooling in early transition years, with firm-level experience playing a significant role.

While most articles on returns to education focus on mean parameters, some studies, including Flabbi et al. (2007) and Staneva et al. (2010) on Bulgaria mentioned above, and cross-country studies by Pereira and Martins (2004) on 16 developed economies, Budria and Telhado-Pereira (2007) on European countries and Patrinos et al. (2006), have looked at variations in returns to education for different quantiles of the

wage distribution to explore the heterogeneity of returns among workers at different quantiles of the wage regression. The review by Patrinos et al. (2006) show that while returns are often higher for workers at the higher end of the wage distribution in Europe and North America, they are lower for workers in the higher end of the wage distribution in few low-income developing countries. In the middle-income countries, however, the trend is mixed.

In view of the existing studies on Bulgaria, this chapter aims to bring together various extensions of the traditional Mincerian wage equation to explore the trend in returns to education in 1995 and 2003 as well as the heterogeneity in returns to education between women and men and among the different quantiles of the wage distribution. While two of the studies on Bulgaria have also used quantile regressions, Flabbi et al. (2007) examined quantiles .10, .20, .50, .70 and .90, and Staneva et al. (2010) looked at .10, .25, .50, .75 and .90. This chapter, on the other hand, will look at .05, .10, .50, .90 and .95 to be able to determine the trend for the workers at the very low end of the wage distribution as well as the workers at the very high end of the wage distribution.

Returns for primary, secondary and tertiary education will also be explored, as the literature suggests that returns are likely to vary depending on education level, such as primary, secondary or higher. A review of studies on returns to investment in schooling by level of education illustrate that returns are often higher for primary education, with falling returns with increasing level of education (Patrinos and Psacharopoulos, 2004). The heterogeneity of returns among different levels of education can have serious implications for children's educational attainment. For example, lower returns to primary

education than secondary education could be a disincentive for parents to invest in children's primary schooling.

Data and Methods

Economic analysis of educational attainment dates back to the human capital theory (Becker, 1964 and Mincer, 1974), which models education as a human capital investment decision. In this model, individuals decide on the optimal level of schooling by weighing the costs and returns of an additional year of schooling. They consider not only direct costs of education, such as costs of school materials, including uniforms and books, and transportation, but also indirect costs, or the opportunity cost of sending a child to school, such as foregone earnings and care of younger children or elderly. Optimizing parents send their daughters and sons to school until the marginal cost of an additional year of schooling equals its marginal return.

The traditional model (Mincer equation), which uses returns to schooling as an indicator of the incentive for individuals to invest in human capital and thus estimates returns to education by regressing log of earnings on educational attainment and experience acquired, will be used in the initial analysis. The basic standard form of the Mincer wage regression is

$$\ln W_i = \beta_0 + \beta_1 \cdot S_i + \beta_2 \cdot \exp_i + \beta_3 \cdot \exp_i^2 + \varepsilon_i \quad [3]$$

The dependent variable, $\ln W_i$, denotes the natural log of monthly net wage of the individual and allows us to observe the percentage impact of the independent variables on wage in this model. The next variable, S_i , is the years of schooling. The variable $\exp$ is the number of years of labor market experience, calculated by subtracting the years of

schooling and the school starting age —6 in the case of Bulgaria— from age. In order to capture the concavity of the earnings with more years of experience—diminishing returns—, a quadratic in the number of years of labor market experience is also included in the model. β_1 measures the percentage increase in wages associated with an additional year of schooling, which is the rate of return to investment in education. This commonly used specification of the model will allow comparison with other international estimates. As the earnings after taxes are used in this chapter, the education coefficient gives the private rate of return as opposed to the social rate of return. Heckman et al. (2006) show that ignoring tuition costs and taxes in rates of return estimations can misrepresent trends in actual rates of return. While the net wages after taxes is used in our analysis, tuition data was not available.

It is often argued that the traditional Mincer equation produces upwardly biased estimates, as the ability variable, which is positively correlated with years of schooling and wages, is omitted. Using data on identical twins, that are assumed to have same ability and family background, Behrman et al. (1980), for example, shows that there is an upward bias in the estimate in the absence of ability variable. An additional constraint in the estimation of returns to education is that data used covers working individuals with wage data, in other words individuals who found jobs. Individuals' are, however, motivated to continue their education depending on the expected returns to education. Expected returns would be lower than empirical results if there are many unemployed or limited jobs available in the economy.

While instrumental variables have often been used to overcome the ability bias, the review of literature on returns to education by Card (1999) illustrates that ability

biases are often modest in magnitude and that instrumental variable estimates of the return to education based on family background have a larger upward ability bias than the ordinary least squares estimates. At the same time, the review of the literature on instrumental variables estimation by Heckman et al (2006) found the resulting estimates indecisive and the instruments weak.

Inspired by the findings in the empirical literature and the fieldwork in Bulgaria, control variables for part-time workers, being a female, those living in rural areas and major ethnic groups in Bulgaria are included in a second specification of the model:

$$\ln W_i = \beta_0 + \beta_1 \cdot S_i + \beta_2 \cdot \exp_i + \beta_3 \cdot \exp_i^2 + \beta_4 \cdot \text{Part_time} + \beta_5 \cdot \text{Female} + \beta_6 \cdot \text{Rural} + \text{EthnicityDummies} + \varepsilon_i \quad [4]$$

Note that, however, these control variables allow us to explore their impact on wages and not on returns to education.

The above specifications of the Mincerian model, however, would not reveal the varying rates of return for different school levels, if schooling investment decisions are sequential based on available information (Heckman et al, 2006). For example, an individual would continue to invest in secondary schooling after completing primary if returns to secondary schooling is higher than the cost. To capture the heterogeneity of returns to schooling for different levels, returns to education will be estimated for primary, secondary and tertiary levels for the two periods.

In addition to the ordinary least squares regression, quantile regressions, which were first introduced by Koenker and Bassett (1978), are also estimated to explore how returns to education vary among the different quantiles of the wage distribution in Bulgaria. Quantile regressions would help us determine how the predicted natural log of

wages of an individual at a particular part of the wage distribution changes with an additional year of schooling. In other words, it helps to illustrate the inequality with regard to returns to education as illustrated in Figure 8 later in this chapter; two individuals with the same years of schooling may have different returns to education depending on their location in the distribution.

Data from the Living Standard Measurement Study Surveys (LSMS) for Bulgaria are used to estimate the returns to education. Both the 1995 and 2003 surveys include a section on employment, which covers not only the employment status but earnings of each individual as well. Bulgaria has been chosen for this analysis, because of the availability of qualitative data as well as the declining trend in educational mobility over this period.

The questions of the employment section were asked to all individuals 16 years old and above in 1995, whereas they were asked to 15 years old and above in 2003. As an initial step, working individuals were identified by the responses to the question on the number of hours worked in the previous week. In order to make it comparable across survey years, monthly net wages from the main job for employed persons is used in the estimation. Self-employed individuals and the individuals who have not reported their hours worked are not included in the sample. All the individuals that worked less than 30 hours in the previous week are also excluded as their monthly earnings would be lower and would bias the estimates downward. Wages from secondary jobs are also not included on the calculation of monthly net wages as these are more likely to be part-time.

The 1995 Bulgarian dataset includes 6,974 individuals, of which 5,734 of them were 16 years old or above, and 2043 individuals reported their monthly net wage. The

2003 dataset includes 7563 individuals, of which 6,866 of them were 15 years old or above, and 2537 individuals reported their monthly net wages. Table 8 below reports the descriptive statistics for all the variables used to estimate the equation [2]. When the regression sample is compared with the full sample, it can be seen that the regression sample has an oversample of male respondents, urban respondents and Bulgarian respondents. In particular, the number of Roma individuals in the regressions is quite low for 1999, which may explain the insignificant findings for 1999, discussed later in this chapter. The differences between the regression sample and the full sample make it difficult to generalize the results for the full sample, as the results may hold only for the regression sample.

Table 8. Descriptive Statistics

	Mean	StdDev	Freq.- full sample	% full sample	Freq. age>15	% age>15	Freq. regression sample	% regression sample
1995								
Monthly net wages	5,165.3	3,279.0						
Years of schooling	11.5	2.9						
Experience	22.8	10.7						
Female			3,608	51.74	2,995	52.23	844	47.42
Male			3,366	48.26	2,739	47.77	936	52.58
Rural			2,301	32.99	1,923	33.54	382	21.46
Urban			4,673	67.01	3,811	66.46	1,398	78.54
Ethnicity								
Bulgar			6,011	86.20	5,022	87.60	1,625	91.29
Turkish			631	9.05	481	8.39	107	6.01
Roma			275	3.94	186	3.24	39	2.19
Russian or other			56	0.80	44	0.77	9	0.51
2003								
Monthly net wages*	5404.55	4,155.37						
Years of schooling	12.18	3.09						
Experience	21.49	11.47						

	Mean	StdDev	Freq.- full sample	% full sample	Freq. age>15	% age>15	Freq. regression sample	% regression sample
Female			3921	51.85	3571	52.01	1,136	46.86
Male			3641	48.15	3295	47.99	1,288	53.14
Rural			2331	30.82	2122	30.91	507	20.92
Urban			5232	69.18	4744	69.09	1,917	79.08
<i>Ethnicity</i>								
Bulgarian			6406	84.70	5848	85.17	2,180	89.93
Turkish			624	8.25	573	8.35	137	5.65
Roma			438	5.79	358	5.21	69	2.85
Russian or other			95	1.26	87	1.27	38	38

Note: Mean and standard deviation for monthly net wages, years of schooling and experience variables are calculated for the regression sample.

* At 1995 prices.

Empirical Results and Discussion

The results for the ordinary least squares (OLS) and quantile regressions for the 1995 and 2003 data are presented in Tables 9 through 13 below. The OLS estimates show that returns have increased from 1995 to 2003, in line with the findings of the literature on returns to education in transition economies; but they are still lower than the average rate of return (10%) estimated in Patrinos and Psacharopoulos (2004). There has been a statistically significant increase in the impact of an additional year of schooling on the monthly wage, from 6.2% in 1995 to 7.7% in 2003. The coefficients of both the experience and experience-squared variables are as expected – wages increase with years of experience, but at a decreasing rate.

The inclusion of control variables reduces the result for the coefficient of education – the returns to education. Furthermore, the R^2 improves from 0.10 to 0.17 in 1995. The results for the control variables estimates suggest that while being part-time coefficient is not significant in ordinary least squares estimates in both years. The

negative significant female coefficient indicates that being female lowers the individual's wages. The penalty for being female, however, declined from -0.31 in 1995 to -0.24 in 2003. Living in the rural areas also had a negative significant impact on wages in both years, with no significant change over time. While ethnicity was not a significant factor in determining wages in 1995, being Turkish or Roma had a significant negative impact on wages in 2003. Note, however, one minority group that is not captured in the analysis is the Muslim Bulgarians, as we have focused on ethnic minorities.

Table 9. OLS Regression Results

	1995 Simple model	2003 Simple model	t-stat of diff.	1995 Model with control variables	2003 Model with control variables	t-stat of diff.
Educ	0.062 (0.005)**	0.077 (0.003)*	2.57*	0.057 (0.005)**	0.071 (0.004)**	2.19*
Exp	0.015 (0.005)**	0.020 (0.003)**	0.86	0.021 (0.046)**	0.022 (0.003)**	0.02
Exp ²	-0.00023 (0.00010)*	-0.00035 (0.0007)**	-0.17	-0.00038 (0.000097)**	-0.00041 (0.00007)**	-0.25
Parttime				-0.03 (0.051)	-0.10 (0.06)	-0.89
Female				-0.31 (0.026)**	-0.24 (0.02)**	2.13*
Rural				-0.13 (0.033)**	-0.12 (0.02)**	0.26
Turkish				-0.02 (0.059)	-0.14 (0.04)**	-1.66
Roma				0.01 (0.091)	-0.20 (0.06)**	-1.93
Other				0.21 (0.175)	-0.06 (0.07)	-1.43
Const.	7.52 (0.08073)* *	4.13 (0.05494)**		7.72 (0.085)**	4.35 (0.06)**	
Obs.	1653	2327		1653	2327	
R ²	0.10	0.20		0.17	0.27	0.27

Note: Standard errors in parentheses

* significant at 5%; ** significant at 1%

Tables 10 and 11 below present the quantile regression estimates. These results illustrate the differences in returns to education over the empirical distribution of monthly net wages, where returns to schooling are higher in higher quantiles of the wage distribution. These findings are similar to the findings of the scholars, discussed earlier in this chapter, who have used the quantile regression approach to explore the trends in returns to education across the wage distribution in Bulgaria. An interesting finding in the quantile regression analysis is that the disparity in returns to education for workers at the lower end of the wage distribution and workers at the higher end of the wage distribution increased substantially over the survey years in Bulgaria. The difference in returns to education between these two groups increased from 0.5% in 1995 to 3.4% in 2003. Furthermore, the increase in returns to education was significant for the .50, .90 and .95 quantiles.

