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MEASURING RETURNS TO EDUCATION: THE CASE OF LATVIA

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Abstract

This paper aims to measure returns to education in Latvia and place them in context of data available in other countries. The goals of this paper are to review the literature on returns to education, highlighting the measurement challenges, and, based on the 2011 labour market survey data, estimate private returns to education in Latvia overall as well as by individual characteristics. The main findings are that returns to education in Latvia are close to the European Union average, but lower than in some emerging markets e.g. Lithuania, and that there are statistically significant differences in returns to education depending on a person's gender, ethnicity, field of employment and location.

Keywords: education finance, financial returns to education, determinants of income, regression analysis

JEL classification: I20, I21, J24

1. INTRODUCTION

Returns to education have been extensively analysed in education finance literature and have been used inter alia to explain past economic growth rates, the optimality of resource allocation within education as well as between education and other sectors, the determinants of income distribution and the behaviour of consumers of education (Psacharopoulos, 1985).

This paper focuses on private returns to education, which are usually defined as financial returns that an individual would obtain by achieving a certain level of education[1]. The aim is to provide new and comparable estimates of returns to education in Latvia for the overall population, as well as different subgroups and suggest some directions for future research.

There are broadly two hypotheses that describe how education brings private financial returns. The first, and the one we mostly focus on, is that education improves an individual's human capital, making the individual more productive and resulting in higher wages. The second hypothesis is that education serves mostly as a screening mechanism, by providing credentials to individuals with enough ability to complete a degree. In this theory education

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may determine your access to employment but not necessarily your salary. In a cross country study, Van de Werfhorst (2011) finds evidence for the first hypothesis, but not the second one.

Most authors distinguish between private and social returns to education Powdthavee and Vignoles, 2006; Rosen, 2008). Private returns may consist of increased chances of employment; increased labour mobility, and other considerations; however the most commonly used measure is the financial returns i.e. increased earnings. Knowing private returns to education may help a person who has to decide on the desired level of education.

The origins of empirical attempts to measure returns to education can be traced back to the middle of the XX century; however the benchmark for current literature was set by Psacharopoulos (1981), who used a single mathematical model to estimate returns to education for 32 countries. This research has since been updated several times but its two main conclusions remained unchanged.

First, returns to education (returns from one additional year of schooling) in most cases were found to be over 10 per cent, a significant magnitude when compared to historical rates of return for other asset categories and exceeding any estimates of the opportunity cost of capital. Second, returns to education in developing countries tended to be higher than the ones in advanced economies.

A significant amount of research on returns to education has analysed comparable cross-country data sets covering OECD and the EU. For example, Psacharopoulos (2004) as well as Psacharopoulos (2009) provide an extensive summary of estimated returns to education for the European countries. Private returns were found to be higher than social returns, which were also estimated less frequently because estimating social returns requires direct cost data by level of education. Private returns were higher than social returns by an average of 4.4 percentage points when using the most recent and comparable data. The highest returns to education were observed in emerging markets (Poland, Hungary and the Czech Republic), while the lowest ones were observed in Scandinavian countries.

A caveat of such summaries of previous findings is that returns in different countries were estimated in different periods of time. Though reported numbers are still comparable, there may also be theoretical reasons for returns to education to fluctuate. For example, greater development of information and communication technologies should have increased returns to education.

This paper focuses on the measured returns to education, rather than perceived returns to education, which may be different and, also have an effect on schooling decisions. For example, Jensen (2010), in a survey of eighth-grade boys from the Dominican Republic found that perceived returns to education were much lower than measured returns to education and that students who were told about higher measured returns completed more schooling.

Badescu *et al.* (2011) estimate the returns to education and losses suffered by those who quit their education after graduating elementary school for 23 European Union member states (but not Latvia) as well as Norway using the results of the European Community Statistics on Income and Living Conditions. Returns to higher education in Europe turn out to vary widely across countries. For example the return in Sweden is around 19 per cent whereas in Portugal around 68.4 per cent (measured as wage increases following an attainment of the next education level).

The methodology and the findings of Badescu *et al.* (2011) are extensively used in this paper in order to make the estimates for Latvia comparable internationally. As a result, we make several methodological choices. First, we abstract from the costs of obtaining education in the form of tuition costs or foregone wages since comparable data on those is not available.

Some may therefore argue that this paper estimates the wage advantage of individuals with a particular education level. Still, if one assumes foregone earnings to be the main cost of education, then the estimation of wage advantage and returns to education are closely related.

