Mincer rates of return to education in the emerging economy of Albania

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Abstract

In this paper we study the relationship between earnings and education measured in schooling levels. The main hypothesis to be tested is whether higher education levels reward with higher earnings the working labour force in Albania. We use cross section data from the Living Standards Measurement Survey (LSMS) of 2002 and develop a comprehensive framework for our quantitative analysis of the private returns to schooling and private incentives to invest in education. We construct estimates of the private return to each post-compulsory schooling level, taking into account the effects of education on wages. We find that only tertiary education provides significant positive returns with the upper secondary school being less rewarded. This finding might explain the reduced incentives to invest in additional post-compulsory schooling if this would not lead to tertiary.

Keywords: schooling, Mincer equation, returns to education.

JEL Classification: IJ

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1 Introduction

Given the role of human capital quality in economic development this paper analyses the incentives to invest into education from a rates of return point of view. As Albanian upper secondary schooling participation have suffered a decline after 1990 and especially during the first decade after the political change to a market economy, and a sharp increase in tertiary education enrolments from 2000 and on, we develop a model of human capital theory to explain the behaviour of household's investment in post-compulsory schooling for their children. The main hypothesis tested is whether the private returns to investment in education in Albania are sufficient to provide economic incentives for a high participation rate in post-compulsory schooling. We use cross section data from the Living Standards Measurement Survey (LSMS) of 2002 and develop a comprehensive framework for our quantitative analysis of the private returns to schooling and private incentives to invest in education. We construct estimates of the private return to each post-compulsory schooling level, taking into account the effects of education on wages of those being in employment.

We will refer to different education levels and develop both a Mincerian model of earnings-education equation and a qualitative dependent variable model. This approach seems to provide an attractive framework since we will typically be interested in post-compulsory education levels with different returns in Albania. This choice is also confined by the available data set; the survey from which they were drawn asks only about the highest level of education completed and no information on the number of school years is reported. Moreover, the "highest level of educational attainment" by type of qualification obtained allows the rate of return to vary across types of completed education and reflects the criticism of the assumption of a constant rate of return to each year of education (Heckman, Layne-Farrar and Todd, 2006).

This paper continues in Section 2 with an overview of the human capital theory under a critical review of the technical assumptions of returns to schooling estimations existing literature. In Section 3 we present the methodology to be undertaken in this study. The econometric approach that we pursue is outlined. In Section 4 we introduce the Albanian LSMS 2002 dataset presenting the descriptive statistics. Section 5 reveals the empirical estimations and empirical findings. A general discussion and conclusions on the hypotheses tested are presented in Section 6.

2 Investment into human capital and the role of education

According to orthodox theory, human capital can be obtained in different forms: from investment in education, training, search and experience, and also from migration and health care. Typically, such accumulation takes a long time signified by the accumulation of human capital over the life cycle (Becker, 1975; Johnes, 1993; Borjas, 2005). On the other side, the benefits from investment in human capital are conventionally assumed to be durable, as knowledge and skills, unlike most goods, may not depreciate in value over time as long as they are regularly exercised (Johnes, 1993). However, rapid structural changes in labour markets, such as those found in transitional

economies, may make this latter assumption inappropriate since the new market may not value previous investments whilst creating premiums for skills and competencies not previously valued.