Table 10. Quantile Regression Results (1995)

	(1) Quant. 5	(2) Quant. 10	(3) Quant. 50	(4) Quant. 90	(5) Quant. 95
Educ	0.055 (0.008)**	0.067 (0.006)**	0.056 (0.006)**	0.064 (0.006)**	0.060 (0.011)**
Exp	0.029 (0.008)**	0.011 (0.006)*	0.012 (0.006)*	0.009 (0.005)	0.012 (0.009)
Exp ²	-0.00054 (0.00018)**	-0.00017 (0.00012)	-0.00019 (0.00012)	-0.00009 (0.00012)	-0.00017 (0.00020)
Const.	6.81 (0.13)**	7.03 (0.09)**	7.61 (0.09)**	8.10 (0.10)**	8.29 (0.17)**
Obs.	1653	1653	1653	1653	1653

Note: Standard errors in parentheses

* significant at 5%; ** significant at 1%

Table 11. Quantile Regression Results (2003)

	(1) Quant. 5	(2) Quant. 10	(3) Quant. 50	(4) Quant. 90	(5) Quant. 95
Educ	0.053 (0.004)**	0.058 (0.003)**	0.075 (0.004)**	0.083 (0.006)**	0.087 (0.008)**
Exp	0.026 (0.004)**	0.016 (0.003)**	0.021 (0.004)**	0.016 (0.006)**	0.011 (0.008)
Exp ²	-0.00053 (0.00009)**	-0.00027 (0.00007)**	-0.00037 (0.00008)**	-0.00027 (0.00012)	-0.00012 (0.00016)
Const.	3.76 (0.06)	3.86 (0.04)**	4.11 (0.06)**	4.68 (0.10)**	4.85 (0.13)**
Obs.	2327	2327	2327	2327	2327

Note: Standard errors in parentheses

* significant at 5%; ** significant at 1%

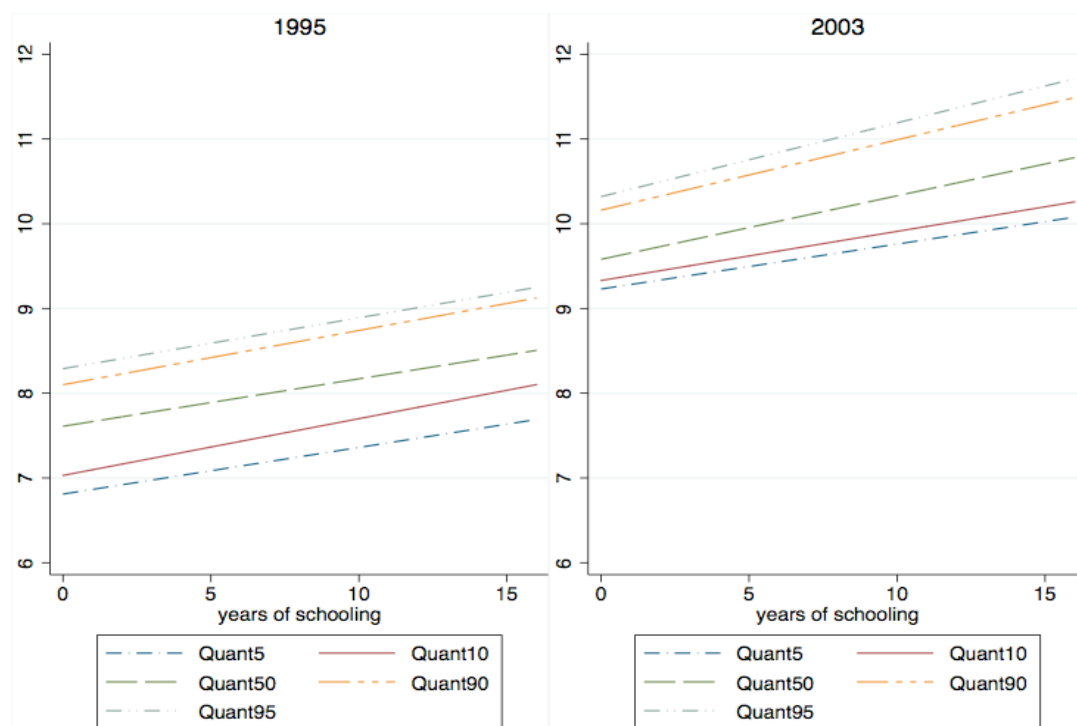
Table 12. Statistical Significance of Differences in Quantile Regression Coefficients for 1995 and 2003

	Quant. 5 t-stat of difference	Quant. 10 t-stat of difference	Quant. 50 t-stat of difference	Quant. 90 t-stat of difference	Quant. 95 t-stat of difference
Educ	-0.22	-1.34	2.63**	2.24*	1.99*
Exp	-0.34	0.75	1.25	0.90	-0.08
Exp ²	-5.32**	-0.72	-1.25	-1.06	0.20

* significant at 5%; ** significant at 1%

Figure 8 below depicts more clearly the quantile regression results for Bulgaria. While all the lines are steeper in 2003, illustrating the increase in returns to education for all quantiles, the widening of the trajectories suggest a greater disparity in returns to education between lower and higher end of the quantiles. The figures for 1995 and 2003 show that two individuals with the same years of schooling can have different returns to education depending on their position in the wage distribution. In other words, returns to

education are determined not only by years of schooling and experience, but there are factors beyond control that are impacting on an individual's earning potential.



Note: 2003 wages for adjusted for the redenomination of Leva in 1999 and inflation from 1995 to 2003 in these graphs.

Figure 8. Quantile regression estimates for natural log of wages.

The quantile regressions with the inclusion of the control variables were also estimated (see Appendix I for results). The returns to education estimates are similar to the basic specification of the quantile regressions in Tables 10 and 11, but the differences over the years and between the quantiles are not as much. This suggests that the control variables used do help, to an extent, explain variations in wages of individuals. The results for quantile regressions illustrate that penalty for both being female and living in rural areas was higher in higher quantiles of the wage distribution. This may be because gender wage gaps and disparities in wages between rural and urban areas become more

apparent at higher quantiles of the wage distribution. Being part-time had a significant negative impact on the lower quantiles of wages in 2003, while being insignificant in 1995.

The returns to primary, secondary and tertiary education are presented in Table 13 below. As expected, returns to education vary depending on the grade level. The returns are significant and higher for secondary and tertiary level compared to primary level both in 1995 and 2003. The results also show that returns to secondary and tertiary education have increased from 1995 to 2003. The returns to primary education, on the other hand, declined and became statistically insignificant over this period.

Table 13. Returns to education by level

	1995	2003	t-stat of difference
Primary	0.040 (0.019)*	0.024 (0.015)	-0.66
Secondary	0.065 (0.011)**	0.081 (0.009)**	1.13
Tertiary	0.066 (0.009)**	0.085 (0.006)**	1.76
Experience	0.016 (0.005)**	0.021 (0.003)*	0.86
Experience ²	-0.00026 (0.0001)*	-0.00037 (0.00007)**	-5.16**
Constant	7.67 (0.144)**	4.52 (0.117)	
Observations	1653	2327	
R-squared	0.10	0.21	

Note: Standard errors in parentheses.

* significant at 5%; ** significant at 1%.

The results by education level suggest a convex relationship between years of schooling and wages, similar to the one in Figure 9. Returns to primary schooling are found to be lower than returns to secondary and tertiary levels. In other words, returns to education increase with education level; an extra year of schooling at high levels of education increases net wages at a higher rate than at lower levels of education. Patrinos et al. (2006) caution that this finding would mean that investment in education might exacerbate inequalities in the labor market.

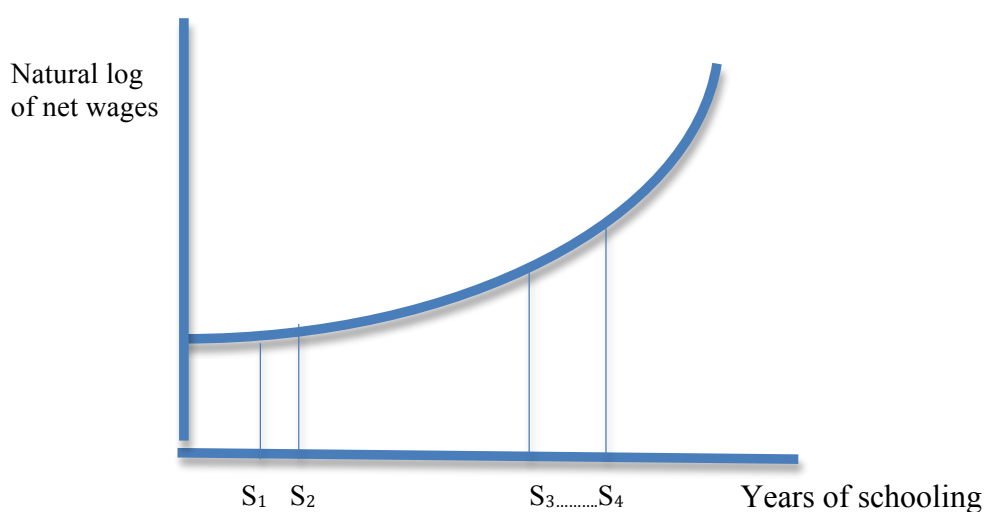


Figure 9. Returns to schooling

The change over time suggests that after transition, education became increasingly more important for individuals with more education, similar to the way it became more important for individuals at the top of the wage distribution. As suggested by the increase in R^2 , education has become ever more important — higher education was critical in order to get good wages.

Tables 14 and 15 present estimations for women and men separately. Returns to education increased for both women and men over the survey years. However, while returns to education were similar for women and men in 1995, returns to education were lower for women than for men in 2003. The finding in 2003 is contradictory to the common finding in the literature. Reviews of empirical evidence on returns to education, including Dougherty (2005), Trostel et al. (2002), Psacharopoulos and Patrinos (2004), report higher returns to women's schooling than men's schooling in most countries.

Table 14. OLS Regression Results for Women and Men

	1995 Female	2003 Female	t-stat of diff.	1995 Male	2003 Male	t-stat of diff.
Educ	0.062 (0.007)**	0.079 (0.004)**	2.11*	0.061 (0.007)**	0.083 (0.005)**	2.56*
Exp	0.018 (0.007)*	0.026 (0.004)**	0.99	0.021 (0.006)**	0.019 (0.005)**	-0.26
Exp ²	-0.00033 (0.00016)*	-0.00048 (0.00010)*	-0.79	-0.00039 (0.00013)**	-0.00035 (0.00009)**	0.25
Const.	7.33 (0.1099)**	3.92 (0.07233)*		7.63 (0.1099)	4.19 (0.0776)**	
Obs.	783	1090		870	1237	
R ²	0.12	0.27		0.11	0.21	

Note: Standard errors in parentheses

* significant at 5%; ** significant at 1%

Table 15. Returns to Education by Level for Women and Men

	1995 Female	2003 Female	t-stat of diff.	1995 Male	2003 Male	t-stat of diff.
Primary	0.024 (0.023)	0.020 (0.020)	-0.13	0.037 (0.027)	0.019 (0.021)	-0.53
Secondary	0.068 (0.016)**	0.081 (0.012)**	0.65	0.060 (0.015)**	0.084 (0.011)**	1.29

	1995 Female	2003 Female	t-stat of diff.	1995 Male	2003 Male	t-stat of diff.
Tertiary	0.06966 (0.01185)**	0.08925 (0.00695)**	1.42	0.06758 (0.01233)**	0.09504 (0.00814)**	1.86
Experience	0.02007 (0.00730)**	0.02747 (0.00434)**	0.87	0.02294 (0.00651)**	0.01938 (0.00450)**	-0.45
Experience ₂	-0.00036 (0.00017)*	-0.00051 (0.00010)**	-0.76	-0.00044 (0.00013)**	-0.00036 (0.00009)**	0.51
Constant	7.59441 (0.18428)**	9.82428 (0.14923)**		7.79882 (0.20770)**	10.14302 (0.16814)**	
Observations	783	1090		870	1237	
R-squared	0.12	0.27		0.11	0.22	

Note: Standard errors in parentheses.

* significant at 5%; ** significant at 1%.

This chapter has demonstrated that while average returns to education increased over the survey years in Bulgaria, in accordance with the international estimates of trends in returns to education, not everyone benefited from this increase. The estimates suggest that exposure to crisis years has coincided with increasing inequality in returns to education, based on the individual's position within the wage distribution as well as education level. Individuals at the lower end of the wage distribution experienced a decline in returns to education, while individuals at the top of the distribution experienced an increase. This finding is important as it signals that factors beyond the control of the individual, in other words factors other than years of schooling and experience, can impact one's returns to education.

These findings on returns to education using various specifications of the Mincerian model have policy implications. For example, policies to increase educational attainment of individuals can exacerbate inequalities in the labor market, if we take into account the findings of the quantile regressions. Therefore, the underlying reasons for the

discrepancies in returns to education across different wage quantiles need to be explored. In particular, measures are needed to ensure ‘a level playing field’ in the labour market for women and ethnic minorities. These can include enforcement of the implementation of the equal pay for work of equal value principle, mentorship programmes or other temporary special measures.

CHAPTER 4

QUALITATIVE STUDY IN BULGARIA

The results in the previous chapter illustrated that wages were lower for individuals living in rural areas compared to the ones living in urban areas in Bulgaria, and returns to primary schooling were lower than for secondary and tertiary levels. In this situation, individuals in rural areas are likely to have little incentive to invest in an additional year of primary schooling. The context of high unemployment can further depress expected returns, especially in the rural areas and small towns worst hit by employment declines. Earlier interview data from Bulgaria suggested that children “[didn’t] expect [education] to help them find work” (Kabakchieva and Iliev, 2002).

This chapter explores what factors influence households’ decisions to invest in children’s education using qualitative data collected through fieldwork in the Bulgarian town of Troyan and village of Dobrodan in 2005. When compared to the theoretical framework for schooling decisions, the interviews confirmed the importance of returns to education and the role of ethnic background, being a female and having social capital in households’ decision to invest in education, which also mediate through the expected returns to education. They also emphasized the role of children’s ability and motivation and quality of schooling.

Fieldwork

The field study was conducted by a team of four researchers, including an

interpreter, in the rural town of Troyan and the village of Dobrodan in the Troyan municipality during July 2005. The qualitative methods included interviews with households and focus group discussions with children, parents and teachers in Dobrodan and Troyan, in order to explore schooling decisions for girls and boys, including minority groups, and perceptions of the education system. A total of 14 interviews with parents and three focus group discussions with children, parents and teachers respectively took place.

A semi-structured interview guide was prepared to explore various factors that can affect schooling decisions, including returns to education and aspirations, parents' perceptions of children's school performance, and quality of schools (See Appendix J). The interview questions begin with household members' characteristics such as gender, age and ethnicity. This is followed by more specific questions related to education of children, including highest level of education attained, school performance, access to education as well as parental education information. Parents were also asked questions on aspirations for their children and perceptions of education system. The open-ended questions provided an opportunity to bring out other important issues.

Each discussion was led by a focus group moderator. The focus groups lasted two hours each and were conducted in Bulgarian. Participants were provided with a small souvenir as well as a small cash stipend for their participation. After an initial briefing by the moderator on the content and the purpose of the discussion, participants were led through a series of questions. A total of 13 children —six girls and seven boys— from the village of Dobrodan participated in the focus group discussion with children, which focused on their schooling outcomes, their perceptions of the education system and

teachers, and their aspirations and expectations from the future. The discussion with parents, that included eight female and one male participants from the village of Dobrodan, focused on factors that might affect schooling decisions for their children, their aspirations for their children, challenges and changes in the education system. The discussion with teachers, that included seven female and three male participants from the town of Troyan, brought in the perspectives of teachers in explaining schooling decisions as well as the changes in the education system. Respondents' identities are not disclosed and their privacy and rights are protected. In the beginning of discussions and interviews, respondents were briefed about the nature of the research and how qualitative information would be used in the study.

