Post-socialist transition and intergenerational educational mobility in Kyrgyzstan[1]

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Abstract

We investigate long-term trends in intergenerational educational mobility in a lower middle-income transition economy. We draw on evidence from Kyrgyzstan using data from three household surveys collected in 1993, 1998 and 2011. We find that Kyrgyzstan, like Eastern European middle-income transition economies, maintained high educational mobility, comparable to levels during the Soviet era. However, we find that the younger cohorts, exposed to the transition during their school years, experienced a rapid decline in educational mobility. We also document that gender differences in schooling and educational mobility, found among older-aged individuals, disappeared in the younger cohorts.

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1. Introduction

The collapse of economic output in the transition countries of Eastern Europe and the former Soviet Union markedly increased poverty and inequality. With the distribution of incomes straying far from the egalitarian standards of socialist times (Milanovic, 1999; Milanovic and Ersado, 2008, World Bank 2000b), maintaining equality of opportunities, including education, is of increasing concern to policymakers (Micklewright, 1999; UNDP 2011). Because inequality in income and opportunity tends to transfer across generations (Andrews and Leigh, 2009; Blanden, 2013; Ermisch *et al.*, 2012), the association of socio-economic status across generations strengthened recently in many transition countries.

However, these findings are mainly based on studies of middle-income post-socialist countries in Europe, such as Bulgaria, Poland and the Baltic countries, which recovered relatively quickly from the economic decline of the early transition period and made substantial development progress during the later phases of transition. In contrast, there is little research on intergenerational mobility in low and lower middle-income transition countries. Because these countries experienced relatively higher rates of poverty during the early transition, intergenerational links could have strengthened more than in the middle-income transition countries. However, the literature to date has not investigated this topic.

We address this knowledge gap by investigating the effect of the transition on intergenerational educational mobility in Kyrgyzstan, a low to lower middle-income country in Central Asia.[2] We pose three questions in the paper: (1) what is the magnitude of educational intergenerational mobility in Kyrgyzstan; (2) how has the transition affected educational mobility; and (3) is there a gender gap in educational mobility? Given the absence of long-term longitudinal studies in Central Asia (Brück *et al.*, 2014), we use three cross-sectional household surveys, collected in Kyrgyzstan in 1993, 1998 and 2011, to approximate for early, mid, and late transition periods, respectively. Using the years of schooling of respondents (aged 20–69) and of their parents, we calculate regression and correlation coefficients to infer the dynamics of educational mobility. For the transition effect, we conduct the same analysis for individuals aged 25–34. Gender analysis is conducted by investigating intergenerational developments separately for men and women.

We find that overall Kyrgyzstan maintained strong educational mobility, comparable to levels during the Soviet era. We argue that the expansion of tertiary educational institutions between 1993 and 2004 is a reason for this high mobility. However, consistent with similar studies based on countries in Eastern Europe, we also find a sharp increase in the educational association between parents and children in the 2011 data for the population aged 25–34, the generation for whom schooling and employment experience was most affected by the transition. This

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[2] Kyrgyzstan gained lower middle-income status in 2014 (World Bank, 2014).

indicates that higher parental socio-economic status may play a more prominent role in children's post-secondary education enrolment, while children of less educated parents realized fewer educational opportunities. Finally, the gender differences in our estimates tend to vanish over time. We relate this to the maintenance of gender parity in schooling in Kyrgyzstan since the end of socialism.

While our study cannot identify causality, we make three contributions to the literature. First, we provide evidence on the effect of the whole cycle of transition (early, middle, late) on intergenerational mobility. Second, ours is the first detailed study to explore intergenerational mobility in a low to lower middle-income transition country. Third, we analyze the gender dimension of intergenerational educational mobility.

The paper is structured as follows. The next section discusses the developments in intergenerational mobility in post-socialist countries. Section 3 provides historic context, describing Soviet educational equality policies and the recent expansion of tertiary education. Section 4 presents the data. The methodology is summarized in Section 5 while Section 6 presents our findings. Section 7 discusses their interpretations and implications.

2. Intergenerational mobility before and during the transition

Intergenerational mobility studies – which investigate the extent that the socioeconomic status of a young generation is associated with their parental background – are important from policy perspective. A higher association between the achievements of children and their parents triggers a discussion of whether policy should be adjusted to equalize opportunities within a society. In this respect, post-socialist countries represent a fascinating case of societies that had achieved a high level of equality but, following their transition to a market system, saw this inheritance erode.

At the onset of transition, the socialist countries were considered relatively egalitarian and mobile societies in international comparison (Atkinson and Micklewright, 1992; Titma and Saar, 1995; Titma *et al.*, 2003). Driven by policies and interventions, equalization during the socialist era covered many areas of life, be it equality in incomes or access to public services, such as healthcare and education (Hanley and McKeever, 1997). Most prominent were efforts to achieve equalization in education, promoted through a universal literacy policy, and – in the times of mature socialism – by reverse discrimination. These policies and institutional settings weaken the 'parent-child' association in educational attainment, thus promoting educational mobility.

The policy of universal literacy, implemented by providing education that was both free and compulsory, markedly increased educational achievements in the Soviet Union. The literacy campaign started in the Soviet Union in the early 1930s (Smith, 1997). Prior to World War II, the Soviet Union provided seven years of

compulsory schooling; by the 1960s eight years of compulsory schooling was standard. By 1970 around a half of the Soviet Union's population, aged 10 years and older, had a basic or higher level of education (Simirenko, 1972). This policy was especially beneficial to the Central Asian countries that had low levels of educational achievements before becoming part of the Soviet Union.

The policy of reverse discrimination – promoting children from lower classes into higher education using quotas and other incentives – was another factor that supported equalization of post-secondary schooling attainment (Ganzeboom and Nieuwbeerta, 1999). Although the equalization policy also promoted upward educational mobility in the socialist countries, its effectiveness varied from country to country.

Confirming the aims of the socialist system to equalize human capital, one strand of literature finds high educational and social mobility during the socialism period. Titma and Saar (1995) conclude that real equalization of educational opportunities was achieved in the Soviet Union during the last years of its existence, but that regional differences existed in the availability of secondary education schools. Titma *et al.* (2003) find relatively high occupational intergenerational mobility in the European part of the Soviet Union during the last years of its existence. They claim that the Soviet society, in its final years, was relatively open with a low level of social reproduction. Verashchagina (2012) reports increased educational mobility in her study of 12 transition economies in former Soviet Union and Eastern European countries. However, intergenerational mobility was somewhat lower for younger age cohorts.

