Simulation model and the dynamics of relative poverty rates in the presence of some social benefits in Romania

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Abstract—This paper presents some simulations of the relative poverty rates values in the presence of some social benefits in the income of persons / households considered in the Household Budget Survey carried out by the National Institute of Statistics of Romania in 2008 and 2009. Dynamics of poverty rates in the 2 reference years have shown the penetration of poverty among the population, through the presence of social benefits which had a greater or lesser influence in reducing poverty.

Keywords— dynamics, relative poverty, simulation model, social benefits, indicators.

I. Introduction

TO highlight the impact of some social benefits groups on the relative poverty, we compared the influence of some types of social benefits when they are included or excluded in the income of the household or person from the Household Budget Survey conducted in the years 2008 and 2009 by the National Institute of Statistics of Romania.

Due to space limitation of the paper, we have been taken into account only certain social benefits, but extensive work may have more other social benefits.

The simulation models were done in terms of relative poverty rates when certain social benefits were included and after that they were excluded in the incomes of persons / households.

The simulation model used, although simple in substance, manages to shape a very expressive picture of the influence that social benefits have on reducing poverty rates and the dynamics in the 2 years of reference outline very well these essential aspects.

The results are very expressive, especially prior to the economic crisis that will have to hit a big part of the population. Last year the data regarding the impact evaluation of social benefits on the reduction of relative poverty in 2008 in Romania were disseminated [1]. In the present paper we received values in the dynamics of poverty rates during two years, 2008 and 2009, and thus we were able to make

comparisons and saw how the social protection policies with a role in reducing poverty acted and influenced poverty rates.

II. Methodology

In the simulation model of the impact of certain social benefits, calculations were made based on data from the national Household Budget Survey carried out in 2008 and in 2009.

Poverty rates were determined at the household level and at the person level, on the whole country and at the different profiles constructed by the following characteristics: gender of household's head (female, male), place of residence (urban, rural), size of household (with 1 person, with 2 persons, with 3, 4, 5, 6 persons and over), age of household's head (less than 30 years, between 33-44 years, between 45-59 years and 60 years and over).

Also, relative poverty rates were determined taking into account the inclusion and exclusion of their own consumption in the income of household / person, by the total country and by profiles mentioned above.

A. Definition of indicator

The relative poverty rate, as the main indicator of poverty, represents the share in the total population of people in households with disposable income per adult equivalent (including or excluding the value of consumption from own resources) lower than the poverty threshold. This indicator is calculated for a threshold of 60% of median disposable income per adult equivalent (according to EUROSTAT methodology).

The poverty rate is the ratio between the number of poor people (whose income is below the threshold) and the total population, according to formula (1).

$$R_S = \frac{N_S}{N} \times 100 \qquad (1)$$

R_S = poverty rate; N_S = number of poverty persons; N = number of total population

The formula is the same for poverty rates based on disposable income, including consumption from own resources and the use of disposable income excluding consumption from own resources.

B. Variables

In the simulation model, the following variables were used: Allowances for maternity and childcare; Allowance for children; Social support provided by the municipalities, according to the Law no. 416/2001 on the guaranteed minimum wage; Grants to cover costs of public utilities; and Special support for disabled.

These variables used in the paper included the following: Allowances for maternity and childcare contains: indemnity for maternity, childcare up to two years; indemnity for sick children care aged up to 7 years (18 years for disabled child); amounts received for care of disabled child, up to three years, and his rehabilitation treatments; other amounts such as indemnities for maternity, child care paid from social insurance fund; incentive for child raising.

The allowance for children included: allowance for preschoolers, for those who attend a school courses provided by law, for persons with disabilities or who have contacted a deficiency; the support allowance for mono-parental family. Inclusive: state allowance for children in family placement or in custody. Exclusive: allowance for dependent minors in family placement or in custody of families or individuals.

The social support provided by the municipalities, according to the Law no. 416/2001 contains: aid provided by municipalities under the Law no. 416/2001 on the on the guaranteed minimum wage; childbirth; cash assistance for newborns (outfits for new born children); aid for partial covering of funeral expenses in case of death of a family member and other benefits of social insurance fund; cash assistance for people with no income or low income; emergency aid (disasters, fires, accidents).

Grants to cover costs of public utilities represent subsidies granted by the state to cover the expenses for home heating in the cold season.

The special support for disabled included: cash amounts received by persons with disabilities who require special protection and have certificates issued by committees of medical and recovery of work capacity experts or by committees of diagnosis and triage; cash amounts received by the blind people as a social pension.

