DETERMINANTS OF POVERTY IN ROMANIA

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Abstract

Romania is one of the poorest countries in Europe. The purpose of this investigation is to determine which factors influence the magnitude of this socio-economic phenomenon. Current availability of data from National Institute of Statistics ensures our sample. We apply a panel data analysis of regional development: North-East, South-East, South, South-West, West, North-West, Centre and Bucharest-Ilfov to understand how Romania can reduce poverty. The authors found a direct link between relative poverty rate and education. In addition, the negative relationship between poverty and pensioners shows the importance of a good government policies. In this context, we propose to focus our attention on the needs of people. Education can be an important determinat of national development, on the other slide, educated people are more willing to understand the role of pension system.

Keywords: Romania, development regions, poverty, education, panel analysis

Classification JEL: F63, H55, H75, I21, I25, I30, O10

1. Introduction

Poverty is a growing problem that affects a considerable number of people worldwide. Dispite the important measures for poverty reduction and for economic development, Romania ranks first in the European Union on relative poverty rate. The share of Romanians at risk of poverty after social transfers increased from 22.9% in 2012 to 25.4% in 2015" (World Bank, 2017).

According to Vaidean (2016) the determinants of poverty "vary on a wide range, from regional and community characteristics, to household and individual ones, basically from general to specific, from macro environment to micro environment, from low to high controllable by people themselves".

By using the panel analysis, the poverty rate as the dependent variable and a set of explanatory variables (enrolled population, rate of natural increse, number of pensioners, offence rate and divorce rate), the aim of this paper is to determine which are the most important factors affecting poverty in Romania.

Our paper is organized as follows: section 1. Literature review - is built on a review of the existing studies from the specialized literature which analyze the impact of education, natural increase of the population, divorciality rate and offence rate on poverty; section 2. the research methodology; section 3. the results; section 4. the conclusions .

2. Literature review

This part of our research seeks to provide an overview of some studies which analyze the impact of education, natural increase of the population, divorciality rate and offence rate on poverty.

Among all the factors affecting poverty, education was intensely investigated in the literature. The study of Sen (1992) revealed that an inadequate education represents a form of poverty. In his study, Wedgwood (2007) highlights that "getting children into school on its own is not enough for poverty reduction", many of the potential benefits of education in poverty reduction depend on the quality of education.

Considering education as the primary weapon against poverty, Awan and others (2011) analyze the effect of different levels of education upon poverty in Pakistan. By estimating a logistic regression model, the probability of an individual being poor as the dependent variable and a set of educational levels, experience and gender as explanatory variables, the authors conclude that: the level of education decreases the chances of a person being poor. Another factor wich influence poverty is the gender: "being a male person provides an advantage in retaining a position above poverty level" (Awan and others 2011). Villegas and others (2016) use a Multinomial Logit model to show the importance of education in moderate and extreme poverty reduction: "is a clear link between education and poverty in Bolivia, where the higher the level of education, the higher the value of the probability of being not poor". Because education is a "lead predictor of poverty at all levels" Bangura and Kim (2017) highlight the importance of the investments in education.

The key role of education in poverty alleviation is also confirmed by: Tilak (2007), Sukati (2010), Julius & Bawane (2011), Mtey & Sulle (2013), Omoniyi (2013), Chegea & al. (2015), Urean et al. (2017).

Another topic that has gained notoriety is the relationship between poverty and the natural increase of the population. According to Ahlburg (1996) the rapid population growth reduces per capita income growth and has adverse effects on child health and on education. Sinding (2009) investigates the relationship between demographic changes and economic outcomes, starting from two points of view debated by economists, demographers and other social scientists: 1. "improving economic conditions for individuals generally lead to lower birth rates; 2. lower birth rates contribute to economic development and help individuals and families to escape from poverty" (Sinding, 2009). Afzal and Awais (2014) also consider the rapid population growth as the "crux of the problems". The rapid populatin growth leads to macroeconomic instability, a high absolute and relative poverty rate and worsening income inequality. In a study which examines the economic effects of the demographic transition in developing countries, Dao (2012) emphasizes that the population growth exerts a positive influence on economic growth only if the average annual population growth rate is less than 1.2 percent.

