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Income Inequality and Social Policy in Serbia

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INCOME INEQUALITY AND SOCIAL POLICY IN SERBIA

Belgrade and Novi Sad, October 2010

ABSTRACT

Using 2006-2009 HBS data, we study poverty and inequality in Serbia and compare income-group impacts of different social policy programmes. Methodological innovations of the paper are: testing validity of OECD equivalence scale by HAC procedure and replacing it with *per capita* measurements, use of quantile regression and recursive estimation in defining income groups with specific responses, and testing group effects (partitioned coefficients) of policy programmes in the frame of panel methodology. The confirmed hypotheses are: income inequality is decreasing as a consequence of social policy measures, except for in the last observed year, but these effects vary in different income-groups.

KEY WORDS: inequality, transition, social policy, Serbia, quantile regression, panel model

1. INTRODUCTION

1.1 Inequality changes in transition

Even before the ongoing global economic instability, growing income disparities have been established in the world[1], especially in emerging markets and transition economies. Transition involves economic restructuring and liberalisation, which cause major changes in the labour market, such as: declining employment protection, reductions in public sector employment and wage level, rapid unemployment increases, and consequently increased inequality and poverty. These phenomena have caused a greater interest in studying fast inequality increase[2] and in explaining the phenomenon the working-age poor[3]. Recent recalculations of the global income inequalities by use of purchasing power parity rates show that they are substantially higher than previously thought[4].

At the beginning of the transition process, transition countries shared remarkably similar low level of inequality. Over the time, the situation has changed dramatically and inequality diverged considerably. The general conclusion in literature seems to be that transition processes result in increased poverty, and consequently increased inequality[5]. It has been shown that economic reforms in transition are likely to negatively influence the income share of the bottom deciles, and positively the income share of the top deciles[6], thus consequently increasing income inequality. This increase substantially differs across transition countries, and so does relative significance of specific income inequality determinants, identified in theoretical and empirical literature[7], such as wage distribution, employment and social safety nets.

Different transition countries witnessed different degrees of income inequality. For instance, Gini indices calculated for income in Poland and Russia at the beginning of the transition process were

[1] A very thorough research of this process is given in Milanovic (2005) and United Nations (2005).
[2] More about references in this field for instance in: World Bank (2000).
[3] On this topic more in: Klugman, Micklewright and Redmond (2002).
[4] These new results are given in: Milanovic (2009).
[5] See: World Bank (2006a).
[6] According to: Milanovic (2009).
[7] More on these results see for instance: World Bank (2006a).

0.25, but in the year 2002 Gini indices in Poland were 0.35, in Russia 0.40, and in Serbia 0.36[8]. However, since consumption is considered a better measure, due to large informal sectors, remittances, and less fluctuations in short-term compared to income fluctuations, in the same World Bank study[9] Gini indices were also calculated for consumption per capita. They show a wide diversity, even in the same group of countries. For instance, Belarus experienced inequality path similar to that in Central Europe, while Baltic countries experienced similar inequality as that in Russia. For Serbia, the lowest Gini index was calculated between all former Yugoslav Republics (0.29 in 2002). The calculated Gini indices, according to both income and consumption, differ largely in low-income CIS countries and Southeastern European countries, whereas in EU-8 countries they were consistent with each other.

The need for active social policy to mitigate rising poverty and inequality in transition is undoubtful[10]. However, the problem of inequality reduction is complex, and it includes social, economic and political dimensions, integrating improvements in health, education, economic development, legislation and justice[11]. In this research we deal only with inequality in the economic cense, namely with the changes in income and consumption distributions.

Growing needs to support the vulnerable social groups in transition are followed by emergent financial constrains. Since one of the main goals of public expenditure in transition is providing beneficiaries to survive transitional shock, social assistance is not as much a solution for long-term poverty, but rather an instrument to overcome temporary consequences of transitional restructuring.

Although it is mostly oriented towards reducing poverty, social policy has an important role in influencing inequality changes as well. However, the effects on inequality of social policy instruments - transfers, pensions and other social benefits - are not uniform. Theoretical and empirical literature gives evidence of heterogeneous impacts of state transfers on inequality in

[8] According to World Bank (2006a), and Government of the Republic of Serbia (2003).
[9] World Bank (2006a).
[10] About this for instance: Simai (2006).
[11] More on these issues in: Unated Nations (2005).

transition[12]. Positive effects of social assistance to the poor are: preventing decrease in human capital, preventing crime and providing political support for economic reforms during transition. Negative effects are crowding out productive investment (money spent for social protection could have been spent in a more productive way) and decreasing beneficiaries' motivation to find a job.

Somewhat delayed, reforms in Serbia in the area of social assistance have been more rapid and systematic than in most other transition countries[13]. Although Serbian economy still suffers from the inherited problems related to demolition of the economy during the 1990s, followed by tremendous impoverishment and erosion of social cohesion, comprehensive legislative and strategic frameworks in the field of social policy have been developed since the democratic changes of 2000. After the *Living Standards Measurement Survey* undertaken by the World Bank in 2002, active social policy programmes started, guided by *Poverty Reduction Strategy* adopted in 2003. In order to achieve three main goals of social policy, i.e. self-sufficiency, equity and social cohesion, these programmes contain policies for improvement of employment opportunities, efficient social protection, better position of pensioners and elderly, health care and education with the purpose of poverty reduction[14].

1.2 Methodology and data

In this paper we study changes in poverty and inequality in Serbia over the period 2006-2009, and the effectiveness of social policy, with differentiated influence of various social policy programmes on income inequality. The main hypotheses to be tested are that inequality is not decreasing in Serbia, that social policy measures are inadequately targeted along the income distribution and insignificant in inequality reduction.

The effects of social policy on inequality in Serbia are most suitably assessed using data from the Household Budget Survey (HBS), since the last Living Standard Measurement Survey (LSMS) was

[12] For instance: Milanovic (1998), Giammateo (2006).
[13] This assessment was given in: World Bank (2006b).
[14] More about this in: Bogićević et al. (2003).

done in 2007. The HBS has been conducted since 2006 according to the international standards and recommendations from Eurostat, ILO and UN, thus providing comparability with the international data. The HBS data satisfy all the defined criteria for measuring inequality. Although the HBS has not been conducted as a panel, but provides cross section data, so that each household's behaviour cannot be followed through the years, samples for different years can be considered comparable since they are collected using the same sampling method[15]. The HBS collects data on household income and consumption, i.e. data on basic elements of individual consumption. Besides, the Survey also compiles data on some important living standard indicators (dwelling conditions, stock of durable consumer goods, etc.), as well as some basic data related to demographic, economic and social features of households[16]. The main disadvantage of the HBS in measuring inequality is the usual imperfection of surveys: data seldom cover the extreme cases in income distribution, there are partial or inadequate answers, etc. Besides, in HBS some of the features are related to the head of the family and not to the household itself as the unit of measurement (age, sex, marital status, education, main activity).

The HBS and data on specific programmes of social assistance in the period 2006-2009 were obtained from the Statistical Office of Serbia and the Serbian Ministry of Finance. Since in measuring inequality inflation can influence variability and thus inequality comparisons in different years, in this paper we have counted all variables in money terms in constant prices, with the basis in 2005. Some of the calculations, for instance value of household property, involved use of additional data on market prices and authors' calculations.

Research of inequality is burdened with numerous technical problems, starting with defining acceptable type of observations, adequate equivalence scale, relevant influencing factors, and estimating their impacts. Since we use HBS data, our units of measurement are households.

[15] Two-stage stratified rotating sample is applied in the Survey, with enumeration districts as primary selection units and households as secondary ones. Enumeration districts are stratified by the type of settlement (urban and other) and by territory (Central Serbia and Vojvodina are basic territorial strata).

[16] See: Statistical Office of the Republic of Serbia, *Household Budget Survey.* Retrieved from: http://webrzs.stat.gov.rs/axd/en/dokumenti/saopstenja/LP12/lp12122009.pdf

The first dilemma is the issue of equivalence scale. Income and consumption data are in Household Budget Survey given for households as units of measurement. However, households differ by size and by number of children. Although needs of a household grow with each additional member, it is often assumed that it does not happen in a proportional way, namely certain economies of scale in consumption are assumed. This requires choice of weights for members of households in comparing different households' incomes and consumptions, the so-called equivalence scale. In order to decide whether to use this ordinary scale, or equal weights for all members of the household, we perform hypothesis testing in an OLS model and the results are given in the following section. Our results show that the OECD equivalence scale is not suitable for the Serbian case, and so throughout the paper we measure household income or consumption per capita, as more appropriate[17].

The other important decision is the question of defining poverty threshold, or poverty line, as the minimum level of income or consumption deemed necessary to achieve an adequate standard of living. Poverty can be measured by an absolute threshold, defining the total cost of all the essential resources that an average household consumes in one year. This approach is needs based, namely an assessment is made of the minimum expenditure needed to maintain a tolerable life, based on certain nutritional standards and other needs. This type of measure is often contrasted with measures of relative poverty, which classify households as poor if they are below some relative poverty threshold. Usually the relative poverty line is 50% of the median income (consumption) in the population. In our study we define such a relative poverty line for the base year, but due to the use of constant prices, results are comparable for all the years in the sample.

In assessing the effects of social policy, there are always dilemmas in identifying the most relevant social policy instruments, since they all differ in targets, intensity, efficiency and effects. In examining the influencing factors and testing their impacts on inequality, two main types of quantitative analyses are used in this research: statistical analysis of inequality changes through

[17] The use of household income per capita has also been advocated in some other literature sources, for instance: Datta and Meerman (1980), Milanovic (2005).

time, and econometric analysis of inequality determination, namely differentiated impacts of policy programmes. More precisely, we use different analytical tools in order to assess intensity, adequacy, and targeting performance of social policy programmes: Gini coefficients for inequality, Coady-Grosh-Hoddinott (CGH) index for targeting performance, and Newey-West (HAC) procedure for equation estimation of policy effectiveness.

It is well known that surveys rarely capture the extreme observations at both tails of the income distribution, thus giving evidence only on the middle majority of the populations. However, even the available data usually show a large number of cases with large disturbances from the prevailing relationships, causing a high level of heteroskedasticity and presence of outliers. Therefore it is very important in estimating econometric models to employ the estimating techniques robust to these disturbances. For that reason, in case of presence of both heteroskedasticity and autocorrelation of unknown form, we use HAC procedure, as a general covariance estimator with robust standard errors in OLS estimation.

Traditional regression analysis, based on modelling of the conditional mean of the response variable for each fixed value of the predictor variables, becomes inappropriate and misleading measure when there is a heavy influence of outliers or heteroskedasticity, due to heavy tails of the distribution. Besides, the observed asymmetry of the income distribution indicates that relationships among variables vary along the distribution, and thus requires estimating different regression coefficients for different percentiles of the dependent variables. This can be done by use of quantile regression. Quantile regression models conditional quantiles, as functions of predictors, by use of linear programming. The median-regression model, as a special case of quantile regression, also represents the relationship between the central location of the response and a set of covariates, as does the conditional-mean regression model. However, when the distribution is highly skewed, conditional-median modelling is more useful.

In our analysis, quantile regression is applied in determining how much the influences of the most important factors which affect inequality vary along the distribution, and at which point in the

ordered data these influences change.

