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## **POVERTY ANALYSIS IN MONTENEGRO IN 2008**

*Podgorica, december 2009*

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## 1. Introduction

Statistical Office of Montenegro – MONSTAT has published for the first time in 2008 results of the poverty analysis for 2005 and 2006 in cooperation with World Bank and with support of Ministry of Health, Labor and Social Welfare. In this publication there are presented results of poverty analysis in Montenegro for 2008 with presentation of basic trends for period 2006-2008.

Poverty estimations are based on national absolute poverty line which was made according to the methodology recommended by World Bank. In the period 2006-2008 for estimations the same methods and procedures are used that provides good comparison of results over the time and observation of the main poverty trends.

Main data source for estimation of poverty in the observed period is Household Budget Survey which is regularly done on annual basis by MONSTAT. Main indicator of living standard it was selected consumption of household. In order to have better comparison of standards by household it was done correction for differences in household size by using of modified OECD scale and correction for regional differences in price level.

## 2. Poverty in Montenegro in period 2006-2008

Absolute poverty line for Montenegro in 2008 was €163.57 per equivalent adult, which is approximately €13 more than in 2007. In 2008 4.9% of the population had equivalent consumption below the absolute poverty line.

**Table 1: Poverty Estimation for Montenegro, 2008**

	2006	2007	2008	Change 2007-2008
National absolute poverty line (in €, monthly, per adult equivalent)	144.68	150.76	163.57	12.81
Poverty rate (%)	11.3	8.0	4.9	-3.1
Poverty gap (%)	1.9	1.4	0.9	-0.5
Poverty severity (%)	0.6	0.4	0.3	-0.1

Total poverty rate in 2008 is significantly reduced, while depth and severity were slightly reduced (Table 1). Portion of persons in the poverty was reduced from 8% in 2007 to 4.9% in 2008. The available indicators of trends in average earnings and consumption show their strong growth in 2008 year and thus suggest that the reduction of poverty rates expected the results of these economic trends<sup>1</sup>. Poverty gap, as an indicator of the depth of poverty has been reduced from 1.4% in 2007 year to 0.9% in 2008 year. Poverty gap indicates an average deviation of consumption of the poor from poverty line and its reducing means that consumption of the poor people in average became closer to poverty line and, thus the poverty depth is less<sup>2</sup>.

Data on poverty gap from 0.9% in 2008 says that for escaping from poverty of all the poor society should provide means amounting 0.9% from poverty line per each citizen and afterwards that sum to allocate to the every poor in the exact amount which is needed so that their total consumption reach poverty line. Poverty severity is also decreasing, and it amounted 0.3% in 2008. Poverty severity also has relative deviation of the consumption of the poor from poverty line but it takes into consideration inequality among the poor because bigger weight in calculation is given to the poorest people, i.e. to those whose consumption is further than poverty line.

In 2008 poverty decreased in urban and rural areas, respectively. Observing urban areas, poverty rate was 2.4% in 2008, while in 2007 it was 5.5%, in other words the rate was reduced for 3.1 percentage points (Table 2). In rural areas the highest poverty rate was in 2006 (17.6%), while in 2007 (12.0%). In 2008 compared to 2007 poverty rate in rural areas decreased for 3.1 percentage points and it was 8.9%.

Although the situation was improved, rural population has much higher poverty risk in comparison with urban population. Depth and severity of poverty is also higher in rural areas.

**Table 2: Poverty According to Location, 2006-2008 (%)**

	Poverty rate			Poverty gap			Poverty severity		
	2006	2007	2008	2006	2007	2008	2006	2007	2008
Urban areas	7.4	5.5	2.4	1.3	1.2	0.6	0.4	0.4	0.2
Rural areas	17.6	12.0	8.9	2.9	1.8	1.4	0.8	0.5	0.4

Between 2007 and 2008 it was increased a share of 20% of the poorest population in total consumption from 8.9% on 9.5% (Table 3). Therewith, 20% of the richest increased their share in the total consumption distribution, from 35.8% to 36.2%. In 2008, 20% of the richest people had consumption which was for 3.8 times bigger than consumption of 20% of the poorest citizens<sup>3</sup>. Gini coefficient confirms decrease of inequality in Montenegro in 2008. The coefficient decreased from 26.4% to 25.3%.

