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From Soviet to Europe: Returns to education puzzle in Bulgaria

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Abstract

This paper makes a systematic presentation of returns to education in Bulgaria, a country that has witnessed a number of dramatic structural changes over the last two decades. It examines the headway of returns to education for Bulgaria in two observed economic regimes - from communism to EU membership. The findings show a steady increase in returns to education for both men and women until 2003. The average returns to one additional year of education rose from 1.1% in 1986 to 5.1% in 2003 for men and from 2.1% to 5.9% for women. Quantile regression estimations between 1986 and 2003 evince that the most prominent increase in the wage premium occurred at the top end of the distribution, where the rate of returns to education increased in particular for women - from a negative and insignificant sign in 1986, to 7% in 2003. However, this increasing trend in returns to education seems to take an inverted-U-shape in 2007, the year when the country joined the EU, which poses a new puzzle to be resolved. To this end, the current paper introduces possible explanations for such a puzzle and sheds lights on a number of insightful policy implications.

Keywords: Returns to education, Transition countries, Quantile regression

JEL classification: I21, J31

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1. Introduction

The transition from a centrally planned economy to a market based economy has affected the living standards and employment outcomes of millions of Eastern Europeans, who faced the changes having themselves been educated under communism and having experienced a completely different economic system and incentive mechanisms. Changing conditions in the labour market and in the education system, suggest that returns to education may have not been constant over time. A number of studies have shown that transition process had significant effects on labour market outcomes and on the distribution of income.¹ In Eastern European countries, returns to education rose immediately following the reforms, but the speed of changes shows great diversity across countries. Andrén et al. (2005), for example, find that returns to education in Romania increased from 3% during the pre-transition period to 8.5% in 2000. A similar pattern is reported by Campos and Jolliffe (2003) for Hungary, where the returns to education rose from 6.4% in 1986 to 11.2% in 1998. München et al. (2004) find for the Czech Republic that in 1989 women with a university education earned on average 45% more than women with secondary education and that this had increased to 85% by 2002. München et al. (2004) also show that the major increase in the rate of return to education occurred in the first phase of transition (1989–1996) and no further changes were observed in the later phase (1996–2002). Similarly, a study by Fleisher et al. (2005) suggests that the sharpest increase in returns to education took place during the early transition (around the early 1990s).

However, there is an alternative hypothesis that the rate of returns to education experienced a fall from the pre-transition to transition period. Education was poorly rewarded in many transition economies in the initial stages of transition and directed toward the productive and ideological goals of the communist regimes. Returns to schooling were low and hence have been limited in its ability to respond to the changing economic and employment patterns essential for success of the market economy (Laporte and Ringold, 1997). An interesting view among researchers on transition economies is that education obtained under central planning was too narrow and firm specific, and not appropriate for the new market environment (Kertesi et al., 2002; Filer et al., 1999). Some individuals (in particular, the low-educated or women) were more likely to become unemployed and to experience more difficulties in moving out of unemployment into a job, whereas for the young educated people it was relatively easy to find a new job.

Despite the large number of empirical studies on returns to education in transition economies, the results for the pre-1989 transition period are limited. Jolliffe (2002) offers Bulgarian gender-specific returns to education, however his analysis only covers the years until 1995. The value added of the present study is thus in its use of a 1986 survey and in extending the analysis to 2012. Understanding the changes in returns to education is important because it not only reflects the progress of reform, but also because it affects wage structures, income distribution, and incentives for investing in human capital. It is interesting to examine whether the transition process has caused changes in economic returns to education in a country which went through a radical economic transformation after 10 November 1989 and joined the EU in 2007. In light of the above, the present paper complements the existing literature in several ways. First, we address the question of what has happened to returns to human capital in Bulgaria before, during and after the transition from a centrally planned economy to a market economy by examining the evolution

¹See for example Fleisher et al. (2005) analysis of returns to education. The study uses metadata between 1975 and 2002 collected from 33 studies of 10 transition economies, to assess changes in the returns to education over the transition period.

of returns to education for the period of 1986 to 2012. As the changes and reforms came with the move to democracy, the analysis is equivalent to comparing returns in two different political regimes in Bulgaria. The subsequent analysis is undertaken separately for men and women. The paper also considers the sample selection induced by non-employment following Petrongolo and Olivetti (2006), where the wages of non-employed are imputed at zero and then median regressions retrieve the true parameters of interest. Finally, we provide evidence on how returns to schooling in Bulgaria have evolved at various points along the conditional wage distribution.

This paper is organized as follows: in Section 2, we briefly describe the Bulgarian education system; in Section 3 we present the data sets and empirical methodological framework; in Section 4 we discuss the main results; and in Section 5 we draw some conclusions.

2. Bulgarian education system in transition to a market economy

The Bulgarian education system is dominated by government-owned institutions at all levels, and although fundamentally national in character, has significant foreign influences. The Soviet influence was most evident during the period of the national revival in the 19th century and reflected the ideas of Slavophilism and pan-Orthodoxy. The communist regime wanted to establish a system of education similar to that of the Soviet Union, but at the same time they wanted to maintain the national culture. The primary aim of the communist educational authorities was to increase the number of students at each educational level. During the period 1990 to 2006, a number of democratic changes affected society as a whole and the educational system in particular. A serious attempt was made to harmonize Bulgarian educational legislation with the standards of other European countries, while preserving the achievements of the Soviet era (Eurybase, 2005).

Bulgaria was not among the countries invited to join the EU in 2004. However, it signed an EU accession treaty in April 2005 and joined in January 2007. The main challenge in the education sector during this period was to adjust the system to a declining school-age population following the general demographic decline and emigration. The Government's strategy was to improve the efficiency of education spending without major increases in public expenditure by gradually decentralizing the management of resources and by increasing the low student-teacher ratio. However, between the 1997/98 and the 2003/04 school years, the student-teacher ratio dropped from 12:4 to 11:8, which partly reflected the negative demographic trend and emigration of skilled persons (Ognivtsev, 2005). In addition, economic growth in the country has not been accompanied by commensurate employment growth. Indeed, during the 1997–2000 period, employment declined at the rate of approximately 2% per annum, and the increase in employment during 2000–2001 was modest. Although the decline in employment has contributed to an increase in labour productivity and, on average, the wages of the employed have increased steadily since the late 1990s, there is as yet no rigorous analysis of how this positive trend may have affected different groups of people in the Bulgarian labour market (Gang and Dimova, 2004).

In general, access to education at national level in Bulgaria is found to be high. For instance, the primary school net enrolment ratio was 97.8%, the secondary school net enrolment ratio was 78.3%, and access to tertiary education was also among the highest in the region at 44%.² Enrolment rates in Bulgaria were related to the level of family income. Children of poorly educated parents tended to complete fewer years of education. While enrolment rates in primary and secondary education did not vary much over the last 30 years, enrolment in tertiary education

²UNESCO EFA Global Monitoring Report 2008.

has increased. As Figure 1 indicates, between 1980 to 2012, the gross enrolment rates at tertiary level increased from 17.2% to 62.7%.³

[insert Figure 1 about here]

Education is compulsory for children aged between 7 to 16 years old. Children at the age of 6 can also be enrolled as first grade pupils, if their physical and mental development allows it. Since 2003/04, pre-school education became compulsory (Eurybase, 2005). Prior to entry into higher education, the education system in Bulgaria consisted of 12 school grades, organized into two major levels of study: basic and secondary. Basic education (grades one to eight) is divided into two sub-levels: elementary (grades one to four) and pre-secondary (grades five to eight). Secondary education normally encompasses grades eight to twelve and there are two major types of secondary schools: secondary comprehensive, usually called gymnasia (high school), and secondary vocational, most often referred to as *technikum* (vocational school). University education is provided at universities and specialized higher schools - academies, or institutes. It includes three stages: the first stage is a course of study of at least four years, leading to a bachelor's degree upon graduation; the second stage is a course of study of at least five years, or one year following a bachelor's degree, leading to a master's degree upon graduation; and the third stage of a three year course of study following a master's degree, that leads to a doctorate.