Next, with the purpose to test different effects of social policy in different parts of income distribution, we use complex econometric techniques. Breakpoints of the distribution are tested and determined by use of recursive least squares in the following manner. On the data sorted in the ascending order of the dependent variable, the specified model is estimated repeatedly, using ever-larger subsets of the sample data. At each step, the last estimate is used to predict the next value of the dependent variable, and the forecast errors resulting from these predictions are plotted as recursive residuals. Residuals outside the standard error bands suggest instability in the parameters of the equation, namely change in the estimated structure.

After that, using a balanced panel regression for 50 quantiles in four years, we estimate conditional means of the response variables through time, allowing us to test separately the significance of individual and time effects. Based on the results of the recursive residual estimation, in the panel model we test different policy programmes in three different income groups. We estimated social policy programmes effects on income inequality using Error Component Two Stages Least Squares Method (EC-2SLS) that enables us to estimate the random effect model with individual effects, taking into account the possible endogeneity problem of some determinants, namely their correlation with the components of the error term.

The employed softwares for our research are EViews 7, SPSS, and Stata 10.

2. POVERTY AND INEQUALITY MEASUREMENTS

In this research we use the economic definition of poverty and inequality as the World Bank[18]. Both poverty and inequality in the economic sense deal with distributions, whether that is income, consumption or some other welfare indicator or attribute of a population. However inequality is a broader concept than poverty, since it takes into account the whole distribution, not only the censored distribution of individuals or households below a certain poverty line[19]. Inequality is a multi-face and complex phenomenon, influenced by welfare of any individual or household in a society. Welfare itself is affected by many factors, so that the study of causation or determination of inequality becomes very difficult[20].

In practice it is more difficult to identify inequality than poverty. In addition, more analyses, as well as public policies, are directed to poverty reduction than to increasing equality, while inequality changes are observed as a result. That is why the First Millennium Development Goal exactly is eradicating extreme poverty and hunger in the world. However, increase of inequality, both between and among the nations, threatens to become the most perilous issue of the present time.

Both poverty and inequality are defined as arbitrary notions, but while poverty can be expressed in percentages, inequality is more difficult to articulate, since identifying distributions involves several parameters. Cowell (2008) defines an inequality measurement as "a scalar numerical representation of the interpersonal differences in income within a given population"[21]. Defined as a scalar, it compresses all characteristics of distribution of chosen welfare indicator in one single number. This is why none of the inequality measurements has its measurement units and it is being interpreted only in comparison, through time, territory, different population groups, etc.

Methodology used for measuring poverty and inequality involves defining acceptable type of

[18] World Bank (2004).
[19] More on these concepts for instance in: Litchfield (1999).
[20] More about that in: Ibid.
[21] Cowell (2008), p.12.

observations, relevant criterion of welfare, methods of measurements to be used for the population as a whole, or for a population subgroup, etc[22]. The level of the assessed poverty depends on the methodology used for measuring it. Therefore this is a very sensitive issue and that is why poverty and inequality should be analysed from several aspects, and measured in different ways.

The observations we use in this research are received by the Household Budget Survey (HBS) in Serbia. Since the results of the LSMS in 2007 established that the goals of the 2003 Poverty Reduction Strategy had been fulfilled, the Serbian Statistical Office aborted work on this survey. After serious methodology changes, even HBS data could be used only for the four year period, 2006 - 2009.

Subsequently, the units of measurement we use are households. Due to their different sizes, as well as to the assumed economies of scale in consumption, comparable units of observation are usually received by use of a certain equivalence scale. In the next chapter we shall test the validity of the usual equivalence scale in the case of Serbia.

As the referent poverty line for all the years in the sample we decided to calculate 50% of the median value in the base year (2006). Poverty lines are calculated separately for household income and consumption per capita, and poverty is defined as the percentage of households below the poverty line.

2.1 Testing the validity of equivalence scale

A wide range of different equivalence scales is known in literature, and the most commonly used is the "OECD equivalence scale" (also called "old", or "Oxford scale")[23] where a value of 1 is a assigned to the first household member, of 0.7 to each additional adult, and of 0.5 to each child.

Although the OECD scale has been commonly used in Serbia up to now[24], here we test its significance in a simple linear econometric model. If the existing equivalence scale is valid,

[22] Coudouel et al. (2002).

[23] More about equivalence scales in: Atkinson and Bourguignon (2000).

household consumption for each household *i* ($CONSUM_i$)[25] can be represented as the sum of consumption of the household head (HHC), consumption of children as number children (CHILD) times 50% of HHC, and consumption of additional adult members save the household head, as their number (ADDAM) times 70% of HHC:

$$CONSUM_i = HHC_i\ (1 + 0.5CHILD_i + 0.7ADDAM_i) \quad (2.1)$$

It is reasonable to expect that the household head, and consequently other members of the household, consume proportionally to the level of the available household income (INCOME). However, there are some fixed costs, and the household head should provide for other household members. So in a simple model, HHC can be represented as a stochastic linear function of household income and the household size, including some average maintenance cost (*a*). In order to avoid perfect multicolinearity in the final regression, we divide income by the household size and the relationship becomes:

$$HHC_i = a + b\ INCOMEPC_i + u_i \quad (2.2)$$

Replacing (2.2) in (2.1) we receive a simple model of household consumption:

$$CONSUM_i = a + bINCOMEPC_i + 0.5aCHILD_i + 0.7aADDAM_i + 0.5bX_i + 0.7bZ_i + v_i \quad (2.3)$$

where X=CHILD*INCOMEPC and Z=ADDAM*INCOMEPC, and u_i and v_i are error terms. Validity of the assumed weights (0.5 and 0.7) can be tested by estimating (2.3) and examining whether the estimated coefficients significantly differ from their assumed relations, for instance that the third coefficient is roughly half of the first, the fourth is approximately 70% of the first, etc.

The estimated model for 2009 is given in Table 2.1[26]. The dependent variable is household consumption, and the regressors are as in the model (2.3). All the estimated coefficients and the whole regression are significant at the highest significance level. For the denoted hypotheses about the regression coefficients, Wald tests for coefficient restriction were conducted, and the relative

[24] About methodology used in Serbian statistics see: Republički zavod za statistiku Srbije (2008), or Vukmirović (2010).
[25] Denotation of all the variables is given in the Annex.
[26] Due to autocorrelation and heteroskedasticity of residuals, HAC procedure with robust standard errors had to be used.

statistics are given with the associated probabilities. The first compound hypothesis represents the assumed relations between the weight values for children and adults, and the second tests the null hypothesis that the weights for children are the same as for the adults.

2.1 Testing hypothesis of equivalence scale weights by linear restrictions on parameters

Dependent Variable: CONSUM (household consumption)				
Sample: 1 4592 Method: Least Squares Included observations: 4592				
HAC standard errors & covariance (Bartlett kernel, Newey-West fixed bandwidth = 10.0000)				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
INCOMEPC	0.432777	0.043180	10.02261	0.0000
CHILD	2509.094	779.2207	3.220005	0.0013
ADDAM	3872.685	406.2527	9.532700	0.0000
X	0.495393	0.095352	5.195405	0.0000
Z	0.415636	0.045384	9.158286	0.0000
C	8759.700	587.4669	14.91097	0.0000
R-squared	0.480977	Mean dependent var		29238.16
Adjusted R-squared	0.480411	F-statistic		849.9671
S.E. of regression	14203.89	Prob(F-statistic)		0.000000
Sum squared resid	9.25E+11	Durbin-Watson stat		1.924783
Wald Test: ASSUMED WEIGHTS				
Test Statistic	Value	df	Probability	
F-statistic	5.722576	(2, 4586)	0.0033	
Chi-square	11.44515	2	0.0033	
Null Hypothesis: C(2)=(0.5/0.7)*C(3), C(4)=(0.5/0.7)*C(5)				
Normalized Restriction (= 0)		Value	Std. Err.	
C(2) - 0.71428571428571415*C(3)		-257.1095	922.1018	
C(4) - 0.71428571428571415*C(5)		0.198510	0.107787	
Wald Test: EQUAL WEIGHTS				
Test Statistic	Value	df	Probability	
F-statistic	1.545174	(2, 4586)	0.2134	
Chi-square	3.090349	2	0.2133	
Null Hypothesis: C(2)=C(3), C(4)=C(5)				
Normalized Restriction (= 0)		Value	Std. Err.	
C(2) - C(3)		-1363.591	997.3270	
C(4) - C(5)		0.079757	0.114965	
Restrictions are linear in coefficients.				

According to the results of testing coefficient restrictions, the first hypothesis was rejected at the highest level of significance. This means that in our empirical research the assumed weights could not be confirmed. Additionally, the second (opposite) hypothesis, that the weights for children and adults are equal, could not be rejected at 5% of significance, since the probability of type I error is even larger than 20%.

Consequently, we concluded that in Serbia economies of scale are not as pronounced in consumption as usually believed. Therefore, smaller mistakes are made if household consumption, or household income, is compared between households of different sizes using *per capita* measures than the usual equivalence scale, assuming there are some additional fixed expenditures for each household. This is especially true when the analysis covers a period in which the age structure is changing, namely when number of children in households is notably decreasing, as in the case of Serbia, and the usual equivalence scale would biasly estimate the inequality changes through time.

Besides, within a year, the use of low weights for children would result in assessing higher income or consumption in households with more children than the use of per capita measures. Since our research shows that number of household members, especially children, is significantly higher in low-income households, it is clear that the use of OECD equivalence scale would seriously underestimate poverty and inequality.

Therefore, throughout this paper the measurement units in all our calculations will be household income (or consumption) per capita.

2.2 Poverty and inequality in Serbia

Poverty intensity, denoting how far off households are from the poverty line, is usually measured by poverty depth, or poverty gap. Poverty severity, measured as the squared poverty gap, takes into account not only the distance separating the poor from the poverty line (as the poverty gap), but also the inequality among the poor[27]. The percentage of poor households, together with poverty depth and severity, are given in the table below. These three poverty indicators are calculated using:

$$P(\alpha)=\frac{1}{n}\sum_{i=1}^{n}\left[\max\left(\frac{z-y_i}{z},0\right)\right]^{\alpha} \qquad (2.4)$$

Where z is a poverty line and y_i is consumption per capita of the household i. For α=0, P(0) is poverty

[27] More on these definitions in: Coudouel et al. (2002).

index representing the number of poor households as a percentage of total number of households. Poverty gap is obtained for α=1, while poverty severity is obtained for α=2.

Table 2.2 Poverty in Serbia (in %)

		poverty	depth	severity
income per capita	2006	18.22	7.05	4.16
	2007	13.89	5.45	3.25
	2008	10.82	4.11	2.51
	2009	9.58	3.50	2.06
consumption per capita	2006	9.32	2.12	0.81
	2007	7.90	1.80	0.68
	2008	5.97	1.18	0.39
	2009	6.62	1.47	0.54

The most interesting result is that poverty counted for both household income and consumption per capita is decreasing through the years, only in 2009 poverty in consumption increases. This change in the decreasing poverty trend is probably due to the world economical instability.