<sup>1</sup> Real growth of GDP in 2008 is 6.9%, while real average earnings without taxes and contributions increased by 13.4%. Total personal consumption (according to HBS monthly, average in households) increased by 13.9%, while life costs were 8.5%.

<sup>2</sup> For short description of poverty measures and their interpretation see annexes at the end of the study.

<sup>3</sup> Inequality indices for 2006 and 2007 are modified comparing to previous release on poverty because of new way of calculation of participation by quintils

**Table 3: Indices of Inequality, 2006-2008**

	<b>2006</b>	<b>2007</b>	<b>2008</b>
Share in total consumption of the poorest 20% (S20)	9.6%	8.9%	9.5%
Share in total consumption of the richest 20% (S80)	35.5%	35.8%	36.2%
Relation of quintal shares (S80/S20)	3.7	4.0	3.8
Gini coefficient	24.4%	26.4%	25.3%

Gini coefficient shows that in rural areas came to decrease of inequality in 2008 compared to 2007 (Table 4). thus Gini coefficient decreased from 25.3% to 23.3%. In 2008 there was also an decrease of inequality in urban areas, too but it was slightly less, Gini coefficient decreased from 24.8% to 24.4%. Contrary to 2007, Gini coefficient in 2008 was higher in urban than in rural areas.

**Table 4: Gini Coefficient in Urban and Rural Areas, 2006-2008**

	<b>2006</b>	<b>2007</b>	<b>2008</b>
Urban areas	23.9%	24.8%	24.4%
Rural areas	22.4%	25.3%	23.3%

### 3. Poverty Profile in 2008

There are significant differences in the extent of poverty in the region between the North and other parts of the country. Table 5 shows that the poverty risk in North region is more than double higher than poverty risk in Central and Southern region. Poverty rate in North region was 8.9% in 2008. In that region there is 28.7% of population of Montenegro and ,while 52.1 % is portion of the poor. Poverty rate in Central region is 3.5%, and in South 2.7%.

**Table 5 : Poverty Estimations by Geographic Areas, 2008**

<b>Regions</b>	<b>Poverty rate</b>	<b>Relative poverty risk</b>	<b>Share of the poor</b>	<b>Share of total population</b>
North	8.9%	1.82	52.1%	28.7%
Center	3.5%	0.71	37.1%	51.9%
South	2.7%	0.55	10.8%	19.3%

Table 6 shows that the risk of poverty in rural areas of Montenegro higher than in urban areas. In urban areas poverty rate in 2008 was 2.4%, and it was less than in rural areas where it was 8.9%. In Montenegro in rural areas live 69.7% of poor persons, while in urban areas there is 30.3%.

**Table 6: : Poverty Risk by Location, 2008**

	<b>Poverty rate</b>	<b>Relative poverty risk</b>	<b>Share of the poor</b>	<b>Share of total population</b>
Urban areas	2.4%	0.49	30.3%	61.6%
Rural areas	8.9%	1.82	69.7%	38.4%

Rural population faces a greater risk of poverty compared to urban population. In rural areas the poverty rate in 2008 has amounted to 8.9%, while in Podgorica was 3.4% and in other urban areas 1.9% (Table 7). In urban areas without Podgorica poverty risk is almost half less than average for Montenegro. 38.4% of the total population lives in rural areas, of which the share of poor is 69.7%.

**Table 7: Poverty Risk by Location and Region, 2008**

	<b>Poverty rate</b>	<b>Relative poverty risk</b>	<b>Share of the poor</b>	<b>Share of total population</b>
Podgorica	3.4%	0.69	15.4%	22.3%
Other urban areas	1.9%	0.39	14.9%	39.4%
Rural areas	8.9%	1.82	69.7%	38.4%