3. Data and methodology

3.1. The Data

The empirical analysis in this paper is based on several household surveys covering the period of 1986 to 2012, the longest time span for which data are available. One is administrated before transition and the others after the initial economic reforms were held. The 1986 Town and Village Survey, conducted by the Institute of Sociology of the Bulgarian Academy of Science in Sofia, was carried out in conjunction with the national census delivered in the winter of 1985 and contains information on the structure of Bulgarian wages prior to the transition (Giddings, 2002). This survey is the only existing pre-transition survey in Bulgaria. The sample is representative of the population and contains 10 333 respondents. After eliminating those who reported zero earnings and excluding individuals who were not of working age, the sample consists of 6451 individuals. The next data sets come from the nationally representative Bulgarian Living Standard Measurement Surveys (LSMS) collected in 1995, 1997, 2001, 2003 and 2007. Exclusion of individuals who do not report wages accounts for a substantial reduction in sample sizes. Our final working samples consist of 1317 individuals in 1995, 1531 individuals in 1997, 1438 individuals in 2001, 2482 individuals in 2003 and 8641 individuals in 2007.⁴ Finally, data for 2010 and

³The most widely available indicator of the education quantity is the gross enrolment rate, defined as total number of children enrolled in a particular level of education.

⁴The number of households included in 2003 LSMS sample is 3023. Information on hourly earnings in 2003 was derived for 2482 workers out of 3663 employed individuals. The 2007 LSMS sample size is almost four times larger than the previous LSMS and probably over-samples low-education individuals. However, we believe this is less likely to be the case as a sample lottery method has been used in each of the selected sampling households (TNS BBSS Technical Report, Multitopic Household Survey 2007 in Bulgaria).

2012 are taken from the European Social Survey (ESS) rounds 5 and 6. The sampling procedures ensured that the samples for each of the surveys are highly representative.⁵

The dependent variable used in the analysis is a logarithm of hourly earnings resulting from the primary occupation and excludes earnings from secondary jobs, or from agricultural production, and non-monetary benefits. Wages are net of taxes. The variable also includes all additional payments in cash, in kind and bonuses. Education is represented by binary variables measuring the completion of indicated levels of schooling. These levels consist of primary, secondary, and university education. However, our empirical analysis is based on the total number of years in education, which are also available within the data sets. It comprises of the number of educational grades completed by the individual and takes on 18 different values: from 0 if the individual achieved no grade to 18 if the individual has a postgraduate education. The binary variable 'Bulgarian' takes value 1 if an individual is ethnic Bulgarian and 0 if an individual is a member of an ethnic minority group, of which the main groups are Roma and Turkish. The vector of exogenous control variables used in the estimations also includes potential experience (linear and quadratic terms), dummy variables for individuals' years of tenure within the firm (less than 1 year, between 1 and 2 years, between 3 and 5 years, between 6 and 10 years and more than 10 years), and urban settlement. We have also included a public sector dummy so as to control for the remaining effect of the old public sector wage structure.

In Table 1 we report descriptive statistics corresponding to the resulting samples derived using sample weights for the effect of sample design and non-responses.⁶ For all years, except 2007, the average log hourly wage rate is higher for men. Interestingly, in 1986 there is no significant difference between the genders in terms of the hourly wages and education, this is mainly explained by the socialist ideology of equality and the wage setting structure. Wages under the communist regime were paid under highly centralized wage grids and differentials were kept within certain limits. Moreover, under communism, tuition was free and all students were eligible for textbooks and meals that were subsidised by the state. The descriptive statistics show a dramatic fall in wages in 2001; the reason for this fall is the 1999 redenomination of the Bulgarian currency. Furthermore, 9.9% of employed men and 9.5% of employed women in 1986 had a university degree. Potential experience, defined as $age - schooling - 7$, is higher for females in 1986, 2007 and 2010. However, potential experience might overstate women's actual labour market experience as it does not account for female absence due to childbearing activities. It is also interesting to compare particular social groups with a certain level of education and the completed education levels of their offspring. The 1986 Town and Village Survey provides information of the educational level of the respondents' fathers and mothers. According to the data, 13% of respondents' mothers had a high degree (university and college education), which indicates that our respondents were slightly better educated than their parents. In contrast to the 1986 data, the 1995, 1997, 2001, 2003 and 2012 samples indicate that women earn less than men, which supports the thesis that transition has resulted in increased gender inequality and large changes in the distribution of wages. For the whole period, women have more years of schooling, measured as a number of total years in education. Moreover, the data show a higher proportion

⁵The LSMS surveys were similarly administrated with nearly identical questionnaires and sampling designs. The sampling was done in two stages. In the first stage the survey sample is selected and the listing is organized in the following order: (i) the list of 28 regions, (ii) cities and villages in these regions, (iii) each city and village listed by size. In the second stage the households interviewed are selected with equal probability, provided that they have also been listed by size. One of the objectives of the interviewers was to reduce the number of refusals to fewer than 5%.

⁶Applying the sample-weights to the remaining models produces results that are qualitatively similar in terms of magnitude and significance to those reported below, albeit having somewhat larger standard errors.

of employed women with university degrees. For instance, 26% of employed women in 1995 had a university degree compared with 17% for men. Women have higher participation rate in the public sector and we can see that for the period 1986–2007 the percentage of public sector workers significantly decreased (from 82% of working women employed in public sector in 1986, to 26% in 2007). The majority of working men and women live in urban areas (see Table 1).