Among the households below the poverty line by income per capita, only around 30% are also poor by consumption per capita, since consumption exists even in households with no money income. This means that 70% of all households that are poor by household income per capita are not really poor, measured by household consumption per capita as the indicator of the household welfare, although many of them are 'nearly poor'.

Opposite to the short-term (monthly) incomes, poverty is calculated also using an indicator of long-term achieved household property. Based on the data available in the Survey, market value in constant prices was calculated as the sum of the value of: flat owned by the household, equipment installed in the flat (6 different types), and value of durables (sum of 37 different goods, weighted by their relative market prices). Comparing households below the poverty line for the current monthly income with the long-term achieved property, we see that in the observed period around 90%-95% of the households that are poor measured by income are not poor measured by the achieved property. Thus, it seems that a significant portion of the poor in current income has just recently become a part of this group, and we

can think of them as 'transition losers'.

Testing differences of poverty rates in household consumption per capita for different groups of households, categorised by their main characteristics (Table 2.3), we can discover which types of households are mostly exposed to poverty. For the test statistic *Z* larger than 1.96 in absolute value, the difference is significant at the 5% level.

Table 2.3 Poverty rates (in %) and test statistics of equality of proportions

	2006	2007	2008	2009
Living in rural area	13.00	10.91	7.87	9.86
Living in urban area	6.56	5.69	4.58	4.26
Test statistic Z	7.39940	6.49055	4.67039	7.53497
Female household head	9.75	6.94	5.15	4.92
Male household head	9.15	8.27	6.28	7.29
Test statistic Z	0.62494	-1.50324	-1.43763	-2.91472
Single household head	8.67	6.89	5.00	4.14
Married or cohabitating	9.66	8.43	6.49	8.06
Test statistic Z	-1.08659	-1.84542	-2.02314	-5.15429
Low education of the household head	15.94	13.88	9.23	11.27
Middle education	6.54	5.44	4.83	4.56
High education	1.95	0.70	1.99	1.60
Test statistic Z 1*	9.43763	9.05154	5.45491	7.97136
Test statistic Z 2*	-4.57497	-5.42924	-3.30004	-3.38349
Employed household head	8.03	6.87	5.14	5.45
Unemployed household head	16.07	14.00	15.90	17.75
Student, retired, housewife, etc.	8.51	6.94	4.53	5.35
Unable, solder, etc.	28.33	26.61	23.08	30.00
Test statistic Z 3*	-0.56165	-0.08922	0.92244	0.13831
Test statistic 4*	-2.87176	-3.09618	-1.69937	-2.48724
Four household members or less	7.04	6.18	4.54	4.49
Five household members or more	18.84	15.32	12.11	16.27
Test statistic Z	-10.82352	-9.00015	-8.51438	-12.34707
Two children or less	8.60	7.40	5.44	6.12
Three children or more	42.27	35.80	31.58	29.59
Test statistic Z	-11.28274	-9.39336	-10.64154	-9.24543

1* - equality of proportions among low and middle education
2* - equality of proportions among middle and high education
3* - equality of proportions among employed, and student, retired, housewife etc.
4* - equality of proportions among unemployed and unable soldier, etc.

The results show that the poverty rate is significantly larger in rural than in urban households, during the whole observed period. It is interesting that the position of families with a female household head is

improving, not only each year, but also such households show lower poverty rate than others since 2007. This result might be an indication that the position of women is improving in the observed period, but also that only women with relatively higher income become household heads. However, the difference between households with male and female head becomes significant only in 2009. As expected, families whose household head has low education are more often below the poverty line than the other families. Of course, households whose head has higher education are rarely poor. Percentage of poor households in which the head is unemployed is significantly larger than in the group where the head is employed and this difference rises especially in 2008 and 2009, no doubt as a result of the economic crisis. Differences in poverty rates between households whose head is employed and those where the head is retired, a student or housewife, are not significant in none of the observed years.

Further, the results show that the households that are below the poverty line are mostly large-numbered, whit more children than overall average. Poverty in households that have four or less members is decreasing, although it stays at the same level in 2009 as it was in 2008. On the other hand, for households with five or more members poverty has significantly increased in 2009. However, poverty in households with three or more children is decreasing even in 2009, probably due to well-targeted social assistance.

In Table 2.4 we present the average number of household members, as well as the average number of children, in poor and non-poor households. Both household size and number of children are constantly decreasing for non-poor group since 2006, while for poor households they increase since 2007.

Table 2.4 Average number of household members and children in household

		Year			
		2006	2007	2008	2009
Number of households members	Non poor	3.08	3.02	3.01	2.91
	Poor	4.06	3.84	3.89	4.31
t-statistic for equality of means test		*-11.705*	*-9.265*	*-8.777*	*-14.235*
Number of children	Non poor	0.37	0.34	0.34	0.32
	Poor	0.87	0.79	0.83	0.90
t-statistic for equality of means test		*-12.457*	*-11.299*	*-10.802*	*-13.326*

These results indicate that households below the poverty line show significantly larger number of household members and a larger number of children in all the observed years. These differences might be one of the causes of poverty. In order to examine more precisely categories of population that are most vulnerable, we calculated poverty rates for specific subgroups. The results are given in Table 2.5.

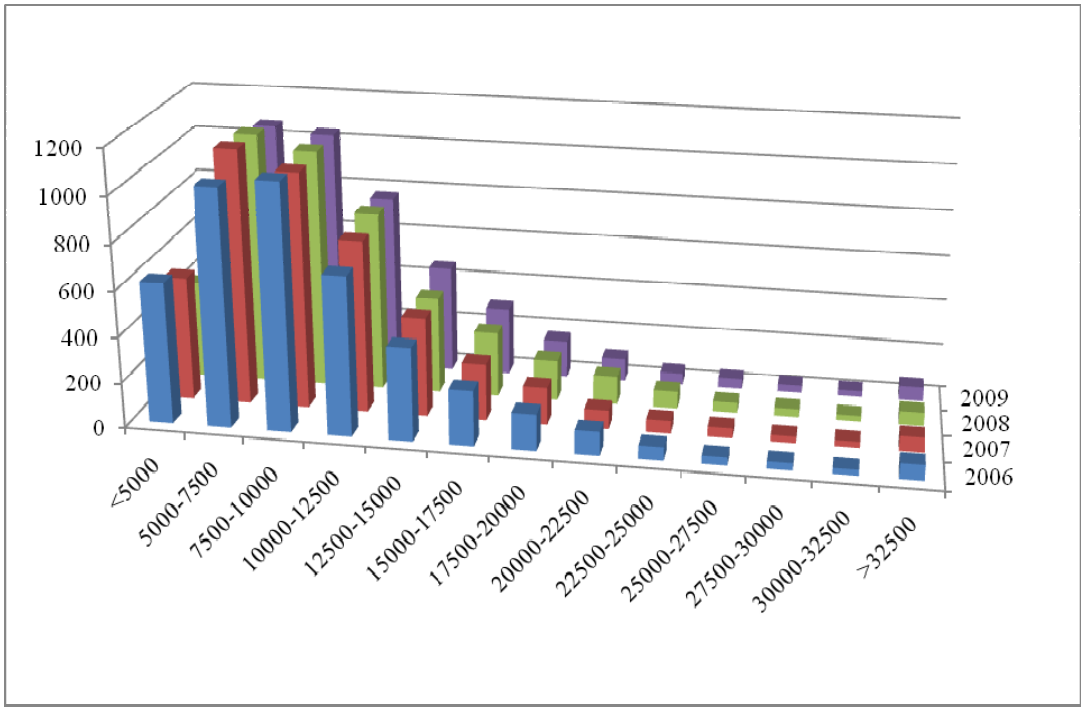
Table 2.5 Poverty rates in specific population categories

	Poverty rates (in%)			
	2006	**2007**	**2008**	**2009**
Living in rural area and low education of household head	15.7	13.3	9.7	12.0
Living in rural area and household head unemployed	23.3	21.0	18.4	25.0
Living in rural area, unemployed and having low education	39.0	27.5	24.5	37.2
Living in rural area, disabled and having a low education	28.4	15.7	23.5	34.0
Living in rural area, household head disabled	27.2	18.5	21.6	33.3
Living in rural area with five or more household members	21.3	17.9	11.4	18.5
Living in rural area with three or more children in household	53.6	37.2	37.3	32.7
Household head unemployed with low education	33.8	25.6	21.7	34.6
Household head disabled with low education	31.8	28.2	26.9	34.7
Three or more children and five or more household members	41.7	35.8	30.9	29.2

From the table above it can be noticed that the highest decrease of poverty since 2006 is among households living in rural area with three or more children (from 53.6% to 32.7%). Similarly, the decrease of poverty is high among households that have three or more children and five or more household members (from 41.7% to 29.2%). This means that groups with highest poverty also showed largest decrease of poverty.

Although poverty of households living in rural area, whose household head is unemployed with low education, was decreasing from 2006 until 2008, it rapidly increased in 2009, probably due to economic crisis. Independently of the type of settlement, the position of such households has worsened in 2009, so that poverty rage among them increased from 21.7% in 2008 to 34.6% in 2009, even to a higher level than it was in 2006. Therefore, it is obvious that the activity and education of the household head are important determinants for the position of household regarding their poverty status.

Figure 2.1 Distribution of household consumption per capita



Distribution of household consumption per capita, similar to income distribution, has a heavy right tail, which indicates inequality of distribution. Around 55%-60% of households have consumption per capita lower than the overall average. This percent was decreasing since 2006, but it slightly increased in 2009. This also indicates a decrease of inequality since 2006 to 2008 and a slight increase in 2009.

One of the most important questions in analysing inequality is what the most adequate measurement of inequality is in the specific case, i.e. by which inequality measurement in the observed population is the distribution best represented. The most commonly used inequality measurement is Gini coefficient. It measures the area between Lorenz curve and the 45 degrees line. From Table 2.6 it is obvious that inequality, as well as poverty, is higher when measured for real household income per capita than for consumption, since variations of income are much higher. The table shows that inequality in income per capita decreases in the whole observed period, while inequality in consumption rises in 2009. Data on long-term achieved property[28] indicate an even lower inequality. This type of inequality has also decreased, since 2006 until 2009 measured by Gini coefficient from 0.224 to 0.206.

[28] Analysis of the calculated household property is given in: Jovičić and Milojević (2010)

Table 2.6 Gini coefficient

	Income per capita	Consumption per capita
2006	0.39465	0.30766
2007	0.37801	0.29704
2008	0.34265	0.29098
2009	0.33323	0.29211

The main disadvantage of Gini coefficient is that it gives equal relative value of changes that may occur in different parts of the distribution[29], meaning that it results in the same values in cases when the inequality is greater both in the lower deciles (among poor parts of the population) and in higher deciles (wealthiest part of the population).

That is why we need to calculate other inequality measures, beside the Gini coefficient. Since we are mostly interested in evaluating the position of the most vulnerable groups, probably the best measurement is the decile dispersion ratio, and the share of income or consumption of the poorest chosen percentage of the population. Decile dispersion ratio presents the ratio of the average income (or consumption) of the richest part, i.e. 25% of the population, divided by the average income (or consumption) of the bottom 25%[30]. The results of decile dispersion ratio by years shown in the Table 2.7 also indicate the decrease of inequality since 2006 until 2008, but a slight increase in 2009.