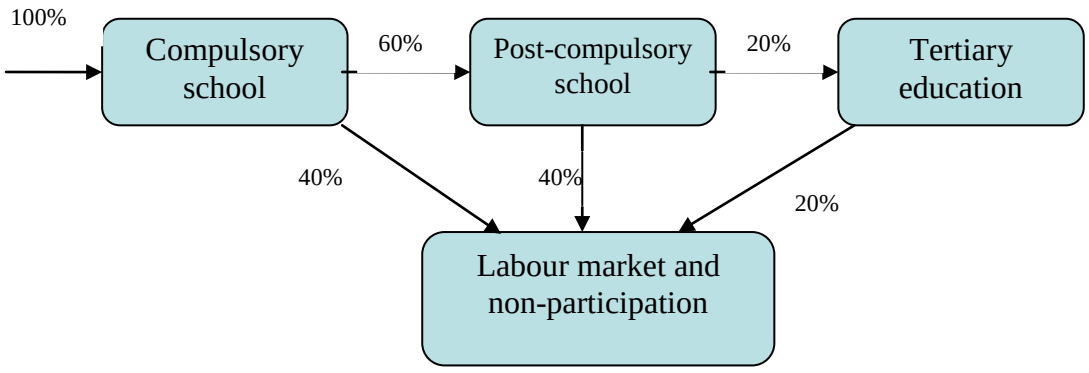
Among the alternative forms of human capital acquisition, schooling will be our main interest here. For researchers, it is the component of human capital that is easiest to measure. Because compulsory schooling is almost universal and enrolments in post-compulsory form the basis for comparisons between countries' education systems and their population's education attainment, we focus our analysis on post-compulsory education. It is usually the latter that provides the possibilities for early specialisation and explicitly prepares youths for the labour market.

The human capital theory assumes that more educated people are typically more skilled and can be expected to be more productive than those with lower levels of educational attainment, they therefore earn more. Statistical evidence from around the world has shown that educational attainment is positively correlated with labour force participation rates, employment rates and earnings (Nickell, 1979; Fuente and Ciccone, 2002; Harmon et al., 2003; Psacharopoulos and Patrinos, 2004; Blundell et al., 2005). However, rational decisions will lead to variation in individuals' intentions with regard to the size of stock of education they will try to acquire. The distribution of human capital quantity and quality in the population depends on the trade-off between lower earnings whilst investing in additional human capital and higher earnings in the future and is affected by financial and institutional constraints. Even when, controlling for individuals' ability, human capital investment turns out to be heterogeneously distributed. More able individuals may be able to "convert" schooling into human capital more efficiently (Harmon et al., 2003) due to their higher intrinsic motivation and capability. Furthermore, as commonly emphasised, skill and ability beget future skill and ability as on-the-job training is targeted at the more educated (Carneiro and Heckman, 2003; Cunha et al., 2006).

At the microeconomic level, human capital theory is employed to explain earnings differentials, an explanation which includes two stages: accumulation of human capital that determines worker productivity and the latter determining relative wages. The difficulty in measuring explicitly the former relationship has led to direct tests of the impact of education on earnings levels. Estimates of rates of return to education involve a method known as the Mincerian earning equation (Heckman et al., 2006). The estimates are generally derived using least squares regression, where the dependent variable is the logarithm of wages or earnings, and the independent explanatory variables include a constant, a measure of schooling (duration or attainment), observed demographic characteristics such as race, sex and experience, and other observed variables that are deemed relevant by the researcher (Psacharopoulos and Patrinos, 2004; Heckman et al., 2006; Blundell et al., 2005).

Figure 1 presents a diagram of flows/exit points between/from various stages of education to the labour market in Albania. Approximate estimations of the size of the flows into each of the points of the diagram are made taking into consideration enrolment rates in all the schooling levels in Albania.

Figure 1. Diagram of current flows through the Albanian education system after 2000



Source: Gjipali, 2010

3 Methodology

As discussed in Section 2, human capital theory suggests that education is a productivity-enhancing investment which is translated into a higher probability of being in employment and receiving a higher wage for the individual that incurs the investment. Given the high rates of employment prevailing in most developed economies the former proposition is frequently ignored and in quantifying the economic returns to schooling research has focussed almost exclusively on wage returns generally adopting the specification proposed by Mincer (1962).