[insert Table 1 about here]

All the cross-section data clearly indicate that in the beginning of the period, the majority of the working sample was poorly educated and only a small proportion had university degrees. For the period 1986–2007 the percentage of working individuals with secondary and university education increased, while the proportion of those with primary education decreased from 29% in 1986 to 17% in 2007 (see Figure 2). Significant changes in the educational structure of the working population, which were expressed in a 10% increase of the share of secondary and university graduates, took place in 1995 and 2007. Overall, individuals with secondary education dominated the educational structure. This might be an indication for the transition wage structure, which did not provide adequate incentives to invest in education. There is a clear reduction in the share of university graduates after 2007. The fall can be partially explained by the increasing number of students continuing their higher education abroad after accession of Bulgaria to the EU.⁷

[insert Figure 2 about here]

3.2. *Econometric methodology*

We consider the following (augmented) Mincer equation:

$$\ln(w_i) = \alpha + \beta_1 S_i + X_i' \beta_2 + u_i \quad (1)$$

where $\ln(w_i)$ is the log of earnings, S_i is schooling for individual i , X_i includes all other covariates, such as potential experience, ethnicity, tenure, marital status, urban settlement and public sector employment. The paper also considers a possible sample selection induced by non-employment following Petrongolo and Olivetti (2006) and runs a median regression where wages of non-employed are imputed at zero. The method does not require assumptions on the actual level of missing earnings, as is typically required in the matching approach, nor does it require the arbitrary exclusion restrictions often invoked in two-stage Heckman (1979) sample selection correction models.⁸

There are however some limitations in the present paper. Studies that are based on multiple surveys face the difficult question of whether the observed change results from changes in the examined population or changes in the survey instrument. The variables used in the current

⁷The 2011 census data confirmed that Bulgaria has been a net emigration country since 1992. Over the twenty-year period, emigration represented a 6% loss in the total population, and a 10% loss considering only the active population. High emigration levels were accompanied by natural decrease, related to low fertility rates, which contributed a further 12% to total population loss over the same period. Figures on declared emigration show an increase from 19 000 in 2009 to 27 700 in 2010. Actual outflows, however, are considered to be much greater, based on immigration statistics of the main destination countries (NSI, Statistical data, external migration). The intention to emigrate for short-term mobility has also increased from 26% in 2001 to 42.4% in 2007 (National Representative Survey, 2007).

⁸See Petrongolo and Olivetti (2006).

analysis were recoded to minimize errors in comparisons over time. Furthermore, the 2007 sample size is larger than the previous LSMS data set and probably oversamples low-education individuals; this, might have an effect on the estimated returns. Finally, the paper does not aim to solve the endogeneity issue that may arise either from unobserved variation in ability or from measurement error in schooling, rather it presents a descriptive analysis comparing conditional means. With the data in hand, neither the exclusion-restriction used in the Heckman correction procedure controlling for selection by using number of dependent young children as identified restriction, nor the instrumental variable (IV) approach based on parents' education, helped us to solve the endogeneity issue. In the literature a useful source of causal determinant of schooling has been found in the institutional features of the education system (Card, 1999). This methodology seems to be a promising way to solve the endogeneity bias because the instruments involved provide effective exogenous source of variation. However, the available data do not include a relevant policy intervention.⁹

Our distributional approach is based on the use of the quantile regression (QR) method of Koenker and Bassett Jr (1978),¹⁰ which provides estimates of the effect of education on earnings at different points in the earnings distribution. Estimating the effect of education at conditional quantiles, therefore, allows for heterogeneity in the returns to education. Just as OLS models the conditional mean of the dependent variable w relative to the covariates X used in the analysis, QR gives estimates of the effect of covariates at different percentiles of the conditional earnings distribution.¹¹ In a wage equation setting, the QR model can be written as:

$$\ln(w_{\theta i}) = X_i \beta_{\theta} + u_{\theta i}, \text{ with } Q_{\theta}(\ln w_i | X_i) = \beta_{\theta} X_i \quad (2)$$

where as before, the notation $\ln(w_i)$ denotes the logarithm of hourly earnings for the sample of individuals $i = 1, \dots, n$, $Q_{\theta}(\ln w_i | X_i)$ denotes the conditional quantile θ of $\ln w_i$, conditional on the regressor vector characteristics X_i , β_{θ} denotes the vector of quantile regression coefficients and $u_{\theta i}$ denotes the random error term with unspecified distribution. The θ^{th} regression quantile, $0 < \theta < 1$ are defined as a solution to the problem:

$$\min_{\beta \in R^k} \left\{ \sum_{i: \ln w_i \geq X_i \beta} \theta |\ln w_i - \beta_{\theta} X_i| + \sum_{i: \ln w_i < X_i \beta} (1 - \theta) |\ln w_i - \beta_{\theta} X_i| \right\} \quad (3)$$

This is written as:

$$\min \sum_i \rho_{\theta}(\ln w_i - \beta_{\theta} X_i) \quad (4)$$

where $\rho_{\theta}(\epsilon)$ is the check function defined as $\rho_{\theta}(\epsilon) = \theta \epsilon$ if $\epsilon \geq 0$, or $\rho_{\theta}(\epsilon) = (\theta - 1)\epsilon$ if $\epsilon < 0$. The

⁹We searched for appropriate instrument for education in Bulgaria but none could meet the necessary criterion for a good instrument: relevance and exogenous criterion. In addition, IV estimates based on family background – such as mother's and father's education that were available within the data – has been criticised because background is a proxy for ability and this affects earnings directly as well as education. Given this constraint, we decide to remain with OLS instead of implementing an IV that could bias the results even more (see Stock and Yogo (2005) for potential issues of weak instruments).

¹⁰Among many others Buchinsky (1998) and Powell (1986) extend the use of QR to get information about the effect of exogenous explanatory variables on the dependent variable at different parts of the distribution.

¹¹Another advantage of QR is that it tends to be less sensitive to the presence of outliers in the dependent variable. This is because in the QR the residuals to be minimized are not squared as in the OLS, and as a result outliers receive less emphasis. Moreover, if the error term of the regression is not distributed normally, the QR may be more efficient than the mean regression (Buchinsky, 1998).

model specifies the θ^{th} quantile of the conditional distribution of the $\ln Y_i$ given the covariates X_i as:

$$Q_{\theta_i}(\theta|X_i) = \beta_{\theta}X_i, \theta \in (0, 1) \quad (5)$$

We obtain different quantiles by increasing θ from 0 to 1. As θ is increased, the entire distribution of $\ln w_i$ is treated conditional on X_i . Estimates at different quantiles can be interpreted as showing the response of the dependent variable to the regressors at different points in the conditional wage distribution. The relative positioning of workers in the conditional wage distribution, therefore, can be related to systematic differences in unobservables, which generally may be referred to as ability and include a diverse range of attributes like motivation, labour market connections, family human capital, school quality, etc (Arias et al., 2002).

4. Empirical results

4.1. Evolution of returns to education at the mean

Table .2 and Figure 3 report the estimated linear and median regressions of returns to education coefficients for both men and women in eight different years. We have attempted to fit comparable specifications to the samples across years, to put the analysis in a common framework. The vector of control variables includes respondents' potential experience (linear and quadratic terms), variables for years of tenure with the current firm, being married, Bulgarian ethnicity, public sector and urban settlement.