Table 2.7 Decile dispersion ratio

	Average real household consumption per capita			
	2006	**2007**	**2008**	**2009**
Bottom 25%	4694.7	4860.5	5195.3	5068.2
Richest 25%	19129.0	18784.6	19424.3	19187.3
Decile dispersion ratio	**4.07**	**3.86**	**3.74**	**3.79**

Descriptive statistics of real household consumption per capita (in Table 2.8) show similar results. It is obvious that consumption per capita does not have a normal distribution, because of the heavy right tail (positive skewness coefficient) due to the extreme values, and high concentration of data in the left tail (kurtosis coefficient larger than three). Thus the Jarque-Bera statistics distributed as χ^2 with two degrees

[29] On discussion of the Gini shortcomings see for instance in: Cowell (2008).

[30] More about inequality measurements: Haughton and Khandeker (2009).

of freedom under the null hypothesis of normal distribution shows a significant deviation from normality. However, from the following table it is noticeable that dispersion statistics indicate an equalisation tendency. Both skewness and kurtosis are lower in 2009 than in 2006, although both of them are grater in 2009 than in 2008. Moreover, kurtosis has increased also in 2008, which means that the increase of concentration in the lower part of the distribution started already in 2008. Beside these exceptions, it is obvious that in the observed period there is some equalisation tendency.

Table 2.8 Descriptive statistics of household consumption per capita in constant prices

	2006	2007	2008	2009
Number of observations	4,560.0	4,608.0	4,621.0	4,592.0
Minimum	749.7	546.0	633.1	1,058.2
Maximum	107,160.9	98,095.3	95,231.9	103,750.1
Mean	10,474.9	10,466.4	10,890.0	10,803.2
Std. Deviation	6,965.5	6,498.6	6,598.8	6,588.4
Skewness	3.5	2.9	2.9	3.0
Kurtosis	27.7	20	20.3	22.1
Jarque-Bera	125645.8	61777.82	64242.82	76319.54

In order to overcome the disadvantages of the above-mentioned measurements, we also calculated Atkinson and Theil indices.

Atkinson index is commonly used as welfare based measure of inequality:

$$A_{\varepsilon} = 1 - \left[\frac{1}{n} \sum_{i=1}^{n} \left[\frac{y_i}{\bar{y}} \right]^{1-\varepsilon} \right]^{1/(1-\varepsilon)} \tag{2.5}$$

where y_i is consumption per capita of household *i* and $\bar{y}$ is an average consumption per capita; *n* is the number of households in the sample. Atkinson index depends on the parameter of inequality aversion ε. With no inequality aversion (ε=0), the utilitarian social welfare function would prevail, i.e. the straight line. When inequality aversion is zero, the society is not inclined toward equality[31]. Developing countries, and especially transitional countries where equality was one of the main social goals, are more averse to inequality than advanced countries. Therefore, because of heritage and fast social and

[31] More on that in: Bellù and Liberati (2006).

economic changes, in transitional countries inequality is a very sensitive issue. On the other hand, it might quite reasonably be argued that as the general level of incomes rises, we are more concerned about inequality. In other words, the social welfare function should exhibit increasing (relative) inequality-aversion[32].

The measurement of inequality that is commonly used when we want to decompose the inequality is Theil index. The fundamental idea behind the Theil index is that it provides a way to measure the discrepancy between the structure of the distribution of income (or consumption) across groups and the structure of the distribution of individuals within those same groups[33].

In Table 2.9 different inequality measurements are given, calculated for inequality in household consumption per capita from 2006 to 2009, including simulations for different levels of inequality aversion in the Atkinson index.

Table 2.9 Inequality measurements (in %)

Year	Theil	Atkinson index for different ε					
		1.25	1.5	1.75	2	2.5	3
2006	16.76	17.93	21.05	24.09	27.10	33.07	39.12
2007	15.32	16.74	19.70	22.60	25.48	31.28	37.39
2008	14.61	15.82	18.55	21.18	23.75	28.79	33.90
2009	14.79	16.18	19.03	21.81	24.53	29.87	35.18

From the Table 2.9 we can see that all calculated indices represent the same tendency: decreasing inequality until 2008, but an increase in 2009. Observing the differences in Atkinson indices for various values of ε in 2009, where larger ε means more concern about lower deciles, we can conclude that the increase of inequality occurred exactly in lower deciles.

2.3 Inequality determinants

In studying the inequality determinants, it is important to find out which features of the available

[32] More about that in: Atkinson and Bourguignon (2000).

[33] According to: Conceição, Ferreira, and Galbraith (2002).

observations cause most significant variations in some welfare measure, in our case the household consumption per capita. Estimating impacts of some household attributes on the per capita household's consumption is commonly done by use of regression analysis. However, the above analysis shows that the distribution of consumption per capita has a heavy right tail and significantly deviates from the normal distribution. This leads us to the conclusion that in a regression model the impact of each independent variable representing household attribute differs in different parts of the population. It is for instance interesting to check whether the lower deciles are more sensitive to changes of the independent variables than the upper deciles.

In situations where a distribution significantly deviates from the normal distribution, a "positional" measurement is a better central tendency representative than the mean. In such cases an alternative approach in estimating the impact of different independent variables is a median-regression model. This model can achieve the same goal as a mean-regression model, i.e. it can represent the relationship between the central location of the dependent variable and a set of independent variables[34]. Actually, the median-regression model is a specific case of a quantile regression-model[35]. By use of quantile regression it is possible to estimate the model coefficients for different percentiles of the dependent variable, and so to obtain model estimates for different parts of the distribution.

In the next table, the results of our estimated median-regression model are given for the four observed years. The dependent variable is household consumption per capita, while the independent variables are household attributes significant in all of the four years. All estimated coeffeicients in the Table 2.10 are significant at the 5% level, except the denoted one which is significant at 10% level. Although dummy variables, presenting gender of the household head and type of settlement (urban/rural), were present in the model at the beginning of the analysis, they had to be excluded from the equations as not significant. This is somewhat contrary to our previous results in poverty testing for different population groups which showed that poverty rate is significantly larger in rural areas, and so is for female household head

[34] More about the this in: Hao and Naiman (2007).

[35] About quantile regression see: Koenker (2005).

in 2009. However, some other variables clearly explain these previously noticed differences.

Table 2.10 Estimated quantile regressions for household consumption per capita

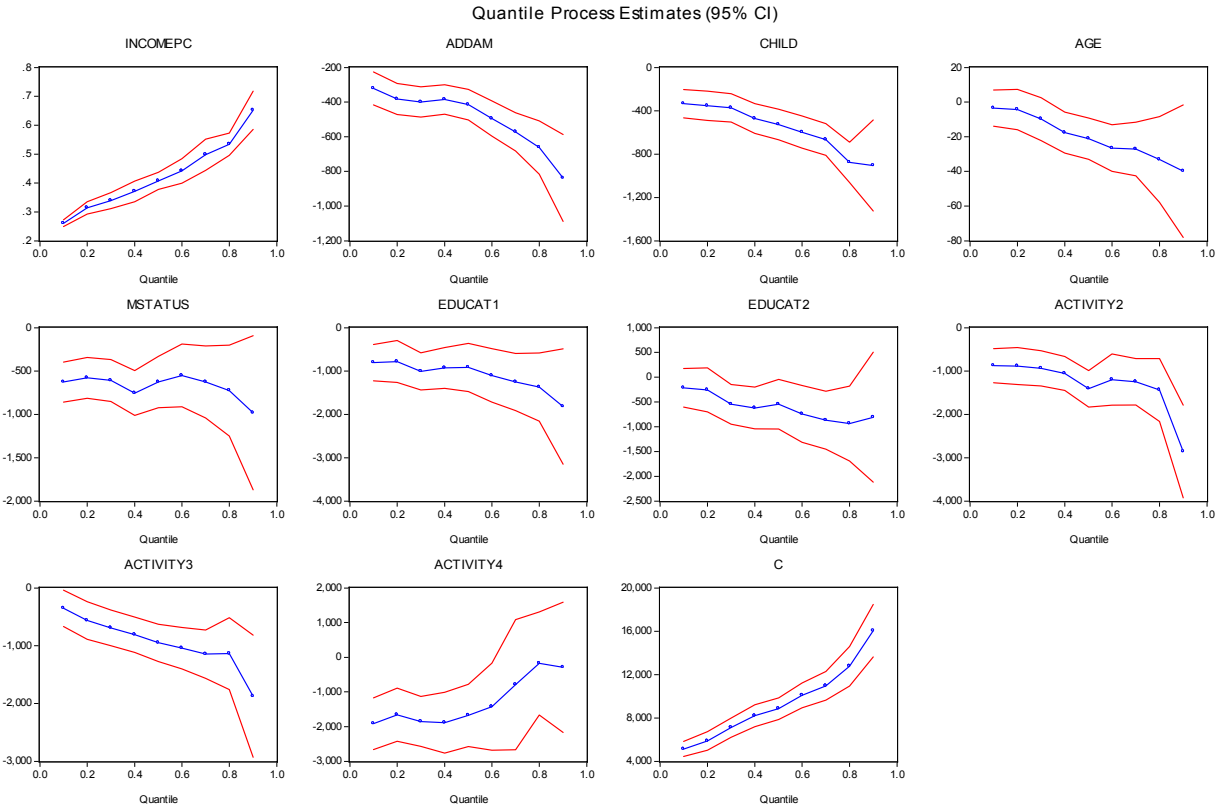
	2006	**2007**	**2008**	**2009**
Household income per capita	0.38	0.36	0.42	0.41
Number of additional adult members	-471.75	-367.31	-297.80	-414.96
Number of children	-699.22	-675.51	-561.02	-526.69
Age of the household head	-18.61	-25.78	-33.71	-21.11
Married or cohabitating	-751.09	-749.34	-1021.85	-627.20
At most elementary school	-1489.50	-1441.26	-754.54	-918.96
At most secondary school	-954.74	-1000.57	-594.64	-546.79
Unemployed	-781.88	-436.17*	-679.98	-1411.73
Retired, student or housewife	-759.44	-397.08	-612.49	-949.04
Unable	-1188.93	-1586.43	-1336.96	-1701.84
Constant	9768.11	9784.24	9518.21	8860.77
Number of observations	*4560*	*4608*	*4621*	*4592*
Pseudo R-squared	0.207605	0.207019	0.212321	0.232917

* Significant at the 10% level, all other coefficients at 5%.

The coefficients in the table determine the median value of the dependent variable. All of the estimated coefficients have expected signs and values. Among all the significant variables, apart from the constant term, only household income per capita has a positive sign in all years, and its impact is higher in 2008 and 2009 than in the two previous years. Each additional adult member on the average reduces household consumption per capita much more intensively in 2009 than in 2008, while each additional child shows a decreasing negative impact throughout the period, which means that the average consumption for children is approaching the level for the adults. A higher negative effect of low education in 2009, and especially much higher reduction in consumption caused by non-employment of the household head, gives evidence of the negative effects of the economic crisis in 2009.

However, the estimated coefficients differ along the distribution of the dependent variable, as can be seen from the following figure. Here the graphs of coefficients estimated in 2009, in the same order as in the previous table, are given for different quantiles (first 10%, 20% etc. of the distribution of the dependent variable), with confidence intervals denoted by boundaries of ± two standard errors.