Another strand of literature challenges the equalizing efforts of the socialist system by pointing to the important role of parental background. A study of the three Baltic countries by Hazans *et al.* (2008) finds that parental education is an important factor in the propensity to earn a university degree both during the Soviet era and the subsequent transition period. Concordant with this line of literature, Gerber and Hout (2004) look at occupational mobility in Russia before and after the Soviet era. They argue that occupational positions did indeed depend on class origins, even in the Soviet times, and that the political and economic transition intensified the 'child-parent' association.

With the transition, most empirical literature tends to find a decline in intergenerational mobility. This decline seems to be affected by both economic and structural changes. The early transition hurdles, such as deterioration in income, increase in economic inequality, and decline in public expenditures were claimed to be harmful for educational mobility. However, the role of structural reforms that encourage more schooling – such as liberalization and expansion of post-secondary educational institutions as well as reforming the educational systems to meet the needs of transformed labour markets – is not as well covered in the literature. The paper by Fan *et al.* (1999) argues that a timely restructuring of the educational system in a transition economy – to meet labour market needs – is extremely important in order to preserve the stock of human capital, thus ensuring educational continuity between generations. Spagat (2006) develops this concept further, arguing that if policy fails

to align the educational system with labour markets, then the stock of human capital in transition countries will deteriorate and become more similar to what is found in non-transition developing countries. Silova *et al.* (2007) argues that Central Asian countries have already experienced deterioration in the publicly funded educational system, thus becoming less effective and less fair.

The early transition years saw a devastating effect on income in a number of transition countries, resulting in high poverty and inequality (Atkinson and Micklewright, 1992; Brück *et al.*, 2010; Milanovic, 1999). Decline of income might have forced poor families to reduce investments in the education of their children, especially at the tertiary level (World Bank, 2000a). This assumption is found to be true by Gerber (2000), who documents a growing educational stratification in Russia due to declining enrolment in tertiary education of children of parents with lower educational background. Compared to children of more educated parents, a higher share of young people with poorer backgrounds opt to enter the labour market earlier due to the worsening living standards and economic hardship associated with the transition.

As lower educational achievement is usually associated with a higher level of poverty, polarization of incomes in transition countries may lead to a widening educational gap over generations. A multi-country study by Andrews and Leigh (2009) finds a negative link between inequality and intergenerational mobility: individuals in countries with higher levels of income inequality experienced less mobility.

One way to mitigate the economic and social exclusion of poor households is to provide social support. However, during the early transition years, in most countries the public expenditures for social support and public schools declined. This typically affected the worse-off households that previously benefited from free schooling. For example, Hertz *et al.* (2009) document that a strong decline in education expenditures in Bulgaria led to lower enrolment rates for children of less-educated parents. In Kyrgyzstan, children with parents of lower social status are already in a disadvantageous position in Kyrgyzstan as evidenced in Tiwari and Mitra (2012).

Liberalization of the educational system in the transition context may drive educational mobility in both directions. The tertiary educational system expanded as regulations were relaxed and the previous regiment of state planning faded. This process is a mechanism that positively affects intergenerational educational mobility as more students can pursue post-secondary studies. However, as new educational institutions are primarily financed by tuition fees, it may reduce opportunities for children from poorer households. This argument, however, does not seem to have played out in practice so far. Tertiary enrolment has grown quite rapidly in those post-socialist countries that have made progress with more reforms (World Bank, 2000a).

3. Transition and education in Kyrgyzstan

After the dissolution of the Soviet Union, Kyrgyzstan experienced a dramatic decline in national output and living standards. Despite having recovered economic

Table 1. Kyrgyz Republic: Economic growth, inequality and education

Average per period	1988–1989	1990–1994	1995–1999	2000–2004	2005–2009	2010–2014
Real GDP *per capita*, 1989 = 100	100	80	56	66	78	89
GNI *per capita* (Atlas method), USD	. . .	447	360	318	636	1050
GINI index, World Bank estimates, %	26.0	53.7	46.4	31.0	33.0	28.2
Gross secondary school enrolment, %	103.6*	97.1	82.4	86.4	86.0	87.9
Gross tertiary school enrolment, %	28.1	24.1	24.9	39.8	43.9	44.0
Public spending on education, % of GDP	. . .	5.6	5.0	4.2	5.8	6.5

Note: *Gross enrolment may be higher than 100 percent. If the secondary grades include students who are younger or older than an official age group (e.g., grade repetition students), it may lead to a somewhat larger number than 100 percent.

Source: World Bank, World Development Indicators (downloaded in April 2017 at http://databank.worldbank.org/data/reports.aspx?source=world-development-indicators).

growth since the mid-1990s, the country remained a low-income economy until 2014, with a third of the population classified as poor (Table 1). Likewise, during the early years of transition, Kyrgyzstan experienced a sharp – more than double – rise in inequality, associated largely with the early transformational consequences, such as wage arrears and erosion of social safety nets (Mitra and Yemtsov, 2006). Once economic growth resumed, inequality returned to a relatively low level by international standards.

Educational attainment in Kyrgyzstan in the second half of the 20th century progressed markedly, thanks to the Soviet Union's universal schooling policy and investments. The literacy rate in Kyrgyzstan increased from 15 percent in 1926 (Lorimer, 1946) to nearly 100 percent at the time of the Soviet Union's collapse as during the Soviet era education was free at all levels, including higher education (Mertaugh, 2004). However, access to university education was largely restricted to about one-fifth of secondary school graduates in accordance with the planning nature of the Soviet system (Karklins, 1984).

The structure of the educational system in Kyrgyzstan has largely remained unchanged during the transition. The secondary school system is based on 4-5-2 year scheme. The first, primary level, up to 4th grade, is attended by children aged 7–10. The next level, basic education, lasts through grade 9, which is the minimum compulsory school level.[3] After 9th grade, students have a choice to continue

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[3] Compulsory secondary schooling was reduced from 11 to 9 years in 2003 in order to ease pressure on public expenditures. It seems that few opted to discontinue studying after the basic level (illustrated in Table 1), driven, probably, by a wider choice of and easier access to tertiary institutions.

studying at vocational institutions, or to stay for two more years in secondary school in order to qualify for enrolment in universities.[4]

Unlike other transition countries, the Kyrgyz government maintained its pre-transition share of public spending on education (World Bank, 2004). This prevented closure of schools and a decline in enrolment, except for pre-school institutions, which dramatically declined in numbers (Anderson and Heyneman, 2005; Falkingham, 2005; Mogilevsky, 2011). However, public expenses on education mainly covered wages of teachers, while other important components of learning, such as textbooks, school infrastructure and teacher training, were underfinanced (Mertaugh, 2004). These factors, along with a shortage of teachers of important subjects, are thought to be the main causes of deterioration in the quality of education.[5]

Despite the perceived decline in the quality of education, enrolment rates at the tertiary level doubled in 20 years after 1991, driven mainly by expanded private universities (Table A2). The deregulation of the tertiary education system led to an increased number of private universities, and, correspondingly, students. There were 33 public and 23 private universities in Kyrgyzstan in 2010 – compared to only nine in the Soviet era (NSC and UNICEF, 2014). As a result, gross enrolments in higher education institutions increased from 10 percent of the corresponding age cohort in the beginning of the 1990s to approximately 48 percent in mid-2000s (OECD, 2010b, p. 313). This process resulted in the child-parent schooling gap in Kyrgyzstan – which was converging during socialist times – widening during the transition years. Overall, the share of university educated in the adult population increased from 11 percent in 1990 to 16 percent in 2009 (NSC, 2009b).