The selection of survey site was pre-determined opportunistically to include a rural town and a village with an ethnically diverse community. The Roma and Turks are the two large ethnic minorities of Bulgaria. According to the 2003 LSMS data, the Turkish minority makes up of 8.34 per cent and the Roma minority make up of 6.12 per cent of the total population. According to data from the UNDP Municipal Development Index, Troyan's ethnic composition included 4% Turkish and 1.37% Roma minority as of the last census in 1992. The ethnic composition of the sample in this qualitative study, however, was heavily Roma and Turkish individuals.

The city of Troyan is located 160 km north east of Sofia and has approximately 28,499 town residents whereas Dobrodan has 241 residents.⁹ Major employers in Troyan include a pharmaceutical plant, two light machinery factories and a plum brandy brewery.

9. <http://bulgaria.domino.bg/troyan/>

According to a Bulgarian woman respondent, “The technical schools in Troyan prepare specialists for all factories in the town. It is hard to find a job if you have university education, there is more low-qualified work”. Most of the residents of the village of Dobrodan are engaged in agriculture or wood-shops. There are a number of elementary, primary, secondary and high schools in Troyan. Dobrodan, on the other hand, has a single “Roma school” with almost 90 percent of the student body being Roma. The Roma School in Dobrodan is attended by local students and students from Roma ghettos in Troyan and surrounding villages and cities. These segregated schools are the legacy of the socialist system and the population perceived them to be of low quality.

Investment in Schooling

A comprehensive model of schooling investment decision can be derived from a review of perspectives provided by a range of disciplines in social sciences, including economics and sociology (Haveman and Wolfe, 1995). In such a model, first governments make choices about policies that impact households both directly and indirectly through institutions and markets, as illustrated in Figure 10 below. Government policies, including monetary and fiscal policies, labor market policies and education policies, therefore, determine the context in which parents and children make schooling investment decisions. Tight monetary policies can, for example, impact availability of credit in the financial markets, constraining households’ ability to invest in children’s schooling. Taxation policies would indirectly impact the availability and affordability of schools. Increased taxes, for example, would mean more revenue for the government and result in more spending on education. On the other hand, more taxation can reduce the

disposable income available to households, limiting their financial capacity to invest in children's education.

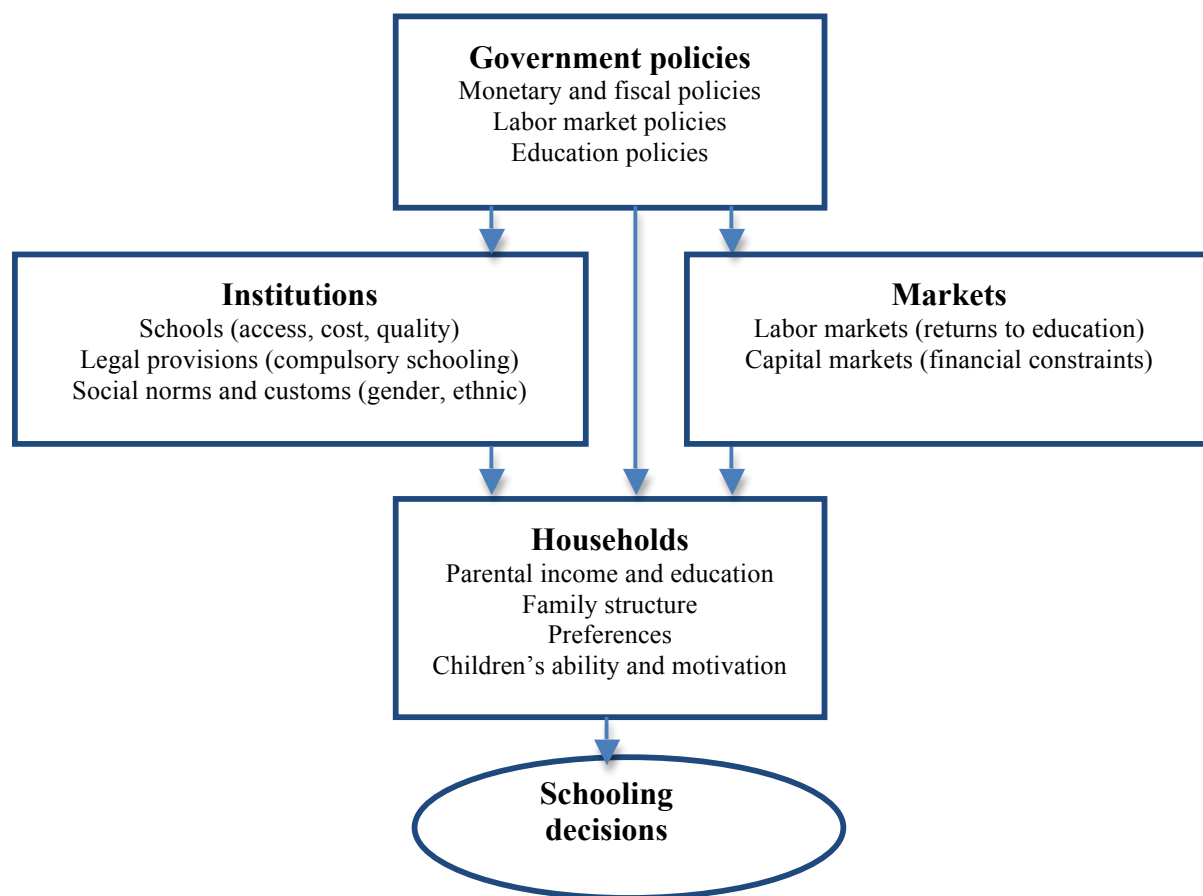


Figure 10. Schooling investment model. Based on Haveman and Wolfe (1995), and Meurs, Miluka and Hertz (2008).

Labor market policies can help reduce gender- or ethnicity-based discrimination in employment, thus creating a 'level playing field and increasing their returns to education. The job prospects in the labor market can also affect expected returns to education. If there is high unemployment, which depresses wages, expected returns to education would decline.

Education policies would determine the availability, accessibility and affordability of schools for households. On the other hand, compulsory schooling would mean that households need to send their children to school regardless of the cost and benefit analysis.

Parents and children, therefore, need to take into account the costs and benefits of an additional year of schooling in an environment determined by governments' policy choices. Elements that factor into the decision-making process at the household level include parental education and income, parental preferences, family structure (number of children), and children's ability and motivation to learn.

Labor Markets and Returns to Education

The empirical results for Bulgaria in the earlier part of this dissertation illustrated that children's education levels are increasingly related to their parents' education in Bulgaria. Fieldwork findings illustrate that parents' expected returns to their children's education was influenced by their own education levels. Educated parents seemed to be more enthusiastic about their children's education and the opportunities that awaited their children. Parents with limited education, on the other hand, felt betrayed with the capitalist system as many found themselves without jobs in a competitive environment where unskilled workers were competing for a limited number of jobs available. Interviews suggest that ethnic background, being a female, quality of education, social capital and access to information play a role in schooling investment decisions through their impact on expected returns to education.

Ethnicity

Empirical results in the earlier part of this dissertation showed that being a minority in Bulgaria had the expected negative association with attainment and wages. Findings from the field study also validate this —there were distinct differences among the perceptions and expectations of Bulgarians, Turks and Romas that were interviewed during the fieldwork. The Roma living in Troyan, for example, were faced with lack of formal employment opportunities as well as discrimination faced in the labor market. The Roma people did not think highly of university education as many believed university graduates were unable to find a job in areas of their professions. As a result of this low expected returns to university education as well as the opportunity costs associated with it, very few chose to continue with university education despite existing quotas for Roma children (with no entrance exam) at universities. In the interviews, what we find is that it is not only low levels of education that may affect minority children's expected returns to schooling, but also discrimination, lack of dignity and respect they face in the job market.

Gender

Empirical analysis that often focuses on sex differences can fail to capture the extent of gender stereotyping within a society by focusing on the biological distinction between women and men, girls and boys. Gender, however, is a social construct, and gender stereotypes became apparent in traditional roles of women and men within the Bulgarian society during our interviews and focus group discussions. Only a few participants acknowledged women's equal right to education. Some parents from the village, on the other hand, believed that girls could do with less education, as they might not be allowed to work once they got married. One respondent noted "Men in my

husband's family are very jealous, and this is why 'our girls' can not go to school. There is work in Dobrodan, but I am not looking for a job, as my husband is very jealous".

Parents implied that the expected returns to education for daughters were lower than those for sons. This is in line with the empirical analysis in the previous chapter that illustrated the lower returns to female education.

Responses suggest that gender inequality may be intersecting with other axes of inequality, such as ethnicity in the case of Dobrodan and Troyan. Traditions, such as early marriage, and traditional beliefs continue to be an obstacle for Roma girls' education. In response to a question on the reason for not continuing with their own education, many Roma women in both Dobrodan and Troyan mentioned marriage as the main factor. Nonetheless, they claimed that they would not allow their traditions affect their children's school life.

Even parents, who mentioned that there should not be any difference in girls and boys education, showed signs of gender stereotypical attitudes, by indicating that certain professions were more suitable for women than men. This belief was echoed across all respondents. Gender stereotypical attitudes therefore can manifest themselves in returns to education. As women and girls are expected to work in occupations traditionally viewed as feminine, for example as secretaries, teachers, health care workers, their expected returns to schooling would be less than men and boys.

Gender stereotypical attitudes also emerged from the interview with a Bulgarian woman, who was an accountant. According to her, "boys needed to get education, but for girls, schooling depended on their career prospects". According to another Bulgarian

woman, whether a woman should get education depended on what kind of husband she was likely to marry.

Quality of Education

During the fieldwork, quality of education stood out in the responses as playing a key role in schooling investment decisions by increasing expected returns to education. Many respondents emphasized that education alone was not considered sufficient to be successful in the labor market and expressed concern about the deteriorating quality in Bulgarian schools following the transition into a market economy. The Trends in International Mathematics and Science (TIMSS) results for 1999 and 2003 demonstrate a decrease in the quality of educational results of Bulgarian school children and the quality of education in Bulgaria (UNICEF, 2008).

In addition to perceiving the quality of education to be deteriorating overall in Bulgaria, many parents and children living in Dobrodan believed the quality of education in Dobrodan to be inferior when compared to the quality of Troyan schools. One female student noted that she fell behind in a Troyan school and transferred to the one in Dobrodan to finish eighth grade, as no one would hire her before completing eighth grade. Courses were considered to be easier, as less was expected from students. Troyan schools offered better opportunities, including more computer and language classes. The village school only provided Russian and German as a second language, while English was offered in schools in the town of Troyan.

Children found classes to be inadequate; noting that private lessons were common among economically better-off students. This immediately put the financially better off

student in a more advantageous position. Parents associated the socialist period with a very structured education system, where as with transition, education system began to dismantle. Private lessons were considered essential as entry exams for secondary schools no longer corresponded to curriculum.

Technical schools were increasingly perceived to be of lower quality among parents compared to gymnasium schools —secondary schools that offer grades 9 to 12 and prepare students for universities. Traditionally, male students would go for vocational schools with the goal of industrial jobs while female students would choose the academic track. Local firms in Troyan used to provide practical training for students, showing them a glimpse of job opportunities. With capitalism and increased competition, this practice was discontinued due to concerns about work safety and loss of production time. With transition, restructuring of the economy and industries resulted in a shift of demand in education from vocational to academic schools at the secondary level. Furthermore, teaching methods after transition emphasized theory rather than practice, with limited or no laboratories or practical work. As shown in our wage regression model, wages increase with experience, discontinuation of this practice is therefore likely to have a negative impact on future wages for these children.

Social Capital

According to both parents in the village and teachers in the town, importance of social capital increased; who you know counted much more than what you know in finding a suitable job. This, according to teachers, was a disincentive among poor children, as if their destiny was already decided. The increasing importance of social

capital in finding a job therefore had a negative impact on expected returns to education. Only a number of parents saw education as opening doors to many opportunities, as many thought that social capital played a more important role in finding jobs than a university degree. “Even with a university degree, you could be doing the most manual work if you don’t know the right people” a man noted. One woman complained that “Completing a university degree does not matter for success in life, because salaries are low”.

Access to Information

Access to information, which can help individuals find suitable jobs in the market, may also impact expected returns to education. People in the village of Dobrodan had very limited knowledge about the existing job opportunities in Troyan. One respondent noted “There are no jobs for persons with high education in Dobrodan”. Many of the female participants in Dobrodan were indeed working in the woodshops for their livelihoods. But, when it came to girls’ aspirations, an overwhelming majority of Roma girls hoped to pursue careers in music and gave examples of famous musicians as role models. While a majority of children did not have any role models or ideas about their career prospects, some male students indicated their desire to become like famous football players. Only two children mentioned professions like being a doctor or an accountant.

No one in Dobrodan referred to jobs in the pharmaceutical plant, light machinery factories or plum brandy brewery in Troyan. This is not surprising; a 2002 UNDP survey of Roma in Bulgaria; 48 percent of the respondents considered music as a potential

source of income, while 73 percent thought of manual work (handicrafts) could be a source of income (O'Higgins and Ivanov, 2006).

Households: Parental income

The existence of imperfect credit markets means that households face constraints in borrowing for investment in their children's education. In the presence of imperfect markets, parental income is expected to be positively associated with a child's educational attainment. The importance of parental income also surfaced during our discussions both with parents and children in Dobrodan and Troyan. Despite differences on other issues, most children agreed on one thing; they aspired to continue their education in Troyan after completing eighth grade, as there was no secondary school in Dobrodan. They, however, were also very much aware that this would depend on the ability of their parents to afford this financially. Almost all participants cited cost of transportation as a major obstacle to children's schooling.

Despite legally-guaranteed free education, primary school fees continue to be charged in Bulgaria, according to a World Bank survey (2002b). Even though primary education is provided free in theory, there are also direct and indirect costs associated with sending children to schools in practice. These include costs of textbooks, meals, and clothing as well as the opportunity cost of sending a child to school. In the case of extended families or families with elderly or sick family members, children, especially girls, may have to take the role of care-giver.

