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**COST OF NON-INVESTMENT  
IN EDUCATION IN ROMANIA**



# **COST OF NON-INVESTMENT IN EDUCATION IN ROMANIA**

Final report for UNICEF

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## ACRONYMS

ARACIP	Romanian Agency for Quality Assurance in Pre-University Education
AES	Adult Education Survey
CSR	Country Strategic Recommendation
CVT	Continuing Vocational Training
GDP	Gross Domestic Product
EDP	Excessive Deficit Procedure
EENEE	European Expert Network on Economics of Education
EMIS	Education Management Information System
EU	European Union
Eurostat	Statistical Office of the European Union
ESL	Early School Leavers
HBS	Household Budget Survey
INS	National Institute of Statistics
ISE	Institute of Education Sciences
ISCED	International Standard Classification of Education
ISSP	International Social Survey Program
JRC	European Commission's Joint Research Centre
MODA	Multiple Overlapping Deprivation Analysis
NEET	Not in Employment, Education or Training
OECD	Organization for Economic Cooperation and Development
PIAAC	Program for the International Assessment of Adult Competencies
PIRLS	Progress in International Reading Literacy Study
PISA	Program for International Student Assessment
PPP	Purchasing Power Parity
OOSC	Out of School Children
OOSCI	Out of School Children Initiative
R&D	Research and Development
RON	Romanian currency
SEN	Special Educational Needs
SILC	Survey on Income and Living Conditions
TIMSS	Trends in International Mathematics and Science Study
TVET or VET	Technical and Vocational Education and Training
UIS	UNESCO Institute for Statistics
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNICEF	United Nations Children's Fund



## FOREWORD

In the fall of 2014, the Nobel Committee announced that, for the first time in its history, the Nobel Peace Prize would be attributed to a child for her fight and her work on the right to education. Malala Yousafzai is 17 year-old, but she believes - and so does the Nobel Committee - that the right to education is fundamental to peace. In her own words: “One child, one teacher, one pen and one book can change the world. Education is the only solution.”

All around the world, UNICEF has been advocating for decades that all children have the *right to education*. This right is enshrined in the UN Convention on the Rights of the Child, ratified by virtually all countries, including Romania; it is even enshrined in the Romanian constitution. We all know that educated children are more likely to fulfil their potential, that they are more likely to become productive adults and engaged citizens, contributing to the society that gave them a chance. We closely work with the Ministry of National Education, civil society, local authorities and families to help realise this right.

Yet, there are hundreds of thousands of children who do not go to school regularly in Romania. According to the PISA<sup>1</sup> study, between 37 and 40% of 15 year-old students can barely read, write and count. Those who are the most likely to have the lowest access to education and perform worse are children from very poor families, Roma communities, rural areas and children with disabilities.

Not surprisingly, Romania has the lowest investment in education in the EU. Even though the education budget has increased in the past two years to almost reach its pre-crisis level, the country spends only the equivalent of 4.1% of its GDP in this sector. This investment does not benefit everyone equally. Since 2005, within the education sector, budget allocations have increased for secondary and tertiary education and decreased for pre-school and primary education. As a result, rich people benefit much more from education expenditures than poor people.

We strongly believe that investment in education needs to be progressively increased to 6% of the GDP, as envisioned by the 2011 Law on Education. But we are aware that referring to the human rights of children does not convince everyone. With support from international and national experts and in close consultation with the Ministry of National Education and the World Bank, this study on the Cost of Non-Investment in Education is looking at financial arguments to answer the question: *why does Romania need to invest more funding in education from a financial and economic point of view?*

International studies show that one additional year of school increases earnings by 8-9% and decreases the likelihood of health problems by 8%. In general, the more education you have, the higher your income is. So going to school longer benefits people at the individual level.

**The figures are even more striking at the country level, and this is the main message of this study: by keeping its investment in education so low, Romania will lose €12 to 17 billion**

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1 PISA: Programme for International Student Assessment, conducted by the Organisation for Economic Cooperation and Development.

**between 2015 and 2025. In other words: if Romania were to progressively increase its investment in education from 4.1% to 6% of the GDP, the economic growth would increase from 2% to 2.7-2.95%. This would represent a gain of €12 to 17 billion in the next ten years.**

*However, it is not enough to receive more funding for education - these additional resources would have to be strategically invested.*

Our recommendations are that Romania needs to give the **highest priority to early and primary education** for several reasons. This would contribute significantly to reduce disparities. Many international studies have also shown that investment in pre-school education has one of the highest returns on investment. This would also increase the pool of students who would reach tertiary education.

Additional investments should also **target schools that enrol and keep disadvantaged students** (from poor families, Roma communities, rural areas and children with disabilities). More efforts should focus on children at risk of dropout to prevent or immediately address dropout. Taking into account the latest research on brain development and employability, there should be **more emphasis on social, emotional and non-cognitive skills** in the curriculum.

The study also recommends to generate **better, more timely and transparent data** on the budget in education. There are many programmes in Romania to increase school participation and the quality of education. We need to **strengthen the evaluation of these programmes** to ensure that funding is spent on the most effective ones.

In conclusion, this study shows that what is right from an ethical point of view also makes sense from a financial and economic perspective. At the time when the Government and the Parliament are starting their discussions on the 2015 budget, we hope that these data will help them make the right decision for children and for Romania.



Sandie Blanchet  
UNICEF Representative  
Romania



## THE ROLE OF INVESTING IN EDUCATION IN ROMANIA

In most countries, financing education is one of the biggest and most complex challenges that governments have to face.

Firstly, they have to figure out the annual budgetary allocation for education. As one of the largest governmental allocations, along with health and social protection, the budget for education is often exposed to significant variations from one year to another, especially in times of economic crisis, when budget deficits should be kept within certain limits. The last five years showed us how deficits were „corrected” through „structural adjustments” applied to the budgets for education, health and social protection. These variations in funding lead, most often, to significant losses, as a result of the financial incapacity to support public policies aimed at ensuring the school enrolment or retention of children and youth from disadvantaged families, given that the investment in retaining a young person in school is much lower than the one in re-enrolling that person.

In this context, both ongoing and prospective public policies, intended to better prepare the education system for future challenges, are at loss. Any new educational project, be it for curricula improvement, for human resources development or for digitization of the educational process, requires funding. The absence of such funding leads to the postponement of those projects. Therefore, with each passing year, underfunded education systems become increasingly exposed.

Secondly, it is about the quality of investment in education. The existence of stable and sufficient sources of financing doesn't always guarantee performance in education, especially when it comes to the system as a whole. Research shows that virtually every educational system faces financing gaps (differences in the economic development of the communities reflected in the level of funding for education; financing formulas that favor performance at the expense of access and equity, financing of certain levels of study at the expense of others – e.g. high school or higher education to the detriment of preschool, primary or vocational education etc.), that generate systemic problems, difficult to address and correct in the short term.

These two basic issues indicated above relate to the system's ability to identify and manage resources. To these, a third issue is added: the consistency of the correlation between educational policies and other public policies. Investments in a specific sector of education would benefit neither the individual, who has undergone a certain program of education, nor to the society, if there is no logical consistency among public policies. I will give one example. During 2007-2013, Romania has received significant EU funding for human resources development. In spite of the considerable investment in the training of specialists in advanced research fields, because of the economic crisis of 2009-2011, the government had to freeze the hiring of these trained specialists in the public sector (universities, hospitals, research institutes etc.). This led to the loss of specialized human resources, whether through the relocation of these specialists

to other countries, or through their employment in the private sector, though not in their specific field of competence.

This is why the issue of financing in education is not only a sector problem, but one that concerns a country's development capacity. In order for this phenomenon to be understood, there is a need for tradition and culture in education funding. It is about valuing education as the most important sector of investment, a sector that could multiply tenfold the initial capital, when it's done within a medium and long term strategic approach.

The present study, conducted by UNICEF in Romania, is not only a technical document, showing how many children in our country fail to complete their studies or how much we should invest to help young individuals in rural areas to overcome socio-economic barriers that blocked the development of most of their parents, but also a document that shows us what a coherent approach to issues of education and development should look like. At the same time, it shows us that education is a good and a right of every individual, but also a huge societal responsibility towards today's children, who will be able to ensure the development of humanity in the days to come.

Many thanks to UNICEF and to the authors of this study for the extraordinary effort made to address, in a scientific manner, such an important topic - the financing of education!



Remus Pricopie  
Minister of National Education

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The main author of this study is Pierre Varly, international expert with 13 years of experience in education statistics and economics, coordinator of several reports on educational achievement, including economic and econometric analyses applied to the planning and evaluation of educational policies, trainer of youth statisticians and author of studies focusing on the link between education spending, economic growth and employment. Since 2002, he is using and producing international comparable statistics in education and has used the Eurostat/OCDE data collection methods.

On the present study, Mr. Varly worked in close cooperation with a team of national consultants who helped ensure comprehensive, accurate and quality research data and interpretation - Tudorel Andrei (President of the National Institute of Statistics), Ciprian Fartușnic (Director of the Institute of Education Sciences, Bucharest), Claudiu Herțeliu (Associate Professor at the Bucharest Academy of Economic Studies and Vice-dean of the Faculty of Cybernetics, Statistics and Economic Informatics), Constantin-Șerban Iosifescu (President of the Romanian Agency for Quality Assurance in Pre-University Education). Luminița Costache (UNICEF Romania) had the overall responsibility for the planning, design, development and coordination of this study. She also consolidated the comments from peer reviewers and helped finalize the document.

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The study also benefited from the relevant clarifications and suggestions of an external reviewer – George Psacharopoulos, whose conception of how investment in education can be approached helped shape and influence research studies all over the world. His signature macroeconomic model was one of the two main frameworks at the heart of our study's computations of the cost of non-investment in education. Involved in research, policy formation and higher education teaching, Mr. Psacharopoulos has made a deep impact on the way education is viewed in relation to economics and developing nations, and his findings on the rates of return to education continue to play an important role in the formation of significant global educational policies.

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## EXECUTIVE SUMMARY

### Background

According to Eurostat, in 2013 the GDP/capita, expressed in PPP, was 54% compared to the EU average, making Romania the second poorest EU member state after Bulgaria (47%). Romania spends only 4.1% of its Gross Domestic Product (GDP) on education according to most recent estimates from Eurostat (2012),<sup>2</sup> compared to 4.7% on average in Eastern European countries or 5.4% in the European Union (EU). There has been a shift in funding priorities towards secondary and tertiary education since 2005, leading to insufficient spending on pre-primary and primary education. The education system depends heavily on public funds since the overall private contribution to education (including household and other contributions) was only 0.12% of GDP in 2010, according to Eurostat, versus 0.82% on average for the EU.

The Romanian education system still faces important challenges in terms of participation in education. According to official INS data, more than 6% of the primary and lower secondary school age population is out of school and 17.5% of the population aged 18 to 24 left school before completing upper secondary education (early school leavers), while 21.8% of the population aged 30 to 34 in Romania has attained tertiary education, compared to 34.6% on average in the EU.

Children and youth population from poorest households, Roma ethnics, people living in rural areas and children with special educational needs (SEN) are the most vulnerable groups in terms of access to education, retention and progress to higher levels of education (UNICEF, 2012).

These categories often overlap, increasing the risk of exclusion. For example, 14% of Roma ethnics from the poorest quintile have never been to school (1.6% for non-Roma) and only 4.9% of the richest Roma population attained tertiary education compared to 38.5% for the richest non-Roma. The World Bank (2013) estimates the impact of the lack of investment in Roma education: the loss of annual productivity and fiscal contribution is estimated to be between 202 and 887 million Euros in Romania.

The EU goals for education set specific targets to reduce the proportion of early school leavers (ESL) in Romania down to 11.3% by 2020 and to increase the tertiary-level attainment to 26.7%. As the rate of ESL has been constantly at a high level in the past few years (around 17%), Romania is at risk of not reaching its target. Although some improvements have been observed in the past years, Romania test scores are continuing to be significantly lower than the average in all international assessments. Data show large disparities among socio-economic groups in terms of learning outcomes (OECD, 2014).

The two wealthiest quintiles use 65.8% of public education spending, whereas the poorest quintile uses only 9.9% of public spending. Up to 61.2% of the public resources for education are being used by people living in urban areas. The per capita funding mechanism introduced since 2010 at pre-university level has not been able to reduce these large disparities.

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2 Most recent data from Eurostat (April 2014) estimate the level of expenditure to 3% of GDP for 2012. The value of 3.53 for 2010 has been used in several publications including the EU structural funds strategy (World Bank, 2014). The value of 4.1 is the value used for projections where level of expenditure as a share of GDP is split by level of education. There is generally a lack of reliable and consistent data on education expenditure in Romania. [http://epp.eurostat.ec.europa.eu/statistics\\_explained/index.php/File:Total\\_general\\_government\\_expenditure\\_by\\_function,\\_2012\\_%28%25\\_of\\_GDP%29.png](http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/File:Total_general_government_expenditure_by_function,_2012_%28%25_of_GDP%29.png)

## Return on investment in education

More investment in the lower levels of education would benefit a proportion of the population that cannot afford to undertake tertiary education, and, in the long term, it will increase the percentage of marginal populations (i.e. the poor and Roma minorities) attaining this level of education. According to our analysis, Roma people have 3.4 times more chances to be unemployed than non-Roma people, for the same level of educational attainment and other measurable characteristics.

Our estimates of the returns of one additional year of schooling are very consistent across the different surveys used and with other papers based on data from Romania. The effect of one additional year of schooling on earnings is 8.05% according to the Survey on Income and Living Conditions (SILC) (2012) and 9.07% according to the Household Budget Survey (HBS) (2012). According to our analysis, each additional year of schooling reduces the probability of being unemployed by 8% and that of being in bad or very bad health or of suffering from a chronic long-standing disease by 8.2%. The individual returns of education are higher for the Roma population than for the non-Roma one. For instance, completing a further level of education increases the probability of finding a job by 5.6% for non-Roma and by 16% for Roma.

Using micro SILC data (2012), the estimated wage premium is 30.8% for graduates of upper secondary education compared to lower levels (primary and lower secondary combined) and 24.9% using HBS 2012 data. The wage premium is 66.5% for tertiary education compared to upper secondary and 67% using HBS.

Simulating the macro gains inferred from micro data, the largest economic gain would be achieved by improving the proportion of the 25-64 years old population attaining tertiary education. Raising this proportion from 13.6% to 19% in 2025 would have an estimated impact of around 3.6% of GDP. A slight increase of the proportion of the population having attained secondary education (from 58 to 59.7% in 2025) would generate a 0.52% increase of GDP. This is consistent with Brunello (2013) estimates which use a different methodology, claiming that the reduction of early school leaving phenomena (from 17.5% to 10% in 2015) would yield a return of 0.38% on GDP.

The structure of the Romanian economy is driven by the high percentage of people employed in agriculture and in the public sector. While agriculture currently attracts mainly medium and low skilled population, the public sector attracts a significant proportion of tertiary graduates. However, according to our analysis, higher individual returns of education on earnings are found in the industry sector.

Another challenge with a direct impact on the overall economic performance is the fact that participation to continuing vocational training (CVT) is considerably underdeveloped in Romania. According to INS data, in 2011 less than 2% of adults participated to CVT of target population, versus 9% in the EU on average. In the case of training in enterprises, when compared to the EU average, the gap is also significant. The fourth Continuing vocational training in enterprises survey (CVTS4) indicates that in 2010 less than 20% of the Romanian employees were involved in CVT courses (formal or non-formal training), versus 38% EU average.

Estimates from macroeconomic models range from 2.7% to 2.95% growth rate in the period 2015-2025 if spending on education is gradually increased up to 6% of GDP compared to a projected 2% growth rate, (Government of Romania, 2014). Improvement of the PISA test

score to reach 500 in 2025 (OECD average) seems achievable under the current trend, which would have a further positive impact on the economic growth (0.95%).

Countries with macroeconomic and education participation indicators close to Romania's (i.e. Latvia and Hungary), but which invest more in education (close to 6% of GDP), demonstrate that an increase of one year of schooling by 2025 seems a sound prospect for Romania and that a smart allocation of resources could stimulate growth.

### Cost of non-investment in education

To compute the cost of non-investment (i.e. what we are losing by not allocating enough resources in education), we have used the Barro-Lee and Psacharopoulos macroeconomic models, linking average years of schooling of the population and forecasted GDP, assuming that other factors (such as physical capital) remain constant over time. We explore the situation of Romania in 2025 under two scenarios:

- Scenario 1 (no further investment in education): the level of education expenditure expressed as % of GDP remains the same until 2025 and little improvement is obtained in terms of average years of schooling of the adult population;
- Scenario 2 (further investment in education): the level of expenditure is gradually increased up to 6% of GDP in 2025, and allows for an increase by one year of the average years of schooling of the population.

The cost of non-investment in education is calculated as year 2025's GDP (under scenario 2) minus 2025's GDP (under scenario 1).

According to our calculations, the estimated cost of non-investment ranges from 12 to 17 billion Euros over the analyzed period, equivalent to 7-9% of 2015 GDP. These estimates are consistent with the rates of individual return calculated on micro data (8%) and with the macro estimates for Eastern European countries calculated by Barro-Lee (2010). Both micro and macro calculations using Romanian data estimate the economic return of an additional year of schooling around 8%, which is superior to the projected education investment (6% of GDP).

More simply stated, we have to consider changing the vicious cycle of investment in education into a virtuous cycle: more resources allocated in the future in education could create the conditions for economic development and growth and grant a bigger public budget supporting all social public policies in Romania. As in the case of any counter-factual analysis, we need to create the conditions for this investment to take place in reality in order to prove that the analysis is accurate and that the benefits are as high as estimated.

### Strategic objectives

Raising the education expenditure up to 6% of GDP is not an end in itself. It must be understood as a tool for supporting the achievement of the ambitious objectives that have been set in the EU 2020 framework or for improving key indicators to reach the levels indicated in our analysis, as presented below.

**Table A: Proposed strategic objectives and targets**

	<b>Current situation (2012 or more recent year)</b>	<b>2017</b>	<b>2020</b>	<b>2025</b>
Out of school children primary **	6.3%	4%	2%	0%
Early schools leavers *	17.5%	15%	11.3%	10%
Proportion of 15-18 years old Roma ethnics in school <sup>l****</sup>	33%	50%	70%	80%
Tertiary attainment (among 25-64 year olds)*	13.6%	14%	16%	19%
Proportion of population with adult education*	1.4%	5%	9%	15%
PISA test scores (math)***	445	465	485	500
PISA test scores (reading)***	438	465	485	500
Education budget as % of GDP*	4.1	4.8	5.4	6.0

Sources: \* Eurostat; \*\* Unesco Institute for Statistics; \*\*\* OECD/PISA 2012;\*\*\*\* World Bank 2014

## Areas for education investment

It is not enough to know that an additional investment has to be done to stimulate social and individual return. This investment should be smart and accompanied by a careful analysis of how to spread the additional budget efforts across the education levels to reach the benchmarks observed in Latvia, Hungary and the EU.

The investment in primary and secondary education would aim to reduce disparities both in terms of school participation and learning outcomes, which is likely to generate further economic growth later on. The investment in upper secondary education, whose economic return must not be neglected, would also be targeting the development of new technical and vocational education and training (TVET) programmes, especially in the industry sector where higher individual returns of education were found and/or where the private sector also contributes to financing.

According to our estimated economic returns, based on micro data and on other research conducted in countries with similar economic development, tertiary education seems the level of education where the return on investment is the highest. However, the specific situation of Romania, with high levels of out of school children and early school leaving, should be taken into account when prioritising investment by education levels. Investment in tertiary education is likely to generate economic growth, but not to reduce the social disparities, since categories at risk of exclusion typically have difficulties in finalising secondary education successfully.