This high level of university enrolment seems to be driven by aspirations for a higher social status and expectations of a greater earnings return from education (Roberts *et al.*, 2009). Yet, a university diploma is not the guarantee of employment, as there is clearly an excess supply of university graduates in the labour market (DeYoung, 2011) with skills that do not meet the needs of the prospective employers (World Bank, 2012). Given this mismatch, the youth unemployment rate is the highest in the Kyrgyz labour market (NSC, 2009a, 2012).

Examining intergenerational mobility using educational attainments, but not income or other economic status, is justified for at least two reasons. First, in the context of a low-income transition economy, the data on earnings and income are not reliable for either children or parental generations. Second, there are no panel data long enough to measure the socioeconomic status of both children and parents at similar productive ages, thus imposing the utilization of recall information. In this respect, educational attainment is a more robust measure of a socioeconomic status that is not prone to large measurement and recall errors. At the same time,

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[4] However, the vocational track allows entering university after completion of vocational study.
[5] For illustration, 15-year-old students from Kyrgyzstan performed worst out of 65 participating countries on the OECD PISA test conducted in 2009 (OECD, 2010a).

educational mobility highly correlates with income mobility (Holmlund *et al.*, 2011; Solon, 2004) and the results may be suggestive of developments in economic mobility.

4. Data

In this paper, we use information on educational attainment of individuals and of their parents from three household surveys. These surveys, collected in 1993, 1998 and 2011, are well positioned to trace the dynamics of educational mobility during the two decades of Kyrgyzstan's transition. First, the 1993 data are the earliest source that approximately represents the demographic structure and educational attainments achieved during the Soviet era. Second, the 1998 data are important in order to take into account the completion of the key structural reforms as well as the large internal and external population migration. For illustration, around 14 percent of 1989 population of Kyrgyzstan out-migrated permanently in the following ten years. It is believed that the ethnic groups that migrated (mainly Russians, Ukrainians and Germans) had higher educational attainment than Kyrgyz and Uzbeks, currently the two largest ethnic groups (Abazov, 1999). Finally, the 2011 data are valuable as they includes a young generation that obtained education and joined the labour market during the transition.

The first data source, the 1993 Kyrgyz Multipurpose Poverty Survey (KMPS), is a nationally representative survey designed to measure living standards (NSC, 1993). The survey sample contains about 2,000 households with around 10,000 individuals (Table 2). The migration section of the adult questionnaire contains recall information about the level of parental education. Limiting our analysis to individuals aged 20–69,[6] we end up with 3,987 child–parent observations.

The second data source, the 1998 Kyrgyz Poverty Monitoring Survey (KPMS), is a nationally representative household survey of 3,000 households (NSC, 1998). The family module comprises retrospective questions about education and sector of occupation of parents. We examine 7,213 parent–child pair observations. The third data source is the second wave of the panel household survey 'Life in Kyrgyzstan', collected in 2011 (Brück *et al.*, 2014). This is a nationally representative survey with data collected from 2,860 households and 8,151 individual respondents (see www.lifeinkyrgyzstan.org for further information). The family module of the survey includes information about parental education and occupation. The available number of respondent-parent observations is 6,385.

All three surveys were collected over the same period (October–November). The three data sources seem to accurately reflect the demographic changes in ethnic

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[6] In addition to including mostly working age population, the choice of this particular age cohort allows us to address measurement errors associated with recall information of old-aged respondents and the censored nature of educational information of currently studying respondents below 20 years of age.

Table 2. Summary of datasets

Dataset	Year	Original sample size		Individual-parent pairs used	Of which (% of individuals aged 20–69):		
		No. of households	Members aged 18+		Females	Urban residents	Ethnic Russians
KMPS	1993	1,933	5,018	3,987	52.6	39.4	19.5
KPMS	1998	2,976	8,685	7,213	51.8	26.8	15.1
LiK	2011	2,861	8,151	6,385	52.5	37.0	8.9

Sources: KMPS 1993, KPMS 1998, LiK 2011.

composition and rural/urban division of population. We do not apply the population weights, as the sample of individuals aged 20–69 used in the analysis is not representative of the demographic characteristics of the whole population in Kyrgyzstan.

The analysis is conducted using years of schooling of the respondents (children generation) and of their parents. For children, we use self-reported cumulative years of secondary and post-secondary schooling available in the 1998 and 2011 surveys. In the 1993 data, only the reported years of secondary schooling are available; we transform the reported post-secondary education category to years of schooling based on time needed to complete this schooling (Appendix Table A4). Except for the parents who resided with their children at the time of the survey data collection, thus reporting their own years of schooling, this counting procedure was also applied to calculate the years of schooling of non-resident parents in all three data sources. This counting approach potentially leads to some inaccuracies, such as fewer years of schooling for repeaters, dropped students, and holders of more than one post-secondary education. The other issue is different years of schooling associated with presumably the same level of education: from the prospective of the current educational system, some parents may be assigned more years of schooling than they have in fact studied. Nevertheless, the years of schooling of both children and parents seems to fit well across three datasets (if compared using common age cohort of children born in 1942–1976, the difference in parental schooling was 0.2–0.6 years between the datasets).

We do not exclude individuals who were studying at the time of the surveys. Instead, we calculate the years of post-secondary schooling by subtracting one year from the current grade of an enrolled individual. It is a compromise solution to reduce a measurement bias from the two extremes: (1) dropping the enrolled individuals from the analysis, or (2) including them by counting only the last highest level of completed education. In general, the share of enrolled individuals among those aged 20–24 was 8, 10 and 22 percent, respectively, in 1993, 1998 and 2011. The share of enrolled among those aged 25–34 was less than 2 percent in all three datasets, and nearly zero for the other older age cohorts. In the sensitivity analysis we show the results with the enrolled individuals excluded.

We use average years of schooling of both parents in our analysis. While a 'son-father' pair is the standard in most intergenerational studies, we consider both female and male individuals and compare their years of schooling to the average years of schooling of both parents – an approach followed by a number of papers (Hertz *et al.*, 2007; Verashchagina, 2012). If educational information of one of the parents is missing, we assign him/her the educational information of the other parent. This approach is justified given the low share of individuals with partial parental information[7] and a high degree of educational assortative mating among the parents (correlation in years of schooling of the parents ranges from 0.76 to 0.79 in the three datasets). For robustness check, we conduct the analysis using only observations where both parents' education is available.