The estimates indicate for both men and women an increase in the returns to education in 1995, followed by a decline in 1997. Overall, the returns to education in Bulgaria increase over time up to 2003 with a sharp decline in 2007; a decline which persists in 2010. Moreover, the estimated returns are higher for women than for men. For instance, the estimated return to education in 2001 was 4.3% for men and 6.6% for women. By 2003 the estimated return to education for men increased to 5.2%, while women coefficient fell slightly to 5.9%. Theories of skilled-biased technical change typically predict that periods of fast economic growth go together with an increase in the relative demand for skilled labour and hence an increase in the returns to education. The OLS estimate of the rate of returns to education for men increased from 1.1% in 1986 to 5.1% in 2003 and from 2.1% to 5.9% for women, respectively. This finding is in line with Arandarenko et al. (2006) who conclude that in Bulgaria the returns to all types of educational degrees increased substantially between 1995 and 2003. The upward trend in the returns to education during the transition period found here is in line with some previous findings. For example, in the Czech Republic the returns to education for men rose from 2.4% to 5.2% between 1983 and 1993 (Chase, 1998). Similarly, increases in returns to schooling also occurred in Poland (Rutkowski, 1996) and Slovenia (Orazem and Vodopivec, 1995). The very low return to education in 1986 suggests that the structure of wage rates in a centrally planned economy does not create incentives for obtaining more education. The returns of 1.1% for men and 2.1% for women in 1986 are also in line with Hung (2008), who reports return to education of 1.9% for Bulgaria in 1989/90. Fleisher et al. (2005) report that most of the transition economies had very low returns to education until the 1990s. A low return to education is also reported in Sweden by De la Fuente and Jimeno (2005) who attribute this to the country's compressed wage structure, which is similar to the wage grid in most of Eastern Europe and Russia before the transition reforms. Clearly, there is a marked downturn in estimated returns after 1995, which might be due to the recession of 1996/97.¹²

¹²In 1996, the Bulgarian economy collapsed due to an unstable and decentralized banking system, a wave of hyperinfla-

Accordingly, there is a recovery after 2001 when the Bulgarian economy improved. Turning to the market forces, Bulgaria has experienced an increase in the supply of higher education over the period between 1995 and 2002, the number of university graduates increased from 33 000 to 50 000.¹³ In addition, the number of higher education students in the 2006/07 academic year increased by 7% compared with the 2002/03 academic year.¹⁴

Columns (2) report the median earnings-returns, having corrected for sample selection following Petrongolo and Olivetti (2006), where the wages of non-employed are imputed at zero. The method has the disadvantage of not providing any wage information on individuals who never worked during the sample period.¹⁵ It is therefore important to understand in which direction this problem may distort, if at all, the resulting median earnings-returns. Moving across years, estimated returns to education tend to be slightly lower as compared to the linear specification as more wage observations are included in the imputed sample. This is indicative of negative sample selection, or, in other words, estimated returns on the observed wage distribution are upward biased due to non-random sample selection into employment. The estimated median returns in 2010 are found to be significant for women suggesting that low-wage women are less likely to feature in the observed wage distribution. Quantitatively, the correction for sample selection is greatest in 2003 when the median returns for both men and women are found to be much lower. The median wage returns on imputed wage distributions follow similar trends as do linear regressions over time.

[insert Table 2 about here]

[insert Figure 3 about here]

There are several potential explanations for the increasing trend in returns to education in Bulgaria during the transition process. In the literature, a lot of emphasis has been placed on the role of skill-biased technical changes. By shifting the relative demand of educated labour relative to available supply, skill-biased technical change has increased the returns to education (Funding et al., 2001). Skill-biased technical progress increased the relative productivity of skilled labour and generated a continuous upward shift in its demand (see Acemoglu and Autor (2011) for a recent discussion). Supply and demand factors affecting the returns to education include changes in the relative supply of educated workers, the changing composition of the labour force as retiring cohorts were replaced with younger workers over time, skill-biased technological change and globalization of the economy, i.e. international trade (Zhang et al., 2005). Desjonqueres et al. (1999) emphasize that the rise in the skills premium has been accompanied by an increase in the ratio of skilled to unskilled employment in all sectors. Moreover, the skill premium has risen in less-developed and newly industrializing countries as well as in OECD countries. The steady increase in the returns to education until 2003 can be explained by the transition from a system of government compressed wage scales to a market-oriented system.

However, the average returns to education in Bulgaria is found to decline from 5.1% for an extra year of schooling in 2003 to 1.3% in 2007 for men, and from 5.9% to 1.4% respectively for

tion throughout several countries of Eastern Europe, and slow reforms, which led to the collapse of the Bulgarian currency. In 1997 the government set up a currency board to stabilize the currency.

¹³Country Profile (2006) Bulgaria, Library of Congress Country Studies program.

¹⁴National Statistical Institute, Bulgaria.

¹⁵Using small children as exclusion restriction in a two-step procedure, we find no sample selection effects and obtain back the original OLS estimates.

women, and was found insignificant in 2010 for both men and women. The decrease in returns to education is in line with Coup and Vakhitova (2012) who found a decrease in estimated returns in Bulgaria, Latvia and Poland in 2007, and an increase in the Czech Republic, Russia, Slovakia and Slovenia. The natural question to ask is why the returns to schooling in Bulgaria have dropped. There are several possible reasons that could lead to a decline in returns to education in Bulgaria during the years of the EU accession: a reduction in the relative demand for skilled workers; an increase in the relative supply of skilled workers; an increase in minimum wage and unionization rates benefiting low-wage workers more than high-wage workers; and a degradation of tertiary education (Lustig et al., 2013). In this context, the minimum wage in Bulgaria as shown in Figure 4, increased from 57 Euro in 2003 to 92 Euro in 2007, and more importantly in real term, wages increased from 3.8% in 2003 to 10.6% in 2007. Colclough et al. (2010) explain that the relative decline in the wage returns to primary education over time may be due to both supply-side and demand-side factors, working separately or in a combination. Azevedo et al. (2013) show that the decline in the skills premium has been driven by an increase in the supply of experienced and educated workers. Hence the excess supply of skilled labour in 2007, as shown in Figure 2, can lead to low returns to education.

[insert Figure 4 about here]

Another interpretation of this empirical phenomenon, following Fersterer and Winter-Ebmer (2003), would be a decreasing quality of education. A decreasing quality could come from increasing student-teacher ratios, declining quality of teachers, curriculum changes or simply a decreasing average quality of students. However, according to the official statistical data the student - teacher ratios have not increased in Bulgaria. Between 2003 and 2007, student-teacher ratios decreased from about 13:7 to 12:8 at the upper secondary level.¹⁶ Furthermore, if enrolment in school is based on the relative abilities of students, rising enrolment should bring more less able students into higher education. Finally, the decreasing trend in the rates of return to education could also be linked to the economic path the country has undergone and, more importantly the recent financial crisis.¹⁷ The decline may be due to the increased relative supply of educated labour and the decreased relative demand for labour due to the adverse labour market effects of the 2008–2009 economic crisis. As can be seen from Figure 5, the supply of university educated workers has increased in the latter period, thus we may suggest that adjustment in the labour market could have been made through the change in the supply of educated workers. Moreover, on the whole, the crisis seemed to have hit the more educated particularly hard (Coup and Vakhitova, 2010).

[insert Figure 5 about here]

¹⁶Source: Eurostat Statistics Explained.

¹⁷We should acknowledge that the period between 2003 and 2007 was characterized by continued robust growth and intensive reform efforts that culminated in EU membership on January 1, 2007. Some other studies show that rates of return start declining once higher levels of development have been achieved. In particular, during the 2000s, in Ecuador, Brazil, Paraguay, Peru and Chile, where the overall inequality declined, the return to primary, secondary and tertiary education versus no schooling or incomplete primary schooling declined (Lustig et al., 2013). Unless the growth of physical capital kept up or technological change took place, returns had to fall. Thus, the falling return to higher education is evidence of positive economic development (Fox and Gaal, 2008).