Second, we use several dummy variables for different levels of educational attainment and measure their effect on wages, while controlling for other relevant covariates. The alternative approach used by some researchers is to measure the effect of an additional year of schooling on wages. Our specification is preferable since a year of schooling may involve very different things – e.g. the last year of high school may differ substantially from the last year of college, etc.

Third, following Badescu *et al.* (2011) we largely abstract from issues dealing with endogeneity[2] of education. It is reasonable to assume that individuals with higher ability may choose to attain higher education levels, in which case the estimation of returns to education will be biased since it will also reflect returns from high ability. This "ability bias" has been recognized by Badescu *et al.* (2011) and was discussed in many contributions including the seminal one by Angrist and Krueger (1991).

In order to control for such bias one needs to find an instrument for education – a variable that would be correlated with education, but not correlated with ability (or other omitted variables). This would allow identifying exogenous variation in education and hence the estimation of the true effect of education on wages. Various instruments have been considered: quarter of birth of an individual (Angrist and Krueger, 1991), proximity to the school (Card, 1995), and government policies of school reform (Meghir and Palme, 2005; Aakvik *et al.*, 2010). Another approach has been tried by Blundell *et al.*, 2001 who focus on the effects of higher education in Britain. They "match" individuals according to the observed characteristics, which include ability, family background and demographics and compare outcomes between individuals who pursued higher education and otherwise identical individuals who had the opportunity but did not. However, sufficient data to implement either of these approaches for Latvia is not available yet, rendering the application of instrumental variables or matching techniques impossible[3].

For Latvia, returns to education were previously estimated by Hazans (2003) who analysed the wage differentials for persons with different educational background and found that persons with higher education earn approximately 69 – 80 per cent more than persons with elementary education. He also found gender, ethnicity and the region to have a statistically significant impact on returns to education. Hazans *et al.* (2008) also considered the effect of nationality and parental achievement on educational outcome variables such as the decision to enrol or the completion of a tertiary education (but not wages), documenting a human capital gap with minority populations, which has emerged in Estonia, Latvia, and Lithuania during the period of economic transition and remained significant even after controlling for parental education.

2. ECONOMETRIC MODEL

The model used in this paper follows the one used in Badescu *et al.* (2011). Equation (1) is an OLS regression that estimates the returns to education.

$$W_i = \delta_1 + \delta_2 X_i + \beta_1 ED1_i + \beta_2 ED3_i + \varepsilon_i \quad (1)$$

where W_i is a logarithm of the monthly earnings for the person "i" and $\delta_1$is a constant. Earnings in this case are defined as the official monthly net salary (after taxes).

Vector X_i consists of various variables that affect person's earnings. Individual's age, ethnicity, marriage status, geographical location and gender are factors that have proven to leave an impact on person's earnings. The vector of coefficients δ_2 shows the impact on earnings of each of the previously mentioned variables.

Furthermore, $ED1_i$ is a binominal variable that equals one if the highest obtained education level of the person "i" is elementary school or lower (elementary school in Latvia is finished after the 9th grade). The coefficient β_1 measures the losses of earnings caused by the decision not to obtain higher educational level than elementary school;

Similarly, $ED3_i$ is a binominal variable that equals one if person has obtained higher education. The coefficient β_2 measures the financial returns to education for persons with higher education compared to individuals with lower level of education. Finally, ε_i is the disturbance with the standard assumptions of normal distribution and zero mean.

This regression model is related to two conceptually different frameworks originally proposed by Mincer. The first is the so-called compensating differences framework which assumes individuals with identical abilities and opportunities, perfect credit markets, and perfect certainty. However occupations differ in the amount of schooling required. Because individuals are ex ante identical and forgo earnings while in school, they require a compensating wage differential to work in occupations that require a longer schooling period. The compensating differential is determined by equating the present value of earnings streams net of costs associated with different levels of investment in education (Heckman *et al.*, 2005)

In the second framework, which is more widely used now, individuals are assumed to be heterogeneous. This framework emphasizes life cycle dynamics of earnings and the relationship between observed earnings, potential earnings, and human capital investment, for both formal schooling and on-the-job investment. Note that in this framework (as well as in ours) the focus is on the ex post average growth rate of earnings with schooling.

Education level and earnings are supposed to be positively correlated, so in most cases β_1 is expected to be less than zero and β_2 greater than zero. If there were no correlation between education and earnings or if it were negative, there wouldn't be any financial incentive for a person to undertake higher education.

This paper uses the labour market survey compiled by the Central Statistical Bureau of Latvia (2013). The survey includes the data on age, region where an individual lives, gender, monthly income, ethnicity and many more variables[4].