The data demonstrate a remarkable increase in educational attainments in Kyrgyzstan over 70 years. Figure 1 – which depicts the average years of schooling of the respondents and of their parents in the three surveys – demonstrates that the schooling of the children increased from 7 years to about 12 years. The schooling of parents progressed more rapidly and grew from about 2 years to 11 years. Accordingly, the educational gap between the children and parents declined from around 5 years to 1 year.

Table A5 in the Appendix reinforces the increasing educational attainment in Kyrgyzstan over time. It illustrates remarkable developments, such as the doubled share of university educated among the young group of aged 25–34, increasing from around 13–14 percent of the total in 1993 and 1998, to 27 percent in the 2011 sample.

Figure 1. Years of schooling of respondents and of their parents [Colour figure can be viewed at wileyonlinelibrary.com]
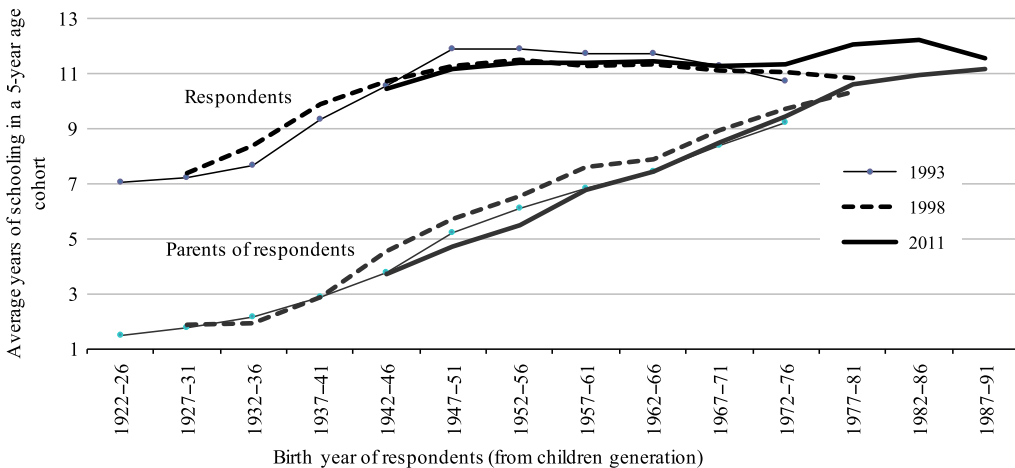
The corresponding rise in the parental schooling in the 2011 sample was accompanied with reduced inequality in parental education (shown by the decline in the standard deviation of years of schooling).

5. Empirical approach

5.1 *Magnitude of educational intergenerational mobility*

In line with the literature on intergenerational mobility (Azam and Bhatt, 2015; Black and Devereux, 2011; Hertz *et al.*, 2007), we estimate two indicators of correspondence in schooling between children and their parents: a regression coefficient, using ordinary least squares (OLS) and a correlation coefficient. Both indicators measure the degree of educational mobility across two generations: the higher the coefficient of the indicators, the lower is the intergenerational mobility.

Our base OLS regression specification is the following:

$$S^C = \beta_0 + \beta_1 S^P + \varepsilon, \tag{1}$$

where S^C is the years of schooling of an individual from the children sample, S^P is the average years of schooling of both parents; superscripts C and P stand for children and parents, respectively. The regression coefficient β_1 shows how a one-year increase in the schooling of the parents is associated with a corresponding increase in the schooling of their children. In this specification we do not control for the age of individuals in order to compare the results with the correlation coefficient, as the literature on intergenerational mobility tends to report not only the regression results, but also a correlation coefficient to account for the inequality within generations.

The correlation coefficient, ρ, is linked to the regression coefficient in the following way:

$$\rho = \left(\sigma^P/\sigma^C\right)\beta_1, \tag{2}$$

where, σ^P and σ^C are the standard deviations of schooling, respectively, of parents and children.

Correlation provides a rather similar interpretation of intergenerational mobility, but it is not affected – in contrast to the regression results – by inequality within two generations as it shows an association between a one standard deviation change in parents' education and a one standard deviation change in children's education. Both correlation and regression coefficients will match if the standard deviation of years of schooling in both children and parents generations are of comparable magnitude. If the dispersion of parental schooling is larger than of children's, then a

correlation coefficient will be greater than a regression coefficient. To provide an insight on the dynamics of educational mobility, the analysis is also conducted using five-year age cohort groups. Thus, for each survey dataset comprising individuals aged 20–69, we form ten age cohort groups.

5.2 *Transition and intergenerational mobility*

In order to measure the effect of transition we compare the correlation and regression coefficients for those aged 25–34 in each sample (referred as the 'young group') over the three survey years. We compare the results for this age group from the 2011 data to the previous two survey results because the individuals in the 2011 data obtained education after 1991, after the start of the transition in Kyrgyzstan. Individuals from the same age cohorts from 1993 and 1998 surveys obtained education mostly before the transition.[8] Approximating 1993 and 1998 to 'before' transition compared to 'after' transition in 2011, we may hypothesize the existence of a transition effect if there are differences in 2011 indicators compared with those estimates for the two earlier surveys.

5.3 *Gender differences*

The gender effect is identified by measuring the correlation and regression coefficients separately for male and female individuals.[9] If there are significant differences in the estimated correlation or regression coefficients between male and female individuals in the generation of children, we conclude that there is a gender effect. In addition, we present the regression and correlation results separately for daughter and sons in relation to fathers and mothers.

5.4 *Extended regression specification*

In addition, we extend the regression analysis by controlling for age, ethnicity and location of the children. These variables, available in all three datasets, help to take into account policy changes (pertaining to age groups), cultural norms and labour market participation practices (in case of ethnicity) as well as location characteristics (such as school quality and labour market features). Equation (1) extends now to:

$$S^C = \beta_0 + \beta_1 S^P + \beta_3 Age^C + \beta_4 Ethnicity^C + \beta_5 Urban^C + \beta_6 Oblast^C + \varepsilon. \qquad (3)$$

In addition, exploiting 2011 data we add to specification (3) information on siblings and extra parental information, specifically job position and membership in the Communist Party during the socialist era. Both variables are proxies for parental

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[8] This 'young group' from the 2011 sample was aged 5–14 in 1991.
[9] The gender effect regression analysis can be also conducted by using a female dummy and its interaction with other covariates. We prefer a separate group analysis.

income and social status as well as strength of parental social networks that may positively affect educational attainment of children, thus providing a more nuanced description of the intergenerational links.