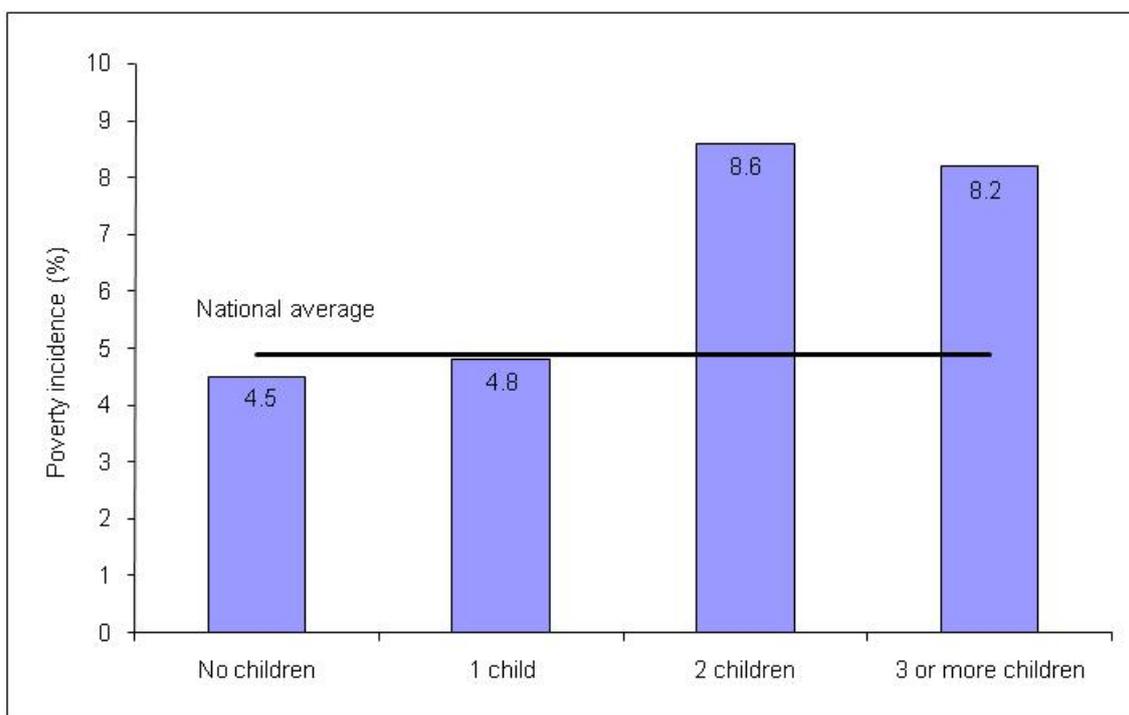
Poverty is strongly connected with labor market status. The greatest risk of poverty has persons who are self-employed (pursuing agriculture for their own needs or managing small private businesses) and unemployed persons (Table 8). Poverty rate is biggest for persons who are self-employed 8.9%, while among unemployed it is 7.6%. With children up to 15 years old from total population (16.3%) portion of the poor is 23.2%, and poverty rate 7.0%. More than one fourth of the poor in Montenegro (30.0%) are other inactive persons. The lowest poverty rate is among pensioners (3.2%) and employed persons (1.4%).

**Table 8: Poverty According to Activity Status, 2008**

	<b>Poverty rate</b>	<b>Relative poverty risk</b>	<b>Share of the poor</b>	<b>Share of total population</b>
Less than 15	7.0%	1.43	23.2%	16.3%
Employed person	1.4%	0.29	7.2%	25.7%
Self-employed person	8.9%	1.82	8.2%	4.5%
Unemployed person	7.6%	1.55	17.9%	11.6%
Retired persons	3.2%	0.65	13.6%	20.6%
Other inactive persons	6.9%	1.41	30.0%	21.3%

Higher poverty risks have families with two or three children up to 6 years old (Figure1). The lowest poverty rate have households without children (4.5%) and households with one child (4.8%). Such households face average poverty risk. However, in households with two children poverty risk is almost double bigger than national average.