These studies have developed estimates of rates of return to education, which are generally derived using least squares regression of the following wage equation:

$$\ln Y_i = \alpha + \beta S_i + \gamma_1 Exp_i + \gamma_2 Exp_i^2 + X_i\delta + u_i \quad \textbf{(1)}$$

where *Y* is a measure of income, earnings, or wage rates, *S* is a measure of schooling, usually in units of years or grades completed, *Exp* is experience at work, *X* is a set of other variables assumed to affect earnings, *u* is a disturbance term, representing the other not explicitly measured forces affecting earnings and is assumed to be distributed independently of the *X*s, *S* and *Exp*, and *i* is an index identifying a particular individual in the sample. The possible variables included in *X* are observed demographic characteristics such as race, sex and other observed variables that are deemed relevant by the researcher (Weiss, 1995).

In economic terms, we would expect that staying longer in schooling and completing higher levels of education increases both the propensity of being in employment and earnings premia. Skilled workers may take unskilled jobs while looking for employment that is more suitable to them, but the contrary is not true. Second, employers may set a higher relative demand for skilled workers as opposed to unskilled ones knowing the relative supply of both types of workers. For these reasons we estimate a different equation from (1), in order to explain the propensity to be in employment.

Estimation of (1) yields the *private return* to education (Psacharopoulos and Patrinos, 2004) and under the quite restrictive assumptions highlighted below, the β parameter represents the rate of return to investment in education. Estimations of the Mincer equation focus exclusively on the economic outcomes of education. Abstracting from the consumption element and other additional investment costs, such as time, psychological and sociological costs, we would expect that, other things being equal, the discounted present value of the lifetime earnings of a highly educated person would exceed those of a less educated person. Hence, there may be a rationale for individuals to bear the direct and indirect costs of education from their current incomes, given the increased income streams in the future. Various public policies would impact on the private return to schooling. For example, Fuente and Jimeno (2008) find for 14 countries of the EU in 1996 that on average, direct subsidies raise returns by 45% while personal taxes and unemployment benefits reduce them by 8% and 22% respectively.

Estimation of the Mincerian earnings function utilises an ordinary least squares (OLS) method in an equation including age, level of school, and job sector to explain monthly earnings, as in the following:

$$Ln(Earnings_i)=\beta_0+\beta_1 age_i+\beta_2 agesquare_i+\beta_3 secgen_i+\beta_4 secvoc_i+\beta_5 tertiary_i+\beta_7 public_i+u_i \quad \textbf{(2)}$$

where the *i* subscript stands for the individual and the variables are defined as follows:

$Ln(Earnings_i)$ is the natural logarithm of monthly earnings. Our data provide measures of earnings at one point in time for a sample of individuals who have completed formal schooling. The choice of OLS is justified presuming only that realized schooling and unobserved labour market ability are uncorrelated. In addition, we use monthly earnings as the dependent variable, with the strong technical assumptions about the exogeneity of hours of work. We note that use of a restricted set of variables is constrained by our data availability. Furthermore, as Psacharopoulos and Patrinos (2004) suggest, only human capital variables are used in order to estimate the total effects of education on earnings. We only have a public/private sector dummy in this specification. Two major problems could make the causal interpretation of the OLS coefficient on schooling variables problematic. First, the sample of individuals for whom wage data is available is likely to be non-random one. This is particularly a concern not only in our dataset, but generally in developing country context where the majority of population is engaged in various self-employment type activities (Asadullah, 2006), such as in the agricultural sector. Second, we emphasized that not all of them in wage employment have reported their earnings.

4 Descriptive statistics

In this paper we use the monthly wage as dependent variables to estimate returns to education. First we explain how these variables are derived and continue next with interpreting the descriptive statistics. The most appropriate question in the survey to draw the dependent variable indicating labour market wages of those in employment is: "How much was your last payment (net of taxes)?" This is reported monthly, twice a month, weekly and daily. If information on job earnings was gathered on a daily, weekly or twice monthly basis they are all transformed into monthly terms[1]. Table 1 provides a list of variable definitions, the description of the explanatory variables and benchmark categories.

[1] We multiply the reported sum by the appropriate factor, 22, 4, 2 respectively.