Social Norms and Customs: Gender and Ethnic Background

In addition to their impact through expected returns to education, gender and ethnic background were key determinants in schooling investment decisions. While interviews of parents in Dobrodan and Troyan revealed their beliefs that girls could do with less education, empirical findings from the earlier part of this dissertation showed that educational mobility was higher for daughters than for sons in Bulgaria. The negative impact of being a female on schooling investment is, however, evident among ethnic minorities. Interviews with Roma households in Troyan suggested that the Roma group's tradition of living in extended families seemed to be taking a toll on girls' education as they were expected to care for smaller children in the household. In the case of a Roma household with four generations, the mother (third generation) was unable to get education beyond third grade due to family responsibilities.

The discussions also revealed stronger gender stereotypes among the Roma population, who thought it was okay for women to get less education and stay at home. Men, on the other hand, were considered to be the main bread winners of the family and could not stay at home. Gender was also found to be a determinant in educational outcomes for the Roma population in a UNDP survey; where gender stereotypes in the Roma community led to early marriages and early pregnancies (O'Higgins and Ivanov, 2006). The focus group discussion with teachers revealed a case where a girl was not permitted to continue her education due to pregnancy.

Teachers in the town of Troyan, mainly Bulgarian, were also skeptical of the ability of Roma students, noting that, as early as first grade, differences in working habits

and skills between Roma, Turkish and Bulgarian students emerged, as Roma children generally did not attend pre-school.

Children's Ability and Motivation

After the fieldwork, what became apparent is that one crucial factor in explaining schooling investment decision is children's ability and motivation. Their efforts, preferences, experiences and expectations all contribute to the decision-making process. Some children mentioned that singers and football players were their role models and indicated their desire to become like them and not to pursue any higher education. Some students expressed their interest and motivation to pursue higher education. One female student emphasized her motivation to study "I do not want to stay illiterate and want to study to get a job". Another female student said, "I need to get an education to pursue my dreams". Another male student pointed out that because of his motivation and performance at school, his parents chose to educate him rather than his siblings even though he was the youngest. Another female student said "Nothing could stop me from getting an education. If my parents do not have the money to support my education, I will go and live with my grandparents to be able to go to school."

Both the focus group discussions and the interviews illustrated that when parents saw their children's willingness to learn and continue with their education, they were trying by all means to send them to school. One male respondent, for example, said, "I would very much like both my children to graduate university. However, if I need to make a choice, I will send my daughter, as she is a better student. Higher education is

always necessary, I want her to be independent.” Another male respondent pointed out ‘If it is for education, I will somehow find the money.’”

Government Policies: Subsidies

Subsidies and incentives to households can play a significant role by changing the choice set available to households and reducing the impact of parental income on schooling, in particular for girls. In the case of Bulgaria, while transportation was not free for Dobrodan children, Roma children commuting from Troyan did receive free passes as an incentive to attend the so-called “segregated Roma schools”. There were no subsidies, however, at the secondary school level even if there were no schools available nearby.

Roma households interviewed in Troyan were pleased to send their children to the Roma school in Dobrodan, because of the subsidies and incentives provided and discrimination faced in Troyan schools. They didn’t have to pay for transportation and their children were provided with meals. In addition, the school in Dobrodan provided them with books, whereas they would have to pay for books in Troyan. These highlighted the importance of subsidies and incentives in reducing the importance of parental income on educational outcomes of children as well as in keeping children in schools.

Transition-specific factors

There are also transition-specific factors that may affect schooling decisions. Transition process involved a shock to many of the variables in Figure 10. According to interviews, financial constraints and changing labor market conditions resulted in falling incomes for households. Job insecurity and lack of decent jobs were all mentioned as negative outcomes of transition into a market economy during the focus group

discussions and interviews. All of the participants concurred that, with transition, financial responsibility for education of children shifted from the state to households. Formerly, the state would compensate for travel and school materials such as books, notebooks and equipment.

Despite some progress, lack of books remained a major problem in schools. Starting in 2005, children in grades 1 to 4 were to receive free books. As the schools did not have the necessary financial resources to purchase sufficient books, either books would need to be photocopied or teachers needed to find sponsors.

Another parent complained about the lack of consistency in the educational system – the books and the curriculum were being changed all the time. He thought that education was better when he was younger, because there used to be order and discipline. Students did not respect their teachers because of this lack of order and discipline. According to him, parents, teachers and the state were all responsible for children not receiving proper education and upbringing. Teachers, on the other hand, argued that parents no longer paid sufficient attention to their children's education.

As mentioned earlier, our interviews and focus group discussions showed differences among perceptions. Some Roma parents felt that competition was getting tougher among students, as they began studying harder subjects, such as mathematics, at an earlier age. However, some Bulgarian and Turkish parents felt that less homework was demanded from students. Students had become more spoiled. They thought that students had more respect for their teachers before transition, partly due to their fear of punishment. Teachers had more control. At present, students were more aware of their rights, and teachers could not use force against them or insult them.

According to some parents, some of these changes were because children's perception of democracy was different. Children were exposed to information through various forms of media and information technologies. They were more confident and independent, while seeing their parents and teachers as inferior. The relationship between teachers and students became more informal and friendlier. Some believed that students should be punished for skipping classes or receiving bad grades. On the other hand, there were parents who complained about the lack of motivation among teachers negatively impacting educational outcomes.

Another change that came with transition was the state's financing for education. There were seven schools in Troyan: municipal schools included two primary schools, one middle school and two secondary schools, state schools included a secondary technical school and a secondary school of Applied Art. The state schools were financed through the national budget directly by the Ministry of Education. With decentralization, municipal schools were now financed by the municipality and had delegated budgets: the municipality received funds from the state and decided on how to allocate these.

When asked about the impact of this kind of financing on the education system, many parents were not fully aware of the implications of this. One participant indicated that municipalities' distribution of funds allowed for better control. A few number of participants argued that the state should have control over the education budget, as some municipalities would not have sufficient resources for their schools. Schools had to compete for the scarce resources provided by municipalities. On the other hand, with this kind of financing, big schools that attract students from villages would get more money.

Many respondents emphasized the importance of the personal efforts of the headmistress in the Dobrodan school in raising necessary funds for the school.

Qualitative Findings

Qualitative findings in this dissertation, while not representative of the overall situation in Bulgaria, present a picture of a rural setting where expected returns to education are low, perceived quality of education is inferior and job opportunities are scarce. Interview evidence suggest that expected returns to education play a key role in schooling investment decisions and to a great extent are determined not only by years of schooling and experience, but also by a range of other factors including ethnic background, being a female, having social capital and quality of education. The importance of ethnic background and being a female on wages was also highlighted in the empirical findings in the previous chapter.

While it is difficult to paint a complete and clear understanding of factors that determine schooling investment decisions in Bulgaria on the basis of this qualitative study alone, the results pointed out to some factors that underlie what is measured with quantitative data and help explain the findings. In line with the theoretical framework, the qualitative results illustrated that parental income, ethnic background and gender play important roles in explaining investment decisions. Lack of financial resources, in other words limited parental income, stands out as a major constraint on parental choice. Incentives and subsidies were helpful in reducing the impact of the parental income on schooling decisions. Social capital and ethnicity can also explain differences in schooling investment, through their impact on expected returns to education.

CHAPTER 5

CONCLUSION

This dissertation brings together evidence on education attainment and returns to education as well as qualitative analysis of factors that affect schooling investment decisions. The contribution of this study is threefold. First, it extends the existing literature on intergenerational educational mobility by examining whether the degree of exposure to economic years is associated with a decline in intergenerational educational mobility in Bulgaria, Kyrgyzstan and Tajikistan. Secondly, it explores returns to education in Bulgaria using various specifications of the Mincer equation. The third part explores what factors influence households' decisions to invest in children's education using qualitative data collected through fieldwork in the Bulgarian town of Troyan and village of Dobrodan in 2005.

While transition brought many opportunities to former socially planned economies, the transition period was also characterized by economic crisis years. Increasing inequalities in the education sector and the labor market became inevitable following the transition process. One question is whether the crisis impacted on all children in a similar way, or whether certain groups of children experienced a greater impact. This study was interested in not only what happened to educational outcomes of children, but also what happened to one's relative position in the distribution —whether this was inherited directly from one's parent. The study finds evidence that the

intergenerational educational mobility declined in Bulgaria and Tajikistan over the survey years. Persistence of educational outcomes through generations have long-term consequences and implies that inequalities in terms of educational attainment are not only between individuals, but between dynasties. The grade-for-age trajectories for children aged 7 through 20 illustrated an increasing gap between the children of poorly-educated parents compared to those born to highly-educated parents for children 12 years and above.

The economic crisis brings more unemployed workers and depressed wages. With liberalization of labor markets, returns to education are expected to increase. The findings in this dissertation confirm that returns to education increased over the survey years in Bulgaria. Depending on the specification of the Mincerian equation used in the analysis, the statistically significant returns to education are found to range from 5.3% to 8.7%. However, these estimates remained low compared to international estimates, which is around 10% on average. This may probably be explained by the finding that exposure to economic crisis years meant that not all the workers experienced an increase in returns to education in Bulgaria over the survey years. Workers in lower quantiles of the wage distribution, workers with lower education levels and women workers were found to be worse off in terms of returns to education. In addition, a greater disparity in returns to education between workers in the lower and higher end of the quantiles is observed, suggesting increased inequalities in terms of returns to education over this period.

The fieldwork in the Bulgarian town of Troyan and the village of Dobrodan in 2005 provided an opportunity to investigate whether the impact of the economic crisis period was still being felt by individuals and how individuals made schooling investment

decisions in a rural setting, characterized with lower wages and lower expected returns to education. In line with the theoretical framework, interview evidence suggest that expected returns to education play a key role in schooling investment decisions, and to a great extent are determined not only by years of schooling and experience, but also by a range of other factors including ethnic background, being a female, having social capital and quality of education. Lack of financial resources had a negative impact on schooling investment decisions.

While countries try to take advantage of opportunities that come with transition, they also need to address the inequalities faced by certain parts of the population to ensure that everyone enjoys the benefits of transition. It is not an easy task to improve educational outcomes for all in the society. Nevertheless, we know that people want to make themselves and their children better off. The former United Nations Special Rapporteur on the right to education noted “Education is a human right, not an economic good”¹⁰. Governments have legal obligations to take measures to realize the right to education for every individual. In addition, governments should play a bigger role in empowering children, through providing better quality schools, incentives to stay in school and better job opportunities.

Attention should be paid to creating a level playing field in the labor market for women and individuals from minorities to increase their expected returns to education. Legislation, policies and strategies should promote equal pay for work of equal value and

10. Human Rights Newsletter “Respect” No. 6, June 2005, page 7.

eliminate gender- and ethnicity-based discrimination in the workplace. Enforcement of existing legislation is crucial in this regard.

In addition to increasing returns to education, measures should also focus on ensuring educational attainment for all children. Raising awareness among families about the importance of educating their children, in particular girls, can be quite instrumental. Investment to increase quality of education —so that skills and knowledge acquired in the education system meet the demands of the competitive labor markets —is essential to ensure that educational gains are translated into decent employment opportunities.

Given the advancements in data collection as well as data analysis, one can learn what kinds of interventions, government policies, and institutional changes can have a positive impact on educational outcomes. Nevertheless, changing the mindset of people and overcoming cultural and social barriers remains a challenging task, especially in overcoming stereotypical attitudes regarding gender and ethnic minorities. The inclusion and participation of children, parents, teachers, communities, local authorities and governments in the process is critical in improving educational outcomes and in promoting equality of opportunities for all.

APPENDIX A

REVIEW OF SELECT STUDIES ON INTERGENERATIONAL
PERSISTENCE OF EDUCATIONAL OUTCOMES

Table 16. Select Studies on Intergenerational Educational Mobility

Study	Countries	Datasets	Sample Size	Age Restriction	Methodology Used	Variable	Results	
Andersen (2001)	Argentina	Household surveys from each country	111,235	Ages 13-19 and ages 20-25	Regression coefficients	Schooling gap	Results for teenagers	Results for young adults
	Bolivia		36,752				Argentina (0.102)	Argentina (0.185)
	Brazil		346,106				Bolivia (0.149)	Bolivia (0.208)
	Chile		188,360				Brazil (0.188)	Brazil (0.246)
	Colombia		143,398				Chile (0.088)	Chile (0.197)
	Costa Rica		43,944				Colombia (0.157)	Colombia (0.219)
	Dominican Republic		24,041				Costa Rica (0.153)	Costa Rica (0.239)
	Ecuador		26,134				Dominican Republic (0.140)	Dominican Republic (0.179)
	El Salvador		40,004				Ecuador (0.187)	Ecuador (0.234)
	Guatemala		35,725				El Salvador (0.153)	El Salvador (0.179)
	Honduras		32,696				Guatemala (0.158)	Guatemala (0.159)
	Mexico		64,916				Honduras (0.157)	Honduras (0.261)
	Nicaragua		23,637				Mexico (0.139)	Mexico (0.229)
	Panama		40,320				Nicaragua (0.159)	Nicaragua (0.165)
	Paraguay		21,910				Panama (0.130)	Panama (0.214)
	Peru		19,745				Paraguay (0.121)	Paraguay (0.233)
	Uruguay		64,028				Peru (0.131)	Peru (0.157)
	Venezuela		76,965				Uruguay (0.115)	Uruguay (0.208)
							Venezuela (0.163)	Venezuela (0.245)

Study	Countries	Datasets	Sample Size	Age Restriction	Methodology Used	Variable	Results
Behrman, Birdsall and Szekeley (2000)	Argentina Bolivia Brazil Chile Colombia Costa Rica Ecuador El Salvador Honduras Mexico Nicaragua Panama Paraguay Peru Uruguay Venezuela	Household surveys from each country	111,235 36,752 346,106 188,360 143,398 43,944 26,134 40,004 32,696 64,916 23,637 40,320 21,910 19,745 64,028 76,965	Ages 10-21	Regression coefficients	Schooling gap and mobility indices	Parental schooling reduces the schooling gap on average. For 26 of the 28 surveys in 16 Latin American countries, the absolute magnitude of the coefficient estimate is larger for mother's schooling than father's schooling. Average coefficient estimate for father's and mother's schooling by age group Ages 10-12 -0.065 (Father's) -0.098 (Mother's) Ages 13-15 -0.105 (Father's) -0.160 (Mother's) Ages 16-18 -0.115 (Father's) -0.176 (Mother's) Ages 19-21 -0.210 (Father's) -0.303 (Mother's)