Our data show that the individual returns of education are higher for the ethnic minorities than for the rest of the population when considering both employment and earnings. Investment in the early levels of education must not be neglected if Romania wants to reach both objectives of economic growth and equity. International research has shown that investment in early education (pre-primary) is among the most rewarding areas of intervention and EU data show that this level of education is still underfunded in Romania.

In line with the planned financing of a lifelong learning strategy under the EU structural funds and to increase human capital, adult education should also receive a higher budget allocation in order to catch up with the EU benchmark, although our data has shown few returns of adult education on earnings. Considering our findings and using a benchmarking approach, the table below proposes a distribution of the budget by education levels in 2015.

**Table B: Proposed allocation of education budget by level of education**

As % GDP	Education (all levels)	Pre-primary	Primary	Secondary	Post secondary non tertiary	Tertiary	Not defined (includes adult education)
EU Average (2010)	5.34	0.52	1.17	1.99	0.13	0.86	0.67
Latvia (2010)	5.73	0.84	1.1	1.76	...	0.94	1.1
Hungary (2010)	5.18	0.7	0.8	1.69	0.04	1	0.96
Romania (2010)	4.13	0.35	0.96	1.58	0.02	0.87	0.35
<b>Romania (2025)</b>	<b>6</b>	<b>0.7</b>	<b>1.31</b>	<b>1.99</b>	<b>0.13</b>	<b>1.2</b>	<b>0.67</b>

Source: Eurostat for actual levels and European Commission (2014) for spending on pre-primary education. Each level of education would receive an additional share of the education budget ranging from 0.32 to 0.41% of GDP in the next ten years.

Finally, increasing the human capital is likely to have several positive outcomes such as better health, crime reduction and lower dependence on social protection schemes, as indicated by international research (e.g. the OECD report ‘Social Capital, Human Capital and Health: What Is the Evidence?’, 2010; Garcia and Gruat ILO report ‘Social Protection: A Life Cycle Continuum Investment for Social Justice, Poverty Reduction and Sustainable Development’, 2003). It would certainly also lead to higher worker productivity, actually one of the lowest in the EU (at 49% compared to EU 15 – Eurostat, 2013).

Increasing the level of spending in education to 6% of GDP is key for Romania if it is to reach the EU 2020 targets. Achieving these targets will get Romania in 2025 in an economic situation comparable to the current average Eastern European country or more precisely Latvia.

## Policy recommendations

The education strategy and budget need to be better aligned to a broader economic development plan **that would focus on incentives for the private sector to create jobs and recruit without discrimination**. This economic plan should provide targets for the development of industry and services sectors, backed up by more human capital. This implies a better adjustment of the education and training system to the labour market needs, as key to economic growth.

**The improvement of both access to and quality of education, with priority given to pre-school and compulsory education, should be seen as a priority in all relevant strategies for reducing disparities and improving human capital in Romania.**

Despite the slow recovery of the Romanian economy after several years of crisis, it is possible today to increase the education budget. To this end, **several solutions are envisaged:**

i) give priority to education reforms when allocating EU funding, and/or increase the share of

GDP devoted to public spending, since more human capital implies more employment, higher earnings and less dependence on social welfare (more tax returns).

ii) increase the share of the education budget within the existing budget. Overall, the private contribution to education should be increased in certain areas, for instance in adult education, especially if the Government is unable to reach 6% of public spending on education. However, this should be done with much caution to avoid widening disparities by increasing private contributions across the board.

**Long term strategic planning of EU funds** in education should aim to meet the financial needs for reducing disparities and fostering economic growth.

**Budget data should be collected in a more accurate and timely manner and reported in a more transparent way** to the EU organizations, such as Eurostat, and to the public.

**Data on executed budget and level of physical realization should be reported** for the sake of transparency and accountability and to monitor external funds absorption, from the EU in particular.

**The different programmes undertaken to increase school participation and quality of education should be evaluated more thoroughly** in order to help prioritise actions based on impact, efficiency and sustainability considerations.

According to international research, in terms of reducing the disparities and raising quality of education, **pre-primary education should be prioritised as it can have the highest impact compared to other interventions**. Funding for pre-primary education and child care programmes should be secured and given the highest priority in the national budget, considering the actual mid-term objectives to expand pre-primary coverage and the potential returns of such investments.

**More investment in primary education is required to compensate for the decrease since 2001 and to catch up with EU averages**. OECD analyses show very clearly that performing countries are managing the equity issues more effectively than others. More funding and a more equitable distribution of education funds are needed for primary and secondary schools, so as to overcome inequalities and raise the level of the quality of average education.

**Schools that manage to enrol and maintain disadvantaged populations such as people with disabilities, from poor households and from ethnic minorities (encouraging social mix) should be financially encouraged and the per capita funding mechanism should be revised accordingly**.

Regarding learning outcomes, **a certain shift of focus is required in primary and secondary education, from the top to the bottom of performers**, in order to reduce disparities and raise the average education quality. Targets for the reduction of disparities among specific population groups, such as people with disabilities and people from ethnic minorities, should be set.

### Technical recommendations

Non-cognitive skills should also be considered in the monitoring and evaluation of current education and training policies. For example, Romania would largely benefit from participating in the OECD/PIAAC survey of adult competencies. Promoting secondary analyses of health

and other surveys would also help to better understand the specific positive impact of education on social outcomes.

Data on groups at risk of exclusion (i.e. ethnic minorities, people with disabilities, people living in low-income households, etc.) could be further collected either by over representing these populations in the sample design of national surveys or by organizing specific surveys targeting these populations. Data on mobility should be made available by level of education, in order to better project the expected years of education (and potential economic returns of education) in the future.

Since enhanced data on education returns can help better shape budget focus and monitor the impact of reforms and programmes, a Romanian framework for the cooperation of education economists could be developed by the Institute of Education Sciences with the goal of actively participating in the European Expert Network on Economics of Education (EENEE) or any equivalent research group. This would require grants (from the Ministry of Education, for instance) and other type of support for research and papers in the area of education economics.

Romania and EU surveys should allow for an adequate calculation of the individual returns of education, by field of study and sector of employment. Wages should be collected in absolute terms rather than by decile. Data on educational attainment collected in household surveys should be separated into technical and general programmes.

## INTRODUCTION

International research has clearly shown that fostering human capital is key to economic growth. Investing in education is also a course of action to reduce disparities that exist in employment and earnings and that are attributable to social or ethnic origins. In its effort to provide technical guidance to the Government of Romania, UNICEF wanted to establish the link between education investment and the country's socio-economic situation, based on international research and national data. The goal of the present study is therefore to provide an estimate of the cost of non-investment in education in Romania (understood as keeping the education budget at the current level of 4.1% of the GDP), using both micro and macro analyses. The study also aims to describe the disparities that exist both in education participation and public spending, in order to shape future investments in education.

Chapter 1 describes the overall education situation in Romania, in terms of school participation and learning outcomes, including the policy objectives adopted in the EU 2020 framework. The study analyzes education expenditure compared to other EU countries and by level of education, providing useful benchmarks. It describes ways to speed up education reforms as recommended by international organizations.

Chapter 2 describes disparities among socio-economic groups, disaggregating education indicators by gender, rural and urban areas, citizenship and ethnicity, poverty and disabilities. It provides snapshot information on the policy issues and pending reforms to reduce the disparities and analyzes the distribution of public and private spending on education among the different groups.

Chapter 3 focuses on the effect of education on individual returns, focusing on employment and earnings. The literature review focuses on Mincer models and their application to the EU and Eastern European countries. It provides an overview of individual returns estimated in several papers in Romania and for certain groups. Using three recent national household surveys, the study analyzes the effect of education on the probability of employment, overall and by socio-economic groups (especially ethnic minorities), and then the effect of an additional year of education on earnings, as well as other variables. Impact on GDP is calculated by level of education associated to individual returns.

Chapter 4 examines the link between education and economic growth. First, after a brief overview of core national economic indicators, the study evaluates how the education provisions match the labour market needs and offers a few economic prospects. It also presents core macroeconomic models linking education and growth. Then, the study uses a benchmarking approach to simulate what could be the situation in terms of average years of schooling in the adult education. Barro-Lee and Psacharopoulos macroeconomic models are used to estimate what the GDP would be in a decade, assuming 6% of the GDP is spent on education in 2025.

Finally, the study makes a proposal for education investment by level of education and formulates policy and technical recommendations. The study was commissioned by UNICEF as part of its technical assistance to the Government of Romania. However, the views expressed in the study do not necessarily represent the views of UNICEF.

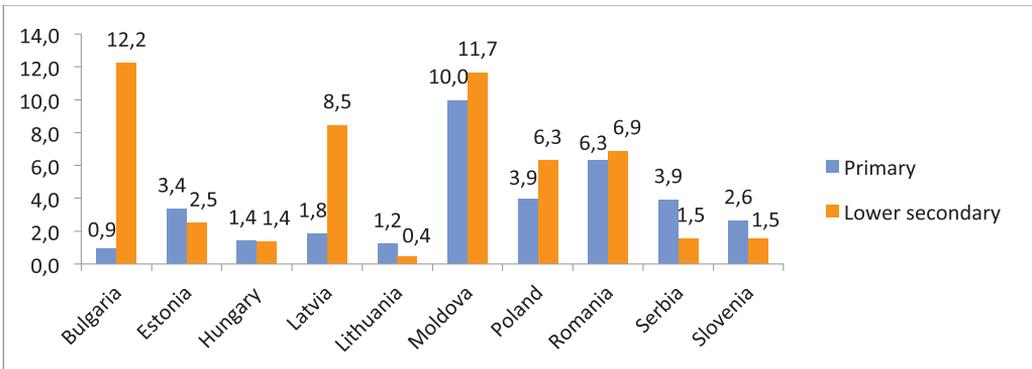
## CHAPTER 1 – DESCRIPTIVE AND COMPARATIVE ANALYSIS OF EDUCATION

In this Chapter, core indicators of school participation, educational attainment among the population, education quality, as well as education budget will be presented, discussed and compared to the EU average and other Eastern European countries. Key ongoing reforms and programmes will also be presented.

### 1.1 Out-of-school children

The out-of-school population is defined as the population of primary and lower secondary education age (7-14 years) that is not currently enrolled in school. The UNICEF-UIS methodology of analysis of the out-of-school children phenomenon uses several dimensions: the children that have never enrolled in any given level of education<sup>3</sup>, the children that have dropped out, and identified categories of children that are at risk of dropping out. According to UNESCO, in Romania there are 103,975 children of primary and lower secondary school age that are not enrolled in school. The proportion is above the rate of other Eastern European countries: 6.3% of the primary school age population is out of school, and 6.9% for lower secondary school age in 2009.

**Figure 1.1: Out-of-school rate for selected countries (2009)**



Source: Data accessed on Edstats, World Bank, June 2014

In Romania, according to UIS<sup>4</sup> data, there is a reverse trend: the proportion of out-of-school children has first decreased from 8.6% in 2001 to 6.3% in 2009, and then increased to 12.2% in 2012 in primary. Data show a warning signal, with the proportion of out-of-school children almost doubling since 2009. This trend on out-of-school children is consistent with the data on early school leavers, and can be partially attributed to an impact of the financial crisis in 2007 (European Commission/EACEA/Eurydice, 2013c).

3 Dimension 1 for pre-primary, 2 for primary and 3 for secondary. Dimensions 4 and 5 are for children at risk of dropping out.

4 UNESCO Institute for Statistics.

The expansion of pre-primary education could certainly help reduce the risk of never being enrolled or of dropping out. The gross enrolment rate of 3 to 6 year-olds increased from 71.8 percent in 2003-2004 to 78.4 percent in 2011-2012 and the Government plans to extend the pre-primary education coverage in the future. Prior to pre-school programmes, access to safe and quality day care centres would have a positive effect on the future education enrolment of those children whose parents may require this support, especially working mothers without family members to act as caregivers. There is actually no study on the cost of OOSC children in Romania.

## 1.2 The situation and cost of early school leavers

The European Union (EU) defines early school leavers (ESL) as people aged 18-24 who have only lower secondary education or less and are no longer in education or training. (Memo 11/52 - 2011). In statistical terms, European ESL rates are measured as the percentage of 18-24 year olds with only lower secondary education or less and no longer in education or training (European Commission, 2013a). In 2012, nearly 5.5 million young people across the EU between 18 and 24 years old had not finished upper secondary education and were no longer in formal or non-formal education and training. The proportion of early leavers was 17.4% in Romania in 2012, compared to 12.7% in the EU on average (European Commission, 2013).

A large number of studies address the issues of early school leaving and dropout rates in Romania. There is a direct link between available resources (in the family, at school, at community level, etc.) and the risk of non-attendance or dropout (UNICEF Romania, 2012). The proportion of early school leavers has slightly decreased since 1997, and started to rise again after the economic crisis (since 2008).

The EU target for 2020 is to decrease the percentage of early school leavers to less than 10% in the EU. In Romania's case, the national target of 11.3% for 2020 will be difficult to attain without major efforts (especially in rural areas and for Roma people), according to national projections and European Commission (2013). An analysis using a new econometric model developed by the European Commission's Joint Research Centre (JRC) shows that the development of early school leaving over time and across Europe is strongly influenced by parents' education and the risk of subsequent unemployment (Dragomirescu-Găină, 2013). According to this study, Romania has a low (<35%) probability of reaching their national targets for early school leaving.

There is ample evidence that early leavers from education and training are more at risk of unemployment and social exclusion, and even of shorter life expectancy resulting in monetary and nonmonetary costs to themselves and, in the longer run, to society. Based on the Psacharopoulos (2007) framework presented in Annex 3, the costs of such exclusion were estimated in some EU countries by analysing major social and economic costs for both individuals and society. The lifetime costs of ESL range from 100.000 Euros to 1.1 million Euros per school leaver in the different countries studied. The early school leaving overall cost is equivalent to 0.9% of GDP in Romania (up to 1.6% of GDP in Hungary, and 1.4% in Latvia), according to Brunello (2013)<sup>5</sup>.

According to the EU, the **young people neither in employment nor in education and training are defined as NEET. Statistically speaking the NEET rate** corresponds to the percentage of the population of a given age group (usually 15-29 years) and sex, not employed and not

5 Analyses are based on 2008 European Union Survey on Income and Living Conditions (EU-SILC)

involved in further education or training. The Brunello (2013) study provides an estimate for the NEET cost in Romania: 1624 Euros for each young person not in employment or training (the lowest absolute cost in the EU26). The figures have to be seen as under-estimates of real costs (of around 0-10 points) of NEETs, as costs related to homelessness, health implications, criminal justice and unpaid taxes on foregone earnings are not included in the definition used.

### 1.3 The situation of tertiary education

The tertiary educational attainment is defined as the share of the population aged 30-34 who have successfully completed university or university-like (tertiary-level) education with an ISCED 2011 education level of 5-8. Currently, 34.6% of the population aged 30-34 in the EU 27 have completed tertiary education. According to the European Commission, the target is to increase the share of the 30-34 year olds having completed tertiary or equivalent education to at least 40% in 2020 in the EU.

In Romania, the tertiary educational attainment was 21.8% in 2012, and the national target is 26.7% by 2020. The proportion of 30-34 year olds having attained tertiary education has doubled between 2005 and 2012 and Romania is one of the EU countries that makes significant progress<sup>6</sup>. However, the tertiary attainment rate is much lower in Romania than in other EU countries (European Commission, 2013). According to the model developed by the European Commission's JRC, there's a high probability that, by 2020, Romania will reach the national targets related to tertiary educational attainment.

### 1.4 Results of international assessments

PISA, TIMSS and PIRLS international assessments confirm the fact that Romania performs worse than other states in the region. For PISA 2012, the average performance in reading of 15 year-olds is 438 points, compared to an average of 496 points in OECD countries (39 points is equivalent to one year of schooling). Girls perform better than boys with a statistically significant difference of 40 points (OECD average is 38 points higher for girls).

According to the PISA 2012 Results in Focus:

- All scores registered by the Romanian students were below the OECD average: 445 points in maths compared to 494; 438 points in reading compared to 496; and 439 points in science compared to 501;
- On the other hand, Romania was mentioned among the countries that have been increasing their performance steadily and significantly since 2006.

### 1.5 Levels of education expenditure

Several indicators can be used to compare the education expenditure in Romania to that of other EU countries: the unit cost per student (expressed as a share of GDP per capita), the education budget as a proportion of GDP, and the proportion of budget education as a share of total government expenditure.

When considering the first indicator (unit cost as percentage of GDP per capita), the table below shows that Romania has the lowest spending per student, far below the EU average. For

6 [http://ec.europa.eu/europe2020/pdf/themes/28\\_tertiary\\_education.pdf](http://ec.europa.eu/europe2020/pdf/themes/28_tertiary_education.pdf), p. 2

the sake of comparison, the data used here to reflect education expenditure as a percentage of GDP (3.53%) is for 2010, while the Eurostat estimate for 2012 is 4.1%.

The spending per student is only 18% of the GDP per capita, while most other Eastern European countries spend between 23 and 27%, Slovenia reaching 32.3%, the third highest in the EU.

**Table 1.1: Spending per student (all levels) as a share of GDP per capita and education expenditure as % of GDP (2010)**

	<b>Spending per student as % of GDP per capita</b>	<b>Education expenditure as share of GDP</b>
Cyprus	38.8	7.92
Malta	36.3	6.74
Slovenia	32.3	5.66
Poland	29.1	5.17
UE27 average	28.2	5.44
Estonia	27.3	5.68
Latvia	27.1	5.01
Hungary	26.8	4.88
Croatia	26.1	4.27
Eastern Europe average	25.7	4.73
Lithuania	25	5.36
Bulgaria	24.6	4.1
Czech Republic	23.6	4.25
Slovakia	23.4	4.22
Romania	18.2	3.53

Source: Eurostat

Note: Data for most recent year Hungary.

When considering education expenditure as a percentage of GDP, again Romania is the country that is spending the least on education: 3.53% in 2010, compared to 4.73% on average for Eastern European countries and 5.44% for the UE. When looking at data trends of the allocation of budget expenditure by level, the total public expenditure on education as percentage of GDP for all levels, excluding pre-primary education, varied between 2.88% in 2000 and 3.07% in 2011.

According to the Government of Romania (2014), the total central government expenditure accounted for 35% of GDP, one of the lowest values among the European countries according to Eurostat. The education budget represents 8.3% of central government expenditure (European Commission/EACEA/Eurydice, 2013c).

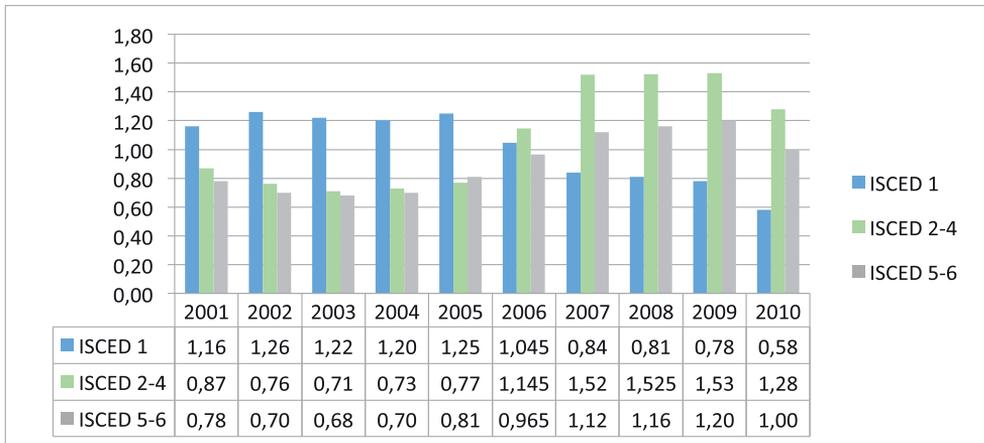
From 2001 to 2005, the highest level of public expenditure on education as percentage of GDP was registered for the primary education level. Since 2006, most of the public expenditure was allocated to secondary education, which was given priority. A significant drop was observed in the share devoted to primary education, which has been reduced by half in a decade in favour of secondary education.