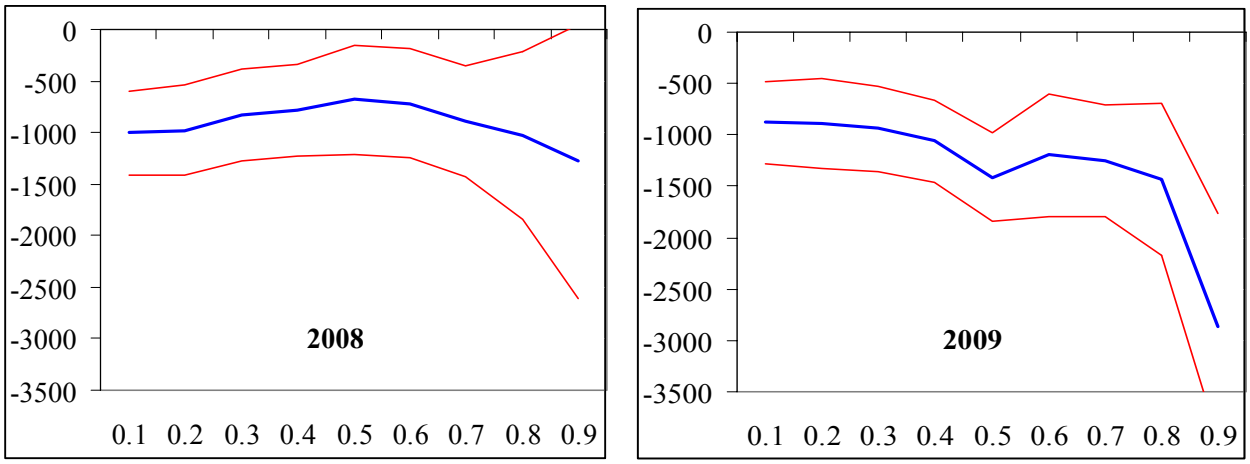
Figure 2.2 Quantile responses of different deciles in 2009



It is obvious from the figure that not only coefficients differ for various parts of the distribution, but also their intervals typically grow for higher deciles. From the graphs of the coefficients, especially from the graphs for the constant and the impact of income per capita, it can be concluded that household consumption per capita has right-skewed distribution, since these coefficients are positive and form upward-sloping curves, which become steeper at the right end. A horizontal curve would indicate that the coefficient does not vary among different quantiles, so that changes in the independent variable have the same effect in each quantile. If all of the curves were horizontal, we could conclude that there is no inequality in the distribution of household consumption per capita. However, in our case, since all of the estimated coefficients form their own curves which are not horizontal, we conclude that all the variables have an impact on inequality. However, any departure from the flat line becomes difficult to interpret, although it is evident that in general a downward sloping curve indicates lowering of the impact of the relative variable for the additional quantiles, and vice versa.

In the next figure we compare coefficient graphs for unemployment of the household head in 2008 and 2009. Although always negative, this effect changes the intensity in determining the median value along the distribution.

Figure 2.3 Effects of unemployed household head to consumption per capita



From Figure 2.3 we can see that in 2009 the negative coefficient shows much larger absolute values, indicating increased negative influence of unemployment of the household head on household consumption. Additionally, in 2009 larger differences in slopes for different quantiles are also obvious, indicating increased inequality. As already noted, this is apparently caused by the economic crisis.

From the analysis of different quantile responses in all the observed years, it is obvious that the model estimates vary for different parts of the distribution, as supposed from the asymmetry of the distribution. The two main functional breaks can be noticed: the first one in the third or forth decile, and the second one in the seventh or eighth, roughly dividing the distribution into thirds. Therefore, roughly, three different groups along the distribution can be distinguished, with different responses. In order to test more precisely at which points in the income distribution structural break appears, we further employ recursive estimation, as explained in section 3.3.

3. SOCIAL POLICY IN SERBIA

3.1 Comparison with other transition countries

Between transition countries, generally speaking, groups of more egalitarian and inegalitarian countries in income distribution could be distinguished. Central European transition countries tend to have relatively low levels of inequality, while the former Soviet republics tend to have relatively higher levels of inequality. West Balkan countries, including Serbia, lie somewhere in between those two groups of countries.

Comparing with other transition countries in the region, social protection expenditures in Serbia are at the level of the average social policy spending in the Baltic countries. These payments cover three social-protection instruments: social insurance-contributory based benefits, social assistance and social services.

Expenditures on the first social-protection instrument, contributory-based benefits, which include pensions and unemployment benefits, are very high. The share of pension transfers in GDP is not only higher in Serbia than in other transition countries (except Poland), but it is also the largest single programme of government expenditures over the period 2005-2009. There are two reasons for this: a steady tendency of population aging in Serbia, and possibilities for an early retirement during the transition process. As a result, in Serbia there is a larger number of pension beneficiaries than the number of contributing workers, while the unemployment is reducing very slowly. Consequently, the pay-as-you-go system is unsustainable. Constantly causing budget deficits, pensions have been frozen in 2009 and by the Government budget plan also in 2010[36]. Yet, high budget expenditures for pensions supersede social assistance and reduce spending for transition victims and child support. Due to high pension transfers, Serbia (together with Poland) spends less than two percent of GDP on the second instrument of social protection: social assistance[37].

[36] More about effects of freezing pensions on poverty in 2010 see in: Jovičić and Milojević (2009).

[37] This is an even lower level of spending then in the EU countries, where the average is more than 2.5 percent.

Social assistance is an instrument of social policy used to achieve a more equal income distribution, but it should also enable equal access to employment, education and health care for the vulnerable groups. More precisely, social protection should not only target the poor and provide support for their basic needs, but should also have a protective manner. Thus in Serbia it includes benefits for families with children, employment programmes, benefits for persons with disabilities, etc. However, social assistance has to be activated only after other usual mechanisms have failed in securing a sustained minimum standard of living. Social assistance is an instrument that provides a minimum standard of living, although there are other goals added to social assistance, for instance, improvements in education and employment. Therefore, social assistance contains many specific programmes.

In Serbia there exist over 20 social assistance programmes, directed to three groups of objectives: poverty reduction, population growth and assistance for the most vulnerable groups[38]. These programmes are legally and administratively separated in two groups of public policy instruments: (1) instruments providing social assistance for citizens and (2) instruments related to social protection of children. All these instruments are related to improvement of material positions of vulnerable groups, namely groups mostly exposed to the risk of poverty. They are: unemployed and poorly supported, children younger than 14 years of age, elderly (65 years of age and more), multi-member households (five or more members), refugees, disabled, households consisting of only one or two elderly members (particularly in rural regions), rural regions of South-eastern and Western Serbia, uneducated individuals[39]. Special attention has been devoted to Roma population, as Serbia has joined a Decade for Roma Initiative. Assistance to vulnerable groups is not always related to cash benefits. Different kinds of assistance have important role as well: day care for children and elderly, organised meals in soup kitchens, assistance in heating fuel and electric power. These kinds

[38] In the report *Doing More with Less,* World Bank (2009) undertook very detail analysis of the quality of public services, including comprehensive analysis of social policy goals and instruments, and possibilities for constructing growth in social policy expenditures.

[39] The identification of the most vulnerable groups can be found in: *Poverty Reduction Strategy* of the Serbian Government, http://www.prsp.gov.rs/engleski/strateski.jsp

of assistance are mostly financed by local administrative authorities' budgets, although assistance from the Republic funds makes the major part of cash assistance.

Two well-designed poverty-target and the most important non-contributory programmes[40] in Serbia are Material Support for Low Income Households (MOP[41]) and Child Allowance[42]. Material Support for Low Income Households is aimed at individuals and households with an income below the minimum social welfare threshold, filling the gap between the household's income and the thresholds (a share of the average wage), provided that additional criteria are fulfilled: small property, involvement in the labour market, regulatory education for children, etc. MOP is mostly received by the unemployed, persons with poor educational background, and persons with disabilities, while employed persons, pensioners and farmers rarely receive MOP[43]. Minimum income for households is defined with respect to the household's size. For a household of a single person minimum income is 16% of the average household income in Serbia, and for households with two, three, four, five and more persons: 22%, 28%, 30% and 32%, respectively. Therefore, this programme is defined assuming economies of scale, and as a result single-person households are relatively favoured in receiving MOP per capita amounts.

In order to analyse the effects of MOP in Serbia, we compared it with similar programmes in other transition countries (in euros). On the average, MOP revenues for single-person households are at a higher level in Serbia than in Bulgaria or Romania, but at a lower level than in Baltic countries, Slovakia or Slovenia. However, households with five and more members in Serbia receive on the average only two times higher MOP allowance than single-person households, while in other transition countries it is between three and five times higher. Therefore, we can conclude that MOP in Serbia is less in favour of households with a large number of members. Moreover, large

[40] According to the assessment in: World Bank (2009).

[41] Shortened from the Serbian "materijalno obezbedjenje porodice".

[42] More about MOP and child allowance see in: Jovičić and Ivančev (2010).

[43] The principles of MOP are given in: Bogićević et al. (2003). In 2004, major changes related to MOP occurred, by the introduction of the Law of Social Care and Provision of Social Assistance for Citizens: uniform eligibility threshold and monthly indexation of living costs are introduced. The new Law had a direct influence on inequality reduction in Serbia.

households usually include larger number of children, and they are more frequent between the poor. Therefore, opposite to the appraisal of the World Bank (2009) that MOP is a well-designed programme, we can conclude that it actually marginalises the problems of households with a large number of members, including children.

Child allowance is the most important instrument of child protection policy. However, the share of child allowance in GDP is decreasing year after year, although the intensity of other policy instruments for child protection is growing: wage compensation for mothers on maternity leave and birth grants. By new legislative changes, mothers on maternity leave receive a share of their own average salary, and therefore this instrument is not focused on poorest parts of the society. In addition, Serbia, like some other transition countries (Bulgaria, Romania, Slovak Republic), provides equal material support for all children in recipient households. Contrary to that, in Estonia and Lithuania for instance child allowance differs according to sequence of birth, and in Hungary it differs with the child's age.

Our analyses show that in Serbia, according to the Household Budget Survey, not only the average number of children per household is steadily decreasing each year, but also the percentage of households without children is growing year after year, from 73.6% in 2006 to 77.6% in 2009. This fact highlights the importance of child support as an instrument of both social and population policy, intending to strengthen incentives for increase of birth rate. Therefore, it is necessary that the active child protection policy fulfill this additional and essential development goal. Besides, children are the most important among the vulnerable groups, and therefore the purpose of child protection policy should be a more adequate social assistance for the poor households with children, in order to create equal conditions for normal development of all children.

Third social-protection instrument, a range of social services is oriented toward promoting community-based actions, skill trainings and rehabilitation services, addressing the needs of women, children, refugees with disabilities, the elderly, etc.

3.2 Empirical results in testing social policy effectiveness

In order to assess the effectiveness of social policy in income inequality reduction, it is necessary to analyse coverage, adequacy and targeting performance of social policy programmes. Coverage of social policy transfers in Serbia is relatively high. However, while in 2006 in Serbia 64% of households received social transfers, in other transition countries that percent was even higher: 80% in Romania, Russia and Estonia[44]. Wide coverage in Serbia is a result of pension participation in social transfers. According to the Survey data, only 13% of households received social assistance in 2006, and in 2009 that percent is even lower, 9.3%.