Study	Countries	Datasets	Sample Size	Age Restriction	Methodology Used	Variable	Results
Behrman, Gaviria and Szekely (2001)	Brazil, Colombia, Mexico, Peru, and United States	Brazil National Household Survey, Colombia Living Standards Survey, Mexico National Urban Employment Survey, Peru National Household Survey, US General Social Survey	Sample size ranged from 16,273 to 331,263 individuals	23-69-year-olds	Regression coefficients	Years of schooling completed	Approximate estimates Brazil (0.7) Colombia (0.7) Mexico (0.5) Peru (0.5) US (0.35)
Belzil and Hansen (2003)	United States	National Longitudinal Survey of Youth	1,710	14-21 year olds as of Jan 1, 1979	Structural estimates and regression coefficients	Schooling attainment	Structural estimates Regression coefficients 0.2565 (Father's) 0.2279 (Mother's)
Binder and Woodruff (2002)	Mexico	1994 Gender, Age, Family and Work Household Survey	23,845	Adults born between 1925 and 1971	Correlation coefficient	Schooling level	Correlation coefficient 0.50 (men) 0.53 (women) 40-49 years of age 0.48 (m), 0.54(w) 30-39 years of age 0.43 (m), 0.49(w) 50-69 years of age 0.57 (m), 0.59(w) 23-29 years of age 0.49 (m), 0.49(w)
Blake (1985)	United States	Occupational Changes in a Generation 1962 and 1973 surveys and General Social Survey 1972-1983	Various	Men aged 20 and over	Regression coefficients	Years of schooling completed	For small and medium sib-sizes, mobility increased over time.
Checchi et al. (1997)	Italy and United States	1985 National Survey of Italy on Social Mobility and United States Panel Study of Income Dynamics (1990)	5016 individuals (Italy) and 1050 father-son couples (United States)	Aged between 18 and 65 (Italy) and 15 and older (United States)	Transition matrices	Educational categories: individuals without a college degree (low education) and those holding a college degree (high education)	United States has a lower degree of intergenerational upward mobility compared to Italy.

Study	Countries	Datasets	Sample Size	Age Restriction	Methodology Used	Variable	Results
Chevalier et al. (2003)	Belgium, Canada, Chile, Czech Republic, Denmark, Finland, Great Britain, Germany, Hungary, Ireland, Italy, Netherlands, North Ireland, Norway, New Zealand, Poland, Slovenia, Sweden, Switzerland	International Adult Literacy Survey between 1994 and 1998	Average size per country is around 2000	25 to 65 year olds	Multivariate analysis of attaining higher education	Years of education	Aggregate ranking of equality of opportunities in education 1 Czech 2 Finland 3 Italy 4 Sweden 5 Ireland 6 Poland 7 Netherlands 7 Switzerland (Fr) 9 Belgium 10 Chile 11 Great Britain 11 Northern Ireland 14 Hungary 15 Slovenia 15 Switzerland (G) 17 New Zealand 18 Norway 19 Germany 20 Denmark 21 USA 22 Canada (Eng) 23 Canada (Fr)
de Broucker and Underwood (1998)	Australia, Belgium, Canada, Ireland, the Netherlands, New Zealand, Poland, Sweden, Switzerland, United Kingdom, United States	International Adult Literacy Survey		16-65 year olds	Correlation coefficient	Educational attainment	Australia (0.29) Belgium (0.42) Canada (0.41) Ireland (0.50) the Netherlands (0.41) New Zealand (0.34) Poland (0.43) Sweden (0.30) Switzerland (0.40) United Kingdom (0.30) United States (0.40)
Dearden et al. (1997)	United Kingdom	National Child Development Survey	1565 father-son, and 747 father-daughter pairs	Cohorts of all individuals born in a week of March 1958	Regression coefficient	Years of education	Sons (0.443) Daughters (0.369)
Deng and Treiman (1997)	China	Census of the People's Republic of China		18-37 year olds in 1982	Regression coefficients	Years of schooling completed	Dramatic decline in the net effect of father's education on son's educational attainment over the 20 year period (low .20s to around .10)

Study	Countries	Datasets	Sample Size	Age Restriction	Methodology Used	Variable	Results
Ganzeboom and Nieuwbeerta (1999)	Bulgaria, Czech Republic, Hungary, Poland, Russia and Slovakia	Data collected as part of the project "Social Stratification in Eastern Europe"	Approximately 5000 in each country	21-69 year olds	Regression coefficients	Number of years it took to complete a given education level for children	Coefficient estimates for the cohort "1960" varied between 0.40 and 0.60: Bulgaria (0.404 (men), 0.467 (women)); Czech Republic (0.489 (men), 0.595 (women))
							Hungary (0.537 (men), 0.483 (women)); Poland (0.375 (men), 0.387 (women)); Russia (0.275 (men), 0.326 (women)); Slovakia (0.561 (men), 0.600 (women))
Hertz and Jayasundera (2007)	Indonesia	RAND Indonesia Family Life Survey	10,884	24-50 year olds in 2000	Regression coefficients	Years of schooling	Decrease in educational persistence/increase in educational mobility
Hertz et al. (2007)	42 countries	LSMS, household surveys conducted by national statistical agencies, and country for the surveys affiliated with the European Social Survey (ESS), the International Social Survey Program (ISSP), and the International Adult Literacy Survey	Sample size ranged from 149,477 for Brazil to 1,047 for the Philippines	20-69 year olds	Regression coefficients and correlation coefficients	Number of years associated with the highest grade completed, assuming no grade repetition	Kyrgyzstan (0.20, 0.28); Malaysia (0.38, 0.31); Nepal (0.94, 0.35); Netherlands (0.58, 0.36); New Zealand (0.40, 0.33); Nicaragua (0.82, 0.55); Ireland (0.41, 0.40); Bangladesh (0.58, 0.38); Belgium (0.41, 0.40); Brazil (0.95, 0.59); Chile (0.64, 0.60); China, rural (0.34, 0.20); Colombia (0.80, 0.59); Czech Republic (0.44, 0.37); Denmark (0.49, 0.30); East Timor (1.27, 0.39); Ecuador (0.72, 0.61); Egypt (1.03, 0.50); Estonia (0.54, 0.40); Ethiopia (0.75, 0.10); Finland (0.48, 0.33); Ghana (0.71, 0.39); Great Britain (0.71, 0.31); Hungary (0.61, 0.49); Indonesia (0.78, 0.55); Ireland (0.70, 0.46); Italy (0.67, 0.54)

Study	Countries	Datasets	Sample Size	Age Restriction	Methodology Used	Variable	Results
Lam and Schoeni (1993)	Brazil	Brazilian National Household Survey	Over 100,000 households (sample: over 40,000 married men)	30-55-year-old married men	Regression coefficients	Returns to education	Increase in returns to schooling with father's schooling
Lauer (2003)	France and Germany	1985 and 1999 German Socioeconomic Panel (Germany) and the 1993 Formation et Qualification Professionnelle Survey (France)	15,000 (France) and 6,000 (German y)	Cohorts born between 1925 and 1968	Regression coefficients	Levels of education	Higher the education of parents, the higher the educational outcome of children
Lillard and Willis (1994)	Malaysia	Malaysian Family Life Survey	27,379 individuals; 1 records created by authors	Children born between 1938 and 1980; Parents born between 1902 and 1965	Correlated sequential probit model	Propensity to continue in school	Children sample; Mothers/sons (0.0910, 0.0656, 0.0352); Mothers/daughters (0.1635, 0.1083, 0.0770); Fathers/sons (0.1052, 0.0756, 0.0415); Fathers/daughters (0.0880, 0.0445, 0.0140)
Sato and Shi (2007)	China	2002 cross-sectional survey of Chinese rural households by the Chinese Household Income Project	9,200 households	Cohorts born over the period 1929 and 1979	Regression coefficients	Years of schooling	Impact of father's years of education on male heads of households' years of education 0.10 0.10 (Mid-Maoist cohort) 0.13 (Post-reform cohort)

Study	Countries	Datasets	Sample Size	Age Restriction	Methodology Used	Variable	Results
Thomas (1996)	South Africa	1991 South African Census	10% random sample from the 1991 South African Census	20-70	Regression coefficients	Years of schooling	Mobility increased Mothers-children: overtime for those 0.3-.04 (Black and born after 1950. Asian children); Fathers-children: 0.2 (White and .25 (Black, Asian, colored children) or colored children)
Wong (2004)	Bulgaria Czechoslovakia Hungary Poland Russia	1993 Social Stratification in Eastern Europe After 1989		25-34	Regression coefficients	Educational categories	Impact of parental education Bulgaria Attended secondary (0.081) Diploma secondary (0.117) Attended university (0.084) Czechoslovakia Attended secondary (0.148) Diploma secondary (0.044) Attended university (0.070) Hungary Attended secondary (0.106) Diploma secondary (0.038) Attended university (0.099) Poland Attended secondary (0.068) Diploma secondary (0.010) Attended university (0.121) Russia Attended secondary (-0.006) Diploma secondary (0.023) Attended university (0.074)

APPENDIX B

DATASETS

Table 17. List of Datasets

Country	Period	Data	Sample size	Source
Bulgaria	1995	Living Standards Measurement Study (LSMS) Household Surveys	2,500 households	World Bank
Bulgaria	2003	Living Standards Measurement Study (LSMS) Household Surveys	3,023 households	World Bank
Kyrgyzstan	1993	Living Standards Measurement Study (LSMS) Household Surveys	2,000 households	National Statistical Committee of the Kyrgyzstan (1993)
Kyrgyzstan	1998	Living Standards Measurement Study (LSMS) Household Surveys	2,979 households	National Statistical Committee of the Kyrgyzstan (1998)
Tajikistan	1999	Living Standards Measurement Study (LSMS) Household Surveys	2,000 households	State Committee on Statistics of the Republic of Tajikistan
Tajikistan	2007	Living Standards Measurement Study (LSMS) Household Surveys	4,860 households	State Committee on Statistics of the Republic of Tajikistan

APPENDIX C

OVERVIEW OF SURVEYS

The 1995 Living Standards Measurement Survey for Bulgaria was conducted by the Gallup International, with the support of the World Bank Office in Bulgaria. The survey is a self-weighting random sample of 2,500 households, in 500 survey clusters. The sampling of the households was done in two stages. In the first stage, the statistical sectors in Bulgaria are selected with probability proportional to the size. In the second stage, households to be interviewed are selected with equal probability.

The 2003 Bulgaria Multi-topic Household Survey was conducted by the National Statistical Institute of Bulgaria from 15 October to 15 November 2003. The nationally representative sample included 3,023 households. Note, however, the World Bank has no information on the sample design. The base files were only available with Bulgarian labels. With Professor Meurs' help and the use of the questionnaire in English, these have been relabeled in English.

The Kyrgyzstan Multipurpose Poverty Survey, a nationally representative survey, was conducted by the University of North Carolina at Chapel Hill, Paragon Research International and the Institute of Sociology of the Russian Academy of Sciences in October and November 1993. The sample contains about 2,000 households and 10,000 household members. The sampling procedure was a stratified, multi-stage sampling.

The 1998 Kyrgyz Poverty Monitoring Survey (KPMS), also a nationally representative survey, was conducted by the National Statistical Committee of Kyrgyzstan, with technical assistance from the Research Triangle Institute based in the United States, from October to November 1998. The sample size of KPMS was 2,700 households and 15,329 household members.

The 1999 Tajik Living Standards Survey was conducted jointly by the State Statistical Agency and the Center for Strategic Studies under the Office of the President, in collaboration with the United Nations Development Programme and the World Bank. The survey, carried out between May and June of 1999, included a nationally representative sample of 2,000 households with 14,142 members, randomly selected over 125 population points, stratified across urban and rural areas within oblasts.

The 2007 Tajik Living Standards Survey was conducted by the National Committee for Statistics, in collaboration with the World Bank and UNICEF during September-November 2007. The survey, which had a stratified two-stage cluster design, had 270 primary sampling unit (PSU) and 4,860 households. As the sample is not self-weighted, the weight variable, a PSU level weight, had to be used in the analyses of the data.

All the surveys included questions about household members' characteristics, such as their age, ethnicity, location, etc), employment, income, consumption, education, health, and poverty.

APPENDIX D

VARIABLE DEFINITIONS

Table 18. Variable Definitions

Variable	Definition		
Survey	Survey year		
hhnumber	Household number		
idcode	ID Code		
district	districts		
	<u>Bulgaria</u>	<u>Kyrgyzstan</u>	<u>Tajikistan</u>
	Sophia City	Bishkek	Dushanbe
	Sofia Region	Issyk-kul	Gorno-Badakhshan
	Bourgass	Jalal-Abad	RRS
	Varna	Naryn	Leninabad
	Lovetch	Osh	Khatlon
	Montana	Talas	
	Plovdiv	Chu	
	Rousse		
	Haskovo		
rural	Urban/Rural (0 Urban, 1 Rural)		
female	Sex (0 Male, 1 Female)		
Age	Age in years		
age_mth	Age in months		
enroll	Currently attending school (1 yes, 0 no)		
educ	Years of schooling		
meduc	Mother's years of schooling		
feduc	Father's years of schooling		
pared	Average years of schooling of parents		
ethnicity	Ethnicity		
	<u>Bulgaria</u>	<u>Kyrgyzstan</u>	<u>Tajikistan</u>
	Bulgar	Kyrgyz	Tajik
	Turkish	Russian	Uzbek
	Roma	Ukrainian	Russian
	Russian	Uzbek	Kyrgyz
	Other	Kazakh	Other
		Tatar	
		Dungan	
		Other	

relationship	Relationship to Head
	1. Head
	2. Spouse / Partner
	3. Child / adopted child
	4. Grandchild
	5. Niece / Nephew
	6. Father / Mother
	7. Sister / Brother
	8. Son / Daughter-in-law
	9. Brother / sister-in-law
	10. Grandfather / Mother
	11. Father / mother-in-law
	12. Other relative
	13. Not related

APPENDIX E

DATA ISSUES

Subsamples were extracted from each dataset for analyses in this paper. In some cases, data needed to be dropped due to missing values and clear errors in reporting (see table below). For example, when a respondent's age was less than years of schooling, or there were discrepancies in the way they responded to the questions related to education. The respondents with missing information on sex, education and parental education were dropped. As noted earlier, parents' education is computed by taking the average of mothers' and fathers' years of schooling. In the case that information on one parent is missing, then the years of schooling for the other parent is used for the average instead. Therefore, only the respondents missing parental education for both parents are dropped.