In the European Union, the average total public expenditure on pre-primary education rose from 0.46 % of GDP in 2006 to 0.52 % in 2010. However, it slightly decreased in Romania (European Commission, 2014). Romania spends only 0.35% of its GDP on pre-primary education in 2010. Romania spends 1,300 Euros per child enrolled in pre-primary, the lowest spending per unit in the EU (using purchasing power standard) in 2010 (Eurostat, 2013). Hungary spends 0.7% of its GDP on pre-primary education, Latvia 0.84% and Bulgaria 0.92%, the second highest in the EU.

The findings of this study are based on micro data for the highest education level attainment obtained from household surveys that do not record the exposure to pre-school. Moreover, the average years of schooling are not counting pre-primary and therefore macro data cannot be used to estimate the returns of additional pre-school participation. Romania has started a programme to extend the coverage of pre-school education that has been given a high priority in terms of funding. Unfortunately, due to data limitations, it is not possible to estimate the economic returns of this investment. **Based on reference research such as Heckman's work, Annex 4 makes the case for further pre-primary investment in Romania.**

According to the reference report from the European Commission (2013c), *“the effect of the financial crisis on education budgets is mainly seen in the countries [including Romania] that had substantial general budget deficits in 2010 and 2011”*.

**Figure 1.2: Total public expenditure on education as % of GDP by ISCED level for Romania**



Source: Eurostat

The level of expenditure in primary education is not consistent with the high proportion of out-of-school children in Romania (12.1% and rising) and is much lower than the EU average. The two countries that are used as benchmark or references (see Chapter 5 for

justification), spend a significant proportion on pre-primary and primary education. Latvia spends up to 1.94% of the GDP on these levels of education and Hungary 1.5%. The level of spending on secondary education is also significantly below the EU average (see Table 4.6). On the other hand, Romania's level of spending in tertiary education is similar to other EU countries, and even slightly over the EU average.

Romania's level of expenditure on education and training is not consistent with the EU benchmark, nor with other Eastern European countries' trends, and is detrimental to participation in education, the reduction of disparities, quality of education, and finally to potential economic growth, as demonstrated further in our study.

According to the European Commission, UNICEF and the World Bank, urgent action is needed in terms of aligning education and training provisions to the labour market needs, implementing policies aiming to reduce social disparities and ensure a better management of the education system. The recommendations from the European Council are extremely clear and presented in Annex 2.

## CHAPTER 2: DISPARITIES ANALYSIS

The data presented above showed the situation for Romania's population on average. Large disparities are observed in terms of education participation, education spending, learning outcomes, employment and wages. According to the 2012 Out-of-School Children (OOSC) study (UNICEF), the categories of children highly affected by the out-of-school phenomenon are children from families with economic disadvantage (from poorest wealth quintile), Roma children, children with disabilities, and children from rural areas. Data and findings are presented by subpopulations, keeping in mind that inequalities cumulate.

### 2.1 Gender disparities

According to the OOSC study, the share of pre-primary age children enrolled in pre-primary or primary education for the school year 2009-2010 does not show important gender-based differences (Gender Parity Index =1.02). However, on average, in the EU countries, boys are clearly at a higher risk of leaving school before finishing upper secondary education than girls. This trend is also valid in Romania, although the gap is less significant than in other European countries.

In terms of quality of education, PIRLS 2011 International Evaluation (grade 4), the results of boys and girls are comparable with the international average – girls performing better than boys with an average of 15 points (16 being the international average – not statistically significant). For TIMSS 2011 Science, results are similar, but in Mathematics, girls perform better than boys. On the other hand, at PISA (15 years old), boys perform better than girls and above average, but with a lower difference than at the OECD level.

Regarding access and equal opportunities on the labour market, the situation of Romania is close to the EU average gaps. For instance, in 2011, at EU level, the employment rate (for ages 20 to 64) was 70.1% for men and 58.5% for women and, for Romania, 71.4% for men and 56.3% for women (with the mention that, between 2001 and 2012, this gap was already reduced by 4.2%)<sup>7</sup>. The average salary differences between employed men and women were 11% in 2012 in Romania while at EU level these differences were 16.4%.

### 2.2 Children and adolescents from rural areas

More than 71% of the Romanian poor population lives in rural communities<sup>8</sup>. Different studies, including the OOSC study, indicate that children and adolescents in rural areas are facing great challenges in school participation. In 2009-2010, the participation rate in early education in urban areas was 80.7%, versus 76% in rural areas. In time, there was an increasing trend in participation rates from 66.1% in 2000-2001 to 82.1% in 2009-2010, but the gap between urban and rural areas remained relatively stable (Precupețu, 2010).

Socio-cultural factors seem to play a major role in this phenomenon (demand side), so do the distance from the children's homes to schools, the precarious school infrastructure and material equipment, and the lack of qualified teachers (supply side).

From a demand for education point of view, in a context where rural communities are struggling with a still underdeveloped economic environment, and professional insertion/job-

7 National Strategy in the Field of Equal Chances between Women and Men for the Period 2014-2017.

8 Romanian Partnership Agreement for the 2014-2020 Programming Period

finding opportunities are quasi-inexistent for rural youth in their communities, the motivation for school participation is usually low.

In terms of quality of education, the performance in PIRLS 2011 for students learning in schools functioning in areas with more than 15.000 inhabitants is above international average, whereas the same performance, but for students learning in schools functioning in areas with less than 15.000 inhabitants, is significantly under the international average (with one exception: Science 4<sup>th</sup> Form). These findings are confirmed by a number of other surveys and research studies. For instance, the average score, resulting from the external evaluation of schools functioning in urban areas, is 10.8% higher than the average score of rural schools (ARACIP<sup>9</sup> 2012).

The proportion of qualified personnel in urban areas is significantly higher than in rural areas, indicating a potential gap in the allocation of public spending related to education personnel. When considering urban versus rural private contribution to education, urban children pay a private tutoring price that is almost three times higher, and rural children's travelling expenses are more than 1 ½ higher than those of urban children<sup>10</sup>.

Rural/urban disparities are approached in several policy documents, the most important and recent one being the Romanian Partnership Agreement for the 2014-2020 Programming Period. Several areas are identified as challenges (the competitiveness and local development challenge, the people and society challenge, the infrastructure challenge, the resources challenge, the administration and government challenge)<sup>11</sup>, each of them having programmes and measures which specifically address rural areas.

### 2.3 Ethnicity

It has been found that across the EU, early school leaving rates amongst the foreign-born population are more than twice as high as the early school leaving rates for the native-born population, indicating worrisome socio-economic discrepancies between the two groups (European Commission, 2013).

In Romania, the issue is not citizenship but ethnicity. A World Bank 2010 study indicated that the poverty rate of Roma people is as high as 67 percent. More than 50 percent of Roma and 60 percent of Roma communities live on less than €3.3 a day, and one in five Roma lives on less than €1.6 a day. 23% of Roma people are not currently connected to electricity and/or running water (World Bank, 2014).

Educational issues affecting Roma communities result in important school dropout rates, due to school-based segregation, discriminatory pedagogy and financial barriers to accessing education (Nelson, 2013). The costs of maintaining a child in school are not affordable for most Roma families. The results of a survey published in 2011 highlights the disadvantaged situation Roma children currently face: the specific attendance rates for the pre-school age are ranging from 4% (in the case of 3 year-olds) to 23% (in the case of 6 year-olds) (UNICEF 2011). Only 82.4% of Roma children of school age attend school, 6.9% have interrupted their

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9 Romanian Agency for Quality Assurance in Pre-University Education

10 The annual amount needed to support a child while in school is greater in urban areas – 1,572 RON (380 EUR) than in rural communities – 1,372 RON (330 EUR).

11 Romanian Partnership Agreement for the 2014-2020 Programming Period.

education and 8.9% have never been enrolled in the education system (Roma girls facing higher risks of early school leaving).

Moreover, in the case of teenagers, the disadvantaged situation is also important, only 33% of the Roma aged 15-18 are still in school (others being potential early school leavers), compared to almost 79% of the other youngsters. Among Roma people, achievement of tertiary education for those aged 30-34 is about 1%, compared to over 20% in the general population (World Bank, 2014). This data is concurred by our secondary analysis of national household surveys.

The problem of segregation of Roma children is persistent in Romania, despite official policies prohibiting it. However, practices such as deliberately placing Roma children in separate classes, or channelling them into special schools for children with intellectual disabilities, have also been reported (Open Society Institute, 2007). This is not consistent with the benefit of social blending in classrooms: children from disadvantaged socio-economic background are likely to benefit from enrolling in schools where more wealthy students are found. If allowed, this has a potential higher gain than any other education intervention (Piketty, 2008).

A consequence of these issues that specifically affect the Roma population is that a major qualification deficit occurs, translated into lower employability and low and unstable income. Roma employment figures are 26% lower than the average male employment rate (World Bank, 2010). The poor level of education is also reflected in the income earned by Roma employees (55% less than the majority), with the financial and economic crisis that started in 2008 making things even worse. Our data show that Roma earn less than others even after controlling for other individual variables, including education, see Chapter 3. That means that at a given education level and with identical measurable characteristics, a Roma earns less than a non Roma person.

A study from Hungary, Kertesi & Kelemen (2006), on increasing the education level of Roma children, found that increasing the education level of Roma children from primary to secondary education can secure an income of around €30,000 – 70,000 per person for the state, even without taking into consideration costs related to unemployment and offending.

The World Bank (2013) estimates the impact of the lack of investment in Roma education: the loss of annual productivity and fiscal contribution is estimated to be between 202 and 887 millions of Euros in Romania.

## **2.4 Children and adolescents from the poorest wealth quintile**

The consequences of poverty and extreme poverty on school participation and dropout are evidenced by numerous national surveys and research. Data from the Household Budget Survey (2012) gives a clear picture of inequities in educational attainment driven by wealth and the relationship between wealth, ethnicity and education.

**Table 2.1: Proportion of the population aged 25-64 by educational attainment in each quintile**

<b>Non Roma</b>					
Quintile	Never enrolled	Primary	Secondary	Tertiary	Total
Poorest	1.6	11.7	85.8	1.0	100.0
2	0.4	3.7	91.7	4.2	100.0
3	0.3	1.8	88.2	9.8	100.0
4	0.2	0.8	77.8	21.2	100.0
Richest	0.1	0.3	61.1	38.5	100.0
Total	0.4	2.9	79.5	17.3	100.0
<b>Roma</b>					
Quintile	Never enrolled	Primary	Secondary	Tertiary	Total
Poorest	14.0	45.8	40.0	0.2	100.0
2	5.7	31.4	62.9	0.0	100.0
3	4.0	27.3	67.7	1.0	100.0
4	0.0	11.8	88.2	0.0	100.0
Richest	0.0	17.1	78.1	4.9	100.0
Total	9.5	37.1	53.0	0.5	100.0

Source: Authors' calculations based on Household Budget Survey (2012), unweighted data

14% of Roma from the poorest quintile have never been to school (1.6% for non-Roma). Only 4.9% of the richest Roma people attained tertiary education compared to 38.5% for the richest non-Roma. Private tutoring is one of the most important hidden costs of education for Romanian families. Different researches have demonstrated that tutoring also maintains and exacerbates social and ethnic inequalities, reflecting inequalities in income and in urban/rural residence, Bray (1999).

Studies on dropout, UNICEF (2010 and 2011) indicate that families dealing with particular economic challenges are often unaware of the importance of education and lack confidence in the utility of attending school, e.g. the individual returns of schooling seem to be perceived as low.

To prevent and combat ESL, different yearly social support programmes have been conceived to assist students from disadvantaged areas - i.e. School supplies, Money for High school, Euro 200, the Croissant and milk programme, and programmes designed to ensure the transportation of students and pupils, i.e. Reimbursement of travel expenses and School shuttles (European Commission, 2013). The lack of an impact evaluation does not allow a judgement on their effectiveness.

There is a well-established relationship between the results of international surveys and evaluations and the economic, social and educational general background (SES – socio-economic status). Based on the data from PIRLS and TIMSS 2011 regarding the existence of

educational resources at home, the percentage of students with few educational resources at home is much higher than the international average of participating countries.

PIRLS, TIMSS and PISA studies reveal that family influence and community factors are greater in Romania than at the international level, indicating higher education-related social disparities in Romania than in other countries. The PISA 2012 international evaluation confirms a higher proportion of the variation in performance explained by elements of socio-economic status. This hypothesis is confirmed by the low percentage of “resilient” students (having good results, in spite of disadvantaged socio-economic background), the percentage of Romanian resilient students is less than half the average OECD percentage.

## 2.5 Children and adolescents with disabilities

Finally, regarding people with disabilities in Romania, their number in 2013 was 700.736, a ratio of 3.71 persons per 100 inhabitants. Of these, 61.043 (8.8%) are children under 18 and 639.693 are adults (91.2%). People with disabilities are seriously disadvantaged on the labour market, and no adequate support for entrepreneurship or other forms of support (e.g. such as sheltered employment) for persons with disabilities is available. Moreover, they are confronted with limited access to health, education and social services, which are not well adapted to their special needs or their financial capacity. Persons with disabilities have limited access to quality health care, including to routine medical treatment (Romanian Partnership Agreement for the 2014-2020 Programming Period).

Concerning access to education, the national legislation has recently been amended in order to reflect the principle of inclusive education. The right to education and inclusion is provided, as a general principle applicable to all children, by several laws<sup>12</sup>. The main feature of this right is the obligation to adapt the educational system to the child’s special needs. Data from the UNICEF OOSC study show that most out-of-school children with disabilities in the 7-14 age group suffer from a very severe handicap, while for the 3-6 age group, even children suffering from mild and moderate handicap are out of school.

Data (2011) provided by the National Authority for Persons with Disabilities (NAPD) within the research of OOSC (2012) show that:

- 31% of employed disabled persons finished high school,
- 21% finished university;
- 23% had a lower secondary level education (*Gimnaziu*)
- 16 % completed professional schooling;

An important study published in 2009 by two Romanian NGOs (Motivation Foundation and the Romanian Academic Society), entitled “Excluded from the Labour Market”, analyzes the barriers and opportunities for persons with disabilities to enter the labour market in Romania:

- The main factor affecting the employability of persons with disabilities is education.

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<sup>12</sup> Article 3 of Law 272/2004 regarding the protection and promotion of child rights; Law 1/2011 which states that one of the principles governing the educational system is the principle of social inclusion (letter ‘o’ of Article 3); Article 46 of Law 272/2004.

- There are no differences between disabled and non-disabled people in relation to the type of employers they benefit from: 61% of disabled persons are employed by private sector employers, 31% by public sector employers and only 1% work in segregated units (sheltered employment);
- The education level of persons with disabilities has a significant impact on their chances of finding employment.

The study also shows that the number of employed persons with disabilities in Romania has progressed steadily since 2003 (from about 9.600 persons to more than 27.000 in 2009, p.22). This study also shows that a low level of education is in direct correlation with the severity of the disability.

## 2.6 Cumulative disparities

Disparities overlap and cumulate; for example, a young person suffering from disabilities, from the lowest income quintile, and living in a rural area is much less likely to be enrolled in school or to find a job than a person not suffering from disabilities, in the highest quintile, and living in an urban area. The proportion of Roma people from the poorest quintile is around 12% for both primary and secondary education, while no out-of-school Roma children were found in the richest quintile, according to data from the National Institute of Statistics.

Though UNICEF has developed a model for analysing cumulative gaps, known as MODA (Multiple Overlapping Deprivation Analysis), these methods are beyond the scope of this study. A multivariate analysis is run on education participation and attainment to adequately measure the effect of the different characteristics.

Multivariate regression enables a separation of the effects of different variables on the probability of being either out of school or early school leavers, e.g. Roma vs poverty. Following the recommendations of the EENEE, we used logit models to identify the reasons for dropping out of school or leaving school early (Psacharopoulos, 2007). The data on out of school children had too few observations and was only based on the population that had never enrolled in school (educational attainment). Models run on out of school generated only two significant variables (age and Roma). Therefore, regardless of socio-economic status (wealth quintile<sup>13</sup>) and other characteristics, Roma are more likely to never enrol in school.

**Table 2.2: Logit model based on the probability of having left school early (18-24 year olds not having reached upper secondary education)**

Variables	Logit coefficient
Age	0.22***
Female	-0.48***
Urban	-0.58***
Roma	2.34***
Hungarian	0.34**
quintile2 (1 as ref)	-1.20***
quintile3 (1 as ref)	-1.74***
quintile4 (1 as ref)	-2.63***
Richest quintile (1 as ref)	-3.62***
Number of persons in the household	0.39***
Share of education budget	-4.26***
_cons	-4.88***
<b>pseudo R<sup>2</sup></b>	<b>0.3203</b>

Source: Authors' calculation from Household Budget Survey (2012), based on highest education level attained

The logit models show that **gender, living in rural areas, wealth, and the number of people living in the household are all factors having an impact on early school leaving.** Females have fewer chances to be early school leavers if living in urban areas. **The Roma variable is significant even when taking into account poverty.** Roma minorities have a higher chance to be early school leavers. The higher the wealth quintile, the lower the probability of being an early school leaver. If the household allocates a higher proportion of its budget to education, it really does reduce its members' chances to leave school.

## 2.7 Distribution of public and private spending on education

When considering the distribution of public expenditure on education by education level using the Household Budget Survey (2012) and the unit cost provided by Eurostat, our calculations indicate that the GINI coefficient is 0.16, close to the ideal. The GINI coefficient synthetically summarizes in a single figure the information provided by the Lorenz curve on the concentration of resources among the population. Public spending is well spread across education levels. When considering the distribution of public spending by wealth quintile, location and gender, the situation is different.

**Table 2.3: Disparities of public spending in education by wealth quintile, gender and area of residence**

	All Education Cycles			
	Share of Resources Consumed (%) [a]	Share of Each Group in the Total Population aged 5-24 (%) [b]	Share of Resources Consumed / Relative Share of Group [R] = [a] / [b]	Relative Appropriation Index [I]
<b>Household Wealth Quintile</b>				
Q1 (The poorest 20%)	9.9	14.7	0.7	1
Q2	10.3	15.22	0.7	1.0
Q3	14.0	16.35	0.9	1.3
Q4	28.5	25.34	1.1	1.7
<b>Q5 (The wealthiest 20%)</b>	37.3	28.39	1.3	2.0
Q1+Q2	20.2	29.92	0.7	1
Q4+Q5	65.8	53.73	1.2	1.8
<b>Gender</b>				
Girls	51.6	48.12	1.1	1
Boys	48.4	51.88	0.9	0.9
<b>Area of Residence</b>				
Rural	37.9	51.05	0.7	1
Urban	62.1	48.95	1.3	1.7

Source: Authors' calculations based on Household Budget Survey (2012), unweighted.