Adequacy of social policy programmes can be analysed by comparing consumption between households that receive social assistance with the average household consumption. According to the Survey data, average consumption in households that receive social assistance is higher than average consumption in all households in one- and two-person households. However, in multi-member households, consumption is lower if the household receives social assistance. This means that social assistance should be redistributed from small to households with more members.

Targeting performance in Serbia can be represented by Coady-Grosh-Hoddinott (CGH) index. It is based on a comparison between the actual targeting and neutral targeting performance. More precisely, it compares the current real targeting to the level of targeting that would result from equal allocation of resources across quintiles[45]. The CGH index can also be used for international comparison of targeting performances of social programmes. According to the results from the quoted World Bank study, Serbia together with Russia, has the lowest CGH index − about 1.4 for child allowance and 2.5 for MOP in 2003 − while for instance Lithuania, Estonia and Bulgaria have CGH index about 3.5 (according to HBS in 2004). The CGH index in Serbia for child allowance shows that targeting has led to the poorest quintile receiving only 40% more than these beneficiaries would have received under neutral targeting. The CGH index shows that social policy has certain

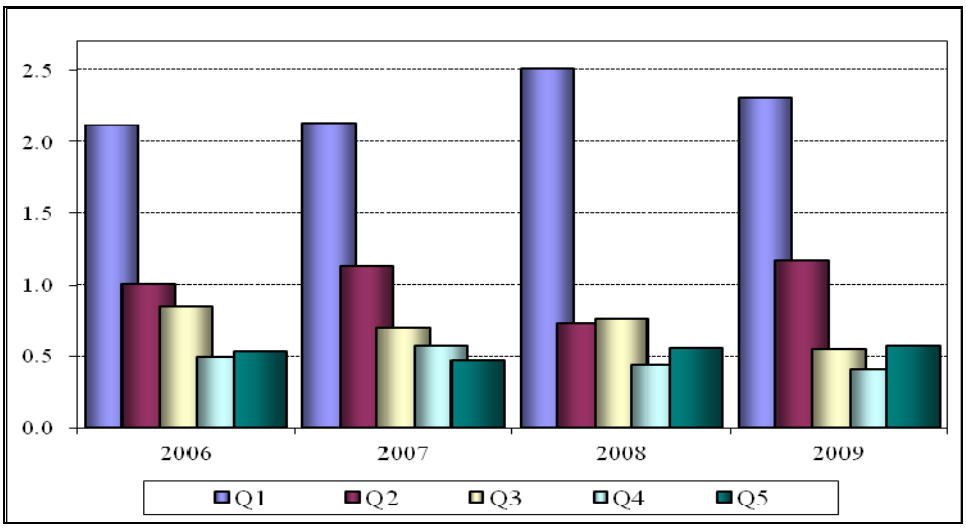
[44] Data are taken from World Bank (2006b).

[45] More on this subject in: Ibid.

influence on inequality in Serbia, but also, according to the comparison with other transition countries, the results suggest that further needs for better targeting exist.

In order to examine the influence of social policy on inequality using CGH indices, these indices are calculated for every quintile in Serbia (every 20% of all households, ordered by the level of household income per capita without social assistance) for the period 2006-2009. The next figure shows that the poorest quintile always receives more in comparison with the other quintiles.

Figure 3.1 CGH indices for quintiles in Serbia over the period 2006-2009*



**Source of data: Household Consumption Survey*

This means that social policy has a significant influence on poverty and inequality reduction. In 2008 and 2009, CGH indices for poorest quintile are higher than in 2006 and 2007. In addition, the increase in CGH index for the second quintile in 2009 represents a better targeting performance than in the previous years. Therefore, distribution of social assistance between quintiles ordered by income during the observed period inevitably led to poverty and inequality decrease.

Although social assistance has been growing together with GDP per capita in the observed period, in order to examine more closely whether social transfers influence income inequality, we use impact evaluation. Impact evaluation is a tool to assess whether a social program is achieving its goals, by comparing how the beneficiaries' situation changed as a result of the programme, and

what the situation would have been without the programme[46]. In fact, we should try to answer what would have happened if the programme had not existed, more precisely, which level of inequality would have been achieved if there were no social policy expenditures.

In order to answer this question, two Gini indices were calculated. The Gini coefficient calculated for household income per capita in Serbia is decreasing over the observed period 2006-2009 (from 0.39 to 0.33), indicating that income distribution is becoming slightly more equal. With the intention to test the influence of social policy on inequality, we have also calculated a Gini coefficient for per capita household income, which does not include revenues from social policy. It is somewhat larger, but also decreases, from 0.40 in 2006 to 0.34 in 2009. Thus we may conclude that inequality in Serbia would have been higher if there were no social assistance. However, inequality is decreasing through time even without social assistance, and this decline is greater each year than the effect of the social assistance on the Gini coefficient. Therefore, the reasons for intensive inequality reduction should be searched for between factors other than social policy.

In estimating which features of households significantly influence social policy in the observed period, we estimate an econometric model on HBS data, where the dependent variable is share of social assistance revernues in household income, as a function of various household features. From the all available, only significant explanatory variables have been kept in the model. These are: revenues before social assistance (INCMSOC), number of household members (NO), number of children (CHILD), number of active numbers of the household (ACTIVE) and three dummy variables for the main activity of the head of household, excluding the first activity (employed). These are: ACTIV2=unemployed, ACTIV3=dependent or retired, ACTIV4 = unable or soldier.

The results of the estimation for each year are given in the following table, coefficient values followed by their level of significance (probability of type one error). In the first step of the OLS estimation, autocorrelation, heteroskedasticity and divergence from normality were discovered in

[46] About impact evaluation see for instance: Cowel (2008).

the residuals, so all the equations were newly estimated by use of Newey-West HAC procedure with robust standard errors, and that the t-tests of significance became more reliable.

Table 3.1 The estimated model determining share of social assistance revenues in income

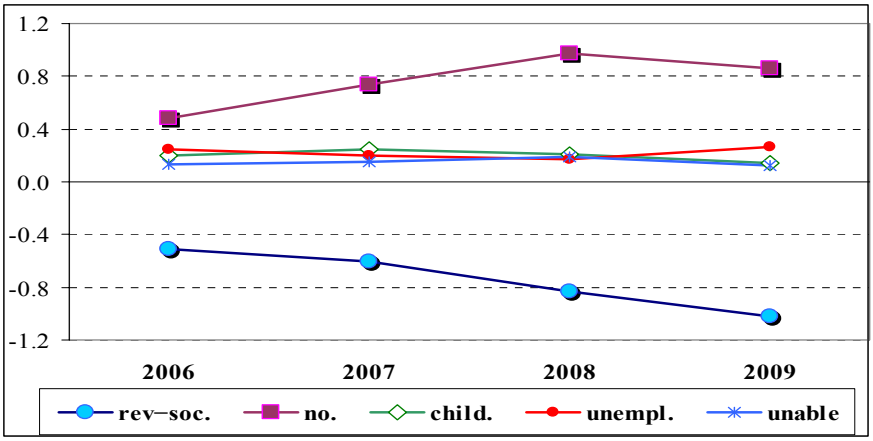
Dependent variable: Share of social assistance in household income								
	2006		**2007**		**2008**		**2009**	
	Coef.	**Prob.**	**Coef.**	**Prob.**	**Coef.**	**Prob.**	**Coef.**	**Prob.**
INCMSOC	-0.0001	0.0002	-0.0001	0.004	-0.0001	0.0001	-0.0001	0.0209
NO	0.5697	0	0.7899	0	0.8742	0	0.8270	0
CHILD	1.7778	0	2.1990	0.0001	1.5627	0	1.1840	0.0052
ACTIVE	-1.0926	0	-0.9445	0	-0.9544	0	-0.8346	0.0019
ACTIV2	13.8924	0.0004	10.2412	0	7.5299	0	12.5286	0.0532
ACTIV3	-2.1966	0.0015	-1.4569	0.0008	-1.6524	0	-1.6650	0
ACTIV4	18.9345	0.0142	18.3172	0.0026	20.4414	0.0001	16.5463	0.0053
C	4.2611	0	2.9568	0	2.9447	0	3.7478	0
R-squared		0.1641		0.1557		0.1750		0.1558
Adj. R-squared		0.1628		0.1544		0.1738		0.1532
Durbin-Watson		1.8506		1.9081		1.9661		1.8160
Mean dep. var.		3.7173		3.3187		2.7472		2.8794
F-statistic		127.64		121.17		139.83		60.57
Observations		4560		4608		4621		2306

Relatively low coefficients of determination can be expected in cross-section studies with large numbers of observations, due to heterogeneity of observation units and their different behaviour in different conditions. This is especially true if most of the variables are dummies, as in our case. Despite relatively low coefficients of determination, which are nevertheless highly significant, the estimated equations satisfy all the usual test criteria in all the observed years. All the regression coefficients are significant at the 5% level, with the expected signs and values. This means that although our model does not describe precisely the mechanism of determining percentage of social assistance in household revenues, mostly due to a limited set of available explanatory variables, we can rely rather dependably on the estimated individual influences of each regression factor, at least in comparing the elasticities of the estimated relations and their change through time.

It can be noted that the average percentage of social assistance in revenues (the mean value of the dependent variable) is dropping in the observed period, except for the last year, indicating lowering intensity of social assistance. According to the estimated regression coefficients, the dependent

variable on the average rises with a low level of revenues from other sources and a high number of members of household (namely with low *per capita* revenues, or in poor households), with number of children and if the household head is unemployed or unable for work. It decreases with the number of active members of the household and if the household head is retired, namely for those who are not registered as unable for work or unemployed. In order to estimate possible changes in the determination of the revenue percentage coming from social assistance, we have counted elasticities at the mean values of the variables, presented by the following figure.

Figure 3.2 Elasticities from the estimated model at the mean values of the variables



Source of data: estimated equations

The figure shows an obvious increase of the negative elasticity with respect to other sources of revenues and the corresponding increase of elasticity with respect to the number of household members. This indicates that social assistance as a percentage of revenues is becoming more elastic to the households income per capita and can be interpreted as a tendency to a better targeting in poverty reduction. Despite the established decrease of number of children per household in the observed period, the social assistance shows a slightly decreasing elasticity with respect to the number of children, but a somewhat increased elasticity with respect to the inactive status of the household head, unemployed of unable for work. For that reason in the next chapter we are investigating determinants of income inequality, as well as differentiated influences of various social programmes with different targets.

3.3 Influence of social policy programmes on income inequality

In trying to assess determinants of income inequality using the HBS data, with an emphasis on influence of social revenues on household income per capita, we first estimated a panel model in which dependent variable is household income per capita, for 50 quantiles (groups of 2% of the ordered population), during the period 2006-2009. Namely, in an attempt to eliminate variations inside the income groups, which might disturb efficient estimation of the average dependence, for each year we divided the data arranged in an ascending order by household income per capita in fifty quantiles, and constructed a balanced panel.