6. Results

In the following we present the results for total and young samples; then discuss gender differences and dynamics of the mobility using age cohorts. The enrichment of the regression analysis by controlling for additional variables completes this section.

6.1 What is the magnitude of educational intergenerational mobility?

Both indicators of intergenerational educational mobility in Kyrgyzstan demonstrate improvement over time. Both regression and correlation coefficients, calculated for individuals aged 20–69, dropped considerably (Table 3): the regression coefficient declined from 0.27 in 1993 to 0.17 in 2011, while the correlation weakened from 0.39 to 0.28 over the same period. This level of intergenerational mobility is extremely high by international standards; it places Kyrgyzstan among the most mobile countries in the world (Hertz *et al.*, 2007).[10]

6.2 How the transition affected intergenerational mobility?

We consider the transition effect by examining the intergenerational mobility of the sample cohorts aged 25–34. For these individuals, we observe rapidly increased association with parental education over time (Table 3). Compared with a relatively weak intergenerational association in 1993 and 1998, the regression outcomes for 2011 imply that this link has strengthened considerably: an extra year of parental education in 2011 is associated with 0.5 additional years of schooling for their children compared with 0.13 and 0.2 in 1993 and 1998, respectively. The correlation results also support this conclusion, although the extent of the rise was relatively moderate. This finding is consistent with the evidence from Bulgaria (Hertz *et al.*, 2009), where the association in schooling of young population with parental schooling increased rapidly.

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[10] The results for 1998 are not directly comparable with the estimates of Hertz *et al.* (2007) who use the same data source for Kyrgyzstan. When we replicated their results by the described method of counting years of schooling and averaging the regression and correlation coefficient for the 10 age cohorts, our correlation coefficient was 0.25 against 0.20, and correlation 0.31 against 0.28. We believe these results are rather close, and the deviations are related to the differences in the final sample size used and the way the years of schooling are derived.

Table 3. The relationship between parental and children's education

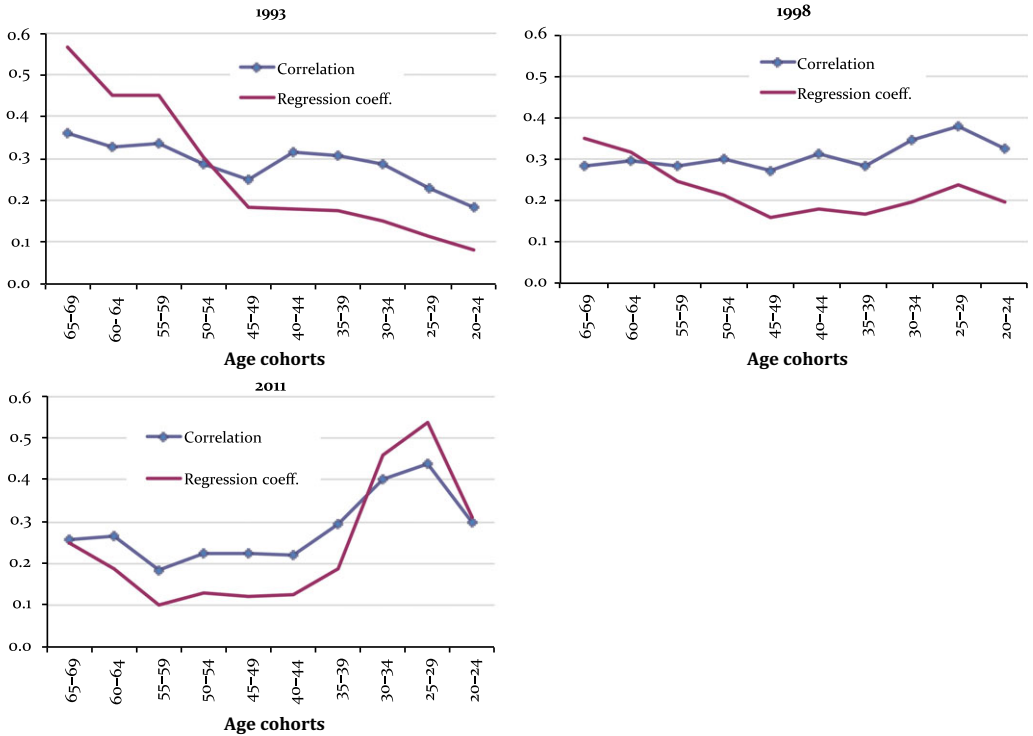|	Regression coefficient			Correlation		
	1993	1998	2011	1993	1998	2011
Total sample of individuals aged 20–69						
Parental years of schooling	0.27***	0.22***	0.17***	0.39	0.38	0.28
Adj. R^2	0.15	0.14	0.08			
No. of observations	3,987	7,213	6,385			
Sample of individuals aged 25–34						
Parental years of schooling	0.13***	0.20***	0.50***	0.26	0.35	0.42
Adj. R^2	0.06	0.12	0.18			
No. of observations	1,176	2,055	1,622			

Note: The regression specifications do not include any other control variables. Parental education coefficients in the regressions are significant at 1 percent level (marked ***).
Sources: KMPS 1993, KPMS 1998, LiK 2011.

We conduct a number of robustness checks using alternative groupings. For this purpose, we (1) enlarge the young group to aged 20–34, instead of aged 25–34; (2) consider aged 35–44 to approximate for the youngest pre-transition age group; (3) exclude individuals enrolled in post-secondary studies; and (4) exclude the individuals who reported education of only one of either parents (Appendix Table A7). First, inclusion of individuals aged 20–24 in the young group levels lowers both regression and correlation coefficients due to higher share of the enrolled individuals. However, the magnitude of increase in intergenerational association between 1993 and 2011 for this group was much higher compared than the 25–34 cohort. Second, the analysis of 35–44 cohort does not reveal any increase in intergenerational link in education: the regression coefficient was relatively flat and low, while correlation was on a downward track. Third, exclusion of the enrolled individuals does not alter, or marginally raises, both regression and correlation coefficients. Finally, the results using only full parental information reveal nearly no difference with the base model outcomes.

To examine the dynamics of educational mobility, we calculate the regression and correlation coefficients individually for ten separate five-year age cohorts. Figure 2 plots separately the regression and correlation coefficients for each age cohort; each of three lines represents the results for one of three datasets. As shown, the regression results for 1993 and 1998 are relatively consistent with each other implying gradual decline in intergenerational association in education from older to younger cohorts. In contrast, the dynamics of the regression coefficient based on 2011 data was 'U'-shaped and relatively low for the oldest seven cohorts; then it increased sharply for the youngest three age cohorts. The

Figure 2. Regression coefficients and correlations of schooling across age cohorts [Colour figure can be viewed at wileyonlinelibrary.com]

Note: The correlation and regression coefficients are derived for each of the ten cohort groups. The age of respondents calculated as of the year of the surveys.