A factor with significant economic impact and financial consequences is the divorce. Vaus and others (2015) study the impact of divorce on income and assets, concluding that divorce has negative impact upon the household income of women, income wich is recovered six years after the divorce. At the opposite pole, men who divorce experience an increase in income. Regt and others (2012) investigate the changed income situation after relationship dissolution for formerly married and formerly cohabiting couples and Sharma (2014) examines the economic security of older men and women living in a divorce state. A report of EconoVision (2013) shows us the two categories of costs resulting from marital dissolution and changes in the family structure: the categories effects of private costs (effects on individual and family income, on subjective well being, on health, on educational attainment, on future family structure decision making) and the categories of direct effects on public finances.

There are only few studies about how and why poverty and crime influence one another. Webster and Kingston (2014) state that "poverty generates conditions that make delinquent and criminal 'solutions' more likely than would otherwise be the case. Finally, being a victim of property and violent crime is also more likely if the person is poor". The same study underlines an

increase female crime as a consequence of the worsening women's poverty. Hombras (2015) combining instrumental variables and spatial panel econometric models investigates the causal effect of poverty on property crime at the municipality level in Chile. The results of the study show that poverty has a strong and significant effect on property crime, measured as incidence of car thefts: "a 10 percentage points increase in poverty incidence increases in 54 the number of car thefts per 100,000 inhabitants". By using Pearson Product Moment Correlative Coefficient, Joseph and others (2014) study the impact of poverty on criminal behaviours among youths in Cross River State, concluding that "poverty influences criminality among members of impoverished communities making especially the youth to become vulnerable to crime activities" Iyer&Topalova (2014) also identify a causal effect of poverty on crime.

3. Methodology

The data used covers the eight development regions of Romania between the years 2007 and 2015, being structured in a panel. The results were obtained by making use of the econometric software Eviews 7.0, while the additional spatial procedures were computed using GeoDa 1.8.14.

Table no. 1. **Dependent and the explanatory variables used in the panel analysis and the sources of data**

Variable	Code	Expected Sign	Source
ENDOGENOUS VARIABLE			
Relative poverty rate	**RPR**	**-**	**NIS**
EXOGENOUS VARIABLES			
Enrolled population	**EP**	**+**	**NIS**
Rate of Natural increase	**RNI**	**-**	**NIS**
Number of Pensioners	**NP**	**-**	**NIS**
Offence rate	**OR**	**-**	**NIS**
Divorce rate	**DR**	**-**	**NIS**

Source: own constructions

Three models were taken into consideration: the Pooled Ordinary Least Square (Pooled OLS), the Fixed Effects model and the Random Effects model. The main reason for using these types of analyses resides in several considerations by Green (2012). The author underlines the fact that a panel analysis eclipses cross-section approaches due to the higher versatility it provides to the analyst in modeling the type of interactions between individuals (Green, 2012, p. 385).

The Pooled OLS model represents a baseline that fosters the creation of the following two models, providing the opportunity to formulate initial presumption. As its construction method ignores the panel structure, its results should be regarded with caution

The Fixed Effects model pays a small amount of attention to the unobservable heterogeneity, as the Random Effects model is centered on the assumption of independence between the observable and unobservable effects (Alan & Hansen, 2009). However, Green (2012) points out that in certain cases adding new observations in the sample can lead to make previous estimations unstable (Green, 2012). The final model estimated is Random Effects.

Given the small time-span available for the analyses, the stationarity issue was not taken into account, due to the small precision and arguable power of the unit root tests, their lack of confidence in such case being highlighted in the literature repeatedly (Maddala and Kim, 1998).