The variables in the dataset match the requirements set by the econometric model, so the findings can be directly compared to the ones of Badescu *et al.* (2011). A total of 2.229 individual observations are used in estimation.

3. FINDINGS

Table 1 summarizes the estimation results of the OLS regression (1)[5].

The expected positive relationship between an individual's education level and her or his earnings can be found in the data. The findings imply that a person with higher education ceteris paribus earns on average 35.1 per cent more than a person who does not have higher education. On the other hand, individuals who quit education after finishing elementary school earn on average 9.9 per cent less than those who obtain higher than elementary education. Higher education in Latvia seems to give higher returns than secondary education.

Table no. 1 – The Impact of Individual Characteristics on Monthly Earnings in Latvia in 2011 in Percentages

Symbol	Variable	Impact
δ_{21}	Age	1.95
δ_{22}	Age squared	-0.25
δ_{23}	Male	21.21
δ_{24}	Ethnicity	4.31
δ_{25}	Region_Vidzeme	-13.29
δ_{26}	Region_Kurzeme	-1.45
δ_{27}	Region_Zemgale	-1.16
δ_{28}	Region_Latgale	-18.76
$\beta 1$	ED1	-9.94
$\beta 2$	ED3	35.14

Source: Authors' calculations

Age appears to have a positive effect on earnings initially, followed by a negative effect as individuals become older. The peak age group in terms of earnings is from age 35 to 44; while ordinarily the group preceding retirement might be expected to have the highest earning power (45 to 54). The difference might be explained by rapid structural changes in Latvian economy in the last decades leaving older workers with depreciated skills as well as the ongoing consequences of the 2009 economic crisis in Latvia.

The coefficients for the regions of Latvia (Vidzeme, Kurzeme, Zemgale and Latgale) show the difference in average earnings compared to Riga (omitted to prevent multicollinearity). As might be expected, because the majority of economic activity is concentrated in the capital city, individuals in regions have lower earnings power than Riga. The disparity between regions is also significant with Kurzeme and Zemgale only marginally below Riga, while Vidzeme and especially the traditionally depressed region of Latgale lag further behind.

In order to fully interpret the results they must be compared to the ones of other countries. As stated previously, the econometric model and the variables used in this research follow closely those of Badescu *et al.* (2011), therefore the results in principle could be considered comparable except that they are based on samples from time periods several years apart – Badescu *et al.* (2011) rely on the data from 2005 and this study uses the data from 2011.

The returns to education for other countries reported by Badescu *et al.* (2011) are shown in Table 2.

Some of the emerging markets such as Lithuania, Hungary and Slovenia tend to have higher returns to education than advanced economies. Portugal has the highest return in the European Union - 68.40 percent. Advanced Scandinavian countries such as Sweden and Denmark have the lowest returns to higher education. Since after tax earnings are used in the study, lower returns to education in Scandinavian countries may be explained by the more progressive tax systems in these countries with higher earnings increasingly taxed away. Returns to higher education in Latvia are, similar to Estonia, and very close to the European Union average; however they are significantly lower than in some other Eastern European countries.

Table no. 2 – Returns to Education in the European Union and Norway in 2011 in Percentages

Country	Losses due to the Quitting Education after Graduating the Elementary School	Returns to Higher Education
Belgium	-15.4	24.3
Czech Republic	-34.2	44.1
Denmark	-6.9	20.7
Germany	-35.7	32.2
Estonia	-20.3	33.6
Greece	-17.9	22.1
Spain	-15.7	31.3
France	-9.7	42.1
Ireland	-22.3	38.7
Italy	-16.4	27.8
Cyprus	-28.1	38.4
Lithuania	-12.5	55.5
Luxembourg	-31.2	45.6
Hungary	-25.8	60.7
The Netherlands	-16.4	29.8
Austria	-36.5	32.2
Poland	-28.6	45.3
Portugal	-29.8	68.4
Slovenia	-36.0	60.8
Slovakia	-32.2	30.5
Finland	-8.8	31.5
Sweden	-12.9	19.2
United Kingdom	-24.5	30.7
Norway	-11.7	20.0
Full sample of Badescu *et al.* (2011)	-18.2	36.0
Latvia	-9.94	35.14

Sources: Badescu et al. (2011), Authors' calculations

In Latvia losses due to quitting education after elementary school graduation are low compared to Estonia and Lithuania. In the European Union there are only three countries that have lower losses: Denmark, Finland and France. The largest losses due to quitting education after graduating the elementary school in the European Union are in Austria (twice the average of European Union and almost four times the one in Latvia).