With regard to gender, disparities are relatively small, women being able to appropriate slightly more public resources in education than their male counterparts. Disparities are much more pronounced in favour of urban dwellers; an individual residing in a city manages to appropriate on average about 70 percent more resources than an individual living in a rural area. Disparities according to the quintiles of wealth tend to be even more acute. It is estimated that an "average" individual belonging to the richest quintile, due to his/her longer schooling

career and better participation rate, gets about twice as much public resources in education than an “average” individual belonging to the poorest quintile of the country’s population. It is however to be noted that there is a statistical relationship between being poor and living in rural areas and that being poor appears to be in itself a stronger factor of disparity than being rural.

Since data is not disaggregated by ethnicity, we cannot calculate disparities in public education spending between Roma and non-Roma. However, since Roma are over-represented in the poorest quintiles and in rural areas, we can infer that Roma children and adolescents are particularly disadvantaged when it comes to education expenditures.

When resource allocation disparities are calculated for primary and secondary education only, the gap between rural and urban is reversed and the disparities across wealth quintiles are very small, though the two wealthiest quintiles (approx. 40% of the population) still consume 48.6 of public spending.

The implementation of the per capita formula mechanism was evaluated in a recent study by the Institute of Education Sciences and UNICEF Romania (2014). Schools in some communities have limited resources and are usually unable to implement any activities that support students at risk of school failure (grade repetition, absenteeism, dropout, among others). It is clear that the financing formula per student needs refining, including additional coefficients to cover the extra costs associated with minority languages, Roma communities, students at risk of ESL and students with disabilities, to mention a few.

Overall, the private contribution to education (including household and other contributions) was only 0.12% of GDP in 2010, according to Eurostat, versus 0.82% on average for the EU. When considering only the household expenditure on education from the Household Budget Survey (2012), the poorest quintile spends only 0.2% of their resources on education, versus 3% for the richest quintile. These levels of household expenditure on education are comparable with data found in other EU countries, such as France (0.9%) (Consales, 2009).

**Table 2.4: Share of private education expenditure as % of total household spending by wealth quintile (2012)**

Wealth quintile	Share of education in household budget
Poorest quintile	0.2%
2	0.3%
3	1.0%
4	2%
Richest quintile	3%
<b>Overall</b>	<b>2.9%</b>

Source: Authors’ calculations based on Household Budget Survey (2012), unweighted.

## 2.8 Disparities reduction policies

There are several policies focused on affirmative measures for disadvantaged groups, namely:

- Encouraging Roma lower secondary students to attend high school and university;
- Continuing and developing programmes to train and recruit Roma human resources in the education system;
- Developing training programmes for non-Roma teachers working with Roma students and children on educational *Rromanipen* profile, Roma fundamental values, non-discrimination and non-segregation in school;
- Enhancing Roma school attendance by motivating Roma students to attend lessons in Romani language as a mother tongue or even to have complete instruction in this language;
- Promoting diversity and carrying out/developing special training programmes for school principals, teachers, support staff and local authorities' representatives in this area.

Further strategies and policies in education, addressing the pre-university levels of education, could take into consideration several important targets:

- Increasing pre-school education participation of those between the age of three and the age for starting compulsory education.
- Offering prevention, intervention and compensation education programmes such as: adapted curricula to the needs of children at risk of dropout, extracurricular activities, after school, second chance etc.
- Increasing enrolment and participation in Initial VET targeting vulnerable populations.
- Promoting gender equity<sup>14</sup>.

Regarding specific Roma issues, the Romanian Government Strategy in this area<sup>15</sup> also mentions specific targets in the field of education, in order to increase access, inclusion, participation and employment, to reduce poverty, to eliminate segregation and discrimination, etc. Those programmes can be further evaluated in terms of impact, efficiency and sustainability.

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14 National Strategy in the Field of Equal Chances between Women and Men for the Period 2014-2017

15 Strategy of the Government of Romania for the Inclusion of the Romanian Citizens Belonging to Roma Minority, for the Period 2012-2020

## CHAPTER 3 - THE INDIVIDUAL RETURNS OF EDUCATION IN ROMANIA

The relationship between level of education, unemployment and wages is well documented in the related literature. Findings from several papers in the EU or in Romania using Mincer models provide estimates of the individual returns of education. Several micro Romanian household surveys have been used to calculate our own estimates of education returns: The EU Survey on Income and Living Conditions (SILC), the Household Budget Survey (HBS) and the Household Labour Force Survey (AMIGO). They all refer to the year 2012. Our estimates of private returns are very consistent with those found in other studies. The values are used to estimate the effect on the economy generated by additional education among the Romanian population (as a result of more investment in human capital), using a microeconomic approach.

### 3.1 The effect of education on employment at individual level

In terms of work productivity, Eastern European countries have lower indicators than the EU average. The productivity (output per hour per worker) of Bulgaria (4.8) and Romania (5.4) is much lower than in other countries<sup>16</sup> and the EU average (32). When looking at the unemployment rate for the population aged 20 to 34, Romania's situation is most striking compared to other EU countries. The unemployment rate of 20-34 year olds in Romania is lower than the EU average, regardless of level of education, which can be explained by a prominent public sector, as well as by methodology and data collection issues. Another explanation here (and the most consistent one) is related to the international migration phenomenon, as more than 3 million Romanians are currently living/ working abroad (especially in EU countries).

**Table 3.1: Unemployment rate for the 20-34 age group in Eastern European countries**

Country	Lower secondary or below	Upper secondary or post secondary non tertiary	Tertiary
Romania	12.6	10	6.4
Lithuania	15.6	10.3	5.3
Latvia	15.9	8.9	4.5
EU (27 countries)	16.3	10.9	7.1
Estonia	16.8	9.1	4.2
Slovenia	17.1	8.8	5.7
Moldova	17.8	11	7.9
Hungary	19.6	8.1	4.1
Croatia	23	16.7	14.2
Serbia	23	20.9	18
Bulgaria	28.6	10.8	6.7

Country	Lower secondary or below	Upper secondary or post secondary non tertiary	Tertiary
Armenia	38.1	44	32.7
Poland	39.5	22.3	10.1
Slovakia	67.2	15.8	7.1

Source: Eurostat for the years 2003-2007

Among Eastern European countries, Romania has the lowest unemployment rate among people having reached lower secondary education or below (12.6%), which is partially due to the persistence of a strong agriculture sector and a poor level of unemployment registration among them. More investment in the lower levels of education would benefit a larger proportion of the population, since the poorest young people and those from ethnic minorities typically have little access to tertiary education.

A multivariate analysis run on the AMIGO household labour force surveys<sup>17</sup> show that the several disparity variables envisaged above in descriptive terms have a net effect on the probability of employment. Women, people living in rural areas, and Roma are less likely to be employed at a given education level. This model below also shows that each additional year of schooling reduces the probability of being unemployed by 8.2%.

**Table 3.2. Logit model: Probability of being unemployed according to several characteristics and fields of study**

Variables	Logit coefficient
Individual characteristics	
Female	1.421***
Married	0.075***
Years of education	-0.079***
Urban	-0.128***
Bucharest	-0.027
Roma	1.228***
Hungarian	0.101
Field of study	
Soft Sciences	-0.489***
Hard Sciences	-0.792***
Industry	-0.462***
Agriculture and Veterinary	-0.643

Variables	Logit coefficient
Health	-1.178***
Services	-0.250

Source: Authors' calculations based on AMIGO survey 2012.

\*\*\*significant at 1%

According to our analysis, **Roma have 3.41 times more chances to be unemployed than non Roma people, for the same level of educational attainment and other measurable characteristics.** The Hungarian minority effect is statistically not significant. The question is now whether education has different returns amongst various groups, especially between Roma and non-Roma people. Does the effect of one additional year of schooling on the probability to get employed vary between Roma and non-Roma?

Andrei (2014) used data collected from the 2011 Population and Housing Census for Bucharest to estimate the effect of education on employment (linear and nonlinear models of probability). It should be noted that the probability for a woman to occupy a job drops by 8% for Romanians overall and by over 22% for Roma population. The positive sign of the coefficients corresponding to the variable Level of Education in the three different models highlights the benefit resulting from individual increasing of investment in education. The marginal rates related to the level of education are calculated for the Romanian population, for Roma people and the entire population. The marginal rate for the Roma people is much higher than for non-Roma. Reaching the next level of education increases the probability of finding a job by 5.65% for non-Roma population and 16.24% for Roma population.

### 3.2 The effect of education on earnings: findings from the literature review

In this chapter we will investigate the relationship between educational attainment, employment and wages at the individual level. For the wages, Mincer (1974) equations will be used. These equations use *Years of education*; *Experience on the labour market* and *Squared experience* variables to explain the variation of the logarithm of income. The general equation is:  $\ln Y = a + bS + cE + dE^2$  where Y is the wage, S is the number of years of schooling, E the years of experience as a worker.

To estimate the relationship between employment and level of education, there is no general micro level equation that would be suitable. However, several techniques were employed in this study, such as logistic regression.

The minimum entrance salary in Romania is far lower than in other European countries. The annual gross salary<sup>18</sup> is 5869 Euros in Romania (4599 in Bulgaria, 9868 in Hungary compared to 42,900 in Germany), Eurostat (2010). A World Bank (2012) publication on jobs in Eastern Europe and Central Asia fits Mincer's earnings functions for full-time workers in each country for mean earnings and at five percentiles (from the 10th to the 90th) of the earnings distribution, given worker characteristics. The average return of tertiary education is 73% in Romania circa 2009. According to this study, in EU10 economies, the demand for "new

18 In industry and services, a full-time employee in a company with more than 10 people employed, Eurostat, accessed 13 May 2014.

economy” skills increased, while the one for manual skills dropped, due to the downsizing of heavy industry, but this has not yet transpired in Romania.

Jurajda (2003) uses Czech data and finds that the returns of one year of education in 2002 were close to 10% for the young generation aged 24 to 44 and equal to 8.7% for the older generation aged 45 to 61. Harmon (2003), using data from the International Social Survey Programme (ISSP) conducted in 1995, sought to establish a link between time spent in education and income. For Bulgaria, the authors found an annual difference of about 4.96% for men and 6.24% for women. These calculations show extremely limited direct financial benefits (incentives) for not leaving education early and completing secondary school education. However, these calculations do not include several key factors, like unemployment rate, social benefits, tax generation, effects on crime and health, etc. that are described further in our study.

Literature studying the effect of education on individual returns in Romania is rather scarce.

Paternostro (1999), using the 1994 Romania Integrated Household Survey, concludes that increasing returns of education and of experience are consistently significant, for both males and females in urban and rural areas; moreover, education returns in rural areas, particularly for females, are greater than those in urban ones.

Skoufias (2003) paper uses cross-sectional individual data from the 1994 Integrated Household Survey of Romania to analyse the deciding factors of male and female wages in public and private enterprises. In the public sector, higher levels of education are significantly associated with higher wages for both males and females. The marginal rate of education returns is higher for men than for women. In the emerging private sector (at the time of the data used), college education yields a much higher marginal rate of return for women than men. The male-female wage differential is higher in the private sector than in public firms (24.9 percent and 15.4 percent, respectively).

Andrén (2005) estimate the impact of schooling on monthly earnings from 1950 to 2000 in Romania. Nearly constant at about 3-4% during the socialist period, the coefficient on schooling in a conventional earnings regression rises steadily during the 1990s, reaching 8.5% by 2000. Roma minorities have the highest return coefficient.

Voinea (2011) explore the existence and statistical significance of a wage premium across the private sector using the 2004-2009 waves of the Romanian Household Budget Survey. Their findings show the existence of a large, positive, and significant wage premium (about 10 percent) in the Romanian public sector between 2004 and 2009. Considering the effect of education on individual returns, according to the authors, the public sector attaches a lower premium on university education, compared to the private sector.

Ion (2013) finds similar rates of return for Romania using more recent data (Household Budget Survey 2009). To properly estimate the individual returns from education, Ion introduces several variables besides the standard Mincer equation: Gender, Nationality, Marital status, Ownership of employer (public/private), Activity, Region of development and Area of residence. The estimated marginal return of one year of schooling is 8.50%. That means that one additional year of schooling increases wages by 8.5%. This is consistent with the estimates from macroeconomic data for Eastern Europe (Barro) (2010), presented in Chapter 4, and with Andrén’s micro estimates (2005) and ours.

Literature focusing on Romania shows differences in education returns between urban and rural areas, between private and public sector and between males and females. The wage

gender gap has not been reduced in the past ten years and is similar to the gap found in other EU country. Individual returns of education are higher for rural population and Roma and therefore education is a way to reduce wage disparities.

### 3.3 The effect of education on individual earnings using recent national data

Statistics published by the National Institute of Statistics highlight significant differences between the net average earnings of those with secondary education and those with a low education level. The table below shows in descriptive terms the indicator values for the three categories of people defined in relation to the level of education, overall and by age group.

According to data from the Household Labour Force Survey (AMIGO 2013), the earnings of Tertiary versus Secondary education are higher than those of Secondary versus Below secondary.

**Table 3.3: Net average earnings - overall and by age groups (in RON)**

Age	Overall	Post secondary-tertiary education	Secondary Education	Below secondary	Ratio (1)/(2)	Ratio (2)/(3)
	<b>0</b>	1	2	3		
<b>All age groups (20-64)</b>	<b>1227</b>	<b>1545</b>	<b>1138</b>	<b>969</b>	<b>1.36</b>	<b>1.17</b>
20-24 years	<b>1084</b>	1233	1073	967	<b>1.15</b>	<b>1.11</b>
25-34 years	<b>1221</b>	1457	1114	944	<b>1.31</b>	<b>1.18</b>
35-44 years	<b>1238</b>	1579	1143	997	<b>1.38</b>	<b>1.15</b>
45-64 years	<b>1246</b>	1680	1160	967	<b>1.45</b>	<b>1.20</b>

Source: Romania National Institute of Statistics, Household Labour Force Survey, 2013 (AMIGO)

**On average, someone holding a tertiary degree can expect to earn 1.36 more than someone having attained secondary education, who in turn can earn 1.17 times more than someone not having attained secondary education. The “returns” of tertiary education increase with age, while the returns of secondary education remain constant across age groups.**

In terms of European comparison, in the EU 25, the earnings ratios of Tertiary education (compared to Secondary education) range from 1.53 to 1.98. Poland, Lithuania, Slovenia and Hungary have higher returns than the EU average. 45% of public sector employees hold a tertiary degree, only 14% in the industry sector and 36.6% in services. Estimates from other Romania surveys are very consistent. To properly assess the earnings differential, the sector of employment has to be taken into account (Arias, 2013).

Several data sources were used to estimate the individual returns of education on wages and employment: AMIGO Household Labour Force Survey, SILC survey, AES survey and Household Budget Survey. Models were run on the age group 25 to 64 and on employed people only, with a special care to achieve comparability across surveys and with Eurostat recommendations.

As per Kingdon (2008), further variables were introduced such as Household size (a proxy for number of children), health status and other relevant variables. The field of study variable has been introduced in multinomial logit models using the AMIGO survey. Although there is some debate about the use of Mincer models, we follow the recommendations from the European Expert Network on Economics of Education: “Regarding the labour market earnings effect, the extended Mincerian earnings function can be used as the main analytical tool, adapted to the data in hand” (Psacharopoulos, 2007).

**Table 3.4: Mincerian results based on SILC and Household Budget Surveys (using years of schooling)**

	SILC (2012)	SILC (2012)	Household budget (2012)	Household budget (2012)
Female	-0.289***	-0.318***	-0.3310***	-0.268***
Experience	0.024***	0.017***	0.0231***	0.0086**
Experience2	-0.0005***	-0.0003***	-0.0003***	-0.00006
Years of education	0.163***	0.079***	0.126***	0.086***
Married	0.051*	0.041**	-0.0682**	-0.070**
Ill		0.005		
Roma		na		-0.304***
Hungarian		na		0.0383*
Number of persons in household		-0.040***		.0116***
Bucharest		0.181***		0.212***
Urban		0.094***		0.235***
Sector of employment (ref. services)				
Agriculture		-1.377***		-0.564***
Public sector		0.008		0.141***
Industry		-0.051*		0.181**
_cons	6.921***	8.482***		5.802***
R-square	0.31	0.62	0.28	0.47
Number of observations		6,147		11,384

na: not available

Source: Authors' calculations based on SILC and Household Budget surveys (2012).

Our estimates of the returns of one additional year of schooling are very consistent across surveys and with Ion's paper (8.50%) based on the *Household Budget Survey (HBS) in 2009* and whose models have been used as starting point. **The effect of one year of schooling on wage is 8.05% according to the SILC data (2012) and 9.07% according to the Household Budget Survey (2012).**

**There are disparities linked to gender, ethnicity and area of residence.** Women, people from rural areas and Roma can expect to have lower wages, regardless of their education level. While wages in agriculture are lower than in other sectors, earnings in the public sector are higher than in the services sector, according to Household Budget Survey data. The effect of working in the industry is negative compared to services when using SILC data, but positive when using the Household Budget Survey.

When models are run on subpopulations (for each sector of employment), the marginal returns of education in industry are higher than in other sectors (especially agriculture). To better assess the effect of the sector of employment and wages and identify sectors that are potentially attractive, it is necessary to take into account the field of study. Using the AMIGO<sup>19</sup> survey, data show that graduates from Industry and Health sectors have a higher chance to be at the top of income distribution.

As found by Andren (2005) and our analysis, better educated Roma can expect higher education returns. **The returns of an additional year of schooling is 11.1% on earnings for Roma compared to 8.98% for non Roma**, according to our analysis based on HBS (2012). There is also a higher effect of the marginal returns of education on the probability of employment for Roma people, according to our analysis. **Since only 2.8% of Roma people have reached tertiary education, investment in tertiary education is not likely to reduce the disparities for Roma people in terms of wage.**

Data below is similar to Table 3.4 but provides estimates of level of education, comparing one to the other using SILC data (2012).

**Table 3.5: Mincerian results based on SILC (using levels of education)**

	Coefficient	Coefficient	Coefficient
female	-0.32***	-0.32***	-0.322***
experience	0.0***	0.02***	0.018***
experience2	-0.0003***	-0.0003***	-0.0003***
primary	ref. level	ref. levels	-0.425***
lower_second	0.014		-0.254***
upper_second	0.28***	0.269***	ref. level
post_second	0.602***	0.591***	0.333***
tertiary	0.782***	0.772***	0.51***
doctor	0.695***	0.685***	0.422***
married	0.044**	0.044**	0.041**
ill	-0.0003	-0.0003	-0.006
number_pers	-0.039***	-0.039***	-0.039***

19 Unfortunately, AMIGO data cannot be compared with other surveys using Mincer models, as it used income decile rather than income absolute value to measure wages.

Bucharest	0.182***	0.182***	0.178***
urban	0.077***	0.077***	0.083***
agriculture	-1.4***	-1.4***	-1.402***
public_sector	-0.015	-0.015	-0.016
industry	-0.039	-0.039	-0.038
_cons	9.177***	9.188***	9.459***
R square	0.63	0.63	0.63

Source: Authors' calculations based on SILC (2012).

Using SILC data (2012), the estimated wage premium is 30.8% for upper secondary compared to lower levels (primary and lower secondary combined), and 24,9% using the Household Budget Survey (HBS) 2012 data. The wage premium is 66.5% for tertiary education compared to upper secondary, using SILC data, and 67% using HBS. World Bank (2012) estimates are 73%. Lower secondary education has a 58% wage premium over primary education when using HBS data, but this premium is not significant in the SILC data. The wage premium for primary education compared to no education cannot be computed since the datasets contain too little active population aged 25-64 not attaining primary education.

