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Urban and rural educational system disparities in Romania

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Abstract. *The aim of this paper is to analyze the complex multidimensional and multidisciplinary issue of the educational system in more details and to deal with conceptions, methodological approaches and the acquired knowledge, focused particularly on Romanian educational system.*

The mean of the paper is to present the complex issue of regional and territorial disparities in Romania. The educational system in Romania is at a crossroad. Initiated important reforms in the sector after the last 21 years – including changing the curriculum, student assessment, teacher training, funding and management module – will be continued to improve outcomes in education.

Keywords: differences in development; urban; rural; education.

JEL Codes: I21, I24, I25.
REL Codes: 4B, 4D.

1. Introduction

The current state of the education system in rural and urban Romania

The restructuring of the national education system and new legislation in the field of education led to the reorganization of the school network in Romania. As a result of reform measures within the national education system in 2007-2010, the number of schools decreased by 642 (7.8%, respectively).

The school population has decreased, reaching the school/academic year of 2010/2011 to be by 8.5% lower than the school/academic year of 2007/2008. Higher education is further extended, although stable in this period, due in particular to the private sector.

For all levels of education, level of enrollment in the education of school age population has different values for sex (76.0% boys, 79.3% respectively for girls in school/academic year 2010/2011).

Specialization structure groups of students enrolled in higher education in academic year 2010/2011 reflect the choice of most students in Romania to study specializations: academic and teaching (27.1%), economics (25.3%) and technical (23.8%). In private higher education, the highest weight is recorded for students studying economics (37.1%).

Correlated with the decrease of the school population, number of graduates decreased, except for post-secondary education, where for the academic year 2009/2010 was with 48.1% heir than for school year 2007/2008 and with 9.4% for academic year 2008/2009. At the end of school/academic year 2009/2010, the largest number of graduates was in high school (over 204000 persons), followed by secondary (199,000 persons) and elementary (more than 191,000 people).

Table 1

Higher level of education

	2007/2008	2008/2009	2009/2010	2010/2011
Number of graduates on educational level (thousand of persons)				
gymnasium	207.8	204	199	:
high school	218.2	202.1	204.9	:
professional school	113.1	200.9	89.8	:
technical school	13	17.6	19.2	:
college	231.9	214,8	191.3	:
number of teachers (thousand of persons)				
total	277	275	268	253
preschool	37	38	38	37
gymnasium	139	138	135	125
high school	62	61	60	60
professional school	6	5	3	*)
technical school	1	1	1	1
college	32	32	31	30

... = No data (school year ending after the examination for second in the autumn). *) Under 0.5.
Source: Statistical survey on labor force in households (AMIGO).

Staff from all levels of education had no significant variation in the last four years, except for primary and secondary education, where the number of teachers decreased by 10.1% from school year 2007/2008 and by 7.4% for 2009/2010.

Staffing level is generally too high but the teacher/student ratio is down. The number of students will continue to decline, but is likely to differ significantly by the level of education. The largest decrease is provided in the secondary education, followed by secondary vocational and higher education. According to the World Bank modeling, future trends, teacher/student ratio in high school are going to drop sharply, from 12.17 to 7.6% in 2013. Simulations performed for the whole system shows a continuous and significant decrease of this ratio in secondary and higher education. Isolation of secondary education in the simulations shows a slight decline in the coming years, but not an ongoing trend – upward or downward (Feser, Isserman, 2006).

If demographic changes are clear, so is the appropriate response to this situation. On the one hand, one could argue the need to reduce teaching staff at these levels of education. On the other hand, this trend is due in no small measure to enrollment rates that are still low (especially in high school), and could thus argue the need for change – both from schools and from teachers, to attract an increasing number of students (Feldmann, 2008). In the absence of other changes, maintaining constant parameters, such as class size, and whether employment practices would be totally flexible, loss of students would require a reduction in the need for over 50,000 staff, of which 80% in secondary education.

Table 2

Simulation student-teacher ratio by level of education (It is considered constant enrollment rates by age and no change in the number of teachers)

Scholar year	Preschool	Gymnasium	High school	College
2004/05	18.37	13.72	12.17	18.48
2005/06	19.24	12.96	12.07	17.06
2006/07	18.93	12.65	11.53	17.15
2007/08	18.36	12.55	10.76	17.38
2008/09	18.35	12.48	9.90	17.57
2009/10	18.32	12.5	9.1	17.53
2010/11	18.21	12.6	8.44	17.13
2011/12	18.01	12.7	7.94	16.36
2012/13	17.73	12.79	7.67	15.33
2012/14	17.37	12.77	7.6	14.17

Source: Public Expenditure Analysis Simulation Model (eirp), World Bank.

In summary, the current educational system has serious problems of efficiency, equity, quality and relevance to the knowledge economy. It produces insufficient research and innovation and is unable to promote a competitive and prosperous economy.

2. Case study – size of the education system development gaps between urban and rural

With this study I wanted to check if there is a strong correlation between the level of education and the level of economic development of the two living environments.

For this I considered the annual values (broken down by urban/rural) on the total number of students enrolled in the national education system and on high school: the total number of students, number of rooms available and number of teachers who serve it (Anexes 1 and 2).

