

VALUING HUMAN CAPITAL IN BALKAN TRANSITION COUNTRIES

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1. Introduction

Valuation of human capital has attracted a great deal of attention in the studies on the pro-market reforms in post-socialist economies. A large body of literature has documented substantial rise in private returns to education during early transition from central planning to market economy¹. As of the collapse of the communism the Mincerian returns to a year of schooling in transition economies was typically about 4% except for Hungary, while 10 years later it rose to about 8% (Fleisher et.al., 2004)². A fewer studies measuring the value of human capital in the late 90s and the beginning of 21st century have provided evidence that after initial increase during early transition private returns to education leveled off. Munich et. al.(2004) show that the major increase in the rate of return to education for women in Czech Republic took place in the first phase of transition (1986-1996) and no further change has been observable in the later phase (1996-2002). Vodopivec (2004) argues that in Slovenia the process of re-evaluation of human capital was over by 1993. Kertesi and Kollo (2001) provide evidence that the major change in returns to education happened between 1989 and 1992 and neither wages nor productivity have grown afterwards.

The evidence on the effect of experience is mixed. The premium placed on a year of experience declined in Czech and Slovak Republics (Chase, 1998; Munich et.al, 1999), East Germany (Krueger and Pischke, 1995), Poland (Rutkowski, 1997), Russia (Nesterova and Sabirianova, 1998). Delteil et.al (2004) and Vodopivec (1997) show increasing returns to experience for younger cohorts in Hungary and Estonia respectively. Several papers focus on the wage differentials by gender and regions (e.g. Brainerd (2000), Jolliffe (2004), Hunt (2002), Reilly (1999); Juraida, 2003).

Despite the growing number of empirical studies, there are still several important limitations of the research devoted to the value of human capital in post-communist countries. Most of the studies rely on cross-sections or very short time series and relatively few have analyzed databases with long series of information on both before and after the radical transformations³. The number of studies that examine wage differentials and the role of human capital in wage determination as transition has progressed through 1990s are limited too⁴. Growing literature on the value of human capital in transition economies has tended to concentrate on several Central European countries (Czech and Slovak Republics, Hungary, Poland) and Russia. At the same time, Balkan countries have been disproportionately presented in publications on wage determination and still little is known about the role of education and experience in

¹ (Krueger and Pischke (1995) for East Germany, Rutkowski (1996) for Poland, Chase(1998) for Czech and Slovak republics, Kertesi and Kollo (2002) for Hungary, Lubyova and Sabirianova (2001) for Russia and Slovakia).

² Fleisher et.al.(2004) summarize 33 studies on 10 transition , including China, to compare changes in the returns to schooling over the period 1975-2002. Summary of the estimates on the returns to education during early transition is also provided in Svejnar (1998).

³ Notable exceptions are Andren et.al.(2004) that use data from 1950 to 2000 to estimate the evolution of the role of schooling in wage determination process in Romania and Fleisher and Wang (2004) that used retrospective data from 1950 to 1994 to analyse the wage determinants in China.

⁴ Notable exceptions are Munich and Terrel (2004) and Adamchek and Bedi (2002).

this process for Bulgaria, Romania and Serbia⁵. For the Balkan countries as well as for other transition economies the importance of various underlying causes of the changes in the value of human capital, (i.e. institutional factors, pace of restructuring and skill-biased technological shifts) remain unclear.

In an attempt to fill in the information gap concerned with the value of human capital in Balkan transition countries this paper seeks: i) to provide recent estimates of returns to education and experience in Bulgaria, Romania and Serbia using an extensive and comparable data sets collected in 2002 and 2003; ii) to test whether the labour markets reward education obtained after the reforms more than the skills gained under central planning. Skill obsolescence hypothesis is discussed and empirical evidence supporting it is provided by Flanagan (1998) and Filer et.al.(1999) for Czech and Slovak Republic, Kertesi and Kollo (2002) for Hungary and Orazem and Vodopivec (1997) for Slovenia.

In addition, comparing the results across the three countries the paper seeks to provide some explanation of the observed differences in the valuation of human capital within standard labour supply and demand framework and to relate them to the pace of economic development and degree of economic restructuring. On the one hand, expansion of higher education may lead to a skill-biased relative supply shift implying leveling off (if not declining) in returns to this type of education after the initial rise immediately after the abolishment of inflexible wage regime. On the other hand, returns to education and especially returns to higher education may continue to rise as transition progresses due to the skill-biased relative shifts in labour demand, improvements in the educational system, or increases in the “value of the ability to deal with disequilibria” (Shultz, 1975). Therefore, the direction and size of the changes in the value of human capital depend on whether the supply or demand effect will prevail. Besides, returns to various educational degrees can be affected in either direction by compositional changes in the labour triggered by large sectoral shifts with the pace of economic restructuring (Arden et.al, 2004).

The three Balkan countries resemble the characteristics of the educational system and wage settings observed in most Central and Eastern European economies under central planning. The educational system strongly emphasized vocational training and engineering relevant to the high demand in the large industrial sector. Wages were paid under the highly centralized wage grids and little variation has been observed with the level of education and occupation. In addition there is a common perception in the literature to view Bulgaria, Romania and Serbia as countries where reforms have proceeded more slowly compared to the advanced reformers of Central Europe.

⁵ Strong representations of the empirical literature on the Balkan countries in the field are Milanovic (1998), Ognjenovic (2002) and Lokshin and Jovanovic (2003) for Serbia and Montenegro; Jolliffe (2002), Falaris (2004) and Dimova and Gang (2004) for Bulgaria; Paternostro and Sahn (1999) and Skoufias (2003) for Romania.