This paper covered only these social benefits, but the extensive paper includes other social benefits, such as: scholarships for students and college students, other social aids, equivalent incomes in kind from the beneficiaries of social benefits. These other groups of social benefits are not mentioned here in the structure, as long as the present space does not permit detailing them.

III. COMPARATIVE ANALYSIS OF THE INFLUENCE OF THE SOCIAL BENEFITS IN DYNAMICS DURING 2008-2009

The calculation of poverty rate in the simulation model in the following analysis was per person and based on available revenues including own consumption. The same analysis can be done using disposable income excluding the own consumption.

A. Allowances for maternity and childcare (R54)

This type of benefit was a share of disposable income of the population of 0.79% in 2008 and a slight increase to 0.85% in 2009, a level low enough to have special influences in the relative poverty rate. So if would not be granted this type of benefit, the poverty rate was higher by 0.57 percentage points in 2008 and by 0.70 percentage points in 2009.

Analyzing this "model" on various demographic characteristics, we can see that non-payment of these allowances would affect in a major share the large households with 5 people and 6 people and over. Interestingly, the stronger negative impact of non-payment of maternity allowance would be affected households with more than six members more in 2009 (0.66 percentage points in 2008 and 1.66 percentage points in 2009). Also, the most affected households were headed by persons younger than 30 years since this type of compensation recipients are young women (Table I).

TABLE I
POVERTY RATE WITH AND WITHOUT SOCIAL BENEFITS R54

Allowance for maternity and childcare	2008 With R54	2009 With R54	2008 Without R54	2009 Without R54	Differences 2008	Differences 2009
TOTAL	18.18	17.53	18.75	18.23	0.57	0.70
Gender of the household's head						
Men	17.03	16.25	17.58	16.91	0.55	0.66
Women	23.33	22.81	23.97	23.65	0.64	0.84
Residence						
Urban	8.64	8.65	9.11	9.24	0.47	0.59
Rural	29.83	28.34	30.51	29.17	0.68	0.83
Size of the household						
1 person	23.76	20.39	23.76	20.39	0.00	0.00
2 persons	11.33	9.19	11.36	9.20	0.03	0.01
3 persons	11.99	12.22	12.48	12.55	0.49	0.33
4 persons	15.80	16.96	16.58	17.68	0.78	0.72
5 persons	26.27	25.10	27.43	26.85	1.16	1.75
6 persons and more	35.72	32.26	36.38	33.92	0.66	1.66
Age of the household's head						
under 30	17.74	17.68	20.49	19.27	2.75	1.59
30-44 years	19.56	20.80	20.52	21.79	0.96	0.99
45-59 years	17.90	17.67	18.12	18.25	0.22	0.58
60 years and over	17.13	14.03	17.33	14.44	0.20	0.41

Source: Estimations based on Household Budget Survey results. 2008. 2009

B. Allowances for children (R25)

Of all the benefits used in the simulation model, the allowances for children have an important share in disposable income (1.50% in 2008 and 1.51% in 2009).

If these social benefits are not included in the incomes of households / person, then the poverty rate is higher by 1.90 percentage points in 2008 and 2.10 percentage points in 2009. In this case, if we are not taken into account this allowance for children, then most affected are households with more members (over 6 persons) and those in rural areas (Table II).

TABLE II
POVERTY RATE WITH AND WITHOUT SOCIAL BENEFITS R25

Social support provided by municipalities	2008 With R25	2009 With R25	2008 Without R25	2009 Without R25	Differences 2008	Differences 2009
TOTAL	18.18	17.53	20.08	19.63	1.90	2.10
Gender of the household's head						
Men	17.03	16.25	18.86	18.31	1.83	2.06
Women	23.33	22.81	25.53	25.10	2.20	2.29
Residence						
Urban	8.64	8.65	9.78	9.89	1.14	1.24
Rural	29.83	28.34	32.64	31.49	2.81	3.15
Size of the household						
1 person	23.76	20.39	23.76	20.39	0.00	0.00
2 persons	11.33	9.19	11.45	9.32	0.12	0.13
3 persons	11.99	12.22	13.13	13.07	1.14	0.85
4 persons	15.80	16.96	18.18	19.47	2.38	2.51
5 persons	26.27	25.10	28.74	28.44	2.47	3.34
6 persons and more	35.72	32.26	41.23	38.76	5.51	6.50
Age of the household's head						
under 30	17.74	17.68	21.48	20.76	3.74	3.08
30-44 years	19.56	20.80	22.82	24.32	3.26	3.52
45-59 years	17.90	17.67	19.04	19.15	1.14	1.48
60 years and over	17.13	14.03	18.16	15.23	1.03	1.20