4.2. Evolution of returns to education across distribution

While the current study is unable to examine a systematic link between returns to education and economic reforms, as in Flabbi et al. (2008), we can indicate that heterogeneity in estimated returns to education coefficients suggests that non-competitive forces might have determined wage levels and their distributions in Bulgaria. We draw this conclusion from the QR estimates showing how returns to education has evolved at different points of the earning distribution. Table .3 shows estimated returns to education over time at the main quantiles for men and women, respectively. The results demonstrate that the average returns to education in Bulgaria, for both men and women, were driven by an increasing trend in returns at the upper end of the conditional wage distribution. In 1986 the point estimates at the top of the distribution were insignificant and even negative. In 2003, the rate of returns to education at the 90th quantile rose to 5.9% for men and 6.7% for women. For women, the changes in returns to education at the lower part of the distribution are roughly proportional over time. The spread in returns between the 10th and 90th percentiles was higher for men as compared with women. Interestingly, the gap ($\ln q_{90} - \ln q_{10}$), has widen indicating an increase wage inequality. In 2010, while wages of the least skilled as measured by the lower quantiles of the earnings distribution are found insignificant for both men and women, the wages of the most skilled as measured by the the upper quantiles of the wage distribution are found at 2.3% for men and 3.9% for women.

The findings of increased wage inequality are in line with Tsanov and Ivanova (2012) who conclude that inequality in Bulgaria increased after 2006. The increase in income inequality (2004–2010) involved a period of economic growth and the financial crisis. The enforced restrictions on incomes in the public sector during the 2008–2009 financial crisis contributed significantly to an increase in inequality. Also, to a greater extent, the economic prosperity reflected the higher earnings (Zahariev, 2011). Furthermore, Tsanov and Ivanova (2012) consider that Bulgaria is a country with a high level of external migration, which affected inequality in different aspects mainly as it changed the size and structure of the labour force towards lessening the participation rate and worsening its composition by age and attained education. Around 395 thousand people (roughly 5% of the population) left the country during the period 2001–2011. The majority of these were young people 20–30 years of age (Tsanov and Ivanova, 2012). In 2001, Bulgaria was removed from the black Schengen list that marked the beginning of the so-called EU pre-accession period (2001–2006). Bulgarian citizens were granted visa-free entry and three months visa-free residence in Schengen countries. By the end of 2007, the migration data from the statistics of receiving countries indicates that there is an increase from 166 thousand to about 310 thousand emigrants from Bulgaria resided in the EU-15 (See Figure 6). Thus we can also hypothesise that more able students are heading out of the country for higher education and thus the pool left behind is lower quality students.¹⁸ This combined with the changing composition of the occupational and industry structure of the economy post access to the EU, might have resulted in a specialization in lower skill jobs, and jobs with lower returns to education in general.

[insert Figure 6 here]

¹⁸Research on Bulgarian migrants education level is limited and no systematic record of data collection regarding migrant population by skill level is available.

4.3. *Are returns to education uniform across all regions*

One point that could be raised with regards to the above decline in estimated returns to education in Bulgaria is that it could be driven by heterogeneity across regions. If returns to education dropped significantly in a few regions, the average returns to education might decline, but returns may still be high in a few regions. Uwaifo (2006) shows the importance of looking at returns for different regions in a country because average returns to education might hide significant differences across regions. We investigate this possibility by estimating the earnings equation by regions in 2003 and 2007. Our focus is on the following two questions: Do the returns to education differ across regions in Bulgaria? Second, is the decline in the returns to education uniform across the regions. Figure 7 shows the difference in average returns to education in 2003 and 2007.¹⁹ In response to the question on differences across regions in returns to education, it is clear that there is a statistical difference in the returns to education across some regions in Bulgaria. For example, in 2003 the capital Sofia had an average return of 0.101, while Blagoevgrad had a return 0.035. Secondly, returns to education have declined across every region in Bulgaria.²⁰ However, the decline in returns to education has been non-uniform. For instance, the average returns to education in Varna fell quickly between 2003 and 2007 from 0.069 to 0.022, respectively. In contrast, Blagoevgrad only had a 1.3 percentage point decrease in returns (from 0.035 to 0.021). Considering that ability does not vary across regions in Bulgaria, these results might provide evidence of a disparity in reduction in average returns to education over time and across regions in Bulgaria. However, returns to education have declined significantly across all regions in Bulgaria, and hence the overall decline is not driven by significant change in few regions.²¹

[insert Figure 7 about here]

4.4. *Evidence from different age groups*

The average rate of return to education may conceal important differences between age groups. If the demand and supply of labour argument is accurate, the increase in skilled labour force would occur at the younger, recently graduated cohorts. We would expect that the younger age cohort should see a greater decline in returns to education in comparison to other age cohorts over time. In contrast, if the decline in returns is simply a trend downwards, then we should see similar trending across all age groups (Gonzalez and Oyeler, 2011). Figure 8 shows the estimated returns to education separately for younger and older groups in support of this thesis.²² We focus on the results of the 18-25 age cohort, which contains the new entrants to the work force. The interesting thing to note, is that returns for both age groups dropped between 2003 and 2007, but as is the case for the 18-25 age group, their returns had declined to insignificant and negative levels in 2010 and 2012.²³

¹⁹We estimate the returns for each region in 2003 and 2007 using the same specification as in Table 2. The estimates on which these tables are made are available on request.

²⁰Note the decline is depicted by changing colors over the two years.

²¹The differential changes in returns across regions are outside the scope of this paper.

²²We estimate the returns for each group in each year of available data.

²³Several studies show that wage patterns have changed substantially over time across cohorts (see e.g. MaCurdy and Mroz (1995), David and Lemieux (2001)). However, cross-section data no longer approximate the life-cycle earnings or schooling returns of any particular individual (Heckman et al., 2006). Therefore, the use of data that follows actual cohorts over the life cycle is essential to accurately measure their true earnings pattern and estimate the education premiums experienced by individuals.

[insert Figure 8 about here]

5. Conclusion

Using extensive and comparable data sets collected between 1986 and 2012 this paper provides a broad assessment of the returns to education in Bulgaria. The framework is that evolution of income is determined by changes in human capital and the rate of return to human capital. The main question addressed concerns the hypothesis whether Bulgarian returns to education rise or fall during the transition process and what has been happening in the years after the EU accession.

A comparison of our results with previous studies, suggests that despite being in a similar position in terms of human capital in 1986 as in 2003, Bulgaria ended with a completely different situation in 2003, which was more than 10 years after the start of the transition reforms. The estimates also show that returns to education are statistically significant and lower than the international average of 7% to 8% and certainly broadly similar to other transition countries, such as the Ukraine. The obtained empirical results place Bulgaria close to the group of transition countries such as Czech Republic, Hungary, Slovenia and Slovakia. Since 1997, Bulgaria has implemented a package of substantial reforms and faced dramatic economic challenges caused by the EU accession. Moreover, the country is classified in the group of countries that are lagging behind in the reforms, compared to the advancers from Central Europe and Eastern Europe. Therefore, one can attribute the trends in the estimated returns to the different pace of economic restructuring.