Adult education is considerably underdeveloped in Romania (only 1.4% of the target population versus 9% in the EU on average). Data from the Adult Education Survey show Adult education generates little value added on wages, while noting that such analysis has to deal with certain methodological issues (in particular that the characteristics of adults willing to enrol in said education might be different than others). **Adult education returns on wages were not significant in our estimations but improvement in this sub sector both in quantity and quality of training delivered would potentially yield a wage premium.**

### 3.4 The effect of more education using microeconomic simulation methods

To estimate what would be the impact on income, we use a simple methodology explained in Thomas (2013): we multiply the wage premium for each education level, estimated using micro data, by the proportion of the new population reaching that level. The estimated return by level of education is: (Proportion of population having Level B of educational attainment in 2025-Proportion of population having level B of educational attainment nowadays)\*Wage premium of level B compared to level B-1; expressed as % of national income (GDP).

Reducing the proportion of out of school children in primary and lower secondary education will contribute to the improvement of average years of schooling and the reduction of early school leavers. However, based on our estimations, the table below shows that improvement of enrolment in primary and lower secondary education has no direct impact on GDP. Even if there is no direct impact on GDP, Romania has to invest in pre-school, primary and lower secondary education in order to have a bigger cohort of population capable of enrolling in tertiary education. Under the hypothesis of further investment in education (up to 6% of GDP) and, as a consequence, the improvement of the level of education attained by the population, the table below provides estimates of education returns on GDP inferred from SILC micro data.

**Table 3.6: Microeconomic simulation model**

Levels of education	Actual situation (based on 2012 data)	Estimated returns	2025 Romania targets and outcomes	Impact if target achieved
Primary or lower secondary	Proportion of population* with lower secondary education or below	Wage premium Primary or lower secondary to no Primary education	Proportion of population with ISCED 2 or lower	Social outcome and a pre-condition for a higher percentage of the population reaching upper secondary
	29%	na	21%	
Upper Secondary or post secondary non tertiary	Proportion of population with upper secondary education**	Wage premium upper secondary (to lower secondary)	Proportion of population with ISCED 3 or 4	A pre-condition for a higher percentage of the population reaching tertiary
	58%	30.8%	59.7%	0.52% of GDP
Tertiary	Proportion of population with tertiary education	Wage premium tertiary to upper secondary	Proportion of population with tertiary education	
	13.6%	66.0%	19.0%	3.59% of GDP

\*25-64 years old

\*\*or post secondary, non tertiary

Source: Authors' calculations from SILC micro data (2012) and Eurostat

According to the micro data, the largest gain would be achieved by improving the proportion of the population reaching tertiary education, with an impact estimated to be around 3.6% of GDP. A slight increase of the proportion of the population with secondary education would generate a 0.52% of GDP.

Based on the micro data by level of education, the gain to the GDP is 4.1% if Romania manages to raise the educational attainment as per the value mentioned in the above table. Assuming more investment in education (up to 6% of GDP) yields on average an additional year of schooling of the population (see Chapter 4), and inferring the estimated individual return to the population, the gain is 8% to GDP. In both cases, the returns are higher than the difference between targeted and actual spending in education (estimated 2% or 2.5% according to the different budget sources).

Microeconomic methods are useful to estimate the returns of the different levels of education and among different groups. Several datasets were used and models were set after a sound review of the Mincer models used in Romania. Our estimates are very consistent with other studies. However, the methodology has limitations when it comes to making estimations based on micro data for Romania's entire population and income and for the effect of human capital on the GDP. The projections are based on actual returns ignoring output elasticity.

General equilibrium effects should be considered, e.g. the fact that once the high school graduation rate is increased, the relative earnings premium of completers may drop. However, our estimates of individual returns of one additional year of schooling based on 2012 data are very consistent with prior research that used more ancient data such as Andrén (2005). This indicates that the earnings premium gain associated to education does not seem to vary across time. These methodological issues can be addressed only by incorporating behavioural elasticity into a macroeconomic model which is beyond the scope of this study (Psacharopoulos, 2007). Moreover, it is not clear to what extent the high tertiary returns (compared to other EU countries) partly results from the slack caused in the labour market by the sizeable emigration of Romanians, many of whom are increasingly well-educated (World Bank, 2012).

### 3.5 The effect of more education on social outcomes at individual levels

Many empirical studies have shown a strong correlation between education and various indicators related to health and social capital (Grossman, 2006). A growing number of studies suggest that education has a direct effect on these factors of social progress. A better understanding of the social benefits of education would be a major step forward. The OECD has developed a framework using data from the PIAAC adult survey that does not include Romania. Little literature is available on the social impact of education investment return in Romania. Psacharopoulos (2007) has defined a framework to understand the impact of school failure, which identifies private, social and fiscal cost. In general, one cannot deny the social and economic benefits of education.

Adults scoring higher on the PIAAC scale are reporting high earnings, high levels of trust and political efficacy, good health, participating in volunteer activities and being employed. An additional year of schooling corresponds to an increase of the degree of interpersonal trust by 3.1% standard deviation; the effect is even more important regarding the value of immigration and type of immigration. One mechanism by which education affects crime is that schooling increases the returns to legitimate work, raising the opportunity cost of illicit behaviour. By raising wages, schooling makes prison time more costly. Schooling may increase risk aversion and patience (Psacharopoulos, 2007).

Several studies have been made on the relation between education and mortality, subjective health, physical health problems, obesity, mental health, drinking and smoking. They all show education decreased risks. The two mechanisms by which education affects health outcomes is by changing behaviour and through higher incomes. A higher level of income thanks to increased education allows the more educated to consume healthier food and buy better health care. A study covering 7 EU countries including the Czech Republic finds that one additional year of schooling reduces the probability of poor health by 4 to 8.5 percentage points for females and by 5 to 6.4 percentage points for males (Brunello, 2011).

Using SILC data, we are able to compute our estimates of the probability of a population aged 25-64 being in fair, bad or very bad health or suffering from a long chronicle disease. Culter (2007) find that mechanisms by which education influences health are complex and are likely to include interrelationships between individual characteristics, such as age, sex; demographic and family background, the level of education, occupation status, income; which must be included in the model. Our model is also including variables that were used to assess the effect of education on earning and employment, in order to compare those with the effects of education on health status (self-reported). According to our analysis, each additional year of schooling reduces the probability of being in bad or very bad health or of suffering from a

chronic long-standing disease by 8.2%. This is consistent with Brunello (2011) estimates. 8% is also the effect of an additional year of schooling on the probability of being employed and the estimated gain on earnings.

**Table 3.7: Logistic regression on self-reported health status (25-64 years old)**

	Fair, bad or very bad health	Suffering from any chronic (long-standing) illness or condition
age	0.098***	0.088***
female	0.400***	0.449***
Log (income)	-0.068	0.051
Years of education	-0.072***	-0.071**
urban	0.318***	-0.152
Bucarest	0.160	0.232
agriculture	-0.344	-0.674\$\$
public_sector	0.054	0.383
industry	0.101	0.069
unemployed	0.983*	1.099**
self_employed	0.428**	0.580**
_cons	-5.381***	-6.756***

Source: Authors' calculations based on SILC 2012

Oreopoulos (2006) reports that one extra year of schooling has a significant effect on reducing dependence on social welfare payments in Canada and the United States. According to Psacharopoulos (2007), social welfare payments can be assessed by means of a demographic projection model where a distinction is made between age groups with incomplete and completed secondary education. Last but not least, those who failed in school are less likely to participate in further education or training (lifelong learning). Although estimating the effect of non investment in education in terms of extra welfare, crime and health cost is beyond the scope of this study, micro data show, at least for health, that additional gain can be obtained by further years of schooling. All this stresses the need for further research in this area in Romania. In the following Chapter, macroeconomic methods are used to link education investment to economic outcomes.

## CHAPTER 4 - EDUCATION AND ECONOMIC GROWTH

### 4.1 Macroeconomic context of Romania

With a Real GDP per capita approximately five times lower than the European Union average, Romania is one of the countries with the weakest economy. Only Bulgaria has a lower Real GDP per capita than Romania. Yet in 2012, when most of the European countries faced a negative growth, Romania registered a 1.0% increase in 2012 and 3.9% in 2013 Eurostat.

Considering the structure of the economy, the highest gross value added was registered for Industry (except constructions) and the lowest value added was registered for Arts, entertainment and recreation; other service activities; activities of household and extra-territorial organisations and bodies. The situation is similar at European level, but in agriculture, Romania has one of the lowest values of the gross value added compared to the other European countries. Together with the overall low work productivity of Romania, the important share of population working in agriculture and the predominance of agriculture hinder Romania's economic competitiveness. When looking at the Eurostat data on trends of different sector contribution, the contribution of agriculture is in sharp decline, while that of the industry has been on the rise since the 2008 economic crisis; services are stagnating.

### 4.2 The match between education and labour market

In 2012 in Romania, an important part of the employees (28.5%) worked in agriculture, forestry and fishing. In the European Union, only 6% of the labour force is engaged in this sector. Given the competitiveness of Romanian salaries, the country would certainly benefit from the fall of industry in Western Europe, such as France. This economic transition would have to be accompanied by a better equipment of key sectors with qualified human capital, backed by the development of Technical and Vocational Education (Mingat, 2013). The development of the services sector's human capital is impeded by a relatively attractive public sector that drives 55.3% of services graduates; it is also important to note that only 76.4% of graduates from the Industry, Construction and Architecture fields of study do work in this sector. Only 31.6% of Maths & Computer Science graduates work in the industry. Given the highest probability of being employed when following this field of study and slightly higher returns in terms of wage, graduates would be encouraged to join this field of study.

**Table 4.1: Sector of employment by tertiary field of study in Romania**

Sector of employment/ Field of Study	Agriculture & Veterinary	Education	Health	Human Sciences & Arts	Industry, Construction & Architecture	Math & Computer Sciences	Services	Social & Economics Sciences, Law	Total
Public sector (n=1,658)	25.6	86.7	82.6	58.8	8.6	43.1	55.3	32.1	37.9
agriculture (n=128)	42.2	3.7	0.9	0.7	3.0	1.4	3.5	1.9	2.9
industry (n=1,710)	8.9	5.9	14.9	8.2	76.4	31.6	24.1	36.0	39.1
services (n=873)	23.3	3.7	1.5	32.3	11.9	23.9	17.1	30.0	20.0
Total (n=4,369)	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Source: Authors' calculations based on the AMIGO Household Labour Force Survey 2012

### 4.3 Does more spending on education automatically generate economic growth?

The question whether more spending in education automatically increases the economy and overall development of a country has been widely debated (Gupta, 1999). **Work performed by the OECD and others tends to show little empirical correlation between education spending and quality of education, or even school participation.**

OECD (2013b) analyses show that below a certain threshold (below 50,000 USD cumulative expense per student aged 6-15), there is a significant relationship between education spending and learning outcomes<sup>20</sup>. But this relationship is too weak ( $R^2=0.37$ ) to allow any prediction of test scores given a certain level of expenditure. For the group of countries that spend more than 50,000 USD per student, there is no significant relationship between per student expenditure and learning outcomes.

Key education policy parameters (such as reducing class size, repetition rate, share of female teachers) rather than contextual factors (demographic and socio-linguistic ones) tend to explain the differences in performance in terms of completion rate (in low and middle income countries) or test scores (in middle and high income countries), Glewwe (2010), Varly (2012) and Altinok (2010). Greater school autonomy, transparency and accountability are key factors of success, bearing in mind possible trade-offs between schools' autonomy and the implementation of education standards, as well as the risk of competition between schools, which might result in poorer schools being unable to meet essential expenditures.

**Therefore, in our study, further investment in education is considered as a necessary but not sufficient condition for improving human capital in Romania.** The hypothesis is that increasing the education expenditure up to 6% of GDP will improve the education quality and the educational attainment of the population. Below, more precise projections are made by level of education using a benchmarking approach.

20 Unfortunately, Romania is not included in the OECD data on expenditure per student.

#### 4.4 What does a higher human capital do for the economy: findings from the literature review

Recent economic literature models the link between education and economic growth, based on the notion of human capital. Three core models are used and described in Annex 3. Barro (2010) analyzed the impact of education on the output for the period 1950 to 2010 for over 146 countries. They concluded that the schooling of workers has a significantly positive effect on the level of income at country level. **The effect of one year of schooling is 12.1% of economic growth, on average (World) and slightly over 8% in Europe and Central Asia, exactly the results found using micro level data analysis for Romania in our estimations and the literature.** According to Psacharopoulos (2004), the effect of investing in education is more or less similar to that of investing in physical capital. Both Barro-Lee and Psacharopoulos models have been used in this study.

Hanushek (2000) explains that most of the studies on the relationship between human capital and economic growth ignored the quality of the human capital, assuming that any variation in human capital quality is virtually not important, compared to the quantity of human capital. He analyses the impact of human capital on economic growth, considering the quality of labour force measured by comparative tests in mathematics and science. He concludes that labour force quality has a consistent, stable and strong relationship with economic growth. The estimated coefficient on cognitive skills implies that an increase of one standard deviation of the performance (or 100 on the PISA scale) gives an annual growth rate of 1.74 percentage points. To figure out what 100 points improvement of PISA performance means, the OECD calculated that 39 points are equivalent to one year of schooling. **Thus, if Romania reaches the OECD average (500), it can gain an estimated 0.95 points of additional economic growth.**

The Heckman (2008) paper discusses the role of cognitive and non-cognitive ability in shaping adult outcomes, the early emergence of differentials in abilities between children of advantaged families and children of disadvantaged families, the role of families in creating these abilities, adverse trends in American families, and the effectiveness of early interventions in offsetting these trends. Practical issues in the design and implementation of early childhood programmes are discussed.

The age span considered for early child development generally covers that period that goes from birth to accessing primary education. **This period as a whole is considered crucial as most (90 percent) of the volume of the brain is achieved by three years of age, while the degree of preparation for primary education has a strong influence on the formal acquisitions of the child in the early grades, themselves considered as strong predictors of his (her) future schooling career as a whole.** The consequences of things not having been properly done for the child's development (in its various dimensions) during the 0-6 age period will tend to be lasting and will be difficult (or sometime impossible) to offset later on. This window of opportunity for early human capital formation need not be missed. These views are backed by researchers in the field of neurosciences, by education experts, for example J. van der Gaag (2013), Abadzi (2006), and by economists and the reference work of Heckman (2008).

A summary of findings on the effect of increasing non-cognitive skills and developing early education is provided in Annex 4 and 5 but no economic return estimate can be easily calculated from the potential increase of non-cognitive skills generated by further education investment.

Burja (2013) analysed the relationship between education and economic growth among 12 new member states of the European Union using data between 1997 and 2011. Thus, they performed regression models between the growth rate of the GDP and the main components of the educational system. The authors found a strong connection between growth rates of GDP and educational factors such as: the share of people with lower secondary educational attainment and the employment rate of people with tertiary education. According to Neagu (2012), education has a strong effect on economic production. **The evolution of GDP per capita is explained in proportion of 63.8% by the dynamics of the stock of human capital in the economy, assuming all other factors are constant.** All Romania authors find a strong relationship between education and economic growth.

#### 4.5 What can Romania achieve in the next ten years by investing more in education?

According to the United Nations, the average years of schooling is the average years of education attained for a certain age group (25+)<sup>21</sup>. In Romania, the average years of schooling is 10.4<sup>22</sup>, comparable to France (10.6), but much lower than in the USA (13.3) (UNDP, website accessed June 2014). Several approaches are possible to estimate what could be a reasonable prospect for Romania in terms of achieved (not expected) average years of schooling in the mid-term (2020) and long term (2025).

The first approach would be to estimate the averages years of schooling following actual trends (conservative approach). While in the period 1980-2000, the average years of schooling improved by almost one additional year every decade, between 2000 and 2012 the increase was only by 0,5 years, with a stagnation from 2009 (as in many other countries). A conservative approach would be to reproduce the trend observed between 2000 and 2012, up to 2025. That would lead to an increase of 0.5 years, reaching 10.9 years of schooling on average.

A more reliable method would be to build a simulation model based on demographic projections, policy targets and key education parameters to estimate the school participation by age groups. Where such models exist, and are often used especially in low income countries, for instance by the Global Partnership for Education Secretariat, they are not based on the average years of schooling, and would require substantial adaptation that is beyond the scope of this study.

Another approach, very similar, would be to take as hypothesis the achievement of the EU 2020 target for different levels of education, estimate the projected enrolment rate, and calculate the average years of educational attainment for a specific age group. These two approaches are difficult to implement in countries where the core issue is to improve tertiary education participation, as tertiary programmes length varies and makes the calculation more complex.

The EU 2020 target is a benchmarking approach where the target is set for all EU countries, noting that specific targets have been set for Romania. An intermediate approach is to benchmark with other Eastern European countries that do spend more on education than Romania (and close to 6%) and that have similar level of socio-economic development.

Given that education quality is an important factor contributing to economic growth, the benchmark indicators would then incorporate PISA test scores, GDP per capita, early school leavers and tertiary attainment, in order to select the closest neighbour from an economic

21 <http://www.uis.unesco.org/Education/Pages/mean-years-of-schooling.aspx>

22 The estimates from Barro-Lee (2010) are slightly different.

point of view. To do so, countries are sorted by GDP per capita to compare Romania with countries with a similar level of economic development.

The table shows data for several Eastern European countries and proposed targets for Romania based on the EU 2020 framework.

**Table 4.2: Benchmarking tool**

Country	Average years of schooling (2012)-UNDP	Tertiary attainment (30-34 years old) (2013) Eurostat	% Early school leavers 2013 Eurostat	PISA scores maths (2009) OECD	PISA scores maths (2012) OECD	GDP per capita (2013) World Bank	Education spending as % GDP (2010) Eurostat
FYROM*	8.2	21.7	11.2	Na	na	4 851	3.3
Romania (actual)	10.4	21.8	18.2	427	445	9 499	4.1
Romania UE 2020 target	11.4	26.7	11.3				5.3
Bulgaria	10.6	26.9	12.4	428	439	7 296	4.1
Latvia	11.5	37.2	10.6	482	491	14 431	5.0
Croatia	9.8	23.7	3.8	460	471	13 530	4.3
Lithuania	10.9	48.6	6.4	477	479	16 977	5.4
Hungary	11.7	29.9	12.2	490	477	12 560**	4.9
Poland	10	39.1	5.9	495	518	13 432	5.2
Estonia	12	39.5	11.3	512	521	18 478	5.7
Slovakia	11.6	23.7	6.3	497	482	20 380	4.2
Czech Republic	12.3	25.6	5.5	493	499	18 861	4.3
Slovenia	11.7	39.2	4.7	501	501	22 059**	5.7
Average Eastern Europe	10.9	31	9.2	478	484	16 971	4.7
Min Eastern Europe	8.2	21.7	3.8	427	439	12 560	3.3
Max Eastern Europe	12.3	48.6	18.2	512	521	22 059	5.7
UE 28 countries	.	35.8	12.9	478	484	.	5.4
Montenegro	10.5	na	na	403	410	7 126	
Serbia	10.2	na	na	442	449	5 935	
Moldova (Republic of)	9.7	na	na	Na	na	2 230	

\*2003 for education spending

\*\*GDP in 2012

This table calls for several comments. Two countries (in purple) are candidate countries for benchmarking: Latvia and Hungary. While they have a similar level of GDP per capita, their spending on education is higher (around 5% of GDP), and their situation regarding early

school leavers and tertiary attainment (two predictors of average years of schooling) is close to Romania's 2020 target. Their PISA test scores are higher than Romania's, but the difference is only 32 points in Hungary's favor. In 3 years, from 2009 to 2012, Romania has increased its PISA test score by 18 points, the second highest increase in Eastern Europe after Poland.

This data tends to show that reaching the situation of Latvia or Hungary is achievable by Romania, both in terms of quantity and quality of education provided. In return, Romania would progressively increase its level of average years of schooling to reach Latvia's figure by 2025 (11.4). Thus, **an increase of one year of schooling by 2025 seems to be a realistic prospect**. Romania has achieved such performance in the 1980s and 1990s.