While sharing common issues and pace of economic development the three Balkan countries differ in number of aspects thus providing a particularly interesting combination for measuring earnings associated with education. Romania is a country with a large agricultural sector while Serbia is confronted with a delayed transition and an erosion of skills (the lost generation problem). Bulgaria and Romania have displayed common patterns in the changing size and composition of the labour supply generated by the higher education reforms. Booming in tertiary education in the two countries⁶ resulted in a steady increase in the relative share of university graduates in the labour force. Similar to the most CEE countries a shift in enrolments from vocational schools towards general secondary education has occurred in Bulgaria and Romania where in Romania it has been particularly fast (see figure 2). In recent years the two countries have also showed considerable interest in the development of private sector as a provider of education including higher education. Serbia differs from Bulgaria and Romania with respect to the speed and scale of the educational reforms and their impact on the individual labour market outcomes. Since 1999 tertiary enrolment rates have fallen (OECD, 2002) in Serbia while at the same time the low general secondary enrolment rates go along with high vocational/technical enrolment rates. Unlike Romania and Bulgaria in Serbia the private institutions have still played a modest role as providers of higher education. The selected countries can be seen to characterize different stages of transition, hence allowing for some degree of variation in the returns to education and experience conditional on the overall progress of the economic and educational reforms. Observed differences in the degree and structure of expansion of tertiary education and in the pace of economic restructuring between Bulgaria and Romania on the one hand and Serbia on the other provide a fruitful basis of thorough studying of the impact of human capital on the individual's labour market performance and on wage determination in particular.

The structure of the paper is as follows. Section 2 reviews the characteristics of the data sets on which analysis draws on. Section 3 presents empirical strategy applied for estimation of wage regressions. Cross-country comparability is always a daunting task. We have attempted to fit comparable specifications to the samples across three countries in estimating earnings functions and controlling for selectivity bias by two-stage Heckman approach and thus, to situate the analysis in common framework across the three countries. Section 4 presents the main empirical results. Section 6 summarizes the main findings and conclusions stemming from the analysis and attempts to provide some explanations of the difference observed across countries.

⁶ . In the first half of 90s the number of students increased by 59% in Romania and as much as 4 times in Bulgaria.

2. Data

In Bulgaria and Serbia, the research makes use of Living Standards Measurement Surveys (LSMS) while in Romania the analysis draws on data from Integrated Household Budget Survey. In Serbia the survey was conducted in June 2002, in Bulgaria in October in 2003 and throughout the whole year 2002 in Romania. LSMS were implemented as the Governments' own studies supported by the World Bank advisory teams⁷. The data sources were chosen because they contain abundant set of personal, household and local environment characteristics as well as rich information on both labour market status and welfare of individuals and households. In fact, the used data sources are considered the largest and most comprehensive studies of living standards in the last decade in all three countries⁸. Similar structure of the questionnaire and sample design as well as the coincidence of timing makes feasible comparative analyses across the three countries.

The surveys are nationally representative and were designed as two-stage sampling surveys. At first stage each country was stratified by main regions (6 in Serbia, 28 in Bulgaria and 42 in Romania) and within each region by urban and rural areas. In each stratum obtained primary sampling units (PSUs) were selected with probability proportional to the size of the stratum. PSUs were enumeration districts. Once the PSUs were selected in each unit a constant number of households were selected and all the persons in the selected households were interviewed. The realized sample sizes were 6386 households in Serbia, 3715 households in Bulgaria and 22 000 in Romania.

In the analysis we focus on working-age adults who are older than 18 and younger than 65. The lower bond of 18 years is chosen since this is the official age of entering labour market in the three countries. Further, in the three samples there are few economically active under 18 years of age who have completed their schooling. The upper bond of 65 is higher than the official age of retirement in the three countries but the sample data indicate that many individuals continue to be economically active after the age of retirement. Besides, the bond of 65 is widely used (particularly in Europe) in the international comparisons and statistical publications containing information about working-age adults. All the persons with missing individual, household composition or income data were excluded from the analysis. The resulting effective sample sizes are 5088 persons aged 18-65 of which 1338 wage earners in Bulgaria, 4545 persons aged 18-65 of which 1996 wage earners in Serbia and 34174 persons aged 18-65 of which 18123 wage earners in Romania. The individuals included in the analysis are full-time workers engaged in wage sector. Self-employed and part-time workers are excluded. Romanian sample do not contain information about the hours worked in the month before the interview, so for the sake of

⁷ In Serbia the primary data collection was conducted by the Strategic Marketing and Media Research Institute (SMMRI), local research firm with an outstanding record in the survey data collection, in June 2002. In Bulgaria the field work was done by National Statistical Institute.

⁸ Previous studies of wage determinants in Bulgaria (Falaris (2004) and Jolliffe(2002) and Romania (Paternostro (1999) and Skoufias (1999)) use micro data from the same sources for previous years.

comparability the analysis is based on monthly wages for all three countries⁹. The wages refer to the month preceding the one interview was done. This means September 2003 for Bulgaria and May 2002 for Serbia. In Romania, the wages were adjusted to the monthly inflation because the interviews were done in several months throughout the year 2002. Earnings are computed as the sum of wage payments before taxes including all forms of wage-related benefits such as allowances for transportation and overtime pay.

Table 1 reports selected summary statistics of the samples used in the analysis. Some interesting stylized facts emerge from the tables indicating the similarities and dissimilarities among the three Balkan countries that are important for the subsequent analysis of returns to education. Bulgaria, Serbia and Romania have quite similar age and gender composition of working-age adults. Serbia and Romania display identical residential structure – 46% of the population in the 2 countries is rural. Unlike them Bulgaria is more urbanized country in which the proportion “urban: rural” population is 2:1.

Table 1 shows some differences in the educational structure of the working adults in the Balkan countries. Bulgaria has the largest share of higher educated people in the age group 18-65 - 20% of the respondents have attained post-secondary education against 11.7% and 12.3% in Serbian and Romanian samples respectively. The greater supply of higher educated labour in Bulgaria than in the other two Balkan countries suggests that returns to tertiary education could be expected to be lower unless there is large outward shift in the relative labour demand for more educated workers.

Another interesting finding is that every second Serbian working-age adult is with secondary vocational education whereas in Bulgarian and Romanian samples the same proportions amount to 36% and 23% respectively. As argued in the introduction the contracted supply of tertiary educated on the one hand and the excessive supply of vocationally-educated workers on the other in Serbia may have resulted in higher rewards to holders of university diploma and lower ones to graduates from secondary professional schools. Moreover, skills received in these schools are considered to be obsolete and non-reflecting the modern labour market demands.