Table 1. The explanatory variables of our empirical analysis

Explanatory variable	Definition of variables
Employed	Dummy=1 if respondent employed in sectors other than agricultural
Have a job	Dummy=1 if respondent employed in any of the economic sectors
LnEarnings	Logarithm of monthly earnings
Age	Age of the respondent
Age squared	Age of the respondent
Marital status	Dummy=1 if married, 0 otherwise
Lived abroad	Dummy=1 if has lived abroad for at least 3 months during the las 5 years (1997-2002).
Upper secondary General	Dummy=1 if completed general upper secondary school
Upper secondary Vocationa	Dummy=1 if completed vocational upper secondary school
Upper secondary	Dummy=1 if completed upper secondary school
Tertiary	Dummy=1 if completed tertiary and/or post-tertiary education

As defined in the above table, the main explanatory variables are the dummy variables related to education qualification of individual regarding post-compulsory schooling, as well as age. We use age and its square value as proxies that measure the effect of experience. Moreover, we incorporate the public-private sector variable (whether the individual is employed in the public or private sector). The rationale is that, since the public sector is subject to political and not profit constraints (Melly, 2006), the civil service pay scales are compressed and we would expect a lower rate of return relative to the one based on earnings differentials in the private sector (Psacharopoulos and Patrinos, 2004).

5 Empirical findings

While acknowledging some data deficiencies, overall our model specifications seem well specified and yield plausible estimates. The effect of increasing schooling levels is positive and significant, average returns rise consistently with education relative to those with primary or less education in the Mincer equation estimations. However, due to the nature of our dataset (missing observations and lack of additional control variables), we suggest that interpretation of our results is taken with caution.

As noticed earlier, the standard Mincer approach that we adopt uses a static decision rule based on expected earnings profiles as of some initial period. As Heckman et al. (2003) observe cross-section estimates, as we apply in our analysis of the rate of return to schooling, should be cautiously interpreted particularly when skill prices are changing over time or when cohort quality is changing. As emphasised above, both of these factors are likely to be important in transitional economies.

Table 2 indicates results of Mincer equation estimations. We interpret our detailed results, indicating significance levels at the 10, 5, and 1 percent levels. Higher schooling attainment increases earnings in the labour market and employees in the public sector are paid less than in the private sector. We also observe that there is a concave shape of the age earnings profile only for men. The two specifications 1 and 2 in Table 2 specifically look at differences in returns between genders. Specification 3 estimates earnings determinants for women using the dummy variable *less than 31 years old* instead of the continuous *age* variable and its square, for the reasons we explain below. Apart from the age variables for females, all the coefficients have the expected sign and are significant at one percentage level of significance in urban area. In rural areas, upper secondary school attainment is not significant for males, and only significant at 5 percent significance level for females. Job sector is also not significant for females in rural area.

Comparing the coefficients of regression results in Table 2 we observe that returns to tertiary education are the highest. We also find, surprisingly, that vocational upper secondary schooling graduates are paid more than those with the general schooling diploma. Our results suggest that in urban areas returns to schooling are considerably higher than in rural areas, especially for the upper secondary vocational and tertiary. Indeed, in the latter areas, upper secondary school attainment only has a positive effect on female earnings at five percent level of significance, and has no effect on male earning at normal confidence levels. In rural areas university graduates do receive higher returns: men (women) receive 30 (50) percent more than their counterparts with only compulsory schooling or less. However, these are lower premiums than those found from the same qualification in urban area. These findings are in line with our hypothesis on the behaviour of rural area decision-makers, who faced with relatively low returns to post-compulsory education have little incentives to invest in post-compulsory schooling unless they plan to move towards urban areas.