While Hungary's and Latvia's spending for education has been more than 5% over the last decade, they managed to nearly double the proportion of 30 to 34 year olds attaining tertiary education, and so did Romania (from 10.3 to 22.8%). Concerning early school leavers, both Romania and Latvia have reduced the proportion from 5 points, while Hungary has stagnated at around 12%. This probably means that Romania could reach the EU target of 11.3%, but could hardly go below as anticipated in national projections.

To estimate what would be the overall impact of increasing the educational attainment of the working-age population (15-64 years), once again we will look at the achievement of Hungary and Latvia over a decade. Indeed, these two countries are in a situation similar to where Romania stands, and the hypothesis is that Romania will reach Hungary and Latvia actual levels in a decade. The proportion of population aged 15-64 with upper secondary education (or post-secondary non tertiary) would increase by 1.9% around 2025 in Romania, following the trend observed in the past decade.

Regarding tertiary attainment, 15% of Latvia's population held a tertiary level in 2003 (a level similar to the current Romanian value of 13.6%), and the country has managed to get that proportion to 25.2% in 2012. Hungary has changed its proportion from 12.9 to 19%. The EU considers Romania likely to meet the target of increased tertiary attainment, and unlikely to reduce the proportion of early school leavers to the expected levels. **Our projections are in line with these assumptions and we assume that Romania will reach Hungary's actual value of 19% of the population aged 15-65 holding a tertiary level.**

Concerning the objectives related to quality of education, the EU 2020 target is presented in terms of diminishing the proportion of low achievers (below level 1 in PISA). **Reaching the actual level of Hungary by 2020 seems achievable and even getting to the OECD average of 500 by 2025.** This would represent an 18.3 points increase over a three-year period, which has already been achieved from 2009 to 2012 in maths.

#### **4.6 Economic growth forecast based on the assumption that Romania spends 6% of its GDP on education**

Using macroeconomic level-based models, the estimates related to the effect of reaching the 500 score in PISA represent a 0.95 points impact on economic growth, but only once this level has been reached (after 2025).

According to the European Commission, in Romania in 2013, a strong growth of 3.5% was driven by exports and an abundant harvest. **The projections for economics range from 2.3% to 3.5% for the period 2013-2015 but Romania recorded a slow growth rate in the first semester of 2014.** According to the projections made by the Government of Romania (2014)

with regard to the long-term sustainability of public finance, Romania is not expecting the share of public expenditure on education to increase because of the rise of age related expenditure (ageing population). The unemployment rate will also stagnate. **The GDP real growth rate is projected to be 1.9% in 2020 and 1.3% in 2030.** In the following sections, we will provide an alternative scenario, where the education investment is increased, yielding a higher educational attainment among the population and, in turn, a faster economic growth. Projections based on the education returns are compared to a 2% GDP per capita growth scenario for the period 2015-2030. The population size is assumed to be slightly decreasing due to emigration or constant, and ageing, while the share of active population is assumed to be constant (70%).

The data on GDP per capita, output per worker and physical capital per capita are from Penn-State, Summers (2009), and series stop at 2007. The GDP per capita up to 2015 is calculated using past growth rate. The physical capital and output per worker are assumed to be constant from 2007 onwards, although there is a strong increase for both indicators for the period 2000-2007. As the goal is to estimate the effect of educational attainment, other factors are assumed to be constant, although a rise in educational attainment would potentially increase further the output per worker (labour productivity). Moreover, EU funds would likely increase the level of physical capita per worker. The projections are based on the assumption of one additional year of schooling on average for the population aged 15 to 64 in 2025. GDP is in constant prices (Laspeyres method).

**Table 4.3. GDP projections using Psacharopoulos and Barro-Lee models**

	Variables	1995	2000	2005	2010	2015	2020	2025	2030
Observed	Years of schooling	9.6	9.9	10.1	10.4	10.4	10.9	11.4	11.7
	GDP per capita, in constant prices (USD) - Laspeyres	6 177	6 141	8 211	9 471	10 589			
	log GDP per capita	8.73	8.72	9.01	9.16	9.27			
Psacharopoulos	$\ln Y/n = 6.645 + 0.258S$	9.13	9.20	9.24	9.32	9.33	9.46	9.59	9.66
Barro-Lee	Investment Share of Real GDP per capita (rgdpl)- Physical Capital per capita	22.4	21.0	24.7	32.8				
	Real GDP chain per worker (rgdpwok) - Output per worker	11 578	11 893	17 998	20 772				
	Share of active population	0.67	0.68	0.70	0.70	0.70	0.70	0.70	0.70
	Physical Capital per worker	33.2	30.9	35.5	46.8	46.8	46.8	46.8	46.8
	$\ln(Y/n) = 6,645 + \ln(w/n) + 0.121(S-10\text{years}) + 0.544 \ln(K/w)^*$	9.2	9.2	9.4	9.58	9.60	9.64	9.64	9.70
Results	<b>GDP per capita Psacharopoulos</b>					10589	12800	14562	15734
	<b>GDP per capita Barro-Lee</b>					10589	15323	15375	16334
	<b>GDP per capita 2% scenario</b>					10 589	11691	12908	14251

Note: Blue are estimates, black are observed data. \*Same intercept as Psacharopoulos model

Our projections of the GDP per capita for 2030 fall between the present Latvia and Hungary values, which are close to the Eastern European average. **Increasing the level of spending in education to 6% of GDP is key for Romania to reach the EU 2020 targets. Achieving these targets will get Romania in 2025 in an economic situation comparable to the current average Eastern European country or more precisely Latvia.**

According to the Psacharopoulos model, an additional year of schooling gradually reached over the next decade yields a 2.7% GDP per capita annual growth rate over the period 2015-2025. The Barro-Lee models lead to a 2.95% growth rate scenario. Both rates are superior to the 2.5% growth rate from the 2013-2015 forecast, and the projection of 1.9% in 2020 and 1.3% in 2030 made by the Government of Romania (2014). To compute the cost of non investment, we use macro data and compare the situation of Romania in 2025 under the two scenarios:

- Scenario 1: the level of education expenditure expressed as % of GDP remains the same until 2025 and little improvement is obtained in terms of average years of schooling of the adult population.
- Scenario 2: the level of expenditure is gradually increased up to 6% of GDP in 2015, and allows to increase, by one year, the average years of schooling of the population.

The Barro-Lee and Psacharopoulos macroeconomic models linking average years of schooling of the population are then applied and used to forecast the GDP, assuming other factors (such as physical capital) remain constant.

**Table 4.4: Cost of non-investment**

	Billion Euros			Cost as % GDP in 2015
	Actual GDP	Projected GDP in 2015*	Cost over the 2015-2025 period	
2.95% growth scenario	143	191	17	9%
2.7% growth scenario	143	187	12	7%
2% growth scenario	143	174		

\*constant price

Source: Eurostat for actual GDP and authors' calculations.

**The cost of non investment in education is then calculated as 2015's GDP (under scenario 2) minus 2015's GDP (under scenario 1) and the estimates range from 12 and 17 billion Euros over the period, equivalent to 7-9% of 2015 GDP.**

Those estimates are consistent with the rates of private returns calculated on micro data (8%) and the macro estimates for Eastern European countries calculated by Barro (2010). Both micro and macro calculations using data from Romania **estimate the economic returns of an additional year of schooling at 8% on earning/income, which is superior to the projected education investment (6% of GDP). The reduction of the early school leaving phenomena (from 17.5% to 10%) would yield a return of 0.38%<sup>23</sup> on GDP based on Brunello (2013) estimates.**

The 2.95% growth rate can be sustained after 2015 given the returns associated with the rise of learning outcomes – PISA test score reaching 500 - according to the average estimates<sup>24</sup> of Hanushek (2000), e.g.  $2\%+0.95\%=2.95\%$  growth rate.

Those estimates do not take into account the social outcomes of education that couldn't be computed due to lack of data.

#### 4.7 Policy targets and areas for investment in education

Based on the EU targets and our own analysis of what can be achieved by Romania in the next years, the table below sets several policy objectives. The 2025 target of Roma 15-18 years old participation in secondary education is based on the actual value for non Roma. The target of PISA test scores is based on current Romania trends and on an assumed effect of greater participation into pre-primary education that would yield a potential gain in non-cognitive and cognitive skills in the latter levels of education. Other targets are based on the EU 2020 framework and achievement recorded in Latvia and Hungary.

*Table 4.5: Proposed objectives*

	Current situation (2012 or more recent year)	2017	2020	2025
Out of school children primary **	6.3%	4%	2%	0%
Early school leavers *	17.5%	15%	11.3%	10%
Proportion of 15-18 years old Roma in school****	33%	50%	70%	80%
Tertiary attainment (25-64 years old)*	13.6%	14%	16%	19%
Proportion of population with adult education*	1.4%	5%	9%	15%
PISA test scores (math)***	445	465	485	500
PISA test scores (reading)***	438	465	485	500
Education budget as % GDP*	4.1	4.8	5.4	6.0

Sources: \* Eurostat; \*\* UNESCO Institute for Statistics; \*\*\* OECD/PISA 2012; \*\*\*\* World Bank (2014)

In line with these objectives, a benchmarking approach will be used once again to determine what levels of education should be prioritised. As shown in Chapter 1, compared to the EU and benchmark countries, Romania spends more in secondary education and tertiary education than others do and less in pre-primary and primary education, levels that were given lowest priority in the recent years. In absolute values, tertiary education will receive more funding from the EU structural funds than other levels, during the period 2014-2020, and therefore the recommendation is to increase the national budget devoted to lower levels of education.

The proposition below consists in **spreading the additional budget effort<sup>25</sup> across the education levels to reach the benchmark observed in Latvia, Hungary and EU, with the**

24 Not specific to Romania.

25 The data on the budget by education level is not consistent across the sources and no national data source was

**objective to spend 6% of GDP in education by 2025.** Based on the international research (See Annex 4), we consider that in view of reducing the disparities and enhancing the quality of education, pre-primary education should be given priority as it can have the highest impact among the other interventions. The actual share of spending on this level of education is not consistent with the goal of extending the pre-school coverage.

**The investment in primary and secondary education would aim to reduce disparities both in terms of school participation and learning outcomes, which is likely to generate further economic growth later on. The investment in upper secondary education, whose economic returns must not be neglected, would also be targeting the development of new technical and vocational education and training (TVET) programmes, especially in the industry sector where higher individual returns of education were found.**

Our data show that **the individual returns of education are higher for the ethnic minorities than the rest of the population when considering both employment and earnings. Investment in the early levels of education must not be neglected if Romania wants to reach both objectives of economic growth and equity.** International research has shown that investment in early education (pre-primary) is among the most profitable areas of intervention and EU data show that this level of education is underfunded in Romania. In line with the planned financing of a lifelong learning strategy under the EU structural funds and to increase human capital, adult education should receive a higher budget allocation in order to catch up with the EU benchmark, although our data has shown few returns of adult education on earnings. Considering our findings and using a benchmarking approach, the table below proposes a distribution of the budget by education levels in 2015.

**Table 4.6. Proposed allocation of the education budget by level of education**

As % GDP	Education (all levels)	Pre-primary	Primary	Secondary	Post secondary non tertiary	Tertiary	Not defined (includes adult education)
EU Average	5.34	0.52	1.17	1.99	0.13	0.86	0.67
Latvia	5.73	0.84	1.1	1.76	...	0.94	1.1
Hungary	5.18	0.7	0.8	1.69	0.04	1	0.96
Romania	4.13	0.35	0.96	1.58	0.02	0.87	0.35
Proposed Romania value for 2025	6	0.7	1.31	1.99	0.13	1.2	0.67

*Source: Eurostat for actual levels and European Commission (2014) for spending in pre-primary. Each level of education would receive an additional share of the education budget ranging from 0.32 to 0.41% of GDP in the next ten years.*

provided for this study. The 2014-2020 strategy does contain data on the cost of different programmes but not based on projections of education spending by level. Baseline and projected data are therefore to be taken with special care and should be refined further based on more reliable data.

## CHAPTER 5: POLICY AND TECHNICAL RECOMMENDATIONS

### 5.1 Summary of findings

The table below presents a summary of findings from the literature reviewed in this study and from the analysis performed in the study.

*Table 5.1: Summary of core findings on the effect of education*

Effect of education	Findings from literature	Findings from this study
On the reduction of disparities	The impact of the lack of investment in Roma education in terms of loss of annual productivity and fiscal contribution is estimated to be between 202 and 887 million Euros in Romania (World Bank, 2013)	The effect of education on the probability of employment and earnings is higher for Roma than for Non Roma
On employment	More education provides more job opportunities at micro and macro level	One additional year of schooling reduces the probability of being unemployed by 8.2%
On the individual earnings	Ion (2013) estimates the private returns of an additional year of schooling are 8%	One additional year of schooling increases earnings by 8-9%
On health	One additional year of schooling reduces the probability of poor health by 4 to 8.5 percentage points for females and by 5 to 6.4 percentage points for males (Brunello, 2011)	One additional year of schooling reduces the probability of bad or very bad health or of suffering from a chronic long-standing disease by 8.2%
On economic development	The early school leaving overall cost is equivalent to 0.9% of GDP in Romania (Brunello, 2013)	
The Barro-Lee estimate of the economic return of an additional year of schooling of the population is 8% for Eastern European countries	The returns of an average year of schooling of the population calculated on macro data range from 7-9% of GDP	

Source: The authors.

In our study, the value of 8% has been found in several measurements of the returns of an additional year of schooling, both at micro and macro level, for Romania.

**The cost of non-investment is equivalent to 12-17 billion Euros in 2025 (8% of GDP),** assuming a 2% economic growth rate if the level of education spending and hence human capital remains the same. Increasing the human capital is likely to have further positive effects on health, crime reduction and decrease of dependence on social protection schemes, the highest cost of public expenditure in Romania. This would free up some resources to fund education further, a virtuous circle.

Based on the findings from our study, the international research and benchmarking approach, several policy and technical recommendations can be formulated and justified. A gradual increase in education investment (both public and private), in terms of percentage both from GDP and public expenditures, accompanied by a sound planning, monitoring and evaluation, could lead to concrete returns of investment, as shown in our study.

The education strategy and budget should be better aligned to a broader economic development plan that would focus on incentives for the private sector to create jobs and recruit without discrimination. This economic plan should provide targets for the development of industry and services sectors, backed up by more human capital. This implies a better adjustment of the education and training system to the labour market needs, as key to economic growth.

## 5.2 Increasing and better managing the education budget

Considering Romania's challenges in terms of economic situation and social disparities, and given the high returns of education (8% for each additional year of schooling) measured by micro and macro data, Romania should spend 6% of the GDP on education in 2025. A long term strategic planning of the EU funds in education should aim to meet the financial needs associated with reducing disparities and fostering economic growth.

To increase the education budget, several solutions are envisaged:

- i) give priority to education reforms when allocating EU funding, and/or increase the share of GDP devoted to public spending, since more human capital implies more employment, higher earnings and less dependence on social welfare (more tax returns).
- ii) increase the share of the education budget within the existing budget.

Overall, the private contribution to education (including household and other contributions) was only 0.12% of GDP in 2010, according to Eurostat, versus 0.82% on average for the EU. This private contribution to education (from companies and other bodies) should be increased in certain areas, for instance in adult education, especially if the Government is unable to reach 6% of public spending on education. However, this should be done with much caution to avoid widening disparities by increasing private contributions across the board.

Budget data should be collected in a more accurate and timely manner and reported to EU organizations such as Eurostat, to partners and to the public in a more transparent way. More precisely, the Ministry of Education and the Ministry of Finance with the methodological support of the Institute of Statistics should publish regularly statistical data on education expenditure, having as reference the revised list of education indicators. Both micro data (revenues and expenditure at school level) and macro data (revenues and expenditure at system level) should be made available in a transparent process.

Data on executed budget and level of physical realization (number of schools built, number of teachers recruited, number of meals delivered, number of beneficiaries reached to start with) should be reported for the sake of transparency and accountability and to monitor external funds absorption (from the EU in particular).

No data was available on the share of personnel expenditure, transfers and other types of current or investment expenditure. Such data should be made public, which could help to build a better social dialogue on education (especially with the teachers' union). Research has shown (at least in low income countries) that universal education can only be reached if a certain

amount of expenditure is allocated to education input in the form of non-salaries expenditure. Targets should be set on the proportion of personnel and non-personnel expenditure in the mid and long term.

Research has shown that the use of a more accountable mechanism in the education system at different levels, from schools up to central authorities, is likely to boost education. The different programmes undertaken to increase school participation and education quality should be evaluated more thoroughly in order to help prioritise actions based on impact, efficiency and sustainability considerations.

### 5.3 Investing in certain priority areas

Pre-school and primary education levels are the essential foundations for higher levels of education: a sustainable decrease of the high rate of early school leavers is not possible without a consistent investment in the first years of school and in the period preparing the child for enrolling in school.

As shown in the literature, the expansion of pre-school coverage is one of the programmes that can have one of the highest impacts on the reduction of disparities, reduction of the early school leaving phenomena and on raising the quality of education. Unfortunately, there is little Romania data to support these findings. Programme funding for pre-primary education and child care should be secured and given the highest priority in the national budget.

More investment is required in primary education to compensate for the decreased investment since 2001 and to catch up with EU averages. OECD analyses show very clearly that performing countries are managing the equity issues more effectively than others. More funding and a more equitable distribution of education funds are needed for primary and secondary schools, so as to overcome inequalities and raise the level of the quality of average education.

In order to respond to the evolving needs of the labour market, the TVET schools must be equipped with new technologies and the teachers trained for using them, via national budget funded programmes. Adult education/Continuous Vocational Education and Training must be strongly supported to become a real alternative for the beneficiaries that are not returning to the training system.

### 5.4 Reducing the disparities

More funding and a more equitable distribution of education funds are needed for primary and secondary schools, so as to overcome inequalities and raise the level of the quality of average education.

The analysis has shown large disparities of public expenditure allocation between urban and rural areas and when considering wealth quintiles. The per capita funding allocation formula has not been taking into account the socio-economic background of the pupils and should be revised. The Romanian Agency for Quality Assurance in Pre-University Education has been developing a comprehensive database that contains information on results, socio-economic background and school resources. Such database could be used to develop further funding allocations that would be based on the concept of value added and resilience. Schools that manage to enrol and maintain disadvantaged populations, such as pupils with disabilities, from poor households and from ethnic minorities, should be financially encouraged.

Our analysis has shown that both the education quantity (defined as the proportion of the population attaining a certain level of education or average years of schooling) and quality (here synthesized in PISA test scores) are key to economic growth. The recent trend of PISA test scores in Romania is positive and encouraging. However, data show large disparities among socio-economic groups in terms of learning outcomes. Students from the wealthiest quintile do actually perform better than their OECD counterparts, while students from lower quintiles have much lower results than the average OECD or EU students. It seems that, in Romania, a certain shift of focus is required in primary and secondary education, from the top to the bottom of performers, in order to reduce disparities and raise the average education quality.

A step forward would be to reduce public expenditure disparities with more equitable funds allocation at school level, taking into account the socio-economic status variable. This alone would not reach the objective of reducing the large disparities as long as the current programmes are not fully implemented and do not have the expected impact. The current programmes aiming at reducing disparities, such as School-After-School (SAS) and “Second Chance”, among others, should be evaluated in terms of impact, efficiency and sustainability.

Targets for the reduction of disparities for specific population groups, such as people with disabilities and people from ethnic minorities, should be set (as this has been done for Roma people in our study for upper secondary participation).