In specifying and choosing the appropriate econometric model, we started with the panel model:

$$INCOMEPC_{it} = b_{1it} + b_1 INCMSOC_{it}, + b_2 SOCREV_{it} + b_3 URBAN_{it} + b_{4j} EDUCAT_{ijt} + b_{5j} ACTIV_{ijt,} + b_6 GENDER_{it,} + b_7 MSTATUS_{it,} + b_8 PROPERTY_{it} + \varepsilon_{it},$$

$$i=1...50,\ t=1,..4,\ j=2,..k, \qquad (3.1)$$

where household income per capita of the quantile *i* in the year *t* ($INCOMEPC_{it}$) is estimated as a function of the total income without social assistance ($INCMSOC_{it}$), total social revenues ($SOCREV_{it}$), dummy variable for type of settlement ($URBAN_{it}$), dummy variable for the education level of the head of the household ($EDUCAT_{ijt,}$ j=2, 3), dummy variable for the main activity of the head of the household ($ACTIV_{ijt}$, j=2, 3, 4), dummy variable for gender of the household head ($GENDER_{it}$), dummy variable for the marital status of the household head ($MSTATUS_{it}$), and the value of the household's property ($PROPERTY_{it}$).

In addition, in order to assess which of the social policy programmes increases household income per capita in the higher and which in the lower income groups, we decomposed social revenue variable in seven different social policy programmes (data available from HBS): child allowance (CHALL), material support for unemployed (UNEMPL), social aid – material support for low income households (AID), alimentation (ALIM), social assistance for disabled (DISINS), health

insurance (HEALTH), and students grants (GRANT).

At the beginning, we tested for individual and time effects using ANOVA F test and Breusch-Pagan LM test. The results indicated, as expected, significant individual (quantile) effects (185.711, p=0.00), but not time effects (0.181534, p=0.23). Due to existence of individual effects only, coefficient b_{1it} from relation (3.1) is transformed into b_{1i}. Next, this coefficient is decomposed into coefficient b_1, and individual effects, μ_i. It means that the panel model indicates constant slopes but different intercepts for the cross-sectional (quantiles) units in fixed specification (FE), while in random effects specification (RE), the intercept is a random variable, namely the error term, v_{it}, is a composite, containing individual effects, μ_i, along with the disturbance term, u_{it}.

We estimated both fixed and random specification for both models – with total social revenues and the decomposed social revenues. Fixed specification was estimated by covariance method, and random effects specification by the error components generalised least squares method (ECGLS). Econometric procedure 'from general to specific' was repeated in order to eliminate insignificant variables. Remaining significant variables of the two estimated models, containing total social revenue variables and different social policy programmes, for fixed individual effects (FE) and random specification (RE) are reported in Table 2.

In the initial specification with fixed individual effects (1a), the only significant variables influencing higher household income per capita are income before social revenues, urban area and higher school or university education of the household head. In addition, total social revenues are significant in the model, but with a negative coefficient sign. This means that social revenues are higher in the lower income groups, and therefore negatively related with household income per capita. Lack of significance of other variables could be explained by the fact that they have different effects along the income distribution. Similar results are obtained by random specification (1b), but despite the expected signs, social revenues and urban settlement are not significant in the RE model.

Table 3.2 Estimated panel models with individual fixed and random effects

Dependent variable: **Household income per capita** 200 observations (50 quantiles, 2006-2009)				
Regressor	**Model FE (1a)** **Coefficient**	**Model RE (1b)** **Coefficient**	**Model FE (2a)** **Coefficient**	**Model RE (2b)** **Coefficient**
C	6784.151***	-1197.097***	5088.356***	14005.85***
INCMSOC	0.124216***	0.334880***	0.193294***	0.430310***
URBAN	1709.138**	443.9588	1130.080*	-3163.798***
EDUCAT3	2816.777*	13593.36***	-578.1542	6227.498***
W50♣	7642.660***	5131.890***	5806.633***	2939.652***
SOCREV	-0.284897*	-0.171328		
ACTIV3			3057.309***	-4070.484***
GENDER			1532.723	6048.469***
MSTATUS			-5239.203***	-16881.54***
PROPERTY			6.08E-05	-0.000837***
CHALL			-1.006581	-0.306209
AID			0.563497	0.927197***
GRANT			-1.217018**	-1.230963**
UNEMPL			-0.453445*	-0.098711
DISINS			0.141471	1.063289***
HEALTH			-0.156983	1.364577***
ALIM			0.551477	1.101143***
R^2	0.996299	0.920266	0.997914	0.981798
Effects tests: Cross section F Cross- section chi^2	 23.066045 p=(0.000) 434.83059 (p=0.000)		 14.648854 (p=0.000) 368.648616 (p=0.000)	
Hausman chi^2 test	632.170551 (p=0.000)		601.040866 (p=0.000)	
Jarque-Bera statistics	0.6827999 (p=0.710775)	1930.471 (p=0.000)	1.739908 (p=0.418971)	929388.0 (p=0.000)

***Statistical significance at the 1% level, **significance at the 5% level, *significance at the 10% level.
♣ Representing extremely high values, dummy variable W50 equals 1 for the last quantile, and otherwise 0.

In the second specification, where social revenues are decomposed, other variables also become significant in determining household income per capita (ACTIV3, MSTATUS, GENDER, PROPERTY). In the fixed specification (2a), some of the variables (EDUCAT3, ACTIV3) have unexpected signs, and significant policy programmes become: material support for unemployed and student grants. In the random specification (2b), all variables have expected signs, and all social policy programmes are significant, except child allowance and material support for unemployed. According to the estimated models, we can conclude how each social policy programme influences

income inequality. For instance, material support for low-income households, alimentation, social assistance for disabled, and health insurance increase inequality, while other programmes reduce inequality. However, in these specifications we cannot discover which income-group receives which social policy programme, nor the efficiency of each programme.

Therefore we identified two problems in modelling influence of social policy programmes on household income per capita. The first one is inability to assess targeting of social revenues. The other one is related to the econometric problem of endogeneity in the models. We used Hausman misspecification test in specifications 1 and 2 to decide whether fixed or random specification is more appropriate, and to test the multiple endogeneity problem. Examining correlation of regressors and components of error terms, we concluded that there exists a significant difference between fixed effects and random effects estimation. In random specification some of the regressors are correlated with the individual effects as an error component and/or disturbance term. Consequently, random specification provides biased coefficient estimates, while fixed effects specification results in consistent estimates. However, in FE specification social policy programmes are not significant, since the estimated cross-section effects represent characteristic variations of household income per capita in each quantile. In addition, due to small variations, influence of time-invariant variables could not be identified, since covariance method eliminates individual effects, as well as individual regressors, due to the correlation between them. Since our main intention is to assess influence of various social policy programmes, we choose the RE specification.

The first problem, to assess targeting of different programmes, could be solved by dividing the whole distribution in income groups. Using recursive estimation for defining subsamples of data, we identify income-groups corresponding to the assessed structural changes. The second problem, related to endogeneity of explanatory variables, leads us to re-estimate the RE specification by use of Error Component Two Stage Least Squares (EC-2SLS). In this way we can obtain a better random specification and estimate influences of each social policy programme on each income group.

In trying to discover groups of the population for which the effects of social policy programmes differ, we estimated a pooled regression (3.1) of all data. In the general-to-specific model-selection procedure, only significant regression coefficients remained in the model. After the residual testing, the equation was re-estimated by White heteroskedasticity-consistent procedure with robust standard errors. Finally, in order to test the stability of parameters across subsamples of data divided in income groups, recursive estimation is used. In recursive least squares, the equation is estimated repeatedly for larger and larger subsets of the sample data and the resulting forecast errors are plotted as recursive residual, with the bands of plus and minus two standard errors. Residuals outside the standard error bands suggest instability of the equation, namely functional break, or the change in parameters. In our case, recursive residuals show some change at the observations 64 and 140, which represent 32% and 70% of the whole sample. This result indicates that there are different impacts on different income groups. Therefore our panel of 50 quantiles could be analysed in three groups of household income per capita: 1) low, quantiles 1-16; 2) middle, quantiles 17-34; 3) upper, quantiles 35-50.

In order to estimate targeting performance for each social policy programme, we tested the significance and the sign of regression coefficients of differentiated social policy variables. They are defined as multiples of a specific social programme and the dummy variable which takes the value one for the relative income group and zero otherwise. For instance, the coefficient of the variable CHALL1 denotes the effect of the child allowance for the first income group, CHALL2 for the middle income group, etc. The panel model augmented with dummy variables for each income group, in which dependent variable is household income per capita, is estimated for the whole sample, 50 quantiles, over the period 2006-2009:

$$\begin{aligned} INCOMEpc_{it} = {} & b_{1it} + b_1 INCMSOC_{it} + b_2 URBAN_{it} + b_{3j} EDUCAT_{ijt} + b_{4j} ACTIV_{ijt,} + \\ & b_5 GENDER_{it,} + b_6 MSTATUS_{it,} + b_7 PROPERTY_{it} + b_{8j} SAID_{ijt} + b_{9j} ALIM_{ijt} + b_{10j} CHALL_{ijt} + \\ & b_{11j} DISINS_{ijt} + b_{12j} GRANT_{ijt} + b_{13j} HEALTH_{ijt} + b_{14j} UNEMPL_{ijt} + \varepsilon_{it}, \\ & i=1...50, \quad t=1,..4, \quad j=2,3, \end{aligned} \tag{3.2}$$

where dummy variables are denoted: for social aid (AID_{ijt}), social alimentation ($ALIM_{ijt}$), child allowance ($CHALL_{ijt}$), disability insurance ($DISINS_{ijt}$), student grants ($GRANT_{ijt}$), health insurance ($HEALTH_{ijt}$), and receipts for cases of unemployment ($UNEMPL_{ijt}$).

We estimated the model containing the whole set of regressors, inclulding dummy variables for each income group, as possible household income per capita determinants, in the forms of FE and RE specification once again with the intention to apply Hausman misspecification test. The results indicated that FE provides consistent, while RE specification biased estimates, due to endogeneity problem (647.871, p=0.000). Therefore we decided to use Error Component Two Stage Least Squares Method (EC-2SLS) to estimate RE specification, which allows us to: (1) eliminate endogeneity from the model and obtain consistent estimates in random specification, (2) estimate influences of social policy programmes on different income groups, that could not be estimated in FE specification due to the influence of each quanitle, (3) obtain efficient estimates compared to those from the FE specification. The procedure includes four steps[47]: (1) identifying type of the endogeneity problem (correlation of regressors with individual effects and/or with disturbance term), (2) defining alternative sets of instruments, (3) estimation of alternative regressions, and (4) using Hausman-Taylor (HT) identification test. Hausman-Taylor test compares estimates from FE specification estimated by covariance method and RE specification estimated by EC-2SLS. If the HT statistics is not significant, it means that estimates from FE specification and RE estimated by EC-2SLS do not differ significantly. This implies that the set of instruments is valid and EC-2SLS estimates are efficient comparing to FE estimates.