Sources: KMPS 1993, KPMS 1998, LiK 2011. [Colour figure can be viewed at wileyonlinelibrary.com]

dynamics of the correlation coefficient, from the other angle, was consistent with this trajectory when the 2011 data were used, although the scale of change was less pronounced. It is necessary to note that both indicators in the youngest cohort show a decline that is explained by a high share of individuals who are still enrolled and, thus, may have lower – than their parents – education at the time of the surveys.

6.3 Is there a gender gap?

The gender related results for the total sample (in Table 4) indicate that females (from the children generation) are less mobile than males. The difference is statistically significant in the regression results for all three years. This gender gap also holds when correlation coefficients are considered. However, when we analyze

Table 4. Educational mobility by gender

	Regression coefficient			Correlation		
	1993	**1998**	**2011**	**1993**	**1998**	**2011**
Sample of aged 20–69						
Male	0.21	0.18	0.13	0.33	0.31	0.22
Female	0.32++	0.26++	0.21++	0.44	0.44	0.33
Sample of aged 25–34						
Male	0.13	0.19	0.49	0.26	0.32	0.43
Female	0.13	0.22++	0.50	0.25	0.38	0.41

Note: The dependent variable is years of schooling of children. The right-hand side variable of interest is parental years of schooling; no other control variables are included. The regression coefficients are significant at 1 percent level in all years and groups. Statistically different estimates between male and female at 5 percent confidence level are marked '++'.
Sources: KMPS 1993, KPMS 1998, LiK 2011.

gender-based mobility in the young group, we do not find large differences for 1993 or 2011 based on either regression or correlation estimations; only in the 1998 data is there a significant difference. Elimination of the gender imbalance has to do with more schooling among women than men, starting with the 1950s generation. In addition, the results from the 2011 data suggest that both young females and males – exposed to the post-Soviet transition – experienced an increase in intergenerational association in education.

One dimension of gender-based analysis is to separately examine a role of maternal or paternal education in relation to the schooling of sons and daughters. Appendix Table A6 shows regression and correlation coefficients for education of sons and daughters vs. schooling of fathers and mothers. This disaggregation does not reveal any differences in intergenerational association of education: schooling of both fathers and mothers – analyzed individually – seem to have similar effects on the education of children.

6.4 The extended regression specification

We extend the regression analysis above by adding a number of confounding factors that affect the schooling of individuals in the children sample. These are age, residency location and ethnicity. This information is available in all three datasets. Adding age dummies allows accounting for age specific effects affecting the education of individuals – such as changes in compulsory years of schooling – that were beyond the control of parents. Inclusion of residency information controls for the fact that more educated individuals are likely to live in urban and more populous areas. Ethnicity of individuals seems to play a role in educational attainments, as

there are emerging differences in schooling between two major ethnic groups in Kyrgyzstan.

The second expanded specification, though limited to only 2011 data, includes sibling information and parental characteristics, such as white-collar job positions and membership in the Communist Party during socialist times. A larger number of siblings may be associated with a lower probability of obtaining post-secondary education if there were credit constraints for parents. A high occupational position of parents incorporates job positions, such as managers and white-collar workers. Communist Party membership for either parent during socialist times indicates not only a relatively higher social status in the past, but also a superior public and economic position after the transition. Membership in the Communist Party was necessary to gain high administrative and managerial positions; after the transition most of these individuals remained active in politics and extended their power in business (Mikhalev and Heinrich, 1999). As such, parental communist background could be a strong predictor of a better off social or economic position of individuals in current times, including education.[11]

First, we comment on the regression specification in which we control for age, location and ethnicity, in addition to parental education. The regression coefficient, compared to the results in the base regression, is smaller for the total sample in all years, around 0.14–0.17 (Table 5). In the young group, the results are rather similar to the ones in the base specification – there is four-fold increase in 2011 (0.41) compared to the 1993 regression coefficient (0.10). In terms of dynamics of the intergenerational mobility, our results seem to conform to the above evidence that Kyrgyzstan, in general, maintains high educational mobility, but that the schooling of the younger population correlates much more with parental education.

In respect to location, urban residents have, on average, more schooling than rural residents. Individuals living in Bishkek, the capital city, have up to one more year of schooling compared to the population of Chui oblast (the reference region). Among regions, the residents of the southern oblasts seem to have less schooling in the 1993 and 1998 datasets; however, this difference is reversed in the 2011 data, especially in the young group.

Ethnicity seems to play a prominent role in educational attainments in Kyrgyzstan. Whilst lower educational levels among Uzbeks has been a broadly known fact, the fact that Russians had, on average, slightly less schooling than Kyrgyz – although significant only for the young group in 1993 and 1998 – is somewhat surprising.

Interesting insights emerge when we control for siblings, parental high job positions and parental Communist Party membership. There is a strong association of parental job position and Communist Party membership with children's educational attainment (Column '(b) 2011' in Table 5). In both the total and young samples,

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[11] In LiK 2011, 3 percent of individuals reported having a parent who was a Communist Party member during the socialist era.

Table 5. Extended regression specification

Variable/year	Total sample, aged 20–69				Young sample, aged 25–34			
	1993	1998	(a) 2011	(b) 2011	1993	1998	(a) 2011	(b) 2011
Parental years of schooling	0.14***	0.17***	0.15***	0.13***	0.10***	0.19***	0.41***	0.37***
Urban	0.69***	0.39***	0.46***	0.37**	0.58***	0.35***	0.35*	0.26
Bishkek	0.48**	0.92***	1.01***	1.04***	0.65***	0.90***	1.27***	1.36***
South	−0.11	−0.42***	0.00	0.04	−0.13	−0.16	0.29***	0.38***
North, excl. Chui	0.28**	−0.26***	−0.10	−0.09	0.09	−0.11	0.06	0.10
Russian	−0.04	−0.40***	−0.05	−0.11	−0.57***	−0.52***	−0.01	−0.17
Uzbek	−0.56**	−0.52***	−0.84***	−0.84***	−0.52**	−0.47***	−1.24***	−1.23***
Other ethnic group	−0.36**	−0.54***	−0.76***	−0.74***	−0.23	−0.48***	−1.07***	−1.04***
Siblings				−0.01				−0.04*
Parental high-job position				0.42***				0.33**
Parental membership in Communist party				0.80***				1.21***
Constant	9.2***	9.2***	9.1***	9.17***	10.6***	9.5***	7.2***	7.5***
Adj. R^2	0.33	0.25	0.18	0.19	0.11	0.17	0.25	0.25
No. of observations	3,987	7,213	6,385	6,363	1,176	2,055	1,622	1,617

Notes: The dependent variable is the years of schooling of individuals. Kyrgyz and Chui oblast are the reference groups, for ethnicity and regions, respectively. Additionally, all regressions include age dummies. The regression coefficients are significant at the 1% level when marked '***'; at 5% level when marked '**'; and at 10% level when marked '*'.
Sources: KMPS 1993, KPMS 1998, LiK 2011.

these two parental characteristics are more important to the educational attainment of children than parental education. For instance, parental Communist Party membership is associated with an additional 0.8 years of children's schooling in the total sample, but even more (1.2 years) in the young sample. The number of siblings seems to play some negative role for educational attainment for children in the young age group, although the effect is only marginally significant.