#### 5.4 Improving data and research on education

Non-cognitive skills, such as social skills, motivation and leadership, socio-emotional regulation, the ability to work with others and to involve important personality traits, can also improve employability, productivity and growth. Non-cognitive skills should be included in the monitoring and evaluation efforts.

Little data is available on the impact of education on social indicators such as health, crime, civic engagement and so forth in Romania. To do so, Romania would largely benefit from participating in the OECD/PIAAC survey of adult competencies and promoting secondary analyses of health and other surveys.

As highlighted by the World Bank, but also as experienced in the secondary analysis of the Romania household survey during this study, the data on ethnic minorities have certain limitations, both with regard to the definition of the categories and to the number of observations in the Romania or EU household surveys. Indeed, there are often too few observations to properly assess the out of school phenomena in these subpopulations or to estimate with accuracy the individual returns of education on employment and earnings.

Data on ethnic minorities (but also on people with disabilities) could be further collected either by over representing these population groups in the sample design of national surveys or by organizing specific surveys targeting these populations. Such data would help to better understand the persistence of the relatively low demand for education, given the higher returns of education for certain ethnic groups compared to the rest of the population calculated in our study. It would help better define and shape demand for support programmes and education advocacy targeting these populations.

Though the National Institute of Statistics has been recently producing some research on the mobility of Romania’s population, the effects of the opening of the EU market to Romanian nationals have to be monitored in terms of potential human capital leakage. If possible, data on

mobility should be made available by level of education, in order to better project the expected years of education (and potential economic returns of education) in the future.

Though there is some research on education economics in Romania, researchers and papers seems fragmented and no institutional framework exists to support collaboration between economists in this area. A national framework for the cooperation of education economists could be developed by the Institute of Education Sciences and the goal would be to actively participate in the European Expert Network on Economics of Education or any equivalent research group. This would require grants (from the Ministry of Education, for instance) and other type of support for research and papers in the area of education economics.

Romanian and EU surveys should allow for an adequate calculation of the individual returns of education, by field of study and sector of employment. Wages should be collected in absolute terms rather than by decile.

Data collected on educational attainment in household surveys should be separated into technical and general programmes for upper secondary and post-secondary non tertiary education in order to estimate and monitor the returns of technical programmes versus general ones.

## BIBLIOGRAPHY

- Abadzi, H. (2006). *Efficient Learning for the Poor. Insights from the Frontier of Cognitive Science*. Washington, DC: World Bank.
- Altinok, N. (2007). *A Macroeconomic Estimation of the Education Production Function*. Working Paper IREDU.
- Altinok, N. (2010). *Do School Resources Increase School Quality?* Working Paper IREDU. Pôle AAFE – Esplanade Erasme – B.P. 26513 - F 21065 Dijon Cedex [http://iredu.u-bourgogne.fr/images/stories/Documents/Publications\\_iredu/documents\\_travail\\_iredu/dt\\_2010-3.pdf](http://iredu.u-bourgogne.fr/images/stories/Documents/Publications_iredu/documents_travail_iredu/dt_2010-3.pdf)
- Andrén, D., Earle J., Saporu D. (2005). *The Wage Effects of Schooling under Socialism and in Transition: Evidence from Romania, 1950-2000*. *Journal of Comparative Economics*, 33 (2), 300-323.
- Arias, O.S., Sanchez-Paramo, C. (2013). *Back to work, Growing with Jobs in Europe and Central Asia*. The World Bank. <http://www.worldbank.org/content/dam/Worldbank/document/Back-to-Work-Full.pdf>
- Barro, R.J., Lee, J. W. (2010). *A New Data Set of Educational Attainment in the World, 1950–2010*. *Journal of Development Economics* 104 (2013)
- Bray, M. (2009). *Confronting The Shadow Education System. What Government Policies For What Private Tutoring?*. Paris: UNESCO IIEP [http://www.iiep.unesco.org/fileadmin/user\\_upload/Info\\_Services\\_Publications/pdf/2009/Bray\\_Shadow\\_education.pdf](http://www.iiep.unesco.org/fileadmin/user_upload/Info_Services_Publications/pdf/2009/Bray_Shadow_education.pdf)
- Brunello, G., De Paola, M. (2013). *The costs of early school leaving in Europe*. EENEE Analytical report N°17, Prepared for the European Commission.
- Brunello, G. & Schlotter, M. (2011). *Non Cognitive Skills and Personality Traits: Labour Market Relevance and their Development in E&T Systems*. EENEE Analytical Report No. 8 Prepared for the European Commission.
- Brunello, G., Fort, M., Schneeweis, N., Winter-Ebmer, R. (2011). *The causal effect of education on health. What is the role of health behaviors?*. IZA Discussion Paper n.5944
- Burja, C., Burja, V. (2013). *Education's Contribution to Sustainable Economic Growth in Romania*. *Procedia - Social and Behavioral Sciences* 81 ( 2013 ) 147 – 151.
- Consales, G., Fesseau, M., Passeron, V. (2009). *La consommation des ménages depuis cinquante ans*, Dossier thématique INSEE.
- Council Recommendation on Romania's 2013 National Reform Programme and Delivering a Council Opinion on Romania's Convergence Programme for 2012-2016 [http://ec.europa.eu/europe2020/pdf/csr2013/romania/csr2013\\_council\\_romania\\_en.pdf](http://ec.europa.eu/europe2020/pdf/csr2013/romania/csr2013_council_romania_en.pdf)
- Cuenca, J. S. (2008). *Benefit Incidence Analysis of Public Spending on Education in the Philippines: A Methodological Note*. DISCUSSION PAPER SERIES NO. 2008-09, Philippine Institute for Development Studies <http://dirp4.pids.gov.ph/ris/dps/pidsdps0809.pdf>
- Cunha, F., Heckman, J.J., Lochner, L., and Masterov, D. V. (2006). *Interpreting the Evidence on Life Cycle Skill Formation*. Chapter 12 in Eric A. Hanushek, Finis Welch (eds.), *Handbook of the Economics of Education*. Amsterdam: North Holland
- Culter, D. M., Lleras-Muney, A. (2007). *Education and Health*, National Poverty Center, Policy Brief #9.
- Dragomirescu-Găină, C., Weber, A. (2013). *Forecasting the Europe 2020 headline target on education and training. A panel data approach*. JRC Scientific and Policy Reports, European Commission's Joint Research Centre (JRC) <http://publications.jrc.ec.europa.eu/repository/handle/111111111/29376>
- European Commission (2014). *Key Data on Early Childhood Education and Care in Europe*. Eurydice and Eurostat Report. 2014 Edition.
- European Commission (2013). *Education and Training Monitor 2013*. European Commission.
- European Commission (2013a). *Reducing early school leaving: Key messages and policy support*. Final Report of the Thematic Working Group on Early School Leaving.
- European Commission/EACEA/Eurydice (2013). *Education and Training in Europe 2020: Responses from the EU Member States*. Eurydice Report. Brussels: Eurydice.
- European Commission/EACEA/Eurydice (2013). *Funding of Education in Europe 2000-2012: The Impact of the Economic Crisis*. Eurydice Report. Luxembourg: Publications Office of the European Union.

- European Economic Forecast Winter 2014. European Economy Series 2|2014. Directorate General for Economic and Financial Affairs, European Commission. [http://ec.europa.eu/economy\\_finance/publications/european\\_economy/2014/pdf/ee2\\_en.pdf](http://ec.europa.eu/economy_finance/publications/european_economy/2014/pdf/ee2_en.pdf)
- European Union (2013). Overview and examples of costs of early school leaving in Europe. Thematic Working Group on Early School Leaving. [http://ec.europa.eu/education/policy/strategic-framework/doc/europe-esl-costs\\_en.pdf](http://ec.europa.eu/education/policy/strategic-framework/doc/europe-esl-costs_en.pdf)
- Fartușnic, C. (coord.) (2012). All Children in School by 2015. Global Initiative on Out-of-School Children. Romania Country Study. Analysing the Situation of Out of School Children in Romania. UNICEF Romania and Institute of Education Sciences. Buzău: Alpha Media Print.
- Gaag, J. van der and Putcha, V. (2013). From Enrollment to Learning: The Way Forward. Brookings Institution, Center for Universal Education.
- Garcia, A.B. and Gruat, J.V. (2003) Social Protection: A Life Cycle Continuum Investment for Social Justice, Poverty Reduction and Sustainable Development. Geneva: International Labor Office.
- Glewwe, P., Hanushek, E., Humpage, S., Ravina, R. (2010). School resources and educational outcomes in developing countries: A review of the literature from 1990 to 2010. Cambridge: National Bureau of Economic Research. [http://www.brookings.edu/~media/events/2012/1/27%20addressing%20learning%20crisis/0127\\_edinptoh.pdf](http://www.brookings.edu/~media/events/2012/1/27%20addressing%20learning%20crisis/0127_edinptoh.pdf)
- Government of Romania (2014). Convergence programme 2014–2017, April 2014. [http://ec.europa.eu/europe2020/pdf/csr2014/cp2014\\_romania\\_en.pdf](http://ec.europa.eu/europe2020/pdf/csr2014/cp2014_romania_en.pdf)
- Grossman, M. (2006). Education and Nonmarket Outcomes. In Handbook of the Economics of Education, Volume 1 Edited by Eric A. Hanushek and Finis Welch. Amsterdam: North Holland
- Gupta, S., Verhoeven, M., Tiongson, E. (1999). Does Higher Government Spending Buy Better Results in Education and Health Care? International Monetary Fund (IMF), Working Paper, n°99/21. <http://www.imf.org/external/pubs/ft/wp/1999/wp9921.pdf>
- Hanushek, E. A., Kimko, D. (2000). Schooling, Labor-Force Quality, and the Growth of Nations. American Economic Review, 90(5), 1184–1208.
- Hanushek, E. A., & Woessmann, L. (2010). The Cost of Low Educational Achievement in the European Union. European Expert Network on Economics of Education (EENEE) Analytical Report No. 7.
- Hanushek, E. A., & Woessmann, L. (2010). The economics of international differences in educational achievement. Cambridge: Working Paper 15949, National Bureau of Economic Research.
- Harmon, C., Oosterbeek H., and Walker I. (2003). The Returns to Education: A Review of Evidence, Issues and Deficiencies in the Literature.
- Heckman, J.J. (2008). Schools, Skills and Synapses. Forschungsinstitut zur Zukunft der Arbeit. Institute for the Study of Labor. IZA DP No. 3515.
- Heckman, J., Stixrud, N., and Urzua, S. (2006). The Effects of Cognitive and Noncognitive Abilities on Labor Market Outcomes and Social Behavior. Journal of Labor Economics 24 (3), 411–482.
- Heston, A., Summers, R., Aten, B. (2009). Penn World Table Version 6.3. Center of International Comparisons of Production, Income and Prices at the University of Pennsylvania. [https://pwt.sas.upenn.edu/php\\_site/pwt\\_index.php](https://pwt.sas.upenn.edu/php_site/pwt_index.php) ; <http://datacentre.chass.utoronto.ca/pwt/>
- Institute of Education Sciences & UNICEF Romania (2014). Financing the pre-university education system based on the standard cost: a current assessment from the equity perspective. Bucharest: Vanemonde.
- Ion, I. (2013). Education in Romania - How Much is it Worth? Romanian Journal of Economic Forecasting, Vol. 1, pp. 149–163.
- Jurajda, S. (2003). Gender wage gap and segregation in enterprises and the public sector in late transition countries. Journal of Comparative Economics, 31(2): 199–222.
- Kertesi, G., Kelemen, G. (2006). A hátrányos helyzetű és roma fiatalok eljuttatása az érettségijéhez. BWP füzetek 6.MTA Közgazdasági Intézet.
- Kingdon, G., Söderbom, M. (2008). Education, Skills, and Labor Market Outcomes: Evidence from Ghana. Education working papers series. The World Bank. [http://siteresources.worldbank.org/EDUCATION/Resources/278200-1099079877269/547664-1208379365576/EWPS11\\_Labor\\_Market\\_Outcomes\\_Ghana.pdf](http://siteresources.worldbank.org/EDUCATION/Resources/278200-1099079877269/547664-1208379365576/EWPS11_Labor_Market_Outcomes_Ghana.pdf)
- Mahdjoub, R. (2014). Bilan des compétences des enfants à l'entrée au primaire au Togo. UNICEF WCARO.

- Malamud, O., Pop-Eleches, C. (2008). General Education vs. Vocational Training: Evidence from an Economy in Transition". NBER Working Paper No. 14155.
- Mincer, J. (1974). *Schooling, Experience and Earnings*. New York: National Bureau of Economic Research.
- Mingat, A, Rakotomalala, M., Tan, J.-P. (2001). *Rapport d'Etat d'un Système Educatif National (RESEN). Guide méthodologique pour sa préparation*. Equipe DH-PPTE, Région Afrique, Banque Mondiale [http://siteresources.worldbank.org/INTAFRREGTOPEUCATION/Resources/444659-1212165766431/ED\\_Rapport\\_detat\\_systeme\\_educatif.fr.pdf](http://siteresources.worldbank.org/INTAFRREGTOPEUCATION/Resources/444659-1212165766431/ED_Rapport_detat_systeme_educatif.fr.pdf)
- Mingat, A. (2013). *Analyzing Cost and Financing Dimensions of Vocational Education and Training*.
- Ministry of Education (2010). In GINI Country Report Romania.
- Ministerul Educației, Cercetării, Tineretului și Sportului (2011). *Raport privind starea învățământului preuniversitar din România - 2011*. București.
- Ministry of European Funds (2013). *ROMANIAN PARTNERSHIP AGREEMENT FOR THE 2014-2020 PROGRAMMING PERIOD*.
- Ministerul Muncii, Familiei, Protecției Sociale și Persoanelor Vârstnice (2013). *Strategia Națională în domeniul egalității de șanse între femei și bărbați pentru perioada 2014-2017*.
- Mortimore, P. (2009). *Alternative models for analysing and representing countries' performance in PISA*. Brussels: Education International Research Institute.
- Neagu, O. (2012). *Measuring the Effects of Human Capital on Growth in the Case of Romania*. *Annals of "Dunărea de Jos" University of Galați*.
- Nelson, L. (2013). *Using Policy to Promote Educational Integration among Romanian Roma Youth: Issues of Exclusion and Framing Potential Solutions*.
- Neubourg, C. de, Chai, J., Milliano, M. de, Plavgo, I., (2012). *Step-by-Step Guidelines to the Multiple Overlapping Deprivation Analysis (MODA)*. Office of Research Working Paper-2012-10, UNICEF.
- OECD (2013). *PISA 2012 Results in Focus: What 15-year-olds know and what they can do with what they know*. Programme for International Student Assessment (PISA).
- OECD (2013). *PISA 2012 Results: What Makes Schools Successful? Resources, Policies and Practices, Volume IV*. Programme for International Student Assessment (PISA). OECD Publishing.
- OECD (2010). *The High Cost of Low Educational Performance. The Long-Run Economic Impact of Improving PISA Outcomes*. Programme for International Student Assessment (PISA).
- OECD (2010). *Improving Health and Social Cohesion through Education*. Centre for Educational Research and Innovation. OECD, Paris.
- OECD (2010). *Social Capital, Human Capital and Health: What is the Evidence?*. Centre for Educational Research and Innovation. OECD, Paris.
- OECD (2007). *PISA 2006 Science Competencies for Tomorrow's World*. Programme for International Student Assessment (PISA). OECD Publishing.
- Open Society Institute (2007). *Equal Access to Quality Education for Roma. Monitoring Reports*.
- Oreopoulos, P. (2006). *Estimating Average and Local Average Treatment Effects of Education When Compulsory Schooling Laws Really Matter*. *American Economic Review*, Vol. 96, pp. 152-175.
- Paternostro, S. and Sahn, D. E. (1999). *Wage determination and gender discrimination in a transition economy: the case of Romania*. Policy Research Working Paper no. 2113, The World Bank.
- Patrinos, H. A., & Psacharopoulos, G. (2011). *Education: Past, Present and Future Global Challenges*. Policy Research Working Paper Series 5616, The World Bank.
- Precupețu, I., Precupețu, M. (2010). *Growing Inequalities and Their Impacts in Romania*. GINI Country Report for Romania <http://gini-research.org/system/uploads/441/original/Romania.pdf?1370077330>
- Psacharopoulos, G. (2007). *The Costs of School Failure – A Feasibility Study*. EENEE Analytical Report No. 2 Prepared for the European Commission.
- Psacharopoulos, G., & Patrinos, H. A. (2004). *Returns to Investment in Education: A Further Update*. *Education Economics* Volume 12, Issue 2, 2004.

- Psacharopoulos, G. & Schlotter, M. (2010). Skills for Employability, Economic Growth and Innovation: Monitoring the Relevance of Education and Training Systems. EENEE Analytical Report No. 6 Prepared for the European Commission.
- Piketty, T. (2008). *L'économie des inégalités*. Editions La Découverte, Paris.
- Strategy of the Government of Romania for the Inclusion of the Romanian Citizens Belonging to Roma Minority for the Period 2012-2020. [http://ec.europa.eu/justice/discrimination/files/roma\\_romania\\_strategy\\_en.pdf](http://ec.europa.eu/justice/discrimination/files/roma_romania_strategy_en.pdf)
- Skoufias, E. (2003). The structure of wages during the economic transition in Romania. *Economic Systems*, 27 (4), 345–366.
- Societatea Academică din România (2009). *Diagnostic: Excluz de pe piața muncii. Piedici în ocuparea persoanelor cu dizabilități în România*. Buzău: Alpha Media Print.
- Surdu, L., Vincze, E., Wamsiedel, M. (2011). *Roma School Participation, Non-Attendance and Discrimination in Romania*. Bucharest: UNICEF.
- Thomas, M., Burnett, N. (2013). Exclusion from education: the economic cost of out of school children in 20 countries. *Educate a Child, Results for Development*.
- Varly, P., Sidi, A. (2012). *Outils De Benchmarking Pour La Scolarisation Primaire Universelle*. <http://varlyproject.wordpress.com/page/2/>
- Voicu, L. (coord.) (2010). *Renunțarea timpurie la educație: posibile căi de prevenire*. UNICEF. București. Ed. Vanemonde.
- Voinea, L., Mihăescu, F. (2011). A Contribution to the Public-Private Wage Inequality Debate: The Iconic Case of Romania. *The wiiw Balkan Observatory - Working Papers*, 2011: [www.balkan-observatory.net](http://www.balkan-observatory.net).
- Walker, M. (2011). *PISA 2009 Plus Results: Performance of 15-year-olds in reading, mathematics and science for 10 additional participants*. ACER.
- World Bank (2014). *Draft Strategies for Lifelong Learning, Early School Leavers and Continuous Education and Training in Romania, 2014-2020, Draft documents*.
- World Bank (2010). *Economic Costs of Roma Exclusion*. Europe and Central Asia Human Development Department, The World Bank. <http://go.worldbank.org/G1EL5HZ850>
- World Bank (2012). *World Bank Education Sector Strategy 2020: Learning For All. Strengthening Education Systems to Improve Learning*. The World Bank, Human Development Network. [http://siteresources.worldbank.org/EDUCATION/Resources/ESSU/EducationStrategyUpdate\\_April2012.pdf](http://siteresources.worldbank.org/EDUCATION/Resources/ESSU/EducationStrategyUpdate_April2012.pdf)

## Core Data Sources

- AMIGO Household Labour Force Survey [http://www.insse.ro/cms/files/Rapoarte%20de%20calitate/Amigo/RO\\_LFS%20Quality%20Report\\_2011.pdf](http://www.insse.ro/cms/files/Rapoarte%20de%20calitate/Amigo/RO_LFS%20Quality%20Report_2011.pdf)
- European Commission [http://ec.europa.eu/europe2020/europe-2020-in-your-country/romania/progress-towards-2020-targets/index\\_en.htm](http://ec.europa.eu/europe2020/europe-2020-in-your-country/romania/progress-towards-2020-targets/index_en.htm)
- Eurostat. (n.d.). Retrieved April 24, 2014, from <http://epp.eurostat.ec.europa.eu/portal/page/portal/eurostat/home/>
- Eurostat <http://epp.eurostat.ec.europa.eu/portal/page/portal/eurostat/home/>
- Edstats, World Bank <http://datatopics.worldbank.org/education/>
- Household Budget Survey [http://epp.eurostat.ec.europa.eu/portal/page/portal/household\\_budget\\_surveys/introduction](http://epp.eurostat.ec.europa.eu/portal/page/portal/household_budget_surveys/introduction)
- National Institute of Statistics - Romania <http://www.insse.ro/cms/>
- OECD PISA [www.oecd.org/pisa/](http://www.oecd.org/pisa/)
- OECD PIAAC [www.oecd.org/site/piaac/](http://www.oecd.org/site/piaac/)
- PIRLS and TIMSS <http://timssandpirls.bc.edu/>
- SILC Survey [http://epp.eurostat.ec.europa.eu/portal/page/portal/microdata/eu\\_silc](http://epp.eurostat.ec.europa.eu/portal/page/portal/microdata/eu_silc)
- UNESCO Institute for Statistics <http://www.uis.unesco.org/Pages/default.aspx>
- UNICEF Romania country profile (2010) [http://www.unicef.org/ceecis/Romania\\_2010.pdf](http://www.unicef.org/ceecis/Romania_2010.pdf)
- UNDP <https://data.undp.org/dataset/Expected-Years-of-Schooling-of-children-years-/qnam-f624>

## ANNEXES

### Annex 1: Core programme costs and legal framework for education expenditure

#### Table of core programme costs in RON and EUR (programmes over 50.000.000 RON) 2013 Budget

Programme	Cost in 000 RON	Cost in 000 EUR
Expansion of Pre-school coverage educational needs	1.251.085	284.512
Support for children with special educational needs	460.372	104.694
Croissant and milk programme and fruits programme, programme for students in kindergartens and primary school to lower secondary school students	416.484	94.714
Complementary Family Allowance granted to families with 370 lei income Single Parent Allowance (conditional cash transfer)	223.287	50.778
Money for high-school, programme beneficiaries	168,500	38.319
Provision of School Minibuses	76,000	17.283
Organise and expand School After-School Programme including remedial learning	61.395	13.962

Source : World Bank (2014)

Law no. 1/2011, articles 101-112 and 119, designs the framework for financing education: The pre-academic unit financing includes **basic financing, complementary financing and additional financing**. The state ensures the basic financing for pre-school children and compulsory school students enrolled in public and private education facilities.