Table 19. Information on Missing Data

Survey and year	Total number of individuals aged 7-20	Total number of individuals aged 7-20 missing education	Total number of individuals aged 7-20 with both parental education missing	Total number of individuals aged 7-20 missing information on sex	Total number of individuals aged 7-20 with erroneous education data
Bulgaria 1995	1,259	0	65	0	15
Bulgaria 2003	1,315	22	318	1	23
Kyrgyzstan 1993	2,938	168	53	0	56
Kyrgyzstan 1998	4,947	49	132	77	422
Tajikistan 1999	5,078	171	983	0	145
Tajikistan 2007	10,492	352	5	0	191

APPENDIX F

SELECT ECONOMIC VARIABLES FOR BULGARIA,
KYRGYZSTAN AND TAJIKISTAN

Table 20. Select Economic Variables

	Real GDP (Index)	Education spending as % GDP	Real Education Spending (Index)	Population aged 5-17 (Index)	Education spending per child (index)	Basic education enrollments (gross rates, % of relevant population)	Employment ratio (number of employed as % of population aged 15-59)
Bulgaria							
1990	100	5	100	100	100	98.6	77.9
1991	92	5.1	93	98	95	97.3	68.3
1992	85	6.1	104	96	108	95.1	63.3
1993	84	5.7	95	94	102	94.0	62.8
1994	85	4.8	82	91	90	94.3	56.7
1995	88	4	70	89	79	93.7	58.3
1996	79	3.2	51	86	59	93.6	60.0
1997	75	4	60	84	71	94.0	59.9
1998	78	4	62	82	76	94.3	59.4
1999	80	4.4	70	79	88	94.8	56.3
2000	85	4.2	72	77	94	95.5	54.7
2001	89	4.0	71	74	96	97.4	53.7
2002	91	4.2	76	71	107	98.7	55.5
2003	96	4.3	83	68	122	98.8	57.5
2004	102	4.3	87	66	133	98.7	59.4
2005	109	4.2	92	63	146	98.8	60.7
2006	115	4.0	91	61	150	98.0	63.8

	Real GDP (Index)	Education spending as % GDP	Real Education Spending (Index)	Population aged 5-17 (Index)	Education spending per child (index)	Basic education enrollments (gross rates, % of relevant population)	Employment ratio (number of employed as % of population aged 15-59)
Kyrgyzstan							
1990	100	8	100	100	100	92.0	73.2
1991	92	1.3	15	102	15	92.0	72.3
1992	79	1	10	104	10	92.0	74.8
1993	67	4.2	35	106	33	85.6	67.3
1994	54	6.1	41	107	38	86.6	64.8
1995	51	6.6	42	109	38	88.0	64.1
1996	54	5.2	35	111	32	89.4	63.5
1997	60	4.9	37	113	32	89.9	64.0
1998	61	4.7	36	115	31	90.3	63.6
1999	63	4.1	32	116	28	89.8	64.6
2000	67	3.0	25	117	22	96.2	63.3
2001	70	3.4	30	118	25	95.2	62.6
2002	70	3.9	34	118	29	94.8	61.8
2003	75	3.9	37	117	31	95.1	61.2
2004	80	4.0	40	116	34	95.2	60.9
2005	80	4.2	43	115	37	96.2	61.0
2006	82	4.7	48	113	43	96.3	64.9
Tajikistan							
1990		NA	NA	100		94.6	72.3
1991		NA	NA	103		94.8	72.1
1992	100	11.0	100	107	100	90.3	68.7
1993	83	8.5	64	110	62	85.5	66.6
1994	65	8.3	49	113	46	86.4	66.1
1995	56	2.4	12	116	11	87.0	65.3
1996	47	2.2	9	119	8	85.9	60.0
1997	48	1.9	8	122	7	85.8	60.7

	Real GDP (Index)	Education spending as % GDP	Real Education Spending (Index)	Population aged 5-17 (Index)	Education spending per child (index)	Basic education enrollments (gross rates, % of relevant population)	Employment ratio (number of employed as % of population aged 15-59)
1998	51	2.2	10	124	9	89.7	59.2
1999	53	2.1	10	126	8	89.1	55.6
2000	58	2.3	12	128	10	88.5	54.0
2001	64	2.4	14	130	11	91.1	54.6
2002	71	2.6	17	131	13	94.4	53.3
2003	78	2.4	17	132	14	95.4	52.1
2004	88	2.8	22	132	18	95.4	55.5
2005	94	3.5	30	132	24	95.7	54.0
2006	101	3.4	31	132	25	96.5	52.7

APPENDIX G

DESCRIPTIVE STATISTICS

Table 21. Descriptive Statistics- Bulgaria

	1995		2003	
	Mean	StdDev	Mean	StdDev
<u>Ages 16-20</u>				
Years of Schooling	10.03	2.07	9.43	2.75
Daughters	10.24	0.13	9.54	0.18
Sons	9.81	0.18	9.33	0.21
Parents' Average Years of Schooling	11.13	3.01	11.27	3.40
Sample Size	351		384	
Daughters	174		181	
Sons	177		203	
<u>Ages 7-20</u>				
Years of Schooling	6.67	3.52	6.40	3.62
Parents' Average Years of Schooling	11.19	3.02	11.39	3.41
Age (Years)	13.64	3.80	13.96	3.72
Age (Months)	5.23	3.31	5.70	3.39
Interview Date (Month Date)	6.55	0.66	-	-
Share Female	49.25		49.64	
Shares in Districts				
Sophia City	14.04		11.91	
Sofia Region	15.55		14.05	
Bourgass	11.43		11.00	
Varna	10.93		13.85	
Lovetch	8.73		9.67	
Montana	4.71		5.91	
Plovdiv	15.15		14.15	
Rousse	6.52		9.27	
Haskovo	12.94		10.18	
Share Rural	23.07		25.66	
Shares by Mother Tongue				
Bulgarian	83.65		80.14	
Turkish	9.73		8.04	

	1995	2003
Sample Size	997	982

Note: Calculations based on 1995 and 2003 household surveys.

Table 23. Descriptive Statistics- Kyrgyzstan

	1993		1998	
	Mean	StdDev	Mean	StdDev
<u>Ages 16-20</u>				
Years of Schooling	10.36	1.53	10.29	1.33
Daughters	10.38	1.41	10.40	1.38
Sons	10.35	1.63	10.19	1.27
Parents' Average Years of Schooling	9.91	3.13	10.68	2.63
Sample Size	673		1144	
Daughters	314		543	
Sons	359		601	
<u>Ages 7-20</u>				
Years of Schooling	6.43	3.52	6.42	3.51
Parents' Average Years of Schooling	10.62	2.61	10.90	2.29
Age (Years)	13.12	3.70	13.11	3.78
Age (Months)	-	-	5.61	3.12
Share Female	48.50		49.36	
Shares in Districts				
Bishkek	6.98		7.50	
Issyk-kul	10.65		14.08	
Jalal-Abad	14.41		19.71	
Naryn	4.86		12.68	
Osh	38.51		23.95	
Talas	5.61		11.59	
Chu	18.97		10.49	
Share Rural	71.57		78.63	
Ethnicity				
Kyrgyz	63.44		79.91	
Russian	11.63		7.64	
Ukrainian	0.22		0.39	
Uzbek	15.96		6.97	
Kazakh	1.15		1.15	
Tatar	0.44		0.37	
Dungan	2.08		0.94	
Other	5.08		2.58	
Sample Size	2262		3841	

Note: Calculations based on 1993 and 1998 household surveys.

Table 24. Descriptive Statistics- Tajikistan

	1999		2007	
	Mean	StdDev	Mean	StdDev
<u>Ages 16-20</u>				
Years of Schooling	9.58	1.69	9.61	2.30
Daughters	9.39	1.74	9.23	2.51
Sons	9.74	1.64	9.98	2.01
Parents' Average Years of Schooling	9.95	2.98	10.99	2.37
Sample Size	1242		3057	
Daughters	561		1494	
Sons	681		1563	
<u>Ages 7-20</u>				
Years of Schooling	6.01	3.38	6.50	3.57
Parents' Average Years of Schooling	10.62	2.62	11.08	2.31
Age (Years)	13.18	3.76	13.85	3.88
Age (Months)	5.21	3.46		
Interview date	5.52	0.25	9.77	0.46
Share Female	49.26		48.72	
Shares in Districts				
Dushanbe	6.36		15.27	
Gorno-Badakhshan	4.70		16.69	
RRS	22.74		33.36	
Leninabad	22.89		23.38	
Khatlon	43.21		11.30	
Share Rural	77.65		70.41	
Ethnicity				
Tajik	74.33		81.86	
Uzbek	23.81		16.59	
Russian	0.32		0.20	
Kyrgyz	1.08		1.09	
Other	0.46		0.26	
Sample Size	4,103		7,824	

Note: Calculations based on 1993 and 1998 household surveys.

APPENDIX H

REGRESSION ESTIMATES OF EQUATION [2]

Table 24. Regression Estimates of Equation [2] for 1995 Bulgarian Survey

Number of obs = 1194
F(43, 405) = 1273.66
Prob > F = 0.0000
R-squared = 0.9661
Root MSE = 1.3709
(Std. Err. adjusted for 406 clusters)

Educ	Coef.	Robust Std. Err.	t	P>t	[95% Conf. Interval]
aged7	.6021829	.9195655	0.65	0.513	-1.205535 2.409900
aged8	.8445201	.6768432	1.25	0.213	-.486045 2.175085
aged9	1.350679	.8352821	1.62	0.107	-.291351 2.992709
aged10	2.762103	.8283808	3.33	0.001	1.133640 4.390566
aged11	3.380989	.7155164	4.73	0.000	1.974399 4.787579
aged12	4.305299	1.297255	3.32	0.001	1.755105 6.855494
aged13	4.229731	1.191034	3.55	0.000	1.888351 6.571111
aged14	5.402745	.7813423	6.91	0.000	3.866752 6.938738
aged15	5.426326	.8687354	6.25	0.000	3.718533 7.134120
aged16	6.427854	1.512661	4.25	0.000	3.454207 9.401502
aged17	7.006250	1.067005	6.57	0.000	4.908690 9.103810
aged18	6.583498	.9790272	6.72	0.000	4.658889 8.508108
aged19	9.238935	.6998457	13.20	0.000	7.863151 10.61472
aged20	6.591879	1.020428	6.46	0.000	4.585882 8.597876
age_mth	.0438983	.0119474	3.67	0.000	.0204116 0.067385
int_date	.0902254	.0693741	1.30	0.194	-.0461529 .2266038
female	.2027230	.0778302	2.60	0.010	.0497213 .3557247
ddis2	.0591021	.1658243	0.36	0.722	-.2668817 .3850859
ddis3	.2819720	.2018888	1.40	0.163	-.1149088 .6788528

Educ	Coef.	Robust Std. Err.	t	P>t	[95% Conf. Interval]
ddis4	.1505900	.2136743	0.70	0.481	-.2694593 .5706393
ddis5	.3439081	.1954839	1.76	0.079	-.0403818 .7281980
ddis6	.2199230	.1895877	1.16	0.247	-.1527758 .5926217
ddis7	.0178458	.2264844	0.08	0.937	-.427386 .4630777
ddis8	.1490589	.1825793	0.82	0.415	-.2098625 .5079804
ddis9	-.2335694	.1965367	-1.19	0.235	-.6199289 .1527901
rural	-.0070378	.1485479	-0.05	0.962	-.299059 .2849834
Turkish	-.6833504	.2554021	-2.68	0.008	-1.185430 -.1812711
Roma	-.0236510	.2748482	-3.72	0.000	-1.563958 -.4833435
Other	.3741073	.2597166	1.44	0.151	-.1364537 .8846683
pa_aged7	-.0659475	.055511	-1.19	0.236	-.1750733 .0431782
pa_aged8	-.0063149	.0319778	-0.20	0.844	-.0691781 .0565484
pa_aged9	.0141993	.0442467	0.32	0.748	-.0727826 .1011811
pa_aged10	-.0009737	.0488253	-0.02	0.984	-.0969564 .0950090
pa_aged11	.0189832	.0380752	0.50	0.618	-.0558666 .0938329
pa_aged12	.0451880	.0812146	0.56	0.578	-.1144667 .2048428
pa_aged13	.0979447	.0884871	1.11	0.269	-.0760066 .2718960
pa_aged14	.0933460	.0482375	1.94	0.054	-.0014812 .1881731
pa_aged15	.1697688	.0627468	2.71	0.007	.0464187 .2931189
pa_aged16	.1233005	.1021259	1.21	0.228	-.0774625 .3240634
pa_aged17	.1545024	.0723468	2.14	0.033	.0122802 .2967246
pa_aged18	.2678733	.066373	4.04	0.000	.1373947 .3983520
pa_aged19	.0801800	.0332745	2.41	0.016	.0147676 .1455924
pa_aged20	.2882859	.0646292	4.46	0.000	.1612353 .4153365

Table 25. Regression estimates of equation [2] for 2003 Bulgarian survey

Number of obs = 981
 F(42, 456) = 569.51
 Prob > F = 0.0000
 R-squared = 0.9526
 Root MSE = 1.6353
 (Std. Err. adjusted for 457 clusters)

Educ	Coef.	Robust Std. Err.	t	P>t	[95% Conf. Interval]
aged7	1.771744	.6989939	2.53	0.012	.3980952 3.145393