Returns to education vary not only between different countries, but between the inner geographic regions as well. We divide the dataset into region-wise groups, so that model (1) can be estimated for each region in Latvia (Vidzeme, Kurzeme, Zemgale, Latgale and Riga).

An alternative strategy would have been to introduce interaction terms between dummy variables on education and on region allowing the return on education to vary by regions and using the entire data sample. However, the approach we adopt has an advantage of potentially excluding some of the unobserved heterogeneity. Individuals in the same region might be similar in terms of their access to employment opportunities, for example, etc. The estimated returns to education for various geographical regions of Latvia are shown in the Table 3[6].

Table no. 3 – Returns to Education in the Regions of Latvia in 2011 in Percentages

Region	Losses due to Quitting Education after Graduating from Elementary School	Returns to Higher Education
Latgale	-9.13	29.46
Zemgale	-17.14	35.83
Kurzeme	-5.44	42.83
Vidzeme	-9.09	35.08
Riga	-6.63	34.78

Source: Authors' calculations

Latgale, Zemgale, Vidzeme and Kurzeme are administrative regions of Latvia, whereas Riga is the capital city. Returns to higher education are significantly above zero for all five regions. The estimate of losses suffered due to quitting education after graduating elementary school is significant only in Zemgale. The main reason why the returns are not significant in other regions is the small number of observations on early dropouts.

Kurzeme has the highest returns to higher education in Latvia (42.83), while Latgale has the lowest one (29.46). Returns in the other three regions are relatively close to the country's average.

Different estimates for different regions are caused by different economic sectors upon which economies of different regions are based. In order to fully understand the variation of returns the economic structure of each region must be analysed, which is beyond the scope of this paper.

When someone decides to follow a certain profession, he or she has to decide whether to enrol in higher education in this field. Therefore returns to education for various different economic sectors can be a helpful auxiliary tool for individuals deciding whether to pursue higher education in this profession.

Splitting the dataset into subsamples by different sectors of employment model (1) can be estimated again. The returns to higher education for different employment sectors in Latvia are shown in the Table 4[7].

Table 4 – Returns to Higher Education for Various Employment Sectors in Latvia in 2011 in Percentages

Employment Sector	Returns to Higher Education
Agriculture, Forestry and Fishery	51.65
Energy industry	31.81
Trade, Accommodation and Food services	32.87
Transport and Information services	24.12
Finance, Insurance, Science and Administrative services	32.57
Real estate	42.62
Public administration and Defence	40.36
Education	42.41
Health and Social care	54.56
Other	24.86

Source: Authors' estimates

The highest returns to education in Latvia are in the Health and Social care sectors in which they reach nearly 55 percent. It implies that in this employment sector a person with

higher education earns on average almost 55 percent more than an individual who does not have higher education.

The lowest return is found in Transport and Information service sector. In this employment sector a person with higher education earns on average only 24 percent more than a person with lower level of education.

The differences between returns to education in different employment sectors are caused by specific requirements that need to be met within each of the sectors and the typical composition of occupations with it. For example, high returns to education in Agriculture, Forestry and Fishery sector may be due to the fact that the majority of labour force in this sector is relatively low-skilled, while the relatively scarce individuals with high levels of education occupy positions that generate most of the value added within the sector. Similarly, high returns to education in Health and Social Care may be generated by the relative scarcity of individuals willing to undertake sophisticated and lengthy training in medicine.

On the other hand, the skill and knowledge needed for daily activities working in the transport and information service sector might be more uniform. For example, everyone who works in IT might need higher education in computer science with the sole possible exception of data entry professionals. One might therefore estimate a low value for returns to education; however, this would not capture the fact that there might be very few vacancies for individuals with low levels of education in these sectors.

The ranking of the professions presented in Table 4 has to be interpreted with a caveat that it is unclear how representative each sample of the professions is. In addition certain sectors may have greater scope for underreporting of salary for reasons of tax avoidance, which can still occur in Latvia.

Thus, geographical locations and the choice of a profession all affect returns to education. However, there are also other factors that should be important. While the geographical location and employment sector are chosen by individuals themselves and can be changed throughout their lives, other factors like gender and ethnicity are unchangeable.

We therefore estimate the OLS regression (1) for subsamples divided by gender and ethnicity. Table 5 shows the returns to higher education for various geographical regions of Latvia divided by the gender.