Source: Estimations based on Household Budget Survey results, 2008, 2009

TABLE III
POVERTY RATE WITH AND WITHOUT SOCIAL BENEFITS R28

Social support provided by municipalities	2008 With R28	2009 With R28	2008 Without R28	2009 Without R28	Differences 2008	Differences 2009
TOTAL	18.18	17.53	18.49	17.85	0.31	0.32
Gender of the household's head						
Men	17.03	16.25	17.28	16.54	0.25	0.29
Women	23.33	22.81	23.92	23.23	0.59	0.42
Residence						
Urban	8.64	8.65	8.68	8.84	0.04	0.19
Rural	29.83	28.34	30.47	28.82	0.64	0.48
Size of the household						
1 person	23.76	20.39	23.92	20.48	0.16	0.09
2 persons	11.33	9.19	11.51	9.32	0.18	0.13
3 persons	11.99	12.22	12.20	12.46	0.21	0.24
4 persons	15.80	16.96	16.03	17.17	0.23	0.21
5 persons	26.27	25.10	26.59	25.61	0.32	0.51
6 persons and more	35.72	32.26	36.70	33.20	0.98	0.94
Age of the household's head						
under 30	17.74	17.68	17.80	17.83	0.06	0.15
30-44 years	19.56	20.80	20.03	21.31	0.47	0.51
45-59 years	17.90	17.67	18.18	18.01	0.28	0.34
60 years and over	17.13	14.03	17.34	14.15	0.21	0.12

Source: Estimations based on Household Budget Survey results, 2008, 2009

So if would not be granted such allowance benefit for children, for households with five members, the poverty rate would have been by 2.47 percentage points higher in 2008 and by 3.34 percentage points in 2009. As for households consisting of six and more persons, the differences were much higher in the absence of child allowances, respectively 5.51 percentage points in 2008 and 6.50 percentage points in 2009.

Interesting would be here a correlation with the number of beneficiaries; a large number of beneficiaries and higher rates of poverty in the absence of the program would outline a rather complex picture in terms of proportion and severity of poverty for large families, which in many cases have children to support. And as we know, the presence of dependent children in household contributes to the consumption growth, without additional sources of appropriate income.

C. Social support provided by municipalities, according to the Law no. 416/2001 on the guaranteed minimum wage (R28)

The share of these benefits in total disposable income was 0.33% in 2008 and 0.29% in 2009. The poverty rate calculated without taking into account the social benefit regarding the social support provided by municipalities would be 0.31 percentage points higher in 2008 and by 0.32 percentage points in 2009. In the absence of such social benefits granted under Law no. 416/2001, the most affected were women, people living in rural areas and members of many households, respectively households with five and more persons (Table III).

D. Grants to cover costs of public utilities (R56)

Table IV shows the poverty rate with and without this grant.

TABLE IV
POVERTY RATE WITH AND WITHOUT SOCIAL BENEFITS R56

Grants for public utilities	2008 With R56	2009 With R56	2008 Without R56	2009 Without R56	Differences 2008	Differences 2009
TOTAL	18.18	17.53	18.47	17.70	0.29	0.17
Gender of the household's head						
Men	17.03	16.25	17.24	16.40	0.21	0.15
Women	23.33	22.81	23.98	23.03	0.65	0.22
Residence						
Urban	8.64	8.65	8.86	8.89	0.22	0.24
Rural	29.83	28.34	30.19	28.42	0.36	0.08
Size of the household						
1 person	23.76	20.39	24.21	20.57	0.45	0.18
2 persons	11.33	9.19	11.56	9.27	0.23	0.08
3 persons	11.99	12.22	12.19	12.26	0.20	0.04
4 persons	15.80	16.96	16.01	17.26	0.21	0.30
5 persons	26.27	25.10	26.52	25.23	0.25	0.13
6 persons and more	35.72	32.26	36.38	32.57	0.66	0.31
Age of the household's head						
under 30	17.74	17.68	18.00	17.69	0.26	0.01
30-44 years	19.56	20.80	19.73	20.99	0.17	0.19
45-59 years	17.90	17.67	18.23	17.84	0.33	0.17
60 years and over	17.13	14.03	17.48	14.18	0.35	0.15

Source: Estimations based on Household Budget Survey results. 2008. 2009

Grants to cover costs of public utilities represent subsidies granted by the state to cover the expenses for home heating in the cold season for certain types of households that have incomes below a certain threshold established under the laws in force.