Table 2. Estimated coefficients for the Mincer equation

	Dependent variable:	Natural Logarithm of monthly net wages					
	Explanatory variables	Females (1)		Males (2)		Females (3)	
		Coefficients	S.E.	Coefficients	S.E.	Coefficients	S.E.
Urban	Constant	9.36***	0.23	8.94***	0.24	9.37***	0.04
	Age	-0.01	0.01	0.04***	0.01		
	Age squared (10^{-2})	0.02	0.02	-0.05***	0.02		
	Age less than 31					-0.09**	0.04
	Upper secondary General	0.20***	0.05	0.15***	0.05	0.19***	0.05
	Upper secondary Vocational	0.37***	0.05	0.24***	0.05	0.36***	0.05
	Tertiary	0.82***	0.06	0.60***	0.05	0.80***	0.06
	Public sector	-0.30***	0.04	-0.31***	0.04	-0.29***	0.04
	Number of observations	611		935		611	
	Prob > F statistic	0		0		0	
	R^2	0.32		0.18		0.30	
Rural	Constant	8.06***	0.77	9.18***	0.28	9.13***	0.13
	Age	0.05	0.04	0.03**	0.01		
	Age squared (10^{-2})	-0.07	0.06	-0.05***	0.02		
	Age less than 31					-0.14*	0.07
	Upper secondary General	0.26**	0.11	0.11	0.07	0.28***	0.10
	Upper secondary Vocational	0.25**	0.09	-0.03	0.06	0.26***	0.09
	Tertiary	0.40***	0.12	0.26***	0.06	0.44***	0.11
	Public sector	-0.03	0.11	-0.28***	0.05	-0.03	0.11
	Number of observations	95		410		95	
	Prob > F statistic	0.00		0.00		0.00	
	R^2	0.13		0.12		0.13	

*, ** and ***, significant at 10, 5 and 1% of level of significance
S.E. = Standard errors

We now explore the returns to experience proxied by age and age squared. Focusing on the second and third rows of Table 2 we find that the coefficients are only significant for males. We calculate[2] that, all other things equal, males in urban areas receive their highest labour market earnings at an age of 42 years, and in rural area at 36,4 years. It may be that male in urban face a higher competition than in rural labour markets for which reason they have to wait longer for reaching the maximum earnings. Or, it may be due to relative younger age structure of sample in the rural area (Gjipali, 2010). The coefficient results of Table 2 indicate that Albanian female workers do not have the usual experience earnings profile. This may reflect that age is a poor proxy for experience for Albanian women because of child rearing and other family responsibilities. Nevertheless, we test whether there are differences in experience-based wage setting across two subpopulations: women older and younger than 31 years old. The last two columns of Table 2 showing a third specification of our estimation, indicate that the former are paid more than the latter (although significant only at 5 percent level of significance in urban area and at 10 percent in rural). As specification 3 in Table 2 indicates, females less than 31 years old receive wages that are 8.8 (13) percent lower than their older counterparts in urban (rural) areas.

We found overall that public sector pays less than the private one. It seems that women with a degree lower than university are more discriminated in the private sector, or that pre-tertiary schooling levels do not very well determine female earnings in the labour market. Regarding experience, experience is valued only for males in the private sector.

6 Discussion and further analysis guidelines

Understanding the differences in labour market opportunities and wages that stem from endowments such as education, experience and demographic characteristics is critical in assessing the likely outcomes of the ongoing process of economic adjustment in the Albanian labour market as well as education system. Our analysis above represents one of the first attempts to investigate the structure of labour earnings and gender discrimination both in rural and urban settings in Albania.

Although the World Bank (2006) has produced similar results to our own regarding returns to schooling levels, our contribution is that we analyse these returns by gender and divided into urban-rural area samples. According to our findings, there exist significant dissimilarities between the defined groups, and hence the World Bank's model is misspecified. According to our hypothesis, the idea of coexisting segmented labour markets and the large agricultural sector in Albania could be the main reason for its relative low education/ low skill and high unemployment equilibrium. In our analysis above we found that education returns in rural areas, particularly for females, are significantly lower than for those in urban ones. This suggests our hypothesis, that there may be insufficient financial incentives to support a higher participation rate in post-compulsory schooling, may apply to Albania. We found that overall the young, and especially the least educated, are facing more difficulties in Albanian labour market. Their propensity to be employed increases noticeably only with tertiary education and there is a relatively small positive effect of upper secondary schooling. Hence, preliminary evidence from the data shows that the significant part of return to secondary education is linked to further returns to higher education. This finding might explain the reduced incentives to invest in additional human capital at the pre-compulsory level, and increased demand for tertiary for those who may afford to complete upper secondary.