Based on these data, I built a regression model for each of the two areas of origin, where I considered a dependent variable as the number of students enrolled in high school: lic_urb respectively lic_rur and as independent variables, I used the total number of students in the educational system minus the number of students enrolled in high school: inv_urb and inv_rur, available for high school halls (sali_lic_u and sali_lic_r) and number of secondary school teachers (pers_did_lic_u and pers_did_lic_r).

For the model of urban education, I used the following equation:

$$LIC\_URB = \lambda + \alpha \times INV\_URB\ (-1) + \beta \times PERS\_DID\_LIC\_U\ (-1) + \\ + \gamma \times SALI\_LIC\_U\ (-1) + \varepsilon,$$

Where

α, β, γ are regression model coefficients, λ constant term and quantify the errors ε that could affect the model.

For a urban school, faculty reputation is very important, the necessary of staff will be considered from the previous year number of student enrollments in that school and conditions of the classrooms in the previous year. The number of high school students will depend on the total number of students from the previous year. Therefore, these variables will be used with lag -1.

Dependent Variable: LIC_URB
Method: Least Squares
Date: 03/15/12 Time: 19:12
Sample (adjusted): 1996 2010
Included observations: 15 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
INV_URB(-1)	0.297081	0.129105	2.301087	0.0420
PERS_DID_LIC_U(-1)	-12.97582	4.187450	-3.098739	0.0101
SALI_LIC_U(-1)	12.49132	4.551877	2.744213	0.0191
C	189801.3	570418.7	0.332740	0.7456

R-squared	0.736272	Mean dependent var	714137.1
Adjusted R-squared	0.664346	S.D. dependent var	44451.65
S.E. of regression	25753.35	Akaike info criterion	23.37370
Sum squared resid	7.30E+09	Schwarz criterion	23.56251
Log likelihood	-171.3027	Hannan-Quinn criter.	23.37168
F-statistic	10.23654	Durbin-Watson stat	1.567114
Prob(F-statistic)	0.001629		

Source: own calculations.

As it can observe, if we look at probability statistics T, all three variables are relevant to a significance level of 5%, except the constant term. Therefore, I reconstruct the model, without free term:

Dependent Variable: LIC_URB
Method: Least Squares
Date: 03/15/12 Time: 20:07
Sample (adjusted): 1996 2010
Included observations: 15 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
INV_URB(-1)	0.333268	0.066948	4.978038	0.0003
PERS_DID_LIC_U(-1)	-12.33192	3.573236	-3.451189	0.0048
SALI_LIC_U(-1)	13.85972	1.877387	7.382454	0.0000

R-squared	0.733617	Mean dependent var	714137.1
Adjusted R-squared	0.689220	S.D. dependent var	44451.65
S.E. of regression	24780.74	Akaike info criterion	23.25038
Sum squared resid	7.37E+09	Schwarz criterion	23.39199
Log likelihood	-171.3778	Hannan-Quinn criter.	23.24887
Durbin-Watson stat	1.606688		

Source: own calculations.

As expected, the probability t-student statistics have improved considerably, even for a 99% accuracy level. R^2 indicates a fair level of model accuracy (73.36%).

But the Akaike criterion (that is bigger for the first model) and multiple coefficient of determination R^2 lead us to take the first regression model. However, by introducing the constant term, the value of R^2 adjusted decreases and therefore, I will stop at the second model. Average number of students in urban high school, was in over 15 years of study 714137.1, with a standard deviation of 44451.65.

Therefore, the regression model is:

LIC_URB = 0.333268 × INV_URB (-1) - 12.33191 ×
PERS_DID_LIC_U (-1) +13.85972 × SALI_LIC_U (-1)

By introducing the variable "employed population" in this model, performance figures will improve, so I consider this further.

In rural areas the appropriate model, lags will be present in the variables: rural students (inv_rur) and rooms available for high school (sali_lic_r).

Dependent Variable: LIC_RUR
Method: Least Squares
Date: 03/15/12 Time: 20:30
Sample (adjusted): 1996 2010
Included observations: 15 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
INV_RUR(-1)	-0.051228	0.014049	-3.646334	0.0038
PERS_DID_LIC_R	7.689391	3.011354	2.553467	0.0268
SALI_LIC_R(-1)	4.717835	3.619672	1.303387	0.2191
C	77094.82	22289.42	3.458807	0.0053

R-squared	0.616656	Mean dependent var	50607.80
Adjusted R-squared	0.512108	S.D. dependent var	6276.619
S.E. of regression	4384.172	Akaike info criterion	19.83257
Sum squared resid	2.11E+08	Schwarz criterion	20.02138
Log likelihood	-144.7443	Hannan-Quinn criter.	19.83056
F-statistic	5.898293	Durbin-Watson stat	0.723350
Prob(F-statistic)	0.011881		

Source: own calculations.