The study focuses on the returns to specific types of educational degrees. That is way it is useful to consider the educational systems in the three countries in brief. The systems are similar across the three Balkan countries and are also similar to that used in other CEE countries. Elementary school begins at the age of 7 and runs for 4 years. Primary school follows for four more years and, at the end of grade seven or eight students have to chose an alternative from a multitrack system of secondary education. In general the secondary school options include: academic school (gymnasium); specialist schools that are

⁹ For Serbia and Bulgaria we tried wage specifications including hours worked in the right side of the model but it turned out to be insignificant. Various surveys point out that in the two countries people employed in private firms work extra hours. Therefore the impact of hours worked is captured in part by the dummy variables on the sector of employment.

also academically oriented but are more specialized and selective (i.e. in foreign languages or natural sciences); technical schools for 4 years providing vocational training and 2-3 years of vocational schools that specialize in industrial skills and craft training. As regards to post-secondary education the two-tiered, (bachelor/master degree) system is already in place.

In the current study, education is measured by a set of dummy variables for the degree obtained. The degrees include primary, secondary general, secondary professional and tertiary (post-secondary) education. The omitted category is elementary school or less. Measuring education through dummies for various types of degrees is preferred to the estimates of returns to education using number of years of schooling because the imputation of the years of schooling from the highest level of educational attainment is likely to be associated with a measurement error¹⁰. Furthermore, the highest level of educational attainment by type of degree obtained allows the rate of return to vary across types of completed education and reflects criticism of the assumption of a constant rate of return to each year of education (Heckman, Layne-Farrar and Todd, 1996).

Unfortunately in all three countries data sources do not asked about individual's experience so we use potential experience calculated as age minus years of schooling minus six. We are aware of the fact that this is not the perfect measure of actual work experience for women because of the periods of child bearing and rearing that they may have had. At the same time it is well established that in all 3 countries the labour market participation rate of females has been quite high during both the central planning and transition period. Hence, the potential experience can be accepted as not ideal but a reasonable measure that is probably closer to the actual experience.

3. Methodology

We apply classical Mincer-Becker semi-log earnings function as the framework for studying educational outcomes. Wage equations were estimated in the following form:

$$\ln(w_i) = \alpha + \sum_{j=1}^m \beta_{ij} X_{ij} + \gamma_i E_i + \delta_i E_i^2 + \sum_{j=m+1}^n \beta_{ij} Z_{ij} + \sum_{j=n+1}^k \beta_{ij} W_{ij} + \varepsilon_{ij} \quad (1)$$

where $\ln(w_i)$ is the logarithm of monthly earning of a full time employee i ; vector X_{ij} includes set of dummy variables for the highest degree obtained; E_i is the number of years of potential labour experience. Vector Z_{ij} contains demographic and demand-side control variables – dummies on ethnicity, firm's size, ownership type and sector of employment. Serbian regression includes dummies on the job tenure and distinguishes whether the private firms are registered or not. Romanian

¹⁰ Munich et al (2004) caution that studies based on years of schooling imputed from the highest degree obtained rather than using actual years in schooling as an explanatory variable have probably overestimated returns to education.

specification includes a set of occupational dummies as independent variables. The last set of independent variables W_{ij} in the equation (1) includes controls for the area where the individuals live. We used local unemployment rate as a proxy for the local labor market conditions. In each national regression a set of regional dummies relevant for the country was incorporated in the model in addition to the residence place classified as capital, urban and rural place. All wage regressions were run for the sample as a whole and for men and women separately.

We first estimate semi-log earnings function described in (1) and then to test whether the “new” education gained after the beginning of the educational reforms is valued more than the education obtained under previous system we run extended wage regressions including various interaction terms. A common concern when estimating wage regressions is the problem of sample selection bias caused by the censored and hence non-representative character of the data used. Due to the self-selection, the standard OLSs estimates become both biased and inefficient. Two-step Heckman and full-maximum likelihood (FIML) methods have become standard estimation procedures for empirical wage equations. The sample selection model employed by the two methods includes:

$$y_{1i}^* = x_{1i}\beta_{1i} + \varepsilon_{1i} \quad (2a)$$

$$y_{2i}^* = x_{2i}\beta_{2i} + \varepsilon_{2i} \quad (2b)$$

$$y_{1i} = y_{1i}^* \text{ if } y_{2i}^* >$$

$$y_{1i} = 0 \text{ if } y_{2i}^* \leq 0$$

Model (2b) is either a probit-type selection equation that describes the propensity to work and to have an observed wage or equation with continuous dependent variable indicating the number of hours worked in the salaried employment. In this paper the selection equation is modeled as probit that indicates whether the individual is a wage earner. Variables y_{1i}^* and y_{2i}^* are unobserved, we observe only wages for actual earners, for whom $y_{2i}^* > 0$. The estimates obtained either by two-stage Heckman or FIML methods are consistent and in general, FIML estimators are more efficient than two-stage Heckman estimators are.

Despite the large-sample desirable properties of two-stage Heckman and FIML estimators recently, a good deal of criticism has been leveled at them on a number of issues. Puhani (2000) provides a brief overview of the literature containing comparative analysis of the appropriateness and properties of OLS versus two-stage Heckman estimators and concludes that the method dealing with the censoring and selection bias should be decided after some preliminary exploratory work. Following literature, we paid special attention on the following factors in choosing the most appropriate estimator: degree of censoring; identification of the Heckman model; degree of correlation between the error terms and between the sets of explanatory variables in selection and outcome equation and validity of distributional

assumptions. The first step was to find appropriate exclusion restrictions, namely to find exogenous variables that belong to the selection equation (and determine probability of being engaged in salaried employment) but not to the wage equation. Our samples are enough favorable in this respect and allow us to include several variables that are considered to be important determinants of labour supply such as household size, number of children, number of unemployed persons, number of disabled, number of pensioners, non-labour income, labour income of other household members and income in kind. Then following Leung and Yu(1996), Breen(1996) and Rendtel(1992) we use R^2 from the regression of inverse Mills ratio (λ)¹¹ on the set of explanatory variables from wage equation as a decisive criterion for appropriateness of FIML and two-stage Heckman to the standard OLS. The high values of R^2 (between 0,6 and 0,8) and the significant values of the correlation coefficients between the error terms (ρ) (see table 2) together indicate the need to correct for selectivity bias using FIML and two-stage Heckman instead of subsample OLS¹².