The share of these grants to cover the public utilities in household's disposable income was 0.23% in 2008 and 0.12% in 2009, decreasing from last year. Removing these social grants from the net revenue would affect very little the relative poverty rate both in 2008 and in 2009.

E. Special support for disabled (R27)

The share of special support for the disabled in total available revenues in 2008 represented 0.54% and 0.62% in 2009. The poverty rate calculated without taking into account this social benefit would be 0.51 percentage points higher in 2008 and by 0.66 percentage points in 2009. The most affected were women, households headed by people over 60 years, people living in rural areas and members of households of two persons and those with 5 people (Table V).

TABLE V
POVERTY RATE WITH AND WITHOUT SOCIAL BENEFITS R27

Aids for disabled	2008 With R27	2009 With R27	2008 Without R27	2009 Without R27	Differences 2008	Differences 2009
TOTAL	18.18	17.53	18.69	18.19	0.51	0.66
Gender of the household's head						
Men	17.03	16.25	17.38	16.82	0.35	0.57
Women	23.33	22.81	24.53	23.85	1.20	1.04
Residence						
Urban	8.64	8.65	8.89	9.06	0.25	0.41
Rural	29.83	28.34	30.64	29.31	0.81	0.97
Size of the household						
1 person	23.76	20.39	24.07	20.71	0.31	0.32
2 persons	11.33	9.19	12.06	9.71	0.73	0.52
3 persons	11.99	12.22	12.43	12.79	0.44	0.57
4 persons	15.80	16.96	16.23	17.66	0.43	0.70
5 persons	26.27	25.10	26.98	25.81	0.71	0.71
6 persons and more	35.72	32.26	36.04	33.40	0.32	1.14
Age of the household's head						
under 30	17.74	17.68	17.88	18.23	0.14	0.55
30-44 years	19.56	20.80	19.73	21.30	0.17	0.50
45-59 years	17.90	17.67	18.34	18.48	0.44	0.81
60 years and over	17.13	14.03	18.10	14.71	0.97	0.68

Source: Estimations based on Household Budget Survey results, 2008, 2009

IV. THE SHARE OF SOCIAL BENEFITS IN THE TOTAL DISPOSABLE INCOMES DURING 2008-2009

For this paper were selected only a part of the social benefits, and we have not taken into account of pension system, although pensions represent the largest share in total household incomes and, of course, in the incomes from the social benefits. The overview of each type of share of the social benefits in total disposable income is presented in the following table (Table VI).

As expected, the pension system has the largest share in total disposable income over time, and, in the entire system, the most important share belongs to the social insurance pensions, respectively 15% in 2008 and 17% in next year.

The increase of the share of these social benefits in 2009 influenced quite enough, the reducing of the poverty rate. Many retirees have passed above the poverty line.

TABLE VI
SHARE OF THE SOCIAL BNEFITS IN THE DISPOSABLE INCOME

Social benefit	2008	2009
Pension:		
- *Pension form the social insurance*	15.35	17.19
- *Pension for loss of work ability*	2.53	2.80
- *Survivor's Pension*	1.04	1.21
- *Social assistance pension type*	0.02	0.02
- *Pension for farmers*	1.73	2.15
- *IOVR Pensions (disabled, orphans and widows of war)*	0.01	0.01
Social benefits used in the simulation model:		
- R54: Allowances for maternity and childcare	0.79	0.85
- R25: Allowances for children	1.50	1.51
- R26: Scholarships for students and college students	0.06	0.07
- R27: Special support for disabled	0.54	0.62
- R28: Social support provided by municipalities, according to the Law no. 416/2001 on guaranteed minimum wage	0.33	0.29
- R29: Other social ads	0.17	0.18
- R43: Equivalent incomes in kind from the beneficiaries of social benefits	1.60	1.78
- R56: Grants to cover costs of public utilities	0.23	0.12

Source: National Institute of Statistics
Note: For lack of space, benefits groups R26, R27, R29, and R43 are not subject to poverty rates simulations in this paper.

Other social benefits have a low share in disposable income of the population, as can be seen from the table above. The largest shares have the incomes in kind from the beneficiaries of social benefits and allowances for children. These shares, as in the case of pensions, are mainly influenced by the number of beneficiaries.

The simulation model of the impact of certain social benefits used in the poverty rates calculated at the household's level follows the same trends as when calculated the poverty rate at the person's level.