In identifying endogeneity problem, we regressed on estimated individual effects all household income per capita determinants, and found out that variable EDUCAT3 is potentially correlated with individual effects, while in testing for simultaneity we found that variable INCMSOC is correlated with individual effects and the disturbance term. Other variables in the model are exogenous with regard to the household income per capita. Next, we defined a set of instrumental

[47] Wooldridge (2002), Hsiao (2003).

variables, trying to choose the instruments which are highly correlated with endogenous variable they represent and with the dependent variable, and uncorrelated with the composite error term. The instrument for the endogenous variable EDUCAT3, correlated only with individual effects, is created as transformation of the original variable in the form of deviations from individual means. As the instruments for double endogenous variable INCMSOC we used other independent variables uncorrelated with the composite error term: $ACTIV_j$, EDUCAT2, and PROPERTY. Since the number of instruments has to be equal or higher than the number of regressors in the model, other instruments are defined as transformed exogenous variables not correlated with the error components. The transformation implies calculation of individual means or deviations from the individual means. Subsequently, a transformed random specification is estimated by EC-2SLS method with the explained set of instruments, consisting of two steps: (1) estimation of reduced-form equations for the endogenous variables that appear as explanatory variables in the structural equation, and (2) substitute the estimated values of these variables from the reduced form at the right side of structural equation, and then estimate the revised structural equation. Finally, we used the HT test and tested validity for various sets of instruments. According to the Hausman-Taylor identification test, model in Table 3.3, estimated by EC-2SLS, fulfils economic, statistic and econometric criteria. The difference between FE specification estimated by covariance method and RE estimated by EC-2SLS is not significant, indicating that RE specification estimated by EC-2SLS with the set of instrumental variables is appropriate, and that the estimates are consistent and efficient, after elimination of insignificant regressors. According to the estimated coefficients in the model 3a, household income per capita in all income-groups increases with a rise of the sum of incomes apart from social assistance, if the household head is male, and living in urban area. Moreover, household income per capita is on the average higher if household head has high level of education, but in the third income-group. On the other hand, household income per capita is lower when the household head is older, or if the number of adult members or children in the household is larger, and if the household head is married or cohabitating.

Table 3.3 Estimated panel model with differentiated effects of social policy programmes in three income groups

Dependent variable: **Household income per capita** 200 observations (50 quantiles, 2006-2009)	
Regressor	**EC-2SLS (3a)** **Coefficient**
C	17075.38***
INCMSOC	0.308162***
AGE	-418.0566***
ADULT	-3830.154***
CHILD	-1790.454***
GENDER	5921.141***
MSTATUS	-8732.259***
URBAN	772.3838*
EDUCAT3_3	2890.063***
UNEMPL1	2.277618***
CHALL1	3.727033**
SAID1	1.922985***
CHALL2	2.652133*
DISINS3	18.44078***
SALIM3	18.17383***
HEALTH3	8.812814***
W50♣	16875.60***
W2009♠	-914.3426***
R^2	0.713550
Hausman-Taylor test	6.257710 (0.9596)
Single endogenous variable	EDUCAT3_3
Double endogenous variable	INCMSOC

***Statistical significance at the 1% level, **5% level, *10% level.

♣ Representing high values, dummy variable W50=1 for the last quantile, and 0 otherwise.

♠W2009: dummy variable, equals 1 for 2009 in each quantiles, and 0 otherwise.

However our main concern in this model estimation is related to specific influences of various social policy programmes on household income per capita in each income group, and consequently on income inequality. We have explained that social policy programmes are related to different population groups. However the question is whether they have distinctive effects on different income groups, thus causing inequality changes. Naturally, as the target for material support for unemployed, low income households and child allowance, can be expected to be households in the low income group. Coefficient signs of these programmes indicate that these programmes decrease inequality, since they increase household income per capita in the low-income group. Therefore, we may conclude that these programmes, with the low income-group as the target, are indeed

oriented towards poverty and inequality reduction. However, within the low income-group, positive influence means that households with a higher income per capita receive higher social revenues. This indicates that, although programmes targeted to the low-income households in general reduce inequality between income-groups, they increase inequality within the low-income group, since not all of the households receive these transfers.

Moreover, there is a different response of income per capita to the unit change of the same policy programme (child allowance) in the first and the second income-groups. Although the influence of child allowance on household income per capita is still positive, its intensity is lower in the second income-group. This indicates that influence of child allowance between income groups lowers income inequality.

On the other hand, social assistance for disabled, alimentation and health insurance seem to increase income inequality within the group and between income-groups, because these programmes positively influence household income per capita in the high-income group.

The estimated model shows that dummy variable for the 50^{th} quantile is highly significant, due to the existence of extremely high values of household income per capita. In contrast, in 2009 the average income per capita is significantly lower than in other years. Although time effects are insignificant in the model, we tested them by introducing dummy variables for different years. It turns out that only dummy variable for the year 2009 is significant in the model. Its negative impact on the average household income per capita in all income groups undoubtedly represents the influence of global instability.

4. CONCLUSIONS AND POLICY RECOMMENDATIONS

In this paper we first discuss why inequality increases in transition, and then deal with adequate methodology in measuring poverty and inequality. We study the changes of poverty and inequality in Serbia, identify the main determinants of inequality, define especially vulnerable groups of the society, then show the reach and the effects of social policy, and finally derive the conclusions and policy recommendations.

First of the methodological issues to be solved was the choice of the adequate scale in comparing consumptions of households of different size. The usual (OECD) equivalence scale, with weights 0.7 of the consumption of household head for each additional adult and 0.5 for each child, was tested in an econometric model of more than 4500 households in 2009. The results show that the hypothesis of different weights can be rejected and equal weights for all children and adults should be adopted. The use of lower weights for children than for the adults would result in assessing higher income or consumption in households with more children, than the use of per capita measures. Since our research shows that number of household members, especially children, is significantly higher in low-income households, it is clear that the use of OECD equivalence scale would seriously underestimate poverty and inequality.

We used several measures for poverty (poverty percentage, poverty gap and poverty severity) and for inequality (Gini and Theil coefficient, decile dispersion ratio, and Atkinson indices). All of the results show that both poverty and inequality in Serbia were decreasing in the period 2006 to 2008, but slightly increased in 2009, undoubtedly because of the economic crisis, although they are still at a lower level than in 2006. Therefore we can assume that well targeted social policy and well conducting of Poverty Reduction Strategy have been successful in fulfilling of National Millennium Goal One – reduction of the poverty rate by half and eradication of hunger by year 2015. However, the average household income is still very low, and inequality has been mainly reduced within the poor part of the population.

One of the main goals of this study was to identify the main determinants which influence poverty and

inequality, in order to find out the most vulnerable groups of the population. We found out that the most threatened are multi-member households with three or more children, in rural area, whose household head has low education and is unemployed.

The resulting policy recommendation is to invest more in education, especially in rural areas. Higher education means lower probability of loosing jobs, especially in crises. Since food production is one of Serbia's comparative advantages, the obvious conclusion is that the best way for development of the agricultural sector is investments in agriculture and education in rural areas, and trying to stimulate people to live in villages. This would create opportunities for generating new jobs and, accordingly, lowering unemployment and poverty rates in Serbia.

Well-targeted social policy can extenuate the problems of poverty and inequality, but in Serbia pension transfers crowd out social assistance and social services. Still, opposite to the experiences of other transition countries, in Serbia income inequality constantly decreased in the observed period, except in 2009. Somewhat delayed, reforms in Serbia in the area of social assistance have been more rapid and systematic than in most other transition countries, according to the 2006 World Bank report. Despite a small portion of GDP, social policy expenditures seem to have been relatively efficient in reducing poverty and inequality. However these issues are still threatening to keep getting worse, especially as a consequence of the recent economic instability.

In our research we studied the effects of social policy in Serbia by assessing its coverage, adequacy, and target performance. According to the conducted analysis, we concluded that − despite the lack of financial means − the set up goals, variety of instruments, and the effects aiming poverty and inequality reduction are relatively satisfactory.

However, in resolving these issues, two main social policy recommendations were developed in this research, regarding targeting and shifting resources. We have to bear in mind that the main obstacle remains: the poorly organised pension system causing ever-growing budget deficits. Thus a reform of the pension system is inevitable, and it will probably make room for an increase of expenditures

for social assistance. Until then, small disposable resources for social assistance could be used more intensively for children's protection and protection of households with more members, since poverty is more frequent in large families, usually with children.

Although the programme of Material Support for Low Income Households (MOP) was esteemed by the World Bank study as the most efficient, it was established here that it marginalises the problems of households with a large number of members, especially children. Hence, our first policy recommendation is to shift recourses from untargeted and poorly targeted programmes to well targeted programmes, in order to achieve better care for children and multi-member households.

Concerning social policy targeting, our analysis has shown that various social assistance programmes differently influence the population, and consequently inequality. Population can be divided roughly into three income groups. Some social programmes have been proved to reduce income inequality (for instance, child allowance, material support for unemployed and for low-income households), and some to increase it (disablement and health insurance, alimentation). Therefore, social policy programmes are related to different income-groups and can affect income inequality both within the group in which they are mostly effective, and between the groups. Our second policy recommendation, concerning inequality reduction, is to focus mainly on the most vulnerable groups and to intensify social revenues in specific income groups.

Finally, we should emphasise that inequality and poverty reduction could be achieved not only by raising effectiveness of social transfers, but also through sustained economic growth and improved investments in human capital, primarily upgrading education and health services.

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ANNEX

List of the variables

VARIABLE	DESCRIPTION	MEASURE*
ACTIVE	number of active members in household	integer
ACTIV1	dummy variable for the main activity of the head of the household, (=1 for the indicated activity, =0 otherwise)	employed
ACTIV2		unemployed
ACTIV3		student, housewife, retired
ACTIV4		unable, soldier, other
ADDAM	number of adult household members beside the household head	integer (NO – CHILD – 1)
ADULT	number of adult household members	integer (NO – CHILD)
AGE	age of the household head	integer
AID	social aid, supplements and other receipts	total value
ALIM	social alimentation and support	total value
CHALL	child allowance	total value
CHILD	number of children in household	integer
CONSUM	household consumption expenditures	total value
CONSUMPC	consumption per capita (CONSUME/NO)	per capita value
DISINS	disability insurance	total value
EDUCAT1	dummy variable for the education level of the head of the household (=1 for the indicated level, =0 otherwise)	at most elementary school
EDUCAT2		secondary school
EDUCAT3		higher school or university
GRANT	student grants and remuneration	total value
HEALTH	health insurance related receipts	total value
HHC	consumption of the household head	total value
INCOME	total value household income	total value
INCOMEPC	income per capita (INCOME / NO)	per capita value
INCMSOC	household income without social assistance (INCOME − SOCREV)	total value
MSTATUS	dummy variable for the marital status of the household head	1- married or cohabitating, 0 - else
NO	number of household members	integer
PROPERTY	household's property (estimated value of owned flat + 6 items of equipment + 37 durables)	total value
SEX	dummy for gender of the household head	1 - male, 0 - female
SOCREV	total value of social revenues in household (AID+ALIM+CHALL+DISINS+ GRANT+HEAL+UNEMPL)	total value
UNEMPL	receipts for cases of unemployment and temporary unemployment	total value
URBAN	type of settlement	1 - urban, 0 - rural
Numerical suffix	1- first, 2-second, 3- third income group	total value

* All money values (total and per capita) are counted in constant prices, base = 2005.

Source: HBS data and authors' calculations