Overall FIML provides more efficient estimates than two-stage Heckman method but empirical evidence has been provided that this superiority is greater the higher is the correlation between the error terms of the selection and outcome equation. Stolzenberg and Relles (1990) and Nawata (1993,1994) show that FIML dominates Heckman especially for $\rho > 0.9$ otherwise for large samples the two-stage Heckman estimates also give reasonable estimates in terms of efficiency. In the present study we employed both FIML and two-stage Heckman methods. It turned out that the results are quite close therefore we report here only the estimates from the two-stage Heckman estimation. Correction for selectivity bias changed substantially the results obtained through OLS for Romania and Serbia, but for Bulgaria, the differences are not so pronounced¹³.

4. Empirical results

4.1. Selection

In the present study, the focus is on the returns to specific degrees of human capital. However, the selection equation estimates also reveal a number of interesting findings and provide useful framework for further analysis. Therefore, it seems reasonable to start with a brief comment on the results from the probit equation¹⁴. The first interesting finding is concerned with the negative impact of sample selection on the earnings function in 8 of the 9 estimated models. The only exception is the sample of Bulgarian women where we found positive but significant (λ) at 10% level selection. Following Nicaise (2001), one may interpret this result as an indication of the crowding out effect in the labour markets in the three countries. People engaged in the salaried employment tend to have lower wages than an average

¹¹ Calculated from the probit selection equation.

¹² Breen (1996) and Puhani (2000) suggest total outcome equation to be estimated by uncorrect OLS only in case that R^2 from the auxiliary regression of inverse Mills ratio (λ) on the set of explanatory variables from wage equation and/or the correlation coefficient (ρ) are around zero.

¹³ FIIML and OLS estimates are available from authors upon request.

¹⁴ Detailed results from the estimation are available from authors upon request.

randomly chosen person from the total population. The negative sign of (λ) is consistent with hypothesis of downward pressure of unemployment on wages. It implies that the cheaper workers, threatened by the risk of unemployment (other factors being equal), are keener to stay in the wage sector than the more expensive ones. It is likely that the more educated accept jobs below their level of qualification led by motivation to escape from unemployment. As a result, the less skilled and unqualified are displaced from the wage sector as the estimates of coefficients of educational dummies in probit equation show.

Probit estimates clearly indicate that probability of being employed in the wage sector increases monotonically with the level of education in each country for both men and women¹⁵. Regression results reveal the disadvantaged position of ethnic minorities, youth and older than 50 in finding salaried job in both Romania and Bulgaria. Serbian sample does not contain data on ethnicity but as regards to the age the probit estimates indicate that young persons (up to 30) have the lowest chance of being hired in the wage sector. Regional disparities play substantial role in ensuring wage employment in all three countries. Men and women have an equal access to the wage sector in both Bulgaria and Romania but not in Serbia where women have statistically significantly lower chance of being hired than men. In terms of family composition and welfare regression estimates show different patterns across countries. In line with the labour supply theory (Becker, 1965) in Bulgaria the factors that influence negatively the decision to participate in the wage sector are the labour income of other household members and the social transfers. This is valid for both sexes. Unlike Bulgaria in Serbia all income variables are insignificant. In Romania, the only household factor that influences significantly the participation in the wage sector is the income in kind. The higher income in kind reduces the probability of being engaged in salaried employment. This finding is consistent with the larger share of rural population in Romania.

4.2. Returns to various educational degrees

While table 2 reports estimates from the wage equations for each of three countries for men and women separately and for the combined sample, table 3 presents marginal returns to education¹⁶. Several interesting results stand out from the wage regressions. In Bulgaria average returns rise consistently with education relative to those with elementary or lower education for both sexes. In Serbia and Romania, however, regression estimates point out higher rewards to education for men than for women. In both countries for men, each succeeding educational level brings wage premium but for women only the higher education brings a significant wage premium of 21.2% and 38.2% respectively.

Whereas Bulgarian university degree holders have the highest marginal return of about 85.7% for men and 87.9% for women, in Serbia and Romania the male university degree holders earn with 65% and 60.2% respectively more than those with the lowest education do. The results suggest that despite the

¹⁵ The only exception are the Serbian women with secondary general education for whom the education appears to be insignificant determinant of probability to find a salaried job.

¹⁶ Given the semilog functional form of the wage equation we have computed the marginal returns to education using formulae $exp(\beta)-1$ (see Halvorsen and Palmquist, 1980).

largest relative supply of higher educated in the labour force in Bulgaria these people receive much higher wages than their counterparts in Serbia and Romania do. An outward shift in the relative demand for more educated workers in Bulgaria most likely has triggered the higher returns to education, thus making schooling more valuable in Bulgaria than in its neighboring countries - Serbia and Romania

Another interesting finding stemming from the wage regressions refers to the valuation of vocational secondary education compared to the general secondary education. In all three countries males who graduated from vocational schools earn approximately much less than those who obtained general secondary degree (see table 3), supporting the view that the skills received in such schools are too narrow and inadequate to the modern labour market demands. However, as regards to women the results do not provide evidence that secondary general education brings significantly higher wages than the secondary vocational education. Explanation of this finding can be searched for in the employment composition of women and their chances of salaried employment in the Balkan countries.

Usually the lack of valuation of skills obtained in the formal educational system (most likely because they do not meet labour demands) pushes the people to invest in their human capital using post-graduate alternatives. In the present analysis, we measure the role of post-graduate training through including a dummy variable in the wage equations¹⁷. The results show that in Serbia post-graduate training increase the wage of a female employee by 20% while for men this premium is only 6%. The role of additional training is also significant in Bulgaria where participation in such post-graduate training increases the wage by 20.2% and 12.1% for men and women respectively. The importance of post-graduate training in wage determination hints at the existence of some imperfections in the formal educational system and its incapability to respond fully to the current labour market demands.