Comparing the evolution of poverty rates in the two years 2008-2009, it highlights the reduction of poverty rates in 2009. Overall poverty rate declined from 2008 by 0.65 percentage points mainly on increasing the share of pensions in total disposable income (17.19% in 2009 compared with 15.35% in 2008).

This decline has affected also the rates calculated in the model simulation, rates calculated without taking into account the analyzed social benefits.

The only exceptions are poverty rates calculated for urban areas which have slightly increased, from where it can be concluded that the increase of pensions affect in a positive way the rural areas, which is normal, given the aging population in the villages.

Two other categories where the total relative poverty reduction had no impact, and even more, the poverty rates calculated in the model increased, are the category of households of 4 persons and those with household's head aged between 30-44 years.

Data analysis using in the calculation of disposable income without self-consumption poverty highlight the same behavior, slightly deeper than the rates of poverty based on total disposable income.

V. CONCLUSION

To highlight the impact of some groups of social benefits on the relative poverty, we compared the influence of some types of social benefits when they are included or excluded in the total revenues of household's or person's incomes. Thus, some simulation activities were carried out for the relative poverty rates without certain social benefits in incomes of the persons / households.

We believe that the model for assessing the impact of social benefits used in this paper highlights a very expressive picture of the influence of social protection policies on relative poverty rates.

In conclusion, the most affected households are those headed by women, those in rural areas, those headed by young or elderly person, those with more people, especially those with many children, because they contribute to the increase of the consumption, without additional corresponding income sources (maybe these kids allowances often represent the main source of living for many poorest families).

Those issues identified in 2008, unfortunately, they were kept in 2009, with very small changes in the sense that for some households, the poverty rates were a little higher or lower, but the trend remained the same.

In 2008, percentage differences between the two poverty rates in the presence and absence of social programs groups are relatively low, varying from 0-1 or 2 percentage points, overall, just for one group of social benefits these differences reached at 5.5 percentage points (in the case of child benefits, R25). In 2009, the same percentage differences between the two poverty rates in the presence and absence of these social benefits groups are still relatively low, varying from 0-1 or 2-3 percentage points, overall, just for one group of social benefits these differences reached at 6.50 percentage points (in the same case of child benefits, R25).

Thereby, because these differences between the two rates of poverty are relatively small, it can be argued that social benefits groups had not so much impact in reducing relative poverty rate calculated at 60% of median income, but certainly more significant impact would have these benefits in relative poverty fixed at threshold of 50% or 40% of median income per adult equivalent.

In terms of simulations in both poverty rates, when we are taken into account and when we are not taken into account of each group of social benefits separately, the values of the relative poverty rates did not differ significantly from one year to another.

Thus, for certain types of households, poverty rate in the presence and absence of social program is slightly higher in 2009 compared to 2008; for other types of household the poverty rate is slightly lower in this period and therefore the differences are not significant. This means that during the two years 2008 – 2009, there has not been a significant impact of the group of social benefits in reducing relative poverty calculated at threshold of 60% of median disposable income per adult equivalent. But one thing is certain, namely that in the absence of such social programs, the relative poverty rate for certain categories of persons would increase.

For the impact assessment of some benefits on poverty, the main instrument used in this paper is the simulation, under certain conditions, of the incidence of poverty, when we included or not the influence of some groups of social benefits.

Also, for a complete diagnosis, a correlation could be made between the number of beneficiaries and these simulated poverty rates, because a large number correlated with higher rates of poverty would be to provide an alarm signal. From this feedback, that social program must be on the order of priorities of decision makers in the field.

The main shortcomings were generated by the use of statistical data, a sampling survey, the rigid methodology of the statistical data, the statements of respondents and also high costs, which would make it difficult to monitor in a more dynamic, in a long series of data. The questionnaire contains detailed statistical research all benefits, but most of these benefits are aggregated into groups – this means a rigid methodology, but in the near future this problem will be solved.

So, for 2011, the research program of the Household Budget Survey conducted by the National Institute of Statistics of Romania was modified as a result of multiple complaints, so that will highlight each social benefit separately, not groups of social benefits, as before.

Thus, these statistical data with comprehensive use of administrative sources that can provide the number of beneficiaries will provide a much more complete simulation model of poverty rates in the presence and in the absence of social program which will better highlight the influence of the social protection policies on poverty reduction.

Through this feedback, these issues will lead to improvement the efficiency and effectiveness of social programs, especially those who have direct effects on poverty reduction and its extreme forms, the marginalization and social exclusion.

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