4. Results

4.1. Descriptive statistics

The highest mean for the *Relative Poverty Rate* in Romania was scored in the North-East region, at a level of 33.58%, while the lowest mean was attained by the Bucharest-Ilfov region (4.98%), which includes the Romanian capital city

Figure no. 1 **Relative Poverty Rate in Romania, 2007-2015**
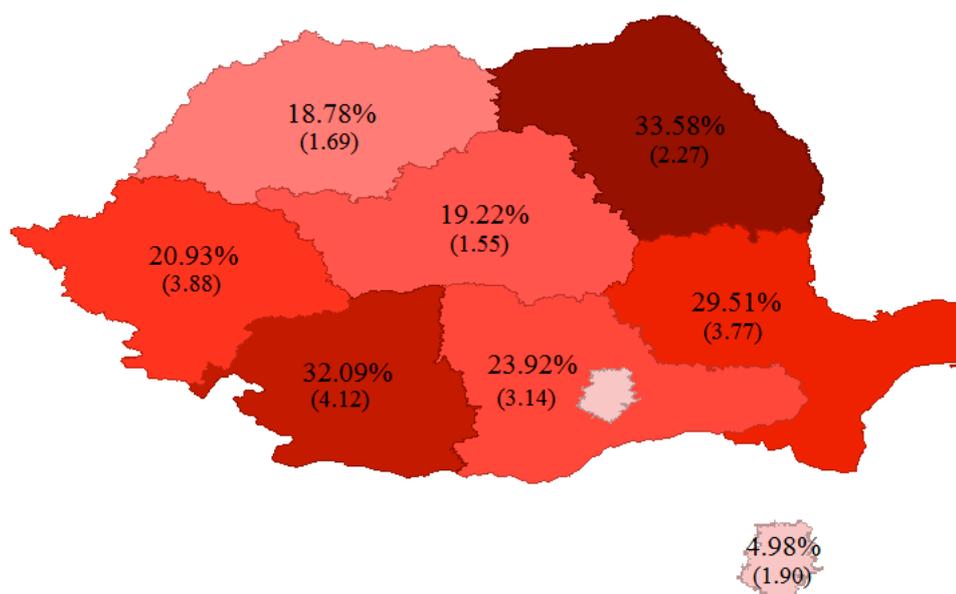
Source: own computations in GeoDa 1.8.14.

Generally, it is observable that lower means for the *Relative Poverty Rate* in Romania between 2007 and 2015 are scored by the three regions that are housed by Transylvania. Also, their respective means are lower than the medium value for the entire country (*i.e.* West = 20.93%, Center = 19.22% and North-West= 18.78%, compared to 22.88% for Romania).

4.2. Panel analysis

The Pooled OLS model represents the baseline in running any panel analysis. Since it ignores the panel structure its results won't be interpreted, but can be considered for obtaining a preliminary image on the upcoming results. The two models that the authors will emphasize are the Fixed Effects model and the Random Effects model. As it can be seen by examining the *Table …* , for the second model (Fixed Effects) we have two out of five statistically significant variables at a level of 5%, while for the third (Random Effects) four out of five are statistically significant at a level of at least 10%. In order to choose the best representation of our data between the two aforementioned models, a Hausman test is to be performed, with additional interest in the Goodness of Fit statistics.

Table no. 2. **Estimated impact of the explanatory variables on relative poverty rate**

Variables	Pooled OLS	Fixed Effects	Random Effects
Enrolled population	-0.3278942	-0.3782062***	-0.3277745***