4.3. Returns to experience

The regression results reported in table 2 reveal different degree of valuation of experience in the three countries. The returns to experience are the highest in Romania for both men and women being equal to 2.5% and 2.8% respectively. In addition, only in Romania, as predicted by human capital theory, returns to experience are positive and then decline with the increase in experience after reaching its peak. In Bulgaria and Serbia, overall return to experience is approximately the same (1.3% and 1.2% respectively) but while in Bulgaria, the experience appears to be insignificant wage determinant for men in Serbia it is insignificant factor for female wages. In addition, in both countries, quadratic term of experience is positive and the earning-experience functions do not have well expressed concave shape. This finding maybe considered as a crude indication of the increasing appreciation of the education of young people that is received after reforms in the educational system. To explore further this hypothesis we run extended regressions using various interaction terms between education and experience.

¹⁷ Unfortunately Romanian data do not contain information about the participation in post-graduate training.

It is interesting to compare the results found with those for the other transition and more developed countries. Most of the empirical studies of wage determination in Central and Eastern European countries treat education as continuous variable that measures years of schooling¹⁸. Table 5 summarizes the latest available estimates for returns to education in selected transition economies from studies that measure education through dummies on the educational degrees. Empirical results obtained in the current study place Bulgaria close to the group of transition countries with the highest rates of returns – Czech Republic, Hungary, Slovenia and Slovakia. The rates of returns in education for this group as well as in Bulgaria are as large and for some of them even larger (i.e.Hungary) as in developed market economies¹⁹. Romania and Serbia provide lower rates of return to education than Bulgaria that are in the ranges of the ones obtained for Poland and Estonia. In contrary to the most of previous studies on transition economies that show no differences with regard to gender, Romania and Serbia reward human capital of women less compared to men.

One of the most interesting questions arising from the comparison of our results with those obtained for other transition countries is about dynamics of the returns to education over time. Wage adjustments depend on the speed of economic reforms and in particular on the speed of relaxation of legal, institutional and regulatory constraints on the wage-setting behavior (Fleisher et al, 2004). Having in mind that the Balkan countries are lagging behind in the reforms, compared to the advancers from Central and Eastern Europe it would be expected that the returns to education would continue rising in Bulgaria, Serbia and Romania. On the other hand the high rates of return to schooling in Bulgaria being at the range of the corresponding rates in the most developed market economies generates the question whether the wage adjustment is approaching its completeness, thus reflecting the much more rapid restructuring of the labour market than lengthy process of restructuring of the economy. In order to shed light of these issues it is necessary to explore further the changes in the valuation of human capital in Balkan countries during transition.

4.4. Changes in the valuation of human capital

The main limitation of our analysis is that it is based on a cross sectional data and does not allow comparing returns to education in the beginning of 21st century with those in mid or early 90s. It is also difficult to find other studies that provide reliable and comparable estimates of private returns to education in Balkan transition countries. The few exceptions²⁰ contain some methodological differences and therefore, are not directly comparable with present estimates. For example Arden et.al.(2004),

¹⁸ Usually years of schooling are imputed from the highest educational degree obtained. Numerous studies provide summaries of the estimated returns to schooling in transition economies including Fleisher, Sabirianova and Wang (2004), Boeri and Terrell (2002), Brainerd (1998), Munich, Svejnar and Terrell (1999), Rutkowski (2001).

¹⁹ For example Freeman and Katz (1995) using different country studies report the following values of coefficients of college education as compared to primary school education: 0.64 for UK, 0.73 for Western Germany, 0.56 for Italy and 0.63 for South Korea. For recent review of rates of returns across the world see Pschacharopoulos (2001).

²⁰ Milanovic (1998), Ognjenovic (2002) and Lokshin, M. and B.Jovanovic (2003) for Serbia and Montenegro; Jolliffe (2002), Falaris (2004) and Dimova and Gang (2004) for Bulgaria; and Paternostro and Sahn (1999), Skoufias (2003) and Earle et al. (2004) for Romania.

Ognjenovic (2002) and Skoufias (2003) report estimates to an additional year of schooling but not to the various educational degrees. Nevertheless, we were able to make additional calculations to derive estimates for returns to various educational degrees in 1994 for Romania (based on Paternostro and Sahn, 1999), in 1995 for Bulgaria (based on Falaris, 2004)²¹. Table 6 presents wage premium to various educational degrees computed from the regression coefficients in the previous studies, described above as well as the ones obtained from the present wage equations. As the results in table 6 clearly show, private returns to education increased over the previous set of estimates but at different speed thus probably reflecting different pace of economic restructuring in the three countries. In Bulgaria returns to all types of educational degrees increased substantially between 1995 and 2003. The rise is especially notable for higher education and secondary general education. Secondary vocational education has lost its value in both countries. It appears that small increases in the returns to human capital took place until 2003 in Romania probably due to the little upward pressure on wages for the more skilled workers and the lower pace of the reforms. One of the most striking facts that need further exploration is the lower returns to education for females compared to men in Romania.

As regards to the experience the premium placed on a year of experience declined in Bulgaria from about 3-4% in 1995 (Falaris, 2004) to 1.2% in 2003. This is an indication that the older workers are losing grounds to younger ones. In Romania, the rate of return to experience increased from close to 1% for men and 2.1% for women in 1995 (Paternostro and Sahn, 1999) to 2.5% and 2.8% respectively in 2003. It is noteworthy that one should be very careful with such comparisons because they draw on studies that differ in wage specifications and data sources. Nevertheless, the comparisons clearly show that being in similar position in terms of valuing human capital in 1995, Romania and Bulgaria ended with completely different situation in 2003. Education is more valued in Bulgaria while experience is more valuable in Romania.