Eliminating variable SALI_LIC_R (-1), whereas the probability associated with the test exceeds the 5% significance threshold, I obtain a new model:

Dependent Variable: LIC_RUR
Method: Least Squares
Date: 03/15/12 Time: 20:52
Sample (adjusted): 1995 2010
Included observations: 16 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
INV_RUR	-0.048327	0.011425	-4.230012	0.0010
PERS_DID_LIC_R	8.330228	2.800245	2.974821	0.0107
C	83923.93	15919.08	5.271909	0.0002

R-squared	0.608107	Mean dependent var	50537.13
Adjusted R-squared	0.547816	S.D. dependent var	6070.377
S.E. of regression	4082.003	Akaike info criterion	19.63392
Sum squared resid	2.17E+08	Schwarz criterion	19.77878
Log likelihood	-154.0714	Hannan-Quinn criter.	19.64134
F-statistic	10.08616	Durbin-Watson stat	0.771855
Prob(F-statistic)	0.002268		

Source: own calculations.

Both R2 and adjusted R2 shows a low yield model, which means that latter I will have to bring them improvements.

At the same time, if isn't a strong link between variables that may be the cause of demographic evolution. In other words, the degree of inclusion in education, an indicator that could explain some of the economic gaps between the two residences, it does not depend mainly on the provision of schools and number of teachers but rather of household income and education level of the parents.

At the same time we should not forget that from the statistical analysis, if current demographic trends persist, by 2013 we will have 20% fewer students than in 2005 and in 2025 - 40% less. The decrease is dramatic, and the consequences for human resources development of the country - easily deduced.

5. Conclusions

One of the challenges of education policies in member countries of the European Union is the addressing and combating disadvantage and disadvantaged groups in terms of education (Chenic (Creţu), 2012).

On this issue, some member states aimed at increasing investment in education as a key solution to prevent poverty and social exclusion in the long run. According to the priorities of these countries, this involves preventing disadvantages in education by developing more effective interventions at an early age (mainly through an adequate and comprehensive child protection), adapting the educational system so that schools can respond successfully the needs and children from disadvantaged groups, prevent drop out and return to training of young people who left school, continuing education and extension, so there will be adequate opportunities for education and training accessible to groups of children and young people at risk.

It also implies an increase in educational policy role of education and training institutions in promoting standards and values, social cohesion, equal opportunities, active social involvement of citizens (Socol, Socol, 2012).

In Romania, education is perhaps one of the most reformed areas in the last 21 years. In this area changes have occurred both in the content of education and major institutional. Strategies developed mainly in the last five years makes the existence of a framework for action and implementation of educational programs to increase access to education opportunities for disadvantaged groups and creating an educational system, in line with European standards development and institutional building.

Especially in recent years Romania developed an impressive number of strategies, national programs and projects designed to improve learning conditions in schools and reduce educational and social inequalities (Manole, 2012). Although at the level of institutional development and change in the educational system have been registered special efforts, reform of Romanian education records still negative aspects that directly affect the level of performance and quality. Educational programs taking place in strategies aimed at pre-university education, in general, and education in rural development, in particular, are aimed at the improvement of education.

In this respect, education in rural areas must be a priority. As discussed above, rural education faces specific problems and requires specific solutions. The beginning was made by developing a recovery strategy in rural education, approved in 2001, the measures in this strategy, and programs aimed at rural

education requires both major investment and integrated solutions that aim, both human and material resources and the quality and content of education.

In short, education and current research is yet able to sustain a prosperous Romania and competitive knowledge economy.

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ANNEXES

Annex 1

Urban area

Obs.	LIC_URB	INV_URB	PERS_DID_LIC_U	SALI_LIC_U
1995	737734.0	3249311.	58363.00	24924.00
1996	741290.0	3232547.	60155.00	25939.00
1997	714034.0	3180618.	59271.00	26606.00
1998	672769.0	3141411.	61612.00	26616.00
1999	651251.0	3081242.	62542.00	28388.00
2000	645193.0	3073002.	59863.00	28749.00
2001	665075.0	3070166.	60562.00	29404.00
2002	691195.0	3028701.	57083.00	30448.00
2003	706759.0	2995017.	54999.00	30762.00
2004	718621.0	2965334.	57807.00	30958.00
2005	712339.0	2997101.	57410.00	31202.00
2006	732328.0	3018940.	58543.00	32077.00
2007	745619.0	3113491.	58287.00	32809.00
2008	735786.0	3059267.	57167.00	33211.00
2009	779290.0	2932035.	56077.00	34105.00
2010	800508.0	2809115.	55095.00	34036.00

Source: INSSE.

Annex 2

Rural area

Obs.	LIC_RUR	INV_RUR	PERS_DID_LIC_R	SALI_LIC_R
1995	49477	1453966	4046	2546
1996	51498	1455764	4330	2683
1997	51869	1462733	4398	2850
1998	45248	1489753	4489	2891
1999	43125	1497141	4697	3186
2000	42726	1492277	4155	2980
2001	45588	1484300	4167	2963
2002	49209	1468085	3905	3088
2003	52158	1477476	3926	3278
2004	55222	1438546	4385	3385
2005	55100	1363730	4504	3552
2006	48597	1326641	3505	2856
2007	45729	1291090	3333	2653
2008	48575	1265725	3480	2655
2009	58438	1244831	4178	3552
2010	66035	1220111	4514	3640

Source: INSSE.