7. Discussion and conclusion

This paper contributes to the research on intergenerational mobility in transition and low-income countries by analyzing the case of Kyrgyzstan. We find that the adult population in Kyrgyzstan maintained high educational mobility despite the transition. For a low-income country that saw a sharp decline in the living standards of its population and a rise in income inequality, this outcome is surprising. We conclude that the dynamics of intergenerational mobility of education in Kyrgyzstan is similar to other post-socialist countries (Jackson and Evans, 2017); however, the degree of intergenerational mobility is particularly high compared to both transition and low-income countries (Appendix Table A1).

In light of these findings, what may be the drivers of high educational mobility in Kyrgyzstan? The answer partly lies in the relatively scattered distribution of educational attainments: Kyrgyzstan is similar to low-income economies with its older population having an extremely low level of schooling. As illustrated in Figure 1, parental schooling in the two oldest age cohorts was about 2 years compared to about 10 years of parental schooling in the youngest age cohort. Thus, this evidence led us to conclude that Kyrgyzstan, and broadly Central Asian countries, are unusual in terms of intergenerational mobility.

High intergenerational educational mobility in Kyrgyzstan is inherently linked to the legacy of Soviet educational investments and equalization policies. However, with the transition we observe a decline in the intergenerational mobility of education for the young population, as our 2011 estimates for the individuals aged 25–34 indicate. While this age group experienced the expansion of the higher education system, the results are suggestive about the growing role of parental education and social status. This points to the important role of political 'social capital' of the parents who had access in the socialist times to information and assets and which they carried over into the transition period (Saar and Helemäe, 2017).

The gender-based analysis reveals that females tend to experience lower intergenerational mobility than males in Kyrgyzstan. However, this difference is mainly driven by older-aged cohorts as gender disparity in educational mobility does not exist in younger age cohorts. As in many post-socialist countries, this finding is related to the progress toward gender parity in educational attainment in Kyrgyzstan.

Do these findings imply that a role of parental background will increase in the future to lead to further decline in educational mobility? The literature suggests that three drivers of change in intergenerational mobility may be in play: the equalizing nature of public expenditure on education, the developments in economic inequality, and returns to education (Blanden, 2013; Verashchagina, 2012).

Two equalizing mechanisms – compulsory schooling and public expenditures – facilitate relative equality in access to basic and secondary education in Kyrgyzstan. However, as previous studies document, a growing number of students are not completing secondary schooling (Anderson and Heyneman, 2005; Micklewright, 1999). The differences in opportunities become more evident at the post-secondary level, where the equalizing institutions of the Soviet government are no longer in place and the sector is dominated by private institutions. At the same time, increased university enrolment is indeed surprising, given rising costs for education and the skills mismatch to the needs of labour markets, unless the returns to education are sufficiently high. Returns to university education in Kyrgyzstan were, in fact, relatively high in mid-1990s. In particular, Anderson and Heyneman (2005) document that college educated individuals in Kyrgyzstan would expect to earn 17–21 percent higher wages than individuals with only a basic or lower education. However, given an increasing number of university educated individuals in the 2000s, it is relevant to determine whether the wage gap was maintained; we hypothesize that this return may have been driven down by the increased supply of labour.

As modeled (Solon, 2004) and documented in a number of studies (Andrews and Leigh, 2009; Blanden, 2013), intergenerational mobility is negatively correlated with inequality. As demonstrated in Table 1, income inequality in Kyrgyzstan was very high in the early 1990s, but then returned to a moderate level. In this respect, we are not yet able to say much how the income inequality and intergenerational mobility are linked in Kyrgyzstan.

The changing pattern of educational attainments across regions in Kyrgyzstan mirrors migration developments to a great extent. Both external and internal migration seem to be changing its educational landscape. As discussed before, the collapse of the Soviet Union led to the permanent, disproportionate migration of better educated people (Abazov, 1999); but the recent permanent and temporary migration has also involved a sizable share of the skilled population. On the other hand, a rural-urban migration, intensified in the last decade and driven by economic factors, also sees better educated individuals migrating to urban areas and abroad while less educated individuals remain in villages. This internal migration pattern, if continued, may be another factor that will adversely affect intergenerational educational mobility.

We note that the young population of non-Kyrgyz ethnic groups seem to lag behind in schooling compared to the Kyrgyz, and it would potentially indicate the existence of some forms of discrimination in segments of the labour market where tertiary education is demanded. In addition, the inequality in education between

groups, so-called horizontal inequalities, might have serious implications for a potential inter-group conflict as in Kyrgyzstan in 2010 (Esenaliev and Steiner, 2014).

Finally, the increasing ratio of people with university education may have a political implication, as was the case in some Arab Spring countries. As more university graduates participate in the labour market either as unemployed or employed in low-qualification jobs, dissatisfaction with economic and labour market policies may transform governments due to mass demonstrations and uprising of youth. In Kyrgyzstan, which experienced changes in its political regime in 2005 and 2010, the educated labour force does not yet seem to be the main factor in the political disruptions, but it may become so in the future.

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Appendix A

Table A1. Countries ranked by average parent-child correlation in education

Individuals aged 20–69				
Country	Rank out of 42 countries	Correlation	Regression coefficient	Survey year
Transition countries				
Slovenia	10	0.52	0.54	1998
Hungary	12	0.49	0.61	1998
Estonia	23	0.40	0.54	2004
Ukraine	26	0.39	0.37	2004
Poland	31	0.43	0.48	1994
Czech Rep.	34	0.37	0.44	1998
Kyrgyzstan	40	0.28	0.20	1998
Low-income countries				
Bangladesh	28	0.38	0.58	1996
Nepal	33	0.35	0.94	2003
Ethiopia	42	0.10	0.75	1994
Lower middle income countries				
Indonesia	8	0.55	0.78	2000
Vietnam	20	0.40	0.58	1998
Ghana	25	0.39	0.71	1998

Source: Adapted from Hertz *et al.* (2007).

Table A2. Share of private institutions in vocational education and universities

	1990	1995	2000	2005	2010	2015
Vocational education	159	113	113	112	109	231
Share of private, %	0	0	2	4	21	14
Universities	9	32	45	51	56	52
Share of private, %	0	31	33	35	41	35

Source: NSC and UNICEF (2014).