Educ	Coef.	Robust Std. Err.	t	P>t	[95% Conf. Interval]
aged8	.6593369	.6096011	1.08	0.280	-.538639 1.857313
aged9	1.925982	.4782600	4.03	0.000	.9861149 2.865849
aged10	2.692187	.7405690	3.64	0.000	1.236835 4.147538
aged11	3.861294	.7793649	4.95	0.000	2.329701 5.392886
aged12	3.286568	.6240556	5.27	0.000	2.060186 4.512949
aged13	3.610205	1.029328	3.51	0.000	1.587391 5.63302
aged14	4.956092	.8173445	6.06	0.000	3.349863 6.562321
aged15	6.483792	.9821836	6.60	0.000	4.553625 8.41396
aged16	5.578171	.9856679	5.66	0.000	3.641156 7.515186
aged17	6.223931	.9904291	6.28	0.000	4.277560 8.170303
aged18	5.443364	1.104252	4.93	0.000	3.273311 7.613418
aged19	4.720759	1.159737	4.07	0.000	2.441667 6.999852
aged20	2.670198	1.695639	1.57	0.116	-.6620372 6.002434
age_mth	.069321	.0157618	4.40	0.000	.0383462 .1002959
female	.0844035	.0996616	0.85	0.397	-.1114494 .2802565
ddis2	-.1400948	.2259823	-0.62	0.536	-.5841906 .304001
ddis3	.1796625	.1914817	0.94	0.349	-.1966335 .5559584
ddis4	-.0433038	.1877520	-0.23	0.818	-.4122702 .3256626
ddis5	-.0516559	.3027974	-0.17	0.865	-.6467073 .5433955
ddis6	.0746081	.1905827	0.39	0.696	-.2999213 .4491374
ddis7	-.0013873	.2756471	-0.01	0.996	-.5430834 .5403088
ddis8	.2933649	.1965641	1.49	0.136	-.0929188 .6796487
ddis9	.010940	.206694	0.05	0.958	-.3952509 .4171308
rural	.1592991	.1702075	0.94	0.350	-.1751892 .4937873
Turkish	-.17152	.2731419	-0.63	0.530	-.7082929 .3652529
Roma	-1.126397	.3485743	-3.23	0.001	-1.811409 -.4413863
Other	-.6018317	.3291808	-1.83	0.068	-1.248731 .0450678
pa_aged7	-.1521182	.0537266	-2.83	0.005	-.2577007 -.0465357
pa_aged8	.0050606	.0424302	0.12	0.905	-.0783224 .0884436
pa_aged9	-.0103637	.032693	-0.32	0.751	-.0746113 .0538839
pa_aged10	-.0211036	.0593086	-0.36	0.722	-.1376556 .0954485
pa_aged11	-.0150215	.0574752	-0.26	0.794	-.1279706 .0979277
pa_aged12	.0893857	.0473055	1.89	0.059	-.0035781 .1823496

Educ	Coef.	Robust Std. Err.	t	P>t	[95% Conf. Interval]
pa_aged13	.1423636	.0761329	1.87	0.062	-.0072512 .2919784
pa_aged14	.1328091	.0604393	2.20	0.028	.014035 .2515832
pa_aged15	.1051488	.0740996	1.42	0.157	-.0404703 .2507679
pa_aged16	.2075981	.0707167	2.94	0.003	.068627 .3465692
pa_aged17	.2076663	.0700261	2.97	0.003	.0700525 .3452801
pa_aged18	.377529	.0870014	4.34	0.000	.2065557 .5485024
pa_aged19	.4511941	.0950569	4.75	0.000	.2643901 .6379981
pa_aged20	.680943	.1342508	5.07	0.000	.4171160 .9447700

Table 26. Regression estimates of equation [2] for 1993 Kyrgyz survey

Number of obs = 2719
F(38, 206) = 2808.24
Prob > F = 0.0000
R-squared = 0.9804
Root MSE = 1.0502

(Std. Err. adjusted for 207 clusters in clust)

Educ	Coef.	Robust Std. Err.	t	P>t	[95% Conf. Interval]
aged7	.7692654	.1937481	3.97	0.000	.3872821 1.151249
aged8	.9844214	.2655628	3.71	0.000	.4608518 1.507991
aged9	1.427273	.3278807	4.35	0.000	.780841 2.073705
aged10	3.12023	.4013582	7.77	0.000	2.328934 3.911527
aged11	4.119669	.3374204	12.21	0.000	3.454429 4.784909
aged12	5.174378	.2975271	17.39	0.000	4.58779 5.760967
aged13	5.974201	.3410113	17.52	0.000	5.301882 6.646521
aged14	7.673144	.3099024	24.76	0.000	7.062157 8.284131
aged15	8.081372	.2849047	28.37	0.000	7.519669 8.643075
aged16	8.563368	.3303364	25.92	0.000	7.912094 9.214641
aged17	9.336514	.3215816	29.03	0.000	8.702501 9.970527
aged18	9.67828	.3610215	26.81	0.000	8.966509 10.39005
aged19	9.50649	.4306956	22.07	0.000	8.657353 10.35563
aged20	9.207641	.3792363	24.28	0.000	8.459959 9.955323
female	.0877543	.0418293	2.10	0.037	-.0052859 .1702227

Educ	Coef.	Robust Std. Err.	t	P>t	[95% Conf. Interval]
ddis2	.2895982	.0847523	3.42	0.001	.122505 .4566914
ddis3	-.0859565	.0908865	-0.95	0.345	-.2651435 .0932306
ddis4	.2014378	.1237424	1.63	0.105	-.0425263 .4454018
ddis5	.0928607	.0886263	1.05	0.296	-.0818703 .2675916
ddis6	.1667071	.1605546	1.04	0.300	-.1498337 .483248
rural	.0340198	.0650512	0.52	0.602	-.0942316 .1622713
dethnicity2	.0717132	.08345	0.86	0.391	-.0928123 .2362386
dethnicity3	1.227173	.8797948	1.39	0.165	-.5073833 2.96173
dethnicity4	.0060281	.081730	0.07	0.941	-.1551065 .1671627
pa_aged7	.0177348	.0150064	1.18	0.239	-.011851 .0473207
pa_aged8	.0186383	.0223406	0.83	0.405	-.0254073 .0626839
pa_aged9	.05677	.0266525	2.13	0.034	.0042234 .1093166
pa_aged10	.0213893	.0347482	0.62	0.539	-.0471183 .0898969
pa_aged11	.0245334	.0300358	0.82	0.415	-.0346835 .0837503
pa_aged12	.0285626	.0252009	1.13	0.258	-.0211221 .0782474
pa_aged13	.0481242	.0305565	1.57	0.117	-.0121195 .1083678
pa_aged14	-.0054841	.025544	-0.21	0.830	-.0558454 .0448771
pa_aged15	.0506512	.0237208	2.14	0.034	.0038845 .0974179
pa_aged16	.0819976	.0312976	2.62	0.009	.0202928 .1437023
pa_aged17	.0840914	.0279054	3.01	0.003	.0290745 .1391083
pa_aged18	.1092094	.0350323	3.12	0.002	.0401416 .1782772
pa_aged19	.1108439	.0410821	2.70	0.008	.0298486 .1918391
pa_aged20	.1680946	.0384599	4.37	0.000	.0922691 .24392

Table 27. Regression estimates of equation [2] for 1998 Kyrgyz survey

Number of obs = 4750
 F(38, 223) = 2728.04
 Prob > F = 0.0000
 R-squared = 0.9734
 Root MSE = 1.1896
 (Std. Err. adjusted for 224 clusters)

Educ	Coef.	Robust Std. Err.	t	P>t	[95% Conf. Interval]
aged7	.5576037	.5783875	0.96	0.336	-.5822008 1.697408
aged8	1.247276	.247815	5.03	0.000	.7589171 1.735635

Educ	Coef.	Robust Std. Err.	t	P>t	[95% Conf. Interval]
aged9	1.759642	.2770274	6.35	0.000	1.213715 2.305569
aged10	3.057233	.2867929	10.66	0.000	2.492062 3.622404
aged11	3.471964	.2832705	12.26	0.000	2.913735 4.030194
aged12	4.485122	.3752183	11.95	0.000	3.745694 5.224549
aged13	5.904983	.3177814	18.58	0.000	5.278744 6.531221
aged14	6.866293	.4118384	16.67	0.000	6.0547 7.677886
aged15	7.808256	.5490509	14.22	0.000	6.726264 8.890248
aged16	8.973593	.3064778	29.28	0.000	8.369629 9.577556
aged17	9.994356	.3486545	28.67	0.000	9.307277 10.68143
aged18	8.985968	.5969079	15.05	0.000	7.809667 10.16227
aged19	9.707217	.4140351	23.45	0.000	8.891295 10.52314
aged20	8.784885	.58965	14.90	0.000	7.622886 9.946884
female	.0529535	.0325321	1.63	0.105	-.0111563 .1170633
ddis2	.0349679	.0883348	0.40	0.693	-.13911 .2090457
ddis3	.1076343	.1021039	1.05	0.293	-.0935775 .3088462
ddis4	-.1472394	.08802	-1.67	0.096	-.3206968 .026218
ddis5	.1251789	.0838602	1.49	0.137	-.0400809 .2904387
ddis6	-.1823883	.10048	-1.82	0.071	-.3804001 .0156235
rural	-.1236433	.0596797	-2.07	0.039	-.2412516 -.0060349
dethnicity2	.0449786	.0874684	0.51	0.608	-.1273917 .217349
dethnicity3	.0097494	.2273016	0.04	0.966	-.4381845 .4576833
dethnicity4	-.1581896	.0810367	-1.95	0.052	-.3178853 .001506
pa_aged7	-.0011066	.0498774	-0.02	0.982	-.099398 .0971848
pa_aged8	.0107979	.0194733	0.55	0.580	-.0275774 .0491732
pa_aged9	.0448783	.0231107	1.94	0.053	-.000665 .0904217
pa_aged10	.0180164	.0244013	0.74	0.461	-.0300702 .066103
pa_aged11	.0638263	.022948	2.78	0.006	.0186037 .1090489
pa_aged12	.0613528	.0315963	1.94	0.053	-.0009128 .1236184
pa_aged13	.0308562	.0255869	1.21	0.229	-.0195669 .0812793
pa_aged14	.0484753	.0339998	1.43	0.155	-.0185267 .1154773
pa_aged15	.0691123	.0453604	1.52	0.129	-.0202776 .1585022
pa_aged16	.0444664	.0234507	1.90	0.059	-.0017469 .0906797
pa_aged17	.0372315	.0304572	1.22	0.223	-.0227892 .0972523

Educ	Coef.	Robust Std. Err.	t	P>t	[95% Conf. Interval]
pa_aged18	.1593094	.0511888	3.11	0.002	.0584338 .260185
pa_aged19	.1041339	.0371669	2.80	0.006	.0308907 .1773772
pa_aged20	.194924	.0508295	3.83	0.000	.0947565 .2950916

Table 28. Regression estimates of equation [2] for 1999 Tajikistan survey

Number of obs = 3792

F(34, 124) = 2319.90

Prob > F = 0.0000

R-squared = 0.9688

Root MSE = 1.2069

(Std. Err. adjusted for 125 clusters)

Educ	Coef.	Robust Std. Err.	t	P>t	[95% Conf. Interval]
aged7	-.6142182	.8232437	-0.75	0.457	-2.243648 1.015212
aged8	.1823109	.7852183	0.23	0.817	-1.371856 1.736478
aged9	.4044412	.8150115	0.50	0.621	-1.208695 2.017577
aged10	1.301202	.8804891	1.48	0.142	-.4415324 3.043937
aged11	2.022153	.8636545	2.34	0.021	.3127383 3.731567
aged12	3.536742	.7861915	4.50	0.000	1.980649 5.092836
aged13	3.69613	.9901122	3.73	0.000	1.736421 5.65584
aged14	5.368762	.8313004	6.46	0.000	3.723386 7.014139
aged15	5.928788	.927074	6.40	0.000	4.093848 7.763727
aged16	6.613916	.8983343	7.36	0.000	4.83586 8.391971
aged17	7.986931	.8815151	9.06	0.000	6.242166 9.731697
aged18	7.912694	.9828683	8.05	0.000	5.967323 9.858066
aged19	8.776938	.8435063	10.41	0.000	7.107403 10.44647
aged20	8.776799	.90072	9.74	0.000	6.994022 10.55958
age_mth	.0601261	.0060611	9.92	0.000	.0481294 .0721228
int_date	.0398483	.1398648	0.28	0.776	-.2369834 .31668
female	-.1644514	.0461659	-3.56	0.001	-.2558268 -.0730761
ddis2	.0701068	.1591162	0.44	0.660	-.2448288 .3850424
ddis3	.1429246	.1588165	0.90	0.370	-.1714179 .457267
ddis4	.5040294	.1438131	3.50	0.001	.2193829 .7886758
ddis5	.0520706	.1353619	0.38	0.701	-.2158485 .3199898
rural	.0968536	.0863177	1.12	0.264	-.0739933 .2677005

Educ	Coef.	Robust Std. Err.	t	P>t	[95% Conf. Interval]
Uzbek	.0595624	.0529649	1.12	0.263	-.04527 .1643949
Russian	.4354974	.3302666	1.32	0.190	-.2181927 1.089187
Kyrgyz	-.3118311	.1097526	-2.84	0.005	-.5290621 -.0946
Other ethnicity	.0208169	.4122301	0.05	0.960	-.795102 .8367358
pa_aged7	.0411072	.0136122	3.02	0.003	.0141648 .0680496
pa_aged8	.0332276	.0150483	2.21	0.029	.0034429 .0630124
pa_aged9	.0804391	.0276054	2.91	0.004	.0258002 .135078
pa_aged10	.0910474	.025911	3.51	0.001	.0397622 .1423325
pa_aged11	.1024883	.0307875	3.33	0.001	.0415513 .1634253
pa_aged12	.0586074	.0235092	2.49	0.014	.012076 .1051387
pa_aged13	.1338042	.0429856	3.11	0.002	.0487236 .2188849
pa_aged14	.0925544	.031118	2.97	0.004	.0309632 .1541456
pa_aged15	.1014405	.0318871	3.18	0.002	.038327 .1645541
pa_aged16	.1305472	.0353342	3.69	0.000	.060611 .2004835
pa_aged17	.0600428	.0275247	2.18	0.031	.0055636 .1145219
pa_aged18	.1181497	.0498029	2.37	0.019	.0195757 .2167237
pa_aged19	.0666212	.0321947	2.07	0.041	.0028988 .1303436
pa_aged20	.0576342	.0367743	1.57	0.120	-.0151524 .1304208

Table 29. Regression estimates of equation [2] for 2007 Tajikistan survey

Number of obs = 7,423

F(32, 269) = 3181.33

Prob > F = 0.0000

R-squared = 0.9543

Root MSE = 1.5738

(Std. Err. adjusted for 270 clusters)