4.5. Valuation of education acquired after the changes versus “old system” education

A popular view among researchers in transition economy is that education obtained under central planning, being too narrow and firm specific is not appropriate for new market environment (Kertesi and Kollo (2002), Filler et al (1999), Boeri and Terrell (2002)). To test the hypothesis that education gained during central planning is less appropriate for the market than the education obtained after the changes, we used two different approaches. First, we test whether the experience effects vary across educational attainments through including a set of interaction terms between experience and dummies on education. Results from this modified version of equation (1), reported in table 4a, provide quite diverse picture of

²¹ Paternostro and Sahn (1999) report separate estimates for urban and rural areas. Therefore, we computed returns to education as a weighted average of urban and rural estimates for both men and women. For Bulgaria Falaris (2004) treated sector of employment as endogeneous and thus controlling for selectivity bias provide separate estimates for public and private employment. In addition, he uses slightly different categories of educational attainment. We aggregated his educational categories using weighted averages of the relevant population. In case of Serbia, we also applied weighted averages to public and private sectors FIML estimates reported by Lokshin and Jovanovic (2003).

the valuation of experience in different educational groups by gender and countries. Experience is valued in the same way across educational attainments for Bulgarian men and for Romanian and Serbian females – all interaction terms are insignificant. For Romanian men and Bulgarian women, however, all interaction terms are positive and significant, thus indicating that persons with education higher than elementary gain more, in terms of increase in wage, from experience than those with basic education do. As regards to Serbian men, experience is less valued for those having secondary general and secondary vocational education compared to the reference group.

To explore further the valuation of skills gained after the reforms, we include dummy that distinguishes persons with less than eight years of experience from the rest in the wage equations. The group of persons with less than 8 years of experience corresponds roughly to the persons aged 30 or younger on the survey date in 2002/2003. If these persons hold university diploma, they completed their education after 1995/1996 meaning that they studied after the radical reforms in the higher education, oriented towards market demands. In this way, we distinguish those who graduated after 1995/1996 as having “new education”. We are aware of the fact that this way of distinguishing “old” and “new” education is quite crude. Moreover, 1995/1996 years serve well as cutting point for university graduates but when one move towards secondary education, the borders become blur²². Nevertheless, our primary interest is with higher education because at this level the skill mismatch problems manifest themselves clearly. Focusing on tertiary education, we include an interaction term between dummy on experience and dummy on tertiary education in the wage equation.

The hypothesis is that newly educated are more valued and would receive higher wages than their older counterparts would. Counter to these expectations the estimated coefficient, presented in table 4b show that the labour markets in the Balkan transition countries reward youth with less than 8 years of experience less (by on average 11%) than those who gained their education before the education has been reformed. Interaction terms in all three countries are insignificant suggesting that youth with university diploma are not rewarded differently from the reference group. This finding is in line with the Munich et.al (2004) and Andren et.al.(2004) who found limited impact of the educational reforms in the early 90s on individual’s labour market performance in Czech Republic and Romania respectively.

5. Conclisions

Using extensive and comparable data sets collected in 2002 and 2003 this paper provides recent estimates of returns to education and experience in Bulgaria, Romania and Serbia. The results indicate that there are significant differences in the “marketability”²³ of different types of education. Tertiary

²² Unlike higher education in secondary education it is not quite clear when the reforms have started and if this is the case which was the year that can be adopted as a cutting point between “old” and “new” education. Furthermore, in all 3 countries recently a serious debate is going for the priorities and ways of reforming secondary educational systems.

²³ The term is adopted from Boeri and Terrell (2002).

education is highly and increasingly rewarded in all three countries for both sexes. Despite the largest relative supply of higher educated in the labour force in Bulgaria, they receive much higher wage premium than their counterparts in Serbia and Romania. So, the outward shift in the relative demand for more educated workers in Bulgaria must have been large enough to offset the down-pressing effects on the returns to skilled labour from the supply side.

In all three countries, males who graduated from vocational schools earn much less than those who obtained general secondary degree, thus supporting the view that skills received in such schools are too narrow and inadequate to the modern labour market demands. However, as regards to women the results do not provide evidence that secondary general education brings significantly higher wages than the secondary vocational education. Indeed the finding that labour markets in Serbia and Romania provide higher rewards to education for men than for women is one of the most interesting results stemming from the current study. In both countries for men, each succeeding educational level brings wage premium but for women only the higher education brings a significant wage premium. Further explanation of the differences in valuating human capital between men and women in Romania and Serbia may be found in the different employment compositions and chances of salaried employment across gender. The analysis also reveals significant positive contribution of the individual post-graduate training to the wage determination. This finding hints at the existence of some imperfections in the formal educational systems and their incapability to respond fully to the current labour market demands.

The returns to experience are the highest in Romania for both men and women and only there, as predicted by human capital theory, the earning-experience functions have well expressed concave shape. In Bulgaria and Serbia, overall return to experience is approximately the same but while in Bulgaria, the experience appears to be insignificant wage determinant for men in Serbia it is insignificant factor for female wages. Using interaction dummies in the wage regressions, we do not find evidence supporting the popular view that the skills of young people acquired after the reforms in the educational system are much higher valued compared to those obtained prior to the reforms. On the other hand, the found decline in the returns to experience is a crude indication of the increasing appreciation of “new education”.

Comparing our results with previous studies suggests that being in similar position in terms of valuation of human capital in 1995, Romania and Bulgaria ended with completely different situation in 2003, more than 10 years after the starting of the reforms. Empirical results obtained in the current study place Bulgaria close to the group of transition countries with the highest rates of returns – Czech Republic, Hungary, Slovenia and Slovakia while the estimates for Romania and Serbia are lower and close to those obtained for Estonia and Poland. Lower returns to human capital in Romania and Serbia than in Bulgaria and in particular, their lower pace of increase between 1995 and 2002 maybe explained by the low speed of economic restructuring in these countries. While since 1997 Bulgaria has implemented a package of

substantial reforms, in Romania and Serbia the process of economic restructuring gained speed after 2000. At the same time, the differences in the pace of economic restructuring in Bulgaria and Romania are not so pronounced. The two countries face similar economic patterns of development and challenges caused by the EU accession. Together with Serbia, they are classified in the group of countries that are lagging behind in the reforms, compared to the advancers from Central and Eastern Europe. Therefore, one can not attribute the differences in the returns to more skilled labour among the three Balkan countries solely to the different pace of economic restructuring. Higher returns to education in Bulgaria may be due to the much more rapid adjustment of its labour market as well as to the shift in the demand triggered by skill-biased technological change including both physical capital and organizational practices. It would be expected that the returns to education would continue rising in Bulgaria, Serbia and Romania. However in order to shed light of the magnitude and the factors driving these changes further research is necessary based on the data for more cross-sections over time.