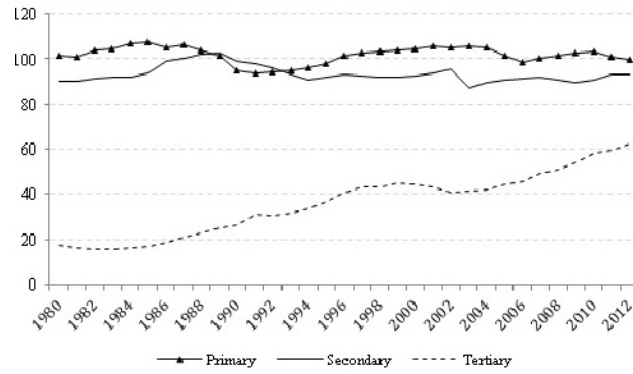
Over the period of transition, which continued until early 2003, we find an upward trend in the evolution of returns to education in Bulgaria. The average returns to one additional year of education rose from 1.1% to 5.1% for men and from 2.1% to 5.9% for women. The findings of a low return to education in 1986 are in line with previous studies that estimate returns to education in transition economies (Brainerd, 1998; Katz, 2002; Newell and Reilly, 1996). Our results confirm that the largest increase in the rate of returns to education took place in the early transition period. For men, the OLS estimate of the return to education increased from 1.1% in 1986 to 4.5% in 1995 and from 2.1% to 7.0% for women respectively. Estimates of earnings function using data from Russia and Eastern Europe exhibit the same increasing tendency (Brainerd, 1998; Chase, 1998). These results clearly suggest that market reforms in Bulgaria led to the productivity augmenting factors being rewarded accordingly. The pattern of findings is not surprising, as returns to education increased in all post-Soviet countries from very low levels.

However, the paper shows an interesting dynamic in the estimated returns. The increasing trend in the estimated returns have taken an inverted U-shape after 2003, the EU pre-accession period, which poses a new puzzle to be solved. Exploring spatial variation in education returns, one can see that the overall decline after 2003 is not driven by significant change in few regions. We show that returns to education have been declining across most regions in Bulgaria. The relatively low returns to education found in 2007 and confirmed in 2010 should be considered by the policy-makers aiming to break the vicious cycle: poor education, poor labour market outcomes, poverty, and welfare dependency. The possible factors responsible for this decline are the increased relative supply of educated labour force recently and the decreased relative demand for labour due to the adverse labour market effects of the recent recession. We also see that the decline in estimated returns to education is greater for the younger age cohort.

This paper further studies the evolution of returns to education using quantile regression techniques. Not all individuals benefited equally from education over the examined period. In the

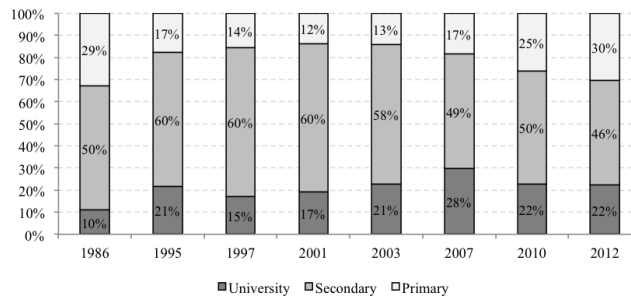
early transition, individuals at the lower part of the earnings distribution appear to have benefited more from education as compared to their counterparts at the upper part of the distribution, lending support to the notion that education could have been substituted for low ability. Whereas the return for males in 1986 at the 10th percentile was 2.8%, it tended to be insignificant at the 90th percentile. Similarly for women, the rate of returns to education at the 10th percentile was 5.2% and it turned to negative at the top of the distribution. Over the examined period, the most prominent increase in the wage premium occurred at the top of the distribution, where the rate of returns to education, in particular for women, increased from a negative and insignificant sign in 1986 to 7% in 2003, however it dropped to 2% in 2007. An important finding is that the returns to education fall has been most marked in the top end of the earnings distribution for both men and women. In particular, the rate of returns to schooling in 2007 was found to be lower for the more skilled individuals, conditional on their observable characteristics. This suggests that schooling does not have a positive impact upon within-levels wage inequality. Factors such as skills mismatch, ability-schooling interactions and school quality or different fields of study may be driving this result. In 2010, while wages of the least skilled as measured by the lower quantiles of the earnings distribution were insignificant for both men and women, the wages of the most skilled as measured by the the upper quantiles of the wage distribution were found at 2.3% for men and 3.9% for women. It would be expected that the returns to education would continue rising in Bulgaria. However, in order to shed further light of the magnitude and the factors driving these changes, further research is necessary based on the data for more cross-sections over time.

Figure .1: Evolution of gross enrolment rates in Bulgaria, both sexes (%)



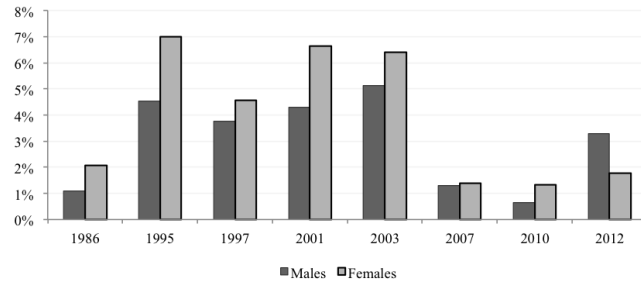
Source: UNESCO database.

Figure .2: Educational structure of employed % respondents in Bulgaria over time



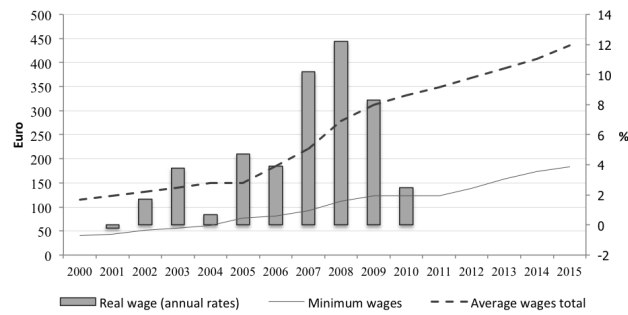
Note: The difference to 100% due to those with no education; Source: Author's calculation based on survey data.

Figure .3: Returns to education over time in Bulgaria 1986-2012, men and women



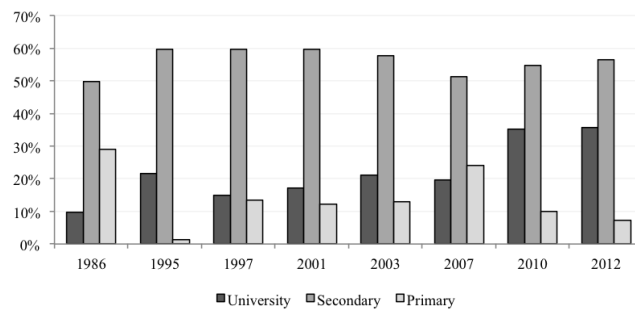
Source: Author's linear regression estimates.

Figure .4: The minimum, average and real wage dynamics in Bulgaria, 2000–2015



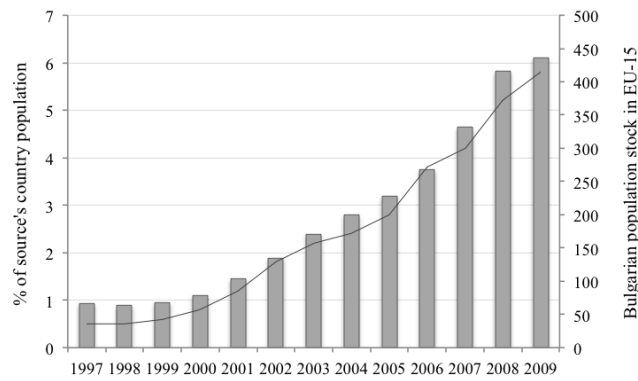
Source: Statistical Yearbook, National Statistics Institute, selected years.