Table 5 – Returns to Higher Education in Various Regions of Latvia by Gender in 2011 in Percentages

Region	Women	Men
Riga	40.93	25.77
Vidzeme	32.15	41.18
Kurzeme	40.70	46.79
Zemgale	38.93	29.17
Latgale	28.84	31.37
Latvia overall	37.13	33.08

Source: Authors' estimates

The return to higher education in Latvia is nearly 4 percentage points higher for women than men. Thus, while the results of Table 1 suggest a substantial wage gap between men and women (because it shows that men's salaries are more than 20 percent higher), on average, it narrows at higher levels of education. Returns vary widely, when subsamples for

different regions are considered without a common pattern. In Riga and Zemgale men tend to have higher returns to higher education while in Latgale, Kurzeme and Vidzeme the relationship is the reverse. Only returns to higher education turned out to be significantly different from zero, therefore losses due to quitting education after graduating elementary school are not reported.

Latvia is a country with a relatively large share of ethnic minorities in the total population. Therefore it is important to see if returns to education for minorities are different from the ones for Latvians.

Returns to education for Latvians are 30 per cent, whereas for minorities they are 38 per cent. The same relationship across the ethnicities is present in individual regions as well. It is possible that this is due to the fact that ethnic minorities are concentrated in cities (especially in Riga), where wages are generally higher and employment opportunities greater. A more complete interpretation of results would require assessing whether each sample is representative enough in terms of gender, occupations and regional distribution.

4. CONCLUSIONS

This paper measured the effect of higher educational attainment on after tax wages in Latvia. The results of statistical analysis show that these effects are statistically significant and comparable to other results obtained with similar datasets in other European countries.

Our baseline results show that on average a person with higher education earns 35 per cent more than a person who does not have higher education. There are also statistically and economically significant differences in returns to education across different regions, industries, genders and ethnicities.

Specifically, returns to education are the highest in Kurzeme and the lowest in Latgale, which is generally acknowledged to be the most depressed region in Latvia. In this case differences in returns to education may reflect problems in the operation of labour markets or more general economic inequality which prevents individuals with higher education from finding a job that corresponds to their abilities.

We also find that returns to education are higher for women than for men and are also higher for ethnic minorities than for Latvians. This may reflect the fact that individuals from these groups are at a particular disadvantage when they have low levels of education. It also suggests that educational policy has a role to play in ensuring that individuals from all groups and all regions have access to the same quality of education.

Our results also indicate that returns to education vary by industry. In particular, healthcare and social care have the highest return to education while transport and information services have the lowest.

The estimates in this paper can be considered a lower bound of the potential returns to education because they focus only on the private component measured by improvement in earnings ability. However, education generates positive externalities for the society as a whole, which can be quantified using different empirical approaches.

There are several avenues for future research into returns on education in Latvia. The most important one is finding a way to correct for the “ability bias” described previously, which can be accomplished by finding a suitable instrument (i.e. a suitable natural experiment). The effect of parental achievement is also worth analyzing in greater detail. Another caveat of this paper is that it does not control for years spent on the job, which can also be considered a form of investment in human capital and improving productivity.

Higher wages likely accrue to individuals who have worked in their professions the longest. More data is necessary to empirically assess this.

Another useful avenue for further research is a more detailed estimation of opportunity costs of education as well as estimation of social rather than private returns. Given that the state plays a considerable role in the education sector in Latvia, such kind of analysis could aid in the design of a better education policy.

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Notes

[1]. An alternative approach to analysing the efficiency of public education expenditure has been suggested by Aristovnik (2012), who uses data envelopment analysis to show that new EU member states show relatively high efficiency in tertiary education, but lag well behind in the R&D efficiency measures.

[2]. Endogeneity refers to the situation when an explanatory variable (e.g. education) is correlated with the variable not included in the model (unobserved), for example, education may be correlated with ability.

[3]. Other possible solutions include explicitly modelling the link between unobserved and observed variables, which requires making specific assumption on their relationship or attempting to control for unobserved heterogeneity by including variables such as parents' income and education.

[4]. Actual source data is available upon request.

[5]. Only the variables with coefficients significant at 95% confidence level are shown in the table. The variable age takes values from 0 to 8, with 1 signifying age from 0 to 14, 2 – 15 to 24 years, 3 – 25 to 34 years and so on until 8 to signify 75 years and above. Variable "Gender" takes value "1" if the person is male, "0"if female. Variable "Ethnicity" takes value "1" if the person is Latvian, "0" if otherwise

[6]. In the estimation of coefficients for Riga 252 observations were used, for Zemgale 235 observations, for Kurzeme 224 observations for Vidzeme 204 observations and for Latgale 296 observations. The count of the observations in (1) is not the same as the total of observations in the region. The differences are due to the missing information in the survey.

[7]. The employment sectors shown in Table 4 are the ones officially defined by the Central Statistical Bureau of Latvia. All professions are included in one of these 10 employment sectors.