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Table 1: Sample Descriptive Statistics : Aged 18-65

Variables	Means (*100)		
	<i>Bulgaria</i>	<i>Serbia</i>	<i>Romania</i>
Sex			
Male	49.6	49.3	48.7
Female	50.4	50.7	51.3
Age groups			
Up to 29	24.2	24.3	24.5
From 30 to 39	21.4	19.3	19.1
From 40 to 49	20.1	21.4	22.8
50 and over	34.2	35.0	33.7
Education			
Higher schools - Doctor and Master	13.1	0.4	6.4
Higher schools - Bachelor	2.5	5.9	1.3
Higher schools - Specialist	4.6	5.4	4.9
Upper secondary education vocational-technical	35.9	50.0	23.2
Upper secondary education general	14.5	3.9	26.9
Lower secondary education	23.1	2.3	27.4
Primary education and lower	6.3	32.2	9.9
post-graduate (informal) education			
Yes	3.5	5.2	NA
No	96.5	94.8	NA
Ethnic origin			
Bulgarian/Romanian	85.3	NA	90.5
Turkish/Hungarian	8.6	NA	6.4
Roma	6.1	NA	1.8
Marital status			
Single, living alone	5.9	2.6	6.4
Single, living with other adults	20.8	23.9	23.6
Married or cohabiting, living alone	27.4	12.6	57.5
Married or cohabiting, living with other adults	39.7	55.2	10.7
Alone parent	6.2	5.7	1.9
Residence place			
Capital	13.7	12.1	7.5
Urban	58.4	42.1	46.0
Rural	27.9	45.8	46.5
Labour status			
Employed	66.1	55.0	48.8
Unemployed	10.5	14.5	13.6
Not in labour force (inactive)	23.4	30.4	37.6
sample sizes (number of persons)	5088	4545	34174

Table 2: Main results from Two-stage Heckman regression: wage equation: hired aged 18-65

Dependent variable: log (wages)

Independent variables	Bulgaria			Serbia		
	Total sample	Men	Women	Total sample	Men	Women
Constant	4,95***	5,457***	4,769***	8,91**	9,143**	8,738**
	0.000	0.000	0.000	0.000	0.000	
Gender (male=1)	0,249***	x	x	0.024	x	
	0.000	x	x	0.424	x	x
Education (base category=elementary education and lower)						
primary education	0.046	0.022	0.088	0.016	0.108	-0.057
	0.563	0.851	0.408	0.831	0.309	
secondary general education	0,243***	0,32**	0,243**	0.023	0,341*	-0.228
	0.005	0.023	0.033	0.839	0.045	
secondary vocational-technical education	0,264***	0,253**	0,267**	0.095	0,226*	-0.014
	0.002	0.044	0.018	0.179	0.022	
tertiary (post secondary) education	0,592***	0,619***	0,631***	0,344***	0,501***	0,192*
	0.000	0.000	0.000	0.000	0.000	
Experience	0,013***	0.001	0,027***	0,012***	0,017***	0.006
	0.006	0.884	0.000	0.004	0.004	
Experience squared	0,000**	0.000	0,000***	0,000*	0,000*	0.000
	0.039	0.821	0.001	0.031	0.017	
post-graduate training (yes=1, no=0)	0,188***	0,202**	0,121*	0,153***	0.062	0,199***
	0.001	0.028	0.091	0.000	0.224	
Ethnic origin (base category=Bulgarian/Romanian)						
Turkish (Hungarian in Romania)	-0.019	0.001	-0.210	x	x	x
	0.078	0.996	0.018	x	x	x
Roma (yes=1, no=0)	-0.103	0.007	-0.167	x	x	x
	0.224	0.955	0.149	x	x	x
other nationality (only in Romanian sample)	x	x	x	x	x	x
	x	x	x	x	x	x
Firm size: (base category=less than 10 employees)						
10-19 employees	-0.002	-0.048	0.038	0.025	0.024	0.028
	0.962	0.464	0.488	0.647	0.745	
20-49 employees	0.123	0.121	0.102	0.014	0.090	-0.072
	0.005	0.070	0.062	0.769	0.159	
more than 50 employees	0.187	0.217	0.128	-0.023	0.003	-0.055
	0.000	0.000	0.014	0.552	0.959	
she/he does not know	0.025	0.040	-0.018	-0.024	-0.050	0.012
	0.517	0.475	0.738	0.613	0.403	
public sector (yes=1, private sector=0) in Bulgaria	0.162	0.176	0.129	x	x	x
	0.000	0.000	0.010	x	x	x
private sector registered in Serbia	x	x	x	0,096***	0,107*	
	x	x	x	0.009	0.029	
private sector unregistered in Serbia	x	x	x	-0,167***	-0,117	0,242***
	x	x	x	0.008	0.166	
Ownership structure (base category= coops) in Romania						
state	x	x	x	x	x	x
private	x	x	x	x	x	x

mixed	x	x	x	x	x	x
public, national or local	x	x	x	x	x	x
other	x	x	x	x	x	x
Residence place (base category=urban)						
capital (yes=1, no=0)	0,231**	0,493***	0.012	0.122	0.065	0.229
	0.030	0.003	0.924	0.178	0.578	
Rural (yes=1, no=0)	-0.056	-0.093	-0.032	0.045	0.037	0.060
	0.085	0.064	0.460	0.183	0.399	
local unemployment rate (measured in decimales)	-1,71***	-0.607	-2,709***	-0.006**	-0.010**	-0,003
	0.000	0.352	0.000	0.027	0.014	
Industry dummies	0.000	0.000	0.000	0.000	0.000	
regional dummies (specific for each country)	0.000	0.000	0.000	0.000	0.000	
occupational dummies	x	x	x	x	x	x
Regression diagnostics						
Number of observations	5088	2524	2564	4545	3672	
Uncensored observations	1338	691	647	1996	1123	
adj.(R2) for uncensored observations				0.21	0.21	
Wald chi2(d.f)	1227,6(44)	643,66(43)	604,55(43)	412,94(28)	228,59(27)	28
Prob > chi2	0.000	0.000	0.000	0.000	0.000	
Mills lambda	-0,094**	-0,39***	0,117*	-0,177**	-0,190**	-0
	0.046	0.000	0.091	0.037	0.044	
Rho	-0,217*	-0,71***	0,30*	-0,295**	-0,31*	-0
Wald test of indep. eqns.(rho = 0):	0.021	0.0	0.09	0.05	0.1	