Figure .5: Employed persons by education level in Bulgaria, 1986–2012



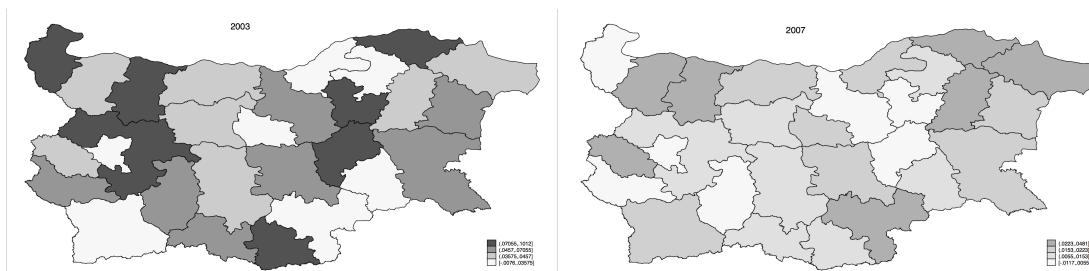
Source: Author's projection based on survey data.

Figure .6: Share of Bulgarian's population residing in the EU-15



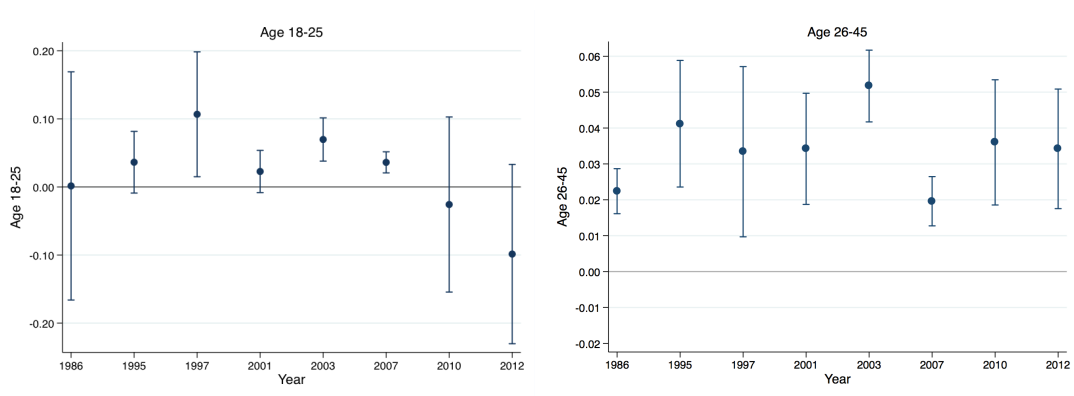
Source: Author's projection based on Holland et al. (2011) data and Eurostat population statistics.

Figure .7: Estimating return to education across regions, 2003 and 2007



Source: Author's calculation based on survey data.

Figure .8: Estimating return to education by age groups, 1986–2012



Source: Author's calculation based on survey data. Showing estimated coefficient and 95% confidence intervals.

Table .1: Descriptive statistics Bulgarian working samples, 1986–2012

Variable	1986		1995		1997		2001		2003		2007		2010		2012	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
Log hourly earnings	0.96 [0.46]	0.94 [0.46]	4.91 [0.59]	4.62 [0.61]	5.91 [0.85]	5.66 [0.77]	1.52 [0.67]	1.34 [0.54]	1.62 [0.56]	1.46 [0.52]	2.01 [0.58]	2.02 [0.57]	2.7 [0.48]	2.75 [0.45]	2.78 [0.48]	2.75 [0.48]
Years in education	10.14 [3.36]	10.19 [3.46]	11.18 [3.08]	11.45 [3.04]	11.68 [2.84]	12.13 [2.86]	11.41 [3.20]	12.10 [3.30]	13.06 [3.42]	13.88 [3.42]	10.26 [3.69]	10.29 [3.79]	11.53 [3.17]	12.00 [5.02]	12.16 [2.94]	12.33 [3.66]
1 if primary	0.30 [0.46]	0.28 [0.45]	0.20 [0.40]	0.15 [0.35]	0.15 [0.36]	0.15 [0.33]	0.14 [0.35]	0.10 [0.30]	0.15 [0.36]	0.11 [0.31]	0.28 [0.45]	0.28 [0.45]	0.25 [0.43]	0.23 [0.42]	0.17 [0.38]	0.20 [0.39]
1 if secondary	0.50 [0.50]	0.49 [0.50]	0.61 [0.49]	0.58 [0.49]	0.64 [0.48]	0.56 [0.50]	0.64 [0.48]	0.56 [0.50]	0.62 [0.49]	0.53 [0.50]	0.50 [0.50]	0.49 [0.50]	0.59 [0.49]	0.48 [0.50]	0.65 [0.49]	0.49 [0.50]
1 if university	0.10 [0.30]	0.09 [0.29]	0.17 [0.38]	0.26 [0.44]	0.13 [0.33]	0.17 [0.38]	0.14 [0.34]	0.21 [0.41]	0.17 [0.37]	0.26 [0.44]	0.17 [0.37]	0.18 [0.39]	0.15 [0.38]	0.27 [0.45]	0.19 [0.41]	0.29 [0.46]
Potential exp	30.07 [14.64]	31.37 [15.24]	22.47 [11.40]	20.94 [9.94]	22.34 [10.84]	20.25 [9.47]	21.79 [11.74]	20.25 [10.80]	19.97 [12.26]	18.65 [11.18]	22.30 [17.47]	24.20 [18.57]	28.04 [14.70]	29.01 [14.08]	28.32 [13.19]	28.19 [13.22]
1 if less 1 year	0.03 [0.18]	0.04 [0.19]	0.15 [0.36]	0.13 [0.33]	0.31 [0.46]	0.26 [0.44]	0.14 [0.34]	0.16 [0.37]	0.27 [0.44]	0.23 [0.42]	0.14 [0.34]	0.14 [0.34]	0.19 [0.40]	0.16 [0.36]	0.81 [0.39]	0.77 [0.41]
1 if 1-2 years	0.03 [0.17]	0.03 [0.16]	0.06 [0.24]	0.05 [0.22]	0.07 [0.26]	0.07 [0.24]	0.07 [0.26]	0.07 [0.26]	0.18 [0.38]	0.16 [0.37]	0.17 [0.38]	0.15 [0.36]	0.04 [0.19]	0.04 [0.20]	0.04 [0.19]	0.04 [0.18]
1 if 3-5 years	0.09 [0.29]	0.09 [0.29]	0.13 [0.33]	0.12 [0.33]	0.14 [0.35]	0.10 [0.29]	0.15 [0.36]	0.13 [0.34]	0.19 [0.39]	0.21 [0.40]	0.20 [0.40]	0.20 [0.40]	0.05 [0.21]	0.08 [0.26]	0.05 [0.22]	0.08 [0.27]
1 if 6-10 years	0.16 [0.36]	0.17 [0.38]	0.15 [0.36]	0.19 [0.39]	0.13 [0.34]	0.20 [0.40]	0.26 [0.44]	0.24 [0.43]	0.12 [0.33]	0.14 [0.35]	0.15 [0.36]	0.16 [0.37]	0.06 [0.21]	0.05 [0.22]	0.04 [0.19]	0.05 [0.21]
1 if more 10 years	0.68 [0.46]	0.67 [0.47]	0.51 [0.50]	0.51 [0.48]	0.35 [0.48]	0.39 [0.49]	0.39 [0.49]	0.39 [0.49]	0.24 [0.43]	0.26 [0.44]	0.34 [0.47]	0.35 [0.48]	0.06 [0.23]	0.07 [0.25]	0.06 [0.23]	0.06 [0.24]
1 if married	0.82 [0.39]	0.86 [0.35]	0.81 [0.40]	0.82 [0.39]	0.82 [0.38]	0.82 [0.38]	0.76 [0.43]	0.73 [0.45]	0.68 [0.47]	0.73 [0.44]	0.57 [0.50]	0.56 [0.50]	0.53 [0.50]	0.60 [0.49]	0.54 [0.50]	0.55 [0.50]
1 if Bulgarian	0.85 [0.36]	0.87 [0.34]	0.92 [0.27]	0.91 [0.29]	0.91 [0.28]	0.91 [0.33]	0.88 [0.27]	0.92 [0.30]	0.90 [0.31]	0.90 [0.31]	0.80 [0.40]	0.81 [0.40]	0.78 [0.42]	0.79 [0.40]	0.79 [0.40]	0.80 [0.40]
1 if in public	0.81 [0.39]	0.82 [0.39]	0.81 [0.35]	0.86 [0.44]	0.74 [0.38]	0.82 [0.50]	0.43 [0.50]	0.44 [0.46]	0.31 [0.49]	0.39 [0.43]	0.25 [0.43]	0.26 [0.44]	0.26 [0.42]	0.36 [0.47]	0.26 [0.44]	0.37 [0.48]
1 if urban	0.53 [0.50]	0.54 [0.50]	0.74 [0.44]	0.77 [0.42]	0.78 [0.41]	0.79 [0.41]	0.75 [0.43]	0.81 [0.39]	0.77 [0.42]	0.81 [0.39]	0.75 [0.43]	0.76 [0.43]	0.66 [0.42]	0.72 [0.44]	0.65 [0.47]	0.71 [0.44]
N	3213	3238	708	609	727	804	729	709	1296	1186	4301	4340	601	760	570	768