**Figure 1: Poverty Rate According to Number of Children (0-6 years) in Household, 2008**



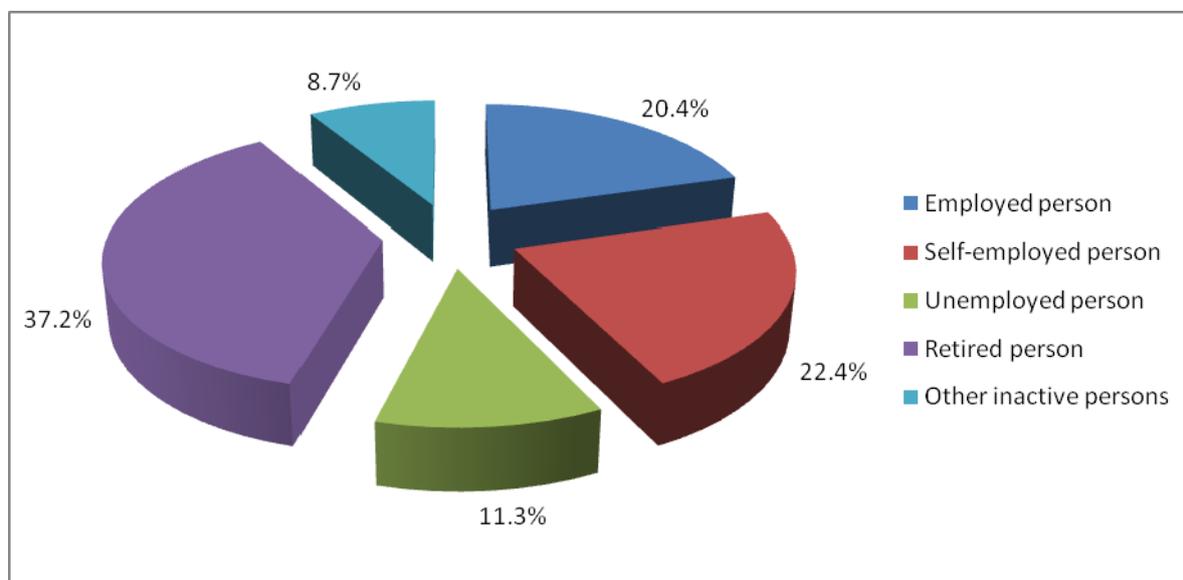
Status activity of the household head determines poverty risk of household members. Poverty risk is biggest in households whose heads are other inactive persons (6.10), and the least in households where head is employed person (0.55) and pensioner (0.80) (Table 9). In households whose heads are self-employed poverty risk is 2.61 times bigger than average and poverty rate was 12.8%. Household heads who are unemployed from total population (6.8%) make portion of the poor is 11.3% with poverty rate 8.2%.

**Table 9: Poverty According to Activity Status of Household Head , 2008**

	<b>Poverty rate</b>	<b>Relative poverty risk</b>	<b>Share of the poor</b>	<b>Share of total population</b>
Employed person	2.7%	0.55	20.4%	37.3%
Self-employed person	12.8%	2.61	22.4%	8.5%
Unemployed person	8.2%	1.67	11.3%	6.8%
Retired persons	3.9%	0.80	37.2%	46.1%
Other inactive persons	29.9%	6.10	8.7%	1.4%

Significance of the activity status of household head is confirmed by structure of the poor observed according to this criterion (Figure 2). In 2008 37.2% of the poor lived in households whose head was pensioner and 22.4% lived in households whose heads were self-employed while in households whose heads are other inactive persons live 8.7% of the poor.

**Figure 2: Structure of Poverty by Status of Household Head, 2008**



Level of education has also strong influence on the poverty status. Having higher level of education, the poverty risk is less (Table 10). The highest poverty risk have persons with completed primary school (90% above average) and poverty rate in 2008 was 9.3%. Persons with incomplete primary school are in slightly better position regarding poverty rate of 9.0%, and poverty risk is for 84% above average. The lowest poverty rate is for persons with higher or high education which is 0.8%.