References:

Asadullah, N. (2006), Intergenerational economic mobility in rural Bangladesh, *Paper prepared for presentation at the Royal Economic Society (RES) Annual Conference,* University of Nottingham, 2006.

Becker, G. (1975) *Human Capital*, Chicago: University of Chicago Press.

Blundell, R., Dearden, L. and Sianesi, B. (2005), Measuring the returns to education, in Machin S. and Vignoles A. (eds.), *What's the Good of Education?: The Economics of Education in the UK,* Princeton University Press.

Borjas, G. (2005), *Labour economics,* McGraw-Hill/Irwin, New York.

Carneiro, P. and Heckman, J. (2003), Human capital policy, *NBER Working Papers,* No. w9495

Cunha, F., Heckman, J., Lochner, L. and Masterov, D. (2006), Interpreting the evidence on life cycle skill formation, in Hanushek E., Welch F. (eds.), *Handbook of the Economics of Eduation*, North Holland, Amsterdam.

Fuente, A. and Ciccone, A. (2002) *Human Capital in a Global and Knowledge-based Economy*, Report for DG Employment and Social Affairs, European Commission, Brussels.

[2] Taking the first derivative of the earnings equation in relation to *age* and equalizing to zero, we find the extreme point of the earnings line, which is the maximum.

Fuente, A. and Jimeno, J. (2008), The private and fiscal returns to schooling and the effect of public policies on private incentives to invest in education: a general framework and some results, Unitat de Fonaments de l'Anàlisi Econòmica (UAB) and Institut d'Anàlisi Econòmica (CSIC) in its series UFAE and IAE Working Papers, no.: 737.08.

Gjipali, A. (2010), Education and the adjustment of the Albanian labour market after 1990", Monograph, LAP Lambert Academic Publishing, Germany.

Harmon, C., Oosterbeek, H. and Walker, I. (2003), The returns to education: Microeconomics, *Journal of Economic Surveys,* 17(2): 115-155.

Hausman, J. and Taylor, W. (1981), Panel data and unobservable individual effects, *Econometrica*, 49(6): 1377-1398

Heckman, J., Lochner, L. and Todd, P. (2006), Earnings Functions, Rates of Return and Treatment Effects: The Mincer Equation and Beyond, published in: E. Hanushek and F. Welch (eds.), Handbook of the Economics of Education, North-Holland.

Heckman, J., Farrar-Layne, A. and Todd, P. (2003), Fifty years of Mincerian earnings equation, *IZA Discussion Paper*, No. 775.

Johnes, G. (1993), *The Economics of Education*, Palgrave Macmillan, US.

Melly, B. (2006), Public and private sector wage distributions controlling for endogenous sector choice, Swiss Institute for International Economics and Applied Economic Research (SIAW) at University of St. Gallen

Mincer, J. (1962), On the job training: costs, returns and some implications, *The Journal of Political Economy*, 70(5): S50-S80

Psacharopoulos, G. and Patrinos, H. (2004), Human capital and rates of return, *In:* G. Johnes and J. Johnes, eds. *International Handbook on the Economics of Education,* Cheltenham, UK: Edward Elgar, 2004, pp. 1-57.

Weiss, A (1995) Human capital vs. Signalling Explanations of Wages, *Journal of Economic Perspectives,* 9(4): pp. 133-154.

World Bank, (2006), Albania: Labour market assessment, Report No. 34597-AL.