	(0.2434420)	(0.09354045)	(0.07842236)
	[-1.346909]	[-4.043237]	[-4.179605]
Natural Increase	-2.860600***	-0.851016	-2.829337***
	(0.683559)	(0.638602)	(0.230281)
	[-4.184859]	[-1.332623]	[-12.28644]
Number of Pensioners	4.227442**	1.975422***	3.989501***
	(1.611853)	(0.612702)	(0.522414)
	[2.622723]	[3.224116]	[7.636659]
Offence rate	-0.000693	0.001366	-0.000487
	(0.003844)	(0.001274)	(0.001227)
	[-0.180218]	[1.072701]	[-0.396853]
Divorce rate	-0.384012	4.142462	-0.045506
	(5.761551)	(2.647960)	(1.893942)
	[-0.066651]	[1.564397]	[-0.024027]
Constant	15.79803*	13.88790**	15.40698***
	(8.982531)	(4.061532)	(2.957271)
	[1.758751]	[3.419374]	[5.209864]
Coefficient (Standard Error) [t-Statistic]	*Statistically significant at a level of 10% **Statistically significant at a level of 5% ***Statistically significant at a level of 1%		

Source: own computations in Eviews 7.0

The Hausman test works under the null hypothesis that the Random Effects model is the best fit for the data configuration. The alternative hypothesis is given by a preference for the Fixed Effects model. The null hypothesis cannot be rejected when the corresponding p-value of the Chi-Square Statistic that is used in computing the test exceeds the statistical significance level imposed by the analyst. For a 5% statistical significance, we reject the null hypothesis that the best fit is the Random Effects model, as the test's corresponding p-value is lower than 0.00001 units (for a Chi-Square Statistic of 454.99 and 5 degrees of freedom).

The *Table no. 3* showcases different Goodness of Fit statistics for the three models. It should be noted that the R^2 and its corresponding Adjusted R^2 are not taken into consideration due to their lack if robustness with panel data estimations. With the exception of the F-test, the other four statistics are not computed for the Random Effects model; therefore a comparison from the Log-Likelihood statistic and the Information Criterions is to be made only between the first two models. The F-statistic works under the null hypothesis that all the coefficients of an estimated model are zero and the constant-only model is a better representation, the alternative hypothesis stating the opposite. In all the three cases the null hypothesis can be rejected, as the corresponding p-value of the statistic is lower than the benchmark of 5%. As addressed before, the Pooled OLS model is unsuitable for explaining the relationships between the variables taken into consideration. It can be seen by examining the aforementioned table that the Fixed Effects model is the best representation of the current data. The authors also emphasize the fact that in terms of AIC, SIC and H-Q the minimum values for each statistic is held by the Fixed Effects Model, which, in addition to the Hausman test, underlines the fact that the second model represents the best fit.

Table no.3 **Goodness of Fit Test**

Statistic	Pooled OLS	Fixed Effects	Random Effects
Log-Likelihood	-221.3611	-143.9937	–
F-Test	4.504571 (0.001548)	61.95451 (<0.0000001)	4.388544 (0.001862)
AIC	7.105034	4.906053	–
SIC	7.307430	5.344576	–
H-Q	7.184768	5.078809	–

Source: own computations in Eviews 7.0

As we came to see, according to the Fixed Effects Model, an increase of 1% of the Number of Pensioners growth rate would determinate an increase in the Relative poverty rate of 1.975 %, all other variables remaining equal. In addition, an increase of 1% of the High-School Students growth rate would be equivalent to a decrease of 0.378% in the Relative poverty rate, Ceteris Paribus. The two coefficients are statistically significant at a level of 5%, therefore their interpretations can be considered to be accurate. As for the remaining three variables, their corresponding coefficients are not statistically significant at any level (*i.e.* 10%, 5% or 1%), therefore their impact on the Relative poverty rate cannot be addressed.

Furter, we obtained the following equation:

$$RPR=13.888-0.378*EP-0.851*RNI+1.975*NP +0.001*OR +4.142*DR$$

3. Conclusions

Using a sample of 7 regions for the period 2007-2015, this paper investigates the relation between poverty and enrolled population, rate of natural increase, number of pensioners, offence rate and divorce rate. We show that education is a significant factor in our simple panel regression. Furthermore, the number of pensioners directly affects the poverty rate.

These findings are important for the government in order for them to be able to reduce the poverty rate.

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