Table 3: Marginal returns to various degrees of education

EDUCATIONAL DEGREES	Bulgaria			Serbia			Romania		
	Total sample	Men	Women	Total sample	Men	Women	Total sample	Men	Women
primary education	4.7	2.2	9.1	1.6	11.4	-5.5	-0.7	7.4	-6.2
secondary general education	27,5***	37,7**	27,5**	2.3	40,6**	-20.4	16,1**	24,2***	1,0**
secondary vocational-technical education	30,2***	28,8**	30,6**	10	25,3**	-1.4	4.8	11,9**	-0.1
tertiary (post secondary) education	80,8***	85,7***	87,9***	41,1***	65,0***	21,2***	47,4***	60,2***	38,2***
postgraduate training	18,8***	20,2***	12,1***	15,3***	6,2***	20,0***	n.a	n.a	n.a
returns to experience	1,3***	0.1	2,7***	1,2***	1,7***	0.6	2,7***	2,5***	2,8***

Table 4a: Returns to education and experience: results from regressions with interaction terms

variable	Bulgaria		Romania		Serbia	
	men	women	men	women	men	women
Primary education	0.223 (0.351)	-0.198 (0.484)	-0.263 (0.126)	0.011 (0.939)	0.291 (0.108)	-0.062 (0.671)
Secondary general education	0.555 (0.032)	0.011 (0.968)	-0.156 (0.360)	0.237 (0.072)	0.864 (0.007)	-0.489 (0.049)
Vocational-technical education	0.434 (0.066)	0.068 (0.813)	-0.249 (0.996)	0.124 (0.346)	0.411 (0.013)	0.004 (0.978)
Tertiary education	0.900 (0.000)	0.428 (0.147)	-0.001 (0.996)	0.460 (0.001)	0.611 (0.000)	0.103 (0.471)
Experience	0.011 (0.351)	0.020 (0.144)	0.009 (0.072)	0.0345 (0.000)	0.027 (0.003)	0.005 (0.639)
Experience squared	-0.019 (0.907)	-0.554 (-2.89)	-0.0003 (0.000)	-0.0005 (0.000)	-0.401 (0.012)	-0.078 (0.638)
Primary education X experience	-0.008 (0.327)	0.0105 (0.274)	0.009 (0.046)	-0.002 (0.625)	-0.0103 (0.197)	0.0005 (0.959)
Sec.general education X experience	-0.0099 (0.288)	0.0090 (0.359)	0.011 (0.020)	-0.005 (0.223)	-0.0291 (0.045)	0.0183 (0.192)
Vocational education X experience	-0.0069 (0.384)	0.0073 (0.447)	0.01 (0.026)	-0.004 (0.295)	-0.0106 (0.135)	-0.0009 (0.914)
Tertiary education X experience	-0.0115 (0.191)	0.0074 (0.456)	0.017 (0.000)	-0.005 (0.232)	-0.0065 (0.387)	0.0005 (0.527)
Number of uncensored observations	691	647	15934	18240	1123	873

Note: The controls in the regressions are the same as those presented in table 2.

Table 4b: Returns to education and experience: results from wage regression with dummy on experience

variable	Bulgaria		Romania		Serbia	
	men	women	men	women	men	women
Primary education	0.031 (0.791)	0.082 (0.441)	0.077 (0.140)	-0.061 (0.209)	0.119 (0.265)	-0.064 (0.523)
Secondary general education	0.308 (0.024)	0.241 (0.035)	0.218 (0.000)	0.105 (0.031)	0.354 (0.038)	-0.237 (0.116)
Vocational-technical education	0.253 (0.041)	0.271 (0.017)	0.118 (0.026)	0.004 (0.936)	0.236 (0.016)	-0.02 (0.829)
Tertiary education	0.599 (0.000)	0.611 (0.000)	0.518 (0.000)	0.328 (0.000)	0.527 (0.000)	0.179 (0.105)
Experience (less than 8 years)	-0.11 (0.100)	-0.176 (0.004)	0.043 (0.056)	-0.026 (0.219)	-0.117 (0.001)	-0.115 (0.027)
Tertiary education X experience	0.106 (0.415)	-0.008 (0.922)	-0.177 (0.000)	0.005 (0.867)	-0.065 (0.494)	0.027 (0.752)
Number of uncensored observations	691	647	15934	18240	1123	873

Table 5: Returns to various educational degrees in selected transition countries

education	Czech republic (2002) ^a		Hungary (1998) ^b		Poland (2001) ^c		Slovenia (1992) ^d		Estonia (1994) ^e	
	women	men	women	men	women	men	women	men		
primary education										
secondary general education	0.359	0.335	0.597	0.525	0.13	0.144	0.37	0.319	0.075	0.123
secondary vocational-technical education	0.315	0.195	0.628	0.59	0.12	0.161	0.164	0.163	0.094	0.168
tertiary (post secondary) education	0.61	0.579	1.236	1.277	0.391	0.432	0.768	0.715	0.254	0.208

Note: The returns are actually regression coefficients from wage equations and refer to the latest year available.

^a-Munich and Terrel (2004); ^b-Campos and Jolliffe(2004); ^c-Adamchik and Bedi (2003); ^{e,d}-Orazem and Vodopivec (2000).-

Table 6: Changes in the value of human capital in Bulgaria and Romania

Bulgaria				
	Men		Women	
EDUCATIONAL DEGREES	1995	2003	1995	2003
secondary general education	0.102	0.320	0.270	0.243
secondary vocational-technical education	0.176	0.253	0.188	0.267
tertiary (post secondary) education	0.195	0.619	0.373	0.631
Romania				
	Men		Women	
EDUCATIONAL DEGREES	1994	2003	1994	2003
secondary general education	0.112	0.217	0.14	0.01
secondary vocational-technical education	0.173	0.112	0.284	-0.001
tertiary (post secondary) education	0.402	0.471	0.611	0.324

Note: Estimates for 1995 are computed from Falaris (2004) for Bulgaria and from Paternostro and Sahn (1999) for Romania.