**Table 10 : Poverty by Education Level, 2008**

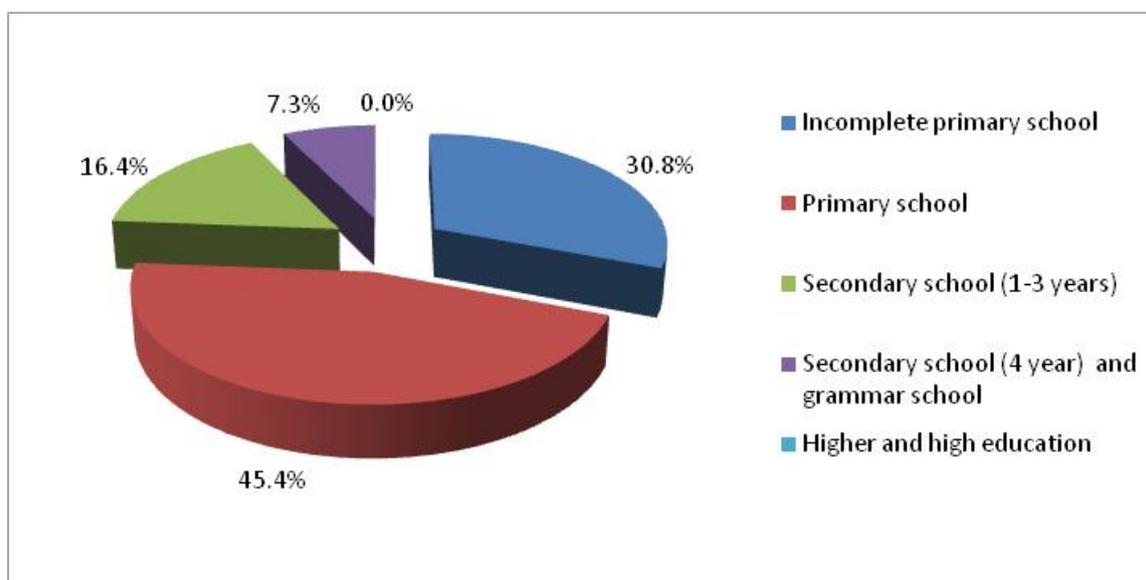
	Poverty rate	Relative poverty risk	Share of the poor	Share of total population
Incomplete primary school	9.0%	1.84	45.5%	24.6%
Primary school	9.3%	1.90	36.1%	19.0%
Secondary school (1-3 years)	2.5%	0.51	7.5%	14.9%
Secondary school(4 year) and grammar school	1.5%	0.31	9.2%	30.5%
Higher and high education	0.8%	0.16	1.7%	10.9%

Education of the household head is important influence on the poverty status. The biggest poverty rate have households whose head is person who did not finish primary school 13.2%, and from whole population (11.4%) portion of the poor is 30.8% (Table 11). Poverty risk below average have individuals who live in households whose head has at least graduated three years secondary school. From total population (29.9%) portion of the poor whose head of the household is person with graduated four years of secondary school or gymnasium is 7.3% (Figure 3).

**Table 11 : Poverty by Education of Household Head, 2008**

	<b>Poverty rate</b>	<b>Relative poverty risk</b>	<b>Share of the poor</b>	<b>Share of total population</b>
Incomplete primary school	13.2%	2.69	30.8%	11.4%
Primary school	11.2%	2.29	45.4%	19.8%
Secondary school (1-3 years)	3.5%	0.71	16.4%	22.8%
Secondary school(4 year) and grammar school	1.2%	0.24	7.3%	29.9%
Higher and high education	0.0%	0.00	0.0%	16.1%

**Figure 3: Poverty Structure by Education of Household Head, 2008**



Size of household has influence on poverty, too. Poverty rate was in 2008 above average in households with five and more members (Table 12). The biggest poverty rate have households with six members 10.1%. Their poverty risk is double bigger related to average. Although only 13% of population live in households with six members, 26.0% of the poor belong to such households. The lowest poverty risks (less than 50% of average) have households with two or three members. One-member households have poverty risk below average.