The basic financing is ensured from the State budget for the wage costs, bonuses, allowances and other entitlements in cash, provided by the law, and the related contributions; staff's on-going training and assessment costs; students' periodical internal assessment costs; material and service costs; current maintenance costs.

The complementary financing is ensured from the local budgets of the administrative and territorial units to which the pre-university educational units are attached, from amounts deducted from the value added tax. The supplementary financing is granted as a global fixed amount from the budget of the Ministry of Education as a reward for the education facilities with special results in the field of inclusion or performance. The public pre-university education institutions may have their own revenues from specific activities, according to the law, from donations, sponsorships and other legal sources.

**Education in the higher education system** is free of charge, within the limit of the positions allocated each year by the Government, the rest of the positions being available for a tuition fee. The amount of the respective tax is set by the University Senate, in compliance with the law. In the private higher education institutions, a tuition tax is charged. The amount of the respective tax is set by the Board of Directors, in compliance with the law. The higher education institutions have autonomy in deciding the quantum of the tuition taxes, but they have the obligation to inform all the interested people on this subject, including on the university website.

## Annex 2: European Council recommendations on Romania's 2013 national reform programme and Romania's convergence programme for 2012-2016.

**Romania faces a major challenge in raising the quality of its education and training.** The quality of and access to upper secondary and tertiary education remain low. The level of basic skills is also very low. A particularly difficult challenge is low achievement: Romania is among the worst performers in the EU on basic skills (40.4 % in reading; 47% in mathematics and 41.4 % in science).

**The very low use of early childhood education and care services still presents a challenge.** A high quality early childhood education and care can have a particularly positive impact on children's development and contribute to breaking the cycle of disadvantage. The under-financing of the sector is one of the main reasons why Romania is underperforming in this area. In 2009, Romania allocated to investment in education the lowest proportion of GDP in the EU and the education budget has been cut even further over the last three years.

**There has been positive but slow progress in the implementation of the transition from institutional to alternative care for children deprived of parental care.** Current efforts should be maintained to strengthen prevention services, enhance staff qualifications and quality of delivery and improve the social and professional integration of young people leaving the child protection system.

**The 2011 education law, a major reform that set a long-term agenda for upgrading the quality of education at all levels, is not yet fully operational.** Once implemented, it will overhaul the management of higher education institutions and raise requirements for master and doctoral programmes.

**Mismatches between skills and labour market demands are characteristic of a large proportion of vocational and tertiary education, with the poor level of vocational skills being a specific challenge.** Completing upper-secondary general or vocational education is a prerequisite for skilled employment and access to higher education. The employment rate of recent graduates has declined further during the economic crisis and is well below the EU average.

**This situation reflects, at least in part, a significant mismatch between the education offered by universities and the needs of the labour market.** The links between higher education and business could be best strengthened through the inclusion in the university curricula, in addition to core competencies, of critical skills needed for a knowledge-based economy, such as entrepreneurship, as well as cross-cutting skills like communication, marketing and management. Attracting more students from lower-income families, particularly those from rural areas, to higher education remains an important challenge. While the legal framework on adult training has been reformed, adult participation in lifelong learning remains stagnant at very low levels (1.6 % in 2011), significantly lower than the EU average (8.9 %).

More info at [http://ec.europa.eu/europe2020/pdf/nd/csr2013\\_romania\\_en.pdf](http://ec.europa.eu/europe2020/pdf/nd/csr2013_romania_en.pdf)

## Annex 3: Macroeconomic models linking education, growth and social outcomes

### Barro-Lee model

The panel data model is based on the Cobb-Douglas equation that expresses the production function in terms of physical capital and human capital, which in turn is related exponentially to the average number of years of education by level. The regression includes a dummy variable period, which represents the total factor productivity assumed to vary over time and variables for regions. A dummy for the oil exporters variable is also included.

The Barro-Lee equations are:

$$\ln(Y_i/w_i) = 0.121S_i + 0.544\ln(K_i/w_i),$$

$$\ln(Y_i/n_i) = \ln(w_i/n_i) + 0.121S_i + 0.544\ln(K_i/w_i)$$

where  $\ln$  represents the natural logarithm operator.

$Y_i$  is the output in country  $i$ .

$S_i$  is instrumented average years of schooling in country  $i$ .

$K_i$  is the per capita physical capital stock in country  $i$ .

$w_i$  is the working age population (15-64) in country  $i$ .

### Psacharopoulos & Patrinos model

In advanced industrial countries, the returns to human and physical capital tend to be assimilated to the margin. The impact of human capital on GDP per inhabitant, measured here by the number of years of study, is 9.7%. The model is derived from the Mincer equation applied to macroeconomic data. They also believe that with micro level data, the results of the investment in education are more tangible and measurable.

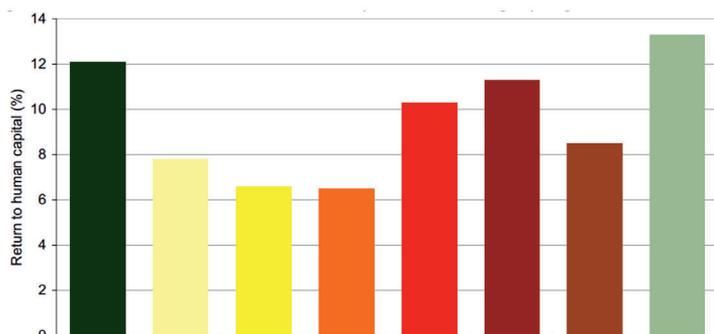
Patrinos & Psacharopoulos (2011) have used an earnings function fitted to macro data. They found that one additional year of education has a significant positive effect on income per inhabitant, which is 0.29. They also conducted a literature review on the return to education.

The Psacharopoulos & Patrinos equation is:

$$\ln Y_i = 6.645 + 0.258S_i$$

Where  $S_i$  is mean years of schooling in country  $i$  and  $\ln Y_i$  is the natural logarithm of per capita income (GDP) in country  $i$ .

Fig. A3.1 Rates of return on education



Source: A New Data Set Of Educational Attainment In The World, 1950–2010, Barro (2010) - National Bureau Of Economic Research, P.4

## Hanushek model

Macroeconomic literature on cross-country differences in economic growth often use measures such as access to school or years of schooling to test the predictions of growth model. However, the average duration of schooling is a particularly incomplete and potentially misleading measure of education quality to compare the effects of human capital on the economies of different countries. It implicitly assumes that a year of schooling delivers the same increase in knowledge and skills, regardless of the education system. For example, a year of schooling in Kyrgyzstan (the country with the lowest performance in the PISA 2006 science assessment) is supposed to create the same increase in the production of human capital as a year of schooling in Finland (the highest PISA performance).

In addition, this assumes that formal education is the main (only) source of education whereas changes in non-school factors have a significant effect on cognitive skills. This neglect of differences between countries in the quality of education and the strength of family health, and other influences is probably the major drawback of such a quantitative measure of schooling.

Hanushek (2010) worked on a sample of 23 OECD countries from the Penn World Table and the Barro and Lee data. The model expresses the average annual growth rate of GDP by GDP per inhabitant, the average number of years of schooling and cognitive skills. The main observation is that the cognitive skills of students are central to economic growth.

The Hanushek and Woessmann equation is:

$$G = -3.54 - 0.30 \text{ GDP/capita}_{1960} + 1.74 C + 0.025 S$$

(2.0) (5.8)

(4.2) (0.3)

Where G is the average annual growth rate of GDP per capita between 1960 and 2000, GDP/capita<sub>1960</sub> is the initial national income, C is the composite measure of cognitive skills, and S is the number of years of education (measured in 1960, but the qualitative results are the same when measured as an average over 1960-2000). The absolute values of t-statistics are in parentheses below the coefficients.

The estimates assume that the variables under consideration are systematic determinants of growth rates, while other factors that could explain growth are not correlated with these. The consideration of additional measures - beyond the initial level of GDP per capita - which could be designed to be linked to growth, such as economic institutions, geographical location, political stability, capital stock and growth population, does not produce a significant change on the impact of cognitive skills.

### Empirical framework for measuring the contribution of education to social progress

The model for measuring the social impact of education is derived from OECD, 2010. It connects observed social changes to number of years of education; it measures the effect of causality associated with education:

$$\text{Outcomes (i)} = \alpha + \beta \cdot \text{Education (i)} + \mu \cdot X_i + \epsilon_i$$

The Education (i) variable is usually equivalent to the number of years of schooling followed by individual i when the social benefits are observed. The vector  $X_i$  includes other observable determinants of social benefits such as demographic characteristics (sex, age and ethnicity, for example) or parameters related to family environment (educational level of parents). Random error  $\epsilon_i$  realizes unobservable determinants. If the variable Education (i) is not correlated with unobserved variables, the regression coefficient of least squares (OLS) gives an unbiased estimate of the marginal effect of an additional year of schooling on social benefits.

To more accurately assess the effects of education, four methods can be implemented:

- Take into account the unobserved heterogeneity between individuals; it could be, for example, the socio-economic status which may bias the inputs of an additional year of schooling by the impact of the environment;
- Take into account the state of health and previous SES (socio-economic status); it is necessary to know the initial situation to effectively measure the contribution of the policy;
- Take account of tertiary hidden variables.
- Use of instrumental variables must be exogenous to education and not direct determinants of explanatory variables.

### Annex 4: Romania: a case for investing in Early Childhood Development activities

The age span considered for early child development generally covers that period that goes from birth to accessing primary education. This period as a whole is considered crucial as most (90 percent) of the volume of the brain is achieved by three years of age, while the degree of preparation for primary education has a strong influence on the formal acquisitions of the child in the early grades, considered themselves as strong predictors of his (her) future schooling career as a whole. The consequences of things not having been properly done for the child's development (in its various dimensions) during the 0-6 age period will tend to be lasting and will be difficult (or sometime impossible) to offset later on. This window of opportunity for early human capital formation need not be missed. These views are backed

by researchers in the field of neurosciences, by education experts, for example J. van der Gaag (2013) and Abadzi (2006), and by economists and the reference work of Heckman (2008).

### The case of preschool education

1. According to readily available statistics, the Gross Enrolment Ratio in Preschool is currently around 78.4 percent in Romania (State of the pre-university education system, 2011). Even though this indicator is not generally considered as entirely appropriate or reliable for gauging the **coverage of preschool education**, when correlated with the proportion of new entrants in primary education that have previously benefitted from preschool, which is currently 92% (State of the pre-university education system, 2011), or with the average number of years spent in preschool by Romanian children, which is currently 3.1 years<sup>26</sup> (State of the pre-university education system, 2011), it is clear that while the overall picture of preschool participation is relatively good, there remains a proportion of a cohort entering primary education without any kind of preparation (8% and where the vulnerable groups are again overrepresented).

2. However, since the **benefits of preschool** education to primary schooling have been widely documented (better student flow indicators - lesser repetitions and lesser precocious drop-outs - as well as better levels of student learning), providing preschool education to those who are currently excluded from these activities is generally considered an efficient and equitable investment. It is efficient in general given the existence of these benefits on average, but it is even more so where vulnerable children are concerned; the point is that the impact of these activities is often found to be stronger for them, preschool education acting as a substitute for the inappropriate conditions of child development in socially and economically deprived families. The equity aspect of the investment is obvious as, in the current circumstances, those who are excluded from preschool are not the children from better-off families.

3. But **preschool is a generic word** that can correspond to a wide variety of concrete activities; and empirical experience stresses that what matters is not the label used to name the service but the content and the quality of the services concretely offered. Empirical results tend to suggest that such preparation could preferably be spread over at least two years, Mahdjoub (2014). Besides, empirical results also show that if duration of services at least does matter, the content of the activities offered does matter also. It happens then i) that across countries, as well as across the different providers of preschool services in a given country, a significant variability exists in the content of the service delivered<sup>27</sup>, and ii) that this has implications upon the degree of preparation of children when entering primary education. In the case of Romania, since the average number of years spent in preschool education is already 3.1, it is important to ensure a better participation in kindergartens in the early years of the cycle, with a special focus on the vulnerable groups. The participation of the vulnerable groups to preschool education should be monitored and actively encouraged throughout the cycle. In addition, the monitoring and evaluation mechanisms need to explore whether the new curriculum and the recently adopted quality standards set for preschool

26 With 3.2 years spent in preschool education by children from urban areas and 3 years spent in preschool education by children from rural areas (Source: State of the pre-university education system, 2011, pag. 7 - [http://www.invatamant-superior.ro/wp-content/uploads/2013/08/Raport\\_privind\\_starea\\_inv\\_preuniversitar.pdf](http://www.invatamant-superior.ro/wp-content/uploads/2013/08/Raport_privind_starea_inv_preuniversitar.pdf))

27 To illustrate this, one can identify that the preparation of children for primary education can be assessed along about 10 dimensions, ranging from i) socialization and the sense of order/discipline to ii) cognitive skills that are at the root of reading and numeration. A possibility is that the relative emphasis placed on the different dimensions varies across countries or providers within countries.

education in Romania are evenly incorporated into the system (across development regions and counties) at the grass-roots level.

### The case of activities concerning the 0-3 age group

In 2008, Romania has adopted the Early Learning and Development Standards and, based on the current ELDS, it has developed a national curriculum from birth to the age of 6. **Some structures do provide services** to children from birth to age 3 (the crèches), but their coverage is currently quite limited and a large proportion of vulnerable children are in fact not covered. The issue is to determine whether it would be appropriate to extend the coverage of such services or to adopt an alternative strategy. The idea of an alternative strategy is in fact backed by the fact i) that the structures tend to be very costly on a per child basis so that it would be difficult to finance such services at the desired scale, and ii) that they do not directly address parents' behaviors and practices, while these young children spend in any event most of their time with their family, particularly with their mother. Based on these two considerations, one can think of **parental education** as an alternative strategy.

Such parenting education programmes have been implemented in Romania since 1998. The argument is that in countries where "spontaneous" behaviors and practices of parents vis-à-vis their young children (in domains such as hygiene, nutrition, emotional and social development, protection, health, cognitive development, language) have been documented, significant deficiencies have been identified, in particular (but not only) in vulnerable families. In Romania, the knowledge, attitudes and practices of Romanian parents have been documented since 2006 (parenting from birth to the age of entry in primary education).

These behaviors concern the child's day-to-day life; and in this context, the main actors are the parents (the mothers in the first place) with their knowledge of child rearing that may not be appropriate on the one hand, and their traditions that may not be in line with the interest of the child, on the other. In Romania, the Parenting Education Program is implemented at national level within the kindergartens, and it is part of the National Strategy for Early Education. UNICEF started the development of an ECD convergent framework many years ago and brought together governmental institutions, civil society organizations and international organizations. Several key policy documents were developed under this initiative, such as Early Education Strategy, Parenting Strategy, Mental Health Strategy, Early Learning and Development Standards, curriculum for ante-preschool children (0-3), curriculum for preschool children (3-6).

Yet, all these policy formulation efforts need to be continued and intensified and matched by implementation efforts to transpose them into daily realities for the crèches and kindergartens throughout Romania, with a special emphasis on ensuring service delivery in the most underserved and vulnerable communities. Since this life cycle is key to human development and also has a key impact on economic growth, due priority should be given when deciding the investments in education.

### Annex 5: Non-cognitive skills

Non-cognitive skills such as social skills, motivation and leadership, socio-emotional regulation, the ability to work with others and involve important personality traits, can also improve employability, productivity and growth.

Brunello (2011) analyze the relationship between non-cognitive skills and employability

and earnings. Using US data, Heckman (2006) showed that at an individual level, movements from a low to a high position in the distribution of non-cognitive skills appear to be much more relevant for earnings and employment prospects than similar movements in the cognitive skills distribution. However, given that most data on non-cognitive skills is self-reported and that most sources are national, no macro analysis of such skills on the economy can be drawn. Psacharopoulos (2010) also make a proposal to monitor skills for employability and economic growth in the European Union, including risk behaviour, communication skills and the like.

Malamud (2008) consider the sources of skill formation in a modern economy, and emphasize the importance of both cognitive and non-cognitive skills in producing economic and social success, as well as the importance of formal academic institutions, families and firms as sources of learning. Non-cognitive skills and motivation are key deciding factors of success, and these can be improved more successfully at later ages than basic cognitive skills. Methods currently used to evaluate educational interventions ignore these non-cognitive skills, and therefore substantially understate the benefits of early intervention programmes, mentoring and teenage motivation programmes.

The Heckman (2008) paper discusses the role of cognitive and non-cognitive ability in shaping adult outcomes, the early emergence of differentials in abilities between children of advantaged families and children of disadvantaged families, the role of families in creating these abilities, adverse trends in American families, and the effectiveness of early interventions in offsetting these trends. Practical issues in the design and implementation of early childhood programmes are discussed.



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