Educ	Coef.	Robust Std. Err.	t	P>t	[95% Conf. Interval]
aged7	.4494014	.3559554	1.26	0.208	-.2514115 1.150214
aged8	1.494642	.1907263	7.84	0.000	1.119136 1.870148
aged9	1.80995	.234815	7.71	0.000	1.347641 2.272258
aged10	3.040236	.2906971	10.46	0.000	2.467905 3.612566
aged11	4.156066	.2259926	18.39	0.000	3.711127 4.601005
aged12	4.493134	.3138004	14.32	0.000	3.875317 5.110951
aged13	5.352015	.2735505	19.56	0.000	4.813443 5.890588

Educ	Coef.	Robust Std. Err.	t	P>t	[95% Conf. Interval]
aged14	6.736325	.3190066	21.12	0.000	6.108258 7.364392
aged15	7.565399	.4309295	17.56	0.000	6.716976 8.413823
aged16	8.001883	.3246133	24.65	0.000	7.362777 8.640988
aged17	8.292827	.4475402	18.53	0.000	7.4117 9.173954
aged18	8.498511	.5342455	15.91	0.000	7.446676 9.550345
aged19	7.426148	.7386771	10.05	0.000	5.971824 8.880471
aged20	7.152123	.6027813	11.87	0.000	5.965354 8.338892
female	-.3405614	.0544551	-6.25	0.000	-.4477739 -.233349
ddis2	-.0008847	.1057469	-0.01	0.993	-.2090816 .2073122
ddis3	-.039612	.1071497	-0.37	0.712	-.2505708 .1713467
ddis4	-.0814991	.1162836	-0.70	0.484	-.3104407 .1474426
ddis5	.1856153	.1177729	1.58	0.116	-.0462586 .4174891
rural	-.0742216	.0783928	-0.95	0.345	-.228563 .0801199
Uzbek	.0702219	.0800912	0.88	0.381	-.0874635 .2279073
Russian	1.088962	.2677119	4.07	0.000	.5618849 1.616039
Kyrgyz	-.0636576	.1706063	-0.37	0.709	-.399551 .2722358
Other ethnicity	-3.268661	1.605152	-2.04	0.043	-6.42892 -.1084017
pa_aged7	.0091213	.0304294	0.30	0.765	-.0507889 .0690314
pa_aged8	.0021303	.0138431	0.15	0.878	-.0251242 .0293848
pa_aged9	.0517855	.0192375	2.69	0.008	.0139102 .0896607
pa_aged10	.0391214	.0237803	1.65	0.101	-.0076978 .0859405
pa_aged11	.0141272	.0170752	0.83	0.409	-.0194908 .0477452
pa_aged12	.0605717	.0259119	2.34	0.020	.0095557 .1115876
pa_aged13	.0642069	.0223234	2.88	0.004	.020256 .1081578
pa_aged14	.0653149	.0263015	2.48	0.014	.0135319 .1170978
pa_aged15	.0463511	.0387081	1.20	0.232	-.0298582 .1225604
pa_aged16	.0897198	.0259358	3.46	0.001	.0386569 .1407828
pa_aged17	.1276064	.037741	3.38	0.001	.053301 .2019118
pa_aged18	.1393975	.0463503	3.01	0.003	.0481421 .230653
pa_aged19	.2408359	.0635925	3.79	0.000	.1156336 .3660382
pa_aged20	.2850068	.0488038	5.84	0.000	.1889208 .3810928

APPENDIX I

QUANTILE REGRESSION RESULTS WITH CONTROL VARIABLES

Table 30. Quantile Regression Results with Control Variables (1995)

	(1) Quant. 5	(2) Quant. 10	(3) Quant. 50	(4) Quant. 90	(5) Quant. 95
Educ	0.052 (0.010)**	0.059 (0.008)**	0.053 (0.005)**	0.056 (0.007)**	0.063 (0.012)**
Exp	0.026 (0.009)**	0.020 (0.007)**	0.019 (0.004)**	0.012 (0.006)*	0.008 (0.009)
Exp ²	-0.00045 (0.00020)*	-0.00040 (0.00014)**	-0.00038 (0.00009)**	-0.00019 (0.00014)	-0.00009 (0.00020)
Parttime	-0.13 (0.09)	-0.10 (0.07)	-0.05 (0.05)	0.10 (0.06)	0.14 (0.10)
Female	-0.10 (0.05)*	-0.19 (0.04)**	-0.33 (0.02)**	-0.32 (0.03)**	-0.32 (0.06)**
Rural	-0.06 (0.07)	-0.04 (0.05)	-0.09 (0.03)**	-0.14 (0.04)**	-0.06 (0.07)
Turkish	-0.04 (0.11)	-0.02 (0.08)	-0.09 (0.06)	-0.01 (0.07)	-0.12 (0.11)
Roma	0.03 (0.14)	0.00 (0.12)	0.01 (0.09)	-0.06 (0.11)	-0.17 (0.16)
Other	0.31 (0.08)**	0.12 (0.08)	0.21 (0.16)	0.48 (0.07)**	0.30 (0.09)**
Const.	6.95 (0.17)**	7.18 (0.13)**	7.82 (0.08)**	8.29 (0.11)**	8.41 (0.18)**
Obs.	1653	1653	1653	1653	1653

Note: Standard errors in parentheses

* significant at 5%; ** significant at 1%

Table 31. Quantile Regression Results with Control Variables (2003)

	(1) Quant. 5	(2) Quant. 10	(3) Quant. 50	(4) Quant. 90	(5) Quant. 95
Educ	0.042 (0.004)**	0.055 (0.003)**	0.070 (0.005)**	0.071 (0.007)**	0.067 (0.010)**

	(1)	(2)	(3)	(4)	(5)
	Quant. 5	Quant. 10	Quant. 50	Quant. 90	Quant. 95
Exp	0.023 (0.004)**	0.016 (0.003)**	0.025 (0.004)**	0.016 (0.005)**	0.019 (0.008)*
Exp ²	-0.00049 (0.00009)**	-0.00028 (0.00007)**	-0.00047 (0.00008)**	-0.00026 (0.00011)*	-0.00032 (0.00017)
Parttime	-0.35 (0.07)**	-0.23 (0.05)**	-0.05 (0.07)	0.02 (0.09)	-0.09 (0.13)
Female	-0.05 (0.02)*	-0.06 (0.02)**	-0.25 (0.02)**	-0.30 (0.03)**	-0.33 (0.05)**
Rural	-0.01 (0.03)	-0.06 (0.03)*	-0.10 (0.03)**	-0.16 (0.04)**	-0.22 (0.06)**
Turkish	-0.10 (0.05)*	-0.05 (0.04)	-0.08 (0.05)	-0.21 (0.07)**	-0.21 (0.10)*
Roma	-0.74 (0.07)**	-0.31 (0.06)**	-0.16 (0.07)*	-0.19 (0.09)*	-0.29 (0.13)*
Other	-0.70 (0.07)**	0.02 (0.07)	-0.02 (0.09)	-0.15 (0.11)	0.05 (0.13)
Const.	3.98 (0.06)**	3.97 (0.05)**	4.31 (0.07)**	5.00 (0.10)**	5.19 (0.15)**
Obs.	2327	2327	2327	2327	2327

Note: Standard errors in parentheses

* significant at 5%; ** significant at 1%

APPENDIX J

FIELDWORK MATERIALS

Household Questionnaire

NAME OF COMMUNITY
NAME OF INTERVIEWER.....
NAME OF TRANSLATOR
DATE OF INTERVIEW
TIME OF INTERVIEW
PLACE OF INTERVIEW
RURAL/URBAN:

Id Code	1. Relationship to Head of Household	2. Sex	3. Age in Years	4. Place of Birth	5. Ethnicity	6. Languages Spoken	7. How many years of pre-schooling did you have?	8. Are you currently enrolled? YES.....1 NO2
1								
..								
..								
10								

Id Code	9. What is the highest level of education received?	10. Why did [name] discontinue her/his studies?	11. How was [name] performance at school? Was he/she held back? Any disciplinary problems?	12. What was the ethnic mix at school? Any language issues?	13. How did [name] get to school?	14. Is there a bus service available?	15. How far is it?
	PRESCHOOL 20 ELEMENTARY 1 YEAR..... 31 ELEMENTARY 2 YEAR..... 32 ELEMENTARY 3 YEAR..... 33 ELEMENTARY 4 YEAR..... 34 MIDDLE SCHOOL 1 YEAR 41 MIDDLE SCHOOL 2 YEAR 42 MIDDLE SCHOOL 3 YEAR 43 MIDDLE SCHOOL 4 YEAR 44 SECONDARY EDUCATION (GENERAL) 1 YEAR..... 51 SECONDARY EDUCATION (GENERAL) 2 YEAR..... 52 SECONDARY EDUCATION (GENERAL) 3 YEAR..... 53 SECONDARY EDUCATION (TECHNICAL) 1 YEAR.... 61 SECONDARY EDUCATION (TECHNICAL) 2 YEAR.... 62 SECONDARY EDUCATION (TECHNICAL) 3 YEAR.... 63 SECONDARY EDUCATION (TECHNICAL) 4 YEAR.... 64 SECONDARY EDUCATION (TECHNICAL) 5 YEAR.... 65 SECONDARY EDUCATION (VOCATIONAL) 1 YEAR 71 SECONDARY EDUCATION (VOCATIONAL) 2 YEAR 72 SECONDARY EDUCATION (VOCATIONAL) 3 YEAR 73 SECONDARY EDUCATION (VOCATIONAL) 4 YEAR 74 SECONDARY EDUCATION (VOCATIONAL) 5 YEAR 75 UNIVERSITY 1 YEAR..... 81 UNIVERSITY 2 YEAR..... 82 UNIVERSITY 3 YEAR..... 83 UNIVERSITY 4 YEAR..... 84 UNIVERSITY 5 YEAR..... 85 UNIVERSITY MORE THAN 5 YEARS 86						
1							
..							
..							
10							

Information on Parents				
Id Code	16. Mother's Education <i>Please use codes from Question 7</i>	17. Father's Education <i>Please use codes from Question 7</i>	18. Mother's Occupation	19. Father's occupation
1				
..				
..				
10				

20. What level of schooling do you think most of your children will achieve?

21. How far (in km) is the closest from your house?

- a. pre-school
- b. elementary
- c. middle
- d. secondary
- e. university

22. What are the major school problems in this community from the point of view of the people?

23. How has things changed in education since 1989?

24. How has decentralization of education (shifting the financial responsibility to municipalities) affected the schools in your area?

25. Do you think your children will have better opportunities if they have more education?

26. Do you want the same education for all your kids? Who has a greater need for education? Why?

Focus Group Discussion: Households

Name of the community: _____

City (if urban): _____

District (if rural): _____

Date of focus group: _____

Facilitator: _____

Note Taker: _____

Translator: _____

Focus Group Members	
Name	Age
Total # _____	

1. What are the main languages spoken in this village/neighborhood? BULGAR 1 ROMAN 2 TURKISH 3 RUSSIAN 4 OTHER (PLEASE SPECIFY) 5	2. What percentage of people consider this their primary language? 0-10% 1 10-20% 2 20-30% 3 30-40% 4 40-50% 5 50-60% 6 60-70% 7 70-80% 8 80-90% 9 90-100% 10	3. What are the main ethnic groups in this community? BULGAR 1 ROMAN 2 TURKISH 3 RUSSIAN 4 OTHER 4	4. What percentage of people belong to this ethnic group? 0-10% 1 10-20% 2 20-30% 3 30-40% 4 40-50% 5 50-60% 6 60-70% 7 70-80% 8 80-90% 9 90-100% 10

1. How do students from ethnic groups manage to stay ahead?
2. What role does ethnicity play in the educational achievement of these children?
3. Are there any traditions or customs that may affect your kids' school life?
4. Do students feel any discrimination or hostility because of their ethnicity at school?
5. What are the major school problems in this community from the point of view of the people?
6. What impact did transition have on education?
7. How has decentralization of education (shifting the financial responsibility to municipalities) affected the schools in your area?
8. Do you think more education means more opportunities?
9. Do local authorities/ministry of Education give any incentive (social benefits etc) to make kids attend school?

Focus Group Discussion: Students

Name of the community: _____

City (if urban): _____

District (if rural): _____

Date of focus group: _____

Facilitator: _____

Note Taker: _____

Translator: _____

[illegible]

1. Are you currently enrolled in school? If not, why?
2. Do you like studying and learning new things? Why?
3. Do you think more education will give you more opportunities in the future?
4. What are the major problems in your school? How do you think this can be resolved?
5. How do teachers treat students? Do they have favorites?
6. How do young people get more education in your neighborhood? Is it common?
7. What do you want to become when they grow up? What is the greatest obstacle in achieving this?
8. Do they have a role model in the society? Why?

Focus Group Discussion: Teachers

Name of the community: _____

City (if urban): _____

District (if rural): _____

Date of focus group: _____

Facilitator: _____

Note Taker: _____

Translator: _____

Focus Group Members	
Name	Age
Total # _____	

1. What are the main languages spoken in this village/neighborhood? BULGAR 1 ROMAN 2 TURKISH 3 RUSSIAN 4 OTHER (PLEASE SPECIFY)5	2. What percentage of people consider this their primary language? 0-10%1 10-20%2 20-30%3 30-40%4 40-50%5 50-60%6 60-70%7 70-80%8 80-90%9 90-100%10	3. What are the main ethnic groups in this community? BULGAR 1 ROMAN 2 TURKISH 3 RUSSIAN 4 OTHER 4	4. What percentage of people belong to this ethnic group? 0-10% 1 10-20% 2 20-30% 3 30-40% 4 40-50% 5 50-60% 6 60-70% 7 70-80% 8 80-90% 9 90-100% 10

1. How do students from ethnic groups manage to stay ahead?
2. What role does ethnicity play in the educational achievement of these children?
3. Are there any traditions or customs that may affect your school life?
4. Do students feel any discrimination or hostility because of their ethnicity at school?
5. What are the major school problems in this community from the point of view of the people?
6. What impact did transition have on education?
7. How has decentralization of education (shifting the financial responsibility to municipalities) affected the schools in your area?
8. Do you think more education means more opportunities?
9. Do local authorities/ministry of Education give any incentive (social benefits etc) to make kids attend school?

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