Table A3. Sample formation

	KMPS 1993	KPMS 1998	LiK 2011	Treatment
Total sample of individuals aged 18+	5,018	8,685	8,151	
Younger than 20 or older than 69	610	1,146	1,021	Dropped
Sub-sample of individuals aged 20–69	4,408	7,539	7,130	
No education information	8	193	37	Dropped
Individuals aged 20–69 with education information	4,400	7,346	7,093	
No information on the education of either parent	413	133	708	Dropped
Final sample used in the analysis	3,987	7,213	6,385	
Education information for one parent is missing	451	256	324	Assigned the other parent education

Sources: KMPS 1993, KPMS 1998, LiK 2011.

Table A4. Calculation of the years of schooling

1993		1998		2011	
Educational categories	Years of schooling	Educational categories	Years of schooling	Educational categories	Years of schooling
Years of secondary school completed	(A) Reported years [0–11]	None	0	Illiterate	0
Vocational courses, e.g. courses for tractor drivers, drivers, typists, accountants	(A)+1	1–8th class	Reported years [1–8]	Primary	3
Vocational-technical school, not granting secondary diploma	(A)+2	Incomplete secondary	9	Basic	8
Vocational-technical school with secondary education, technical school	(A)+3	Complete secondary	10	Secondary general	10
Technikum, medical, music school, school of education	(A)+3	Professional-technical school	11	Primary technical	11
Institute, university, academy	(A)+5	Technikum	13	Secondary technical	13
Graduate school, residency	(A)+8	Higher educational diploma	15	University (bachelor, diploma, master)	15
		Candidate or doctor of science	18	Candidate or doctor of science	18
		Other	4		

Notes: Reported years of both secondary and post-secondary education are used in the analysis. The presented scale is mostly applied to calculate parental years of schooling.
Sources: KMPS 1993, KPMS 1998, LiK 2011.

Table A5. Education, demographic and location characteristics

	1993		1998		2011	
	Mean	**SD**	**Mean**	**SD**	**Mean**	**SD**
Total sample, ages 20–69						
Individual's years of schooling	10.8	*3.0*	10.9	*2.5*	11.6	*2.4*
Parental years of schooling	6.1	*4.3*	7.3	*4.3*	8.8	*3.9*
University educated, share	0.14		0.13		0.18	
Age of individuals	37.9		37.9		39.1	
Female, share	0.53		0.52		0.52	
Shares by ethnic groups						
Kyrgyz	0.52		0.70		0.67	
Russians	0.19		0.15		0.09	
Uzbeks	0.15		0.08		0.13	
Other groups	0.13		0.08		0.11	
Urban residents, share	0.39		0.27		0.37	
Sample shares in regions						
Bishkek city	0.14		0.12		0.16	
Chui oblast	0.22		0.14		0.18	
North	0.18		0.37		0.17	
South	0.46		0.37		0.49	
Sample	3,987		7,213		6,385	
Young sample, ages 25–34						
Individual's years of schooling	11.6	*2.0*	11.1	*2.0*	12.1	*2.8*
Parental years of schooling	7.3	*3.8*	8.8	*3.5*	10.8	*2.4*
University educated, share	0.14		0.13		0.27	
Age of individuals	29.4		29.3		29.1	
Female, share	0.50		0.49		0.51	
Shares by ethnic groups						
Kyrgyz	0.62		0.74		0.70	
Russians	0.11		0.10		0.08	
Uzbeks	0.16		0.08		0.11	
Other groups	0.11		0.07		0.12	
Urban residents, share	0.35		0.26		0.36	
Sample shares in regions						
Bishkek city	0.12		0.12		0.17	
Chui oblast	0.22		0.13		0.19	
North	0.18		0.36		0.16	
South	0.48		0.39		0.48	
Sample	1,176		2,055		1,622	

Sources: KMPS 1993, KPMS 1998, LiK 2011.

Table A6. Estimations based on gender and paternal or maternal education

	Regression coefficient			Correlation		
	1993	1998	2011	1993	1998	2011
Total sample aged 20–69						
Male						
Both parents	0.21	0.18	0.13	0.33	0.31	0.22
Father	0.19	0.17	0.12	0.33	0.31	0.22
Mother	0.18	0.15	0.11	0.30	0.28	0.21
Female						
Both parents	0.32	0.26	0.21	0.44	0.44	0.33
Father	0.28	0.24	0.19	0.42	0.42	0.31
Mother	0.29	0.23	0.20	0.42	0.41	0.32
Sample aged 25–34						
Male						
Both parents	0.13	0.19	0.49	0.25	0.32	0.43
Father	0.12	0.17	0.39	0.24	0.32	0.38
Mother	0.10	0.15	0.38	0.22	0.28	0.39
Female						
Both parents	0.13	0.22	0.50	0.25	0.38	0.41
Father	0.11	0.19	0.42	0.24	0.35	0.38
Mother	0.11	0.18	0.40	0.22	0.35	0.36

Note: The regression specifications do not include any other control variables. All regression coefficients are significant at the 1 percent confidence level.
Sources: KMPS 1993, KPMS 1998, LiK 2011.

Table A7. Estimations based on alternative groups

	Regression coefficient			Correlation		
	1993	1998	2011	1993	1998	2011
(1) Young group extended to ages 20–34						
Aged 20–34	0.09***	0.19***	0.42***	0.18	0.33	0.37
Adj. R^2	0.03	0.14	0.14			
No. of observations	1,934	3,395	2,721			
(2) Next youngest group, ages 35–44						
Aged 35–44	0.17***	0.17***	0.15***	0.39	0.29	0.26
Adj. R^2	0.09	0.08	0.07			
No. of observations	919	1,743	1,322			
(3) Without individuals enrolled in post-secondary study						
Aged 20–69	0.28***	0.22***	0.19***	0.40	0.37	0.29
Adj. R^2	0.16	0.14	0.09			
No. of observations	3,905	7,041	6,105			
Obs.excluded, %	2.1	2.4	4.4			
Aged 25–34	0.13***	0.20***	0.52***	0.27	0.35	0.43
Adj. R^2	0.07	0.12	0.16			
No. of observations	1,160	2,022	1,598			
Obs.excluded, %	1.4	1.6	1.5			
(4) Only individuals with education information for both parents						
Aged 20–69	0.27***	0.23***	0.18***	0.40	0.38	0.29
Adj. R^2	0.16	0.15	0.08			
No. of observations	3,536	6,960	6,061			
Obs.excluded, %	11	4	5			
Aged 25–34	0.13***	0.21***	0.53***	0.27	0.36	0.44
Adj. R^2	0.07	0.13	0.19			
No. of observations	1,071	1,958	1,528			
Obs.excluded, %	9	5	6			

Sources: KMPS 1993, KPMS 1998, LiK 2011.