**Table 12 : Poverty Risk According to Size of Household , 2008**

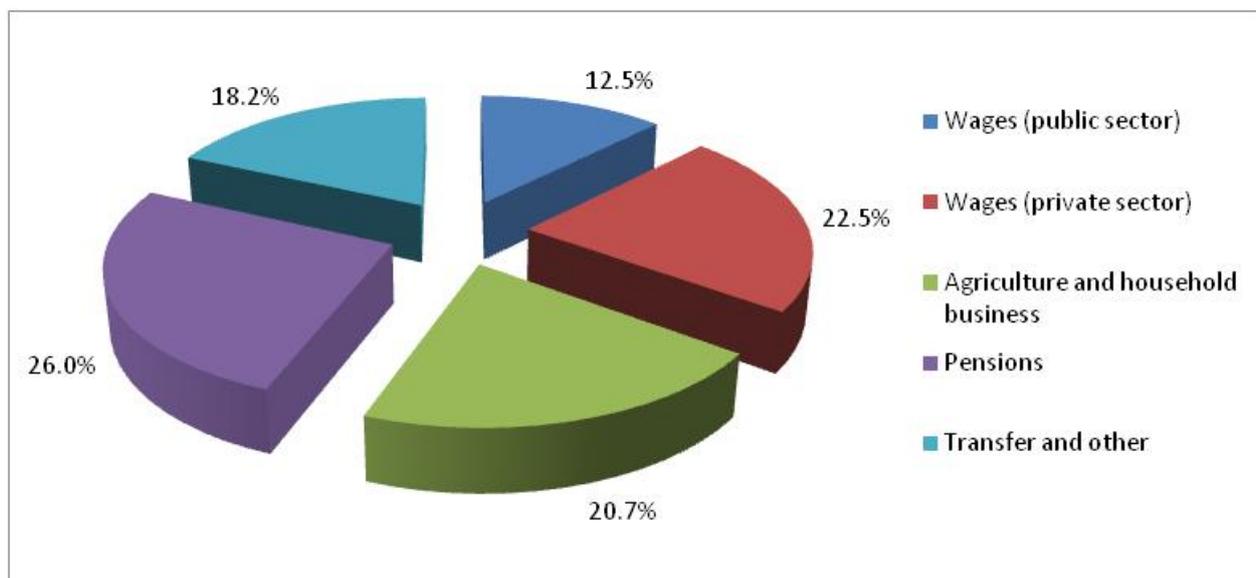
<b>Household size</b>	<b>Poverty rate</b>	<b>Relative poverty risk</b>	<b>Share of the poor</b>	<b>Share of total population</b>
One person	4.2%	0.86	4.8%	5.6%
Two persons	2.2%	0.45	5.6%	12.5%
Three persons	0.6%	0.12	1.8%	14.1%
Four persons	3.8%	0.78	17.8%	22.9%
Five persons	5.0%	1.02	21.7%	21.2%
Six persons	10.1%	2.06	26.0%	12.6%
Seven and more	9.9%	2.02	22.2%	11.0%

Regular wages provide low level of poverty risk. In 2008 the lowest poverty rate was in households which had as main sources of income wages from public sector (2.0%), and is slightly bigger in households which main source of income are wages from private sector (Table 13). The biggest poverty rate was in households where “transfers and other “ are main source of incomes. Although it is relatively small group of citizens (3. 8%), they make something less than fifth of all poor (Figure 4). Households where pensions and income from agriculture and business are main source of income have poverty risk above the average. From total population whose main source of income is agriculture and business (9. 8%) portion of the poor is 20. 7%.

**Table 13 : Poverty Risk by Main Household Income, 2008**

	<b>Poverty rate</b>	<b>Relative poverty risk</b>	<b>Share of the poor</b>	<b>Share of total population</b>
Wages (public sector)	2.0%	0.41	12.5%	31.1%
Wages (private sector)	3.3%	0.67	22.5%	33.1%
Agriculture and household business	10.3%	2.10	20.7%	9.8%
Pensions	5.7%	1.16	26.0%	22.2%
Transfer and other	23.6%	4.82	18.2%	3.8%

**Figure 4: Structure of the Poor by the Main Household Income Source, 2008**



#### **4. Results review**

In 2008 poverty rate is significantly decreased. It was also contribution of available indicators on real GDP, movement of average real wages without taxes and contribution, consumption and life costs indexes. Rural population faces higher poverty risk comparing to urban population. Poverty risk in Northern region is more than double bigger from poverty risk in Southern and Central region.

Reducing of poverty happened along with increase of inequality. Gini coefficient has decreased from 26.4% in 2007 to 25.3% u 2008, actually it decreased by 1.1 percent .

Poverty profile presented in the third part of the study identified the following characteristics of the poor in Montenegro:

- Comparing to the other parts of country poverty frequency is significantly bigger in Northern region.
- The poor usually lives in large households. The biggest poverty rate have households with six members.
- In household with two children poverty risk is almost double bigger that national average.
- Status in labour market of the head of household has influence on poverty status for all persons in household. The poverty risk is the least in households which have as head employed persons or pensioner.
- Wages, whether from private or public sector, provide in most cases enough resources for households so that their members can avoid absolute poverty.

## ANNEX 1:

### METHODOLOGY OF POVERTY ESTIMATION IN MONTENEGRO

Poverty estimation in