Note: Standard deviations are given in brackets.

Table .2: Returns to education in Bulgaria 1986–2012 by gender

	<i>MEN</i>		<i>WOMEN</i>	
	OLS	Median	OLS	Median
	(1)	(2)	(1)	(2)
1986	0.0110*** (0.003)	0.0068** (0.0029)	0.0207*** (0.0029)	0.0114*** (0.0026)
<i>N</i>	3213	3275	3238	3275
1995	0.0453*** (0.0097)	0.0347*** (0.009)	0.0700*** (0.0113)	0.0685*** (0.0094)
<i>N</i>	708	723	609	656
1997	0.0397*** (0.0119)	0.0489*** (0.0171)	0.0454*** (0.0115)	0.0370*** (0.0148)
<i>N</i>	727	895	804	988
2001	0.0431*** (0.0117)	0.0319* (0.0189)	0.0664*** (0.0094)	0.0745*** (0.0153)
<i>N</i>	729	886	709	826
2003	0.0512*** (0.0048)	0.0025 (0.0021)	0.0598*** (0.0046)	0.0066** (0.0028)
<i>N</i>	1296	1965	1186	1731
2007	0.0134*** (0.0025)	0.0159*** (0.0037)	0.0145*** (0.0024)	0.0155*** (0.00335)
<i>N</i>	4301	5030	4340	5115
2010	0.0064 (0.0051)	0.0163 (0.0124)	0.0133 (0.0082)	0.0122** (0.0059)
<i>N</i>	761	1057	1026	1367
2012	0.0332*** (0.0065)	0.0469*** (0.0147)	0.0178*** (0.0049)	0.0249** (0.0091)
<i>N</i>	735	955	1014	1014

Notes: Standard errors in parentheses. * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

Table .3: Evolution of returns to education across distribution in Bulgaria, 1986–2012

MEN					
QR	10th	25th	50th	75th	90th
1986	0.0281*** (0.0043)	0.0205*** (0.0034)	0.0098*** (0.0033)	-0.0005 (0.0035)	0.000 (0.0001)
1995	0.0451*** (0.0161)	0.0292*** (0.0086)	0.0236** (0.0094)	0.0308** (0.0122)	0.0395* (0.0218)
1997	0.0172 (0.0205)	0.0270 (0.0167)	0.0352*** (0.0107)	0.0450*** (0.0144)	0.0678*** (0.0161)
2001	0.0344** (0.0146)	0.0310*** (0.0090)	0.0427*** (0.0093)	0.0305*** (0.0104)	0.0166 (0.0198)
2003	0.0383*** (0.0059)	0.0463*** (0.0054)	0.0461*** (0.0054)	0.0490*** (0.0057)	0.0589*** (0.0108)
2007	0.0190*** (0.0024)	0.0188*** (0.0027)	0.0158*** (0.0027)	0.0160*** (0.0039)	0.0142** (0.0058)
2010	0.0037 (0.0047)	0.0031 (0.0041)	0.0140*** (0.0045)	0.0242*** (0.0047)	0.0232** (0.0064)
2012	0.0193** (0.0097)	0.0317*** (0.0074)	0.0363*** (0.0072)	0.0352*** (0.0079)	0.0233** (0.0118)
WOMEN					
1986	0.0524*** (0.0050)	0.0305*** (0.0027)	0.0171*** (0.0029)	0.0082** (0.0035)	-0.0032 (0.0021)
1995	0.0557*** (0.0093)	0.0526*** (0.0058)	0.0644*** (0.0070)	0.0448*** (0.0120)	0.0458** (0.0192)
1997	0.0571*** (0.0144)	0.0383*** (0.0116)	0.0492*** (0.0153)	0.0604*** (0.0175)	0.0436** (0.0213)
2001	0.0591*** (0.0097)	0.0672*** (0.0069)	0.0566*** (0.0066)	0.0434*** (0.0130)	0.0533*** (0.0139)
2003	0.0478*** (0.0070)	0.0505*** (0.0044)	0.0625*** (0.0064)	0.0699*** (0.0068)	0.0673*** (0.0100)
2007	0.0256*** (0.0027)	0.0154*** (0.0025)	0.0157*** (0.0024)	0.0161*** (0.0034)	0.0197*** (0.0052)
2010	0.0026 (0.0034)	0.0139*** (0.0042)	0.0245*** (0.0034)	0.0311*** (0.0051)	0.0394*** (0.0072)
2012	0.0144** (0.0053)	0.0161*** (0.0068)	0.0183*** (0.0087)	0.0223*** (0.0083)	0.0224** (0.0075)

Notes: Standard errors in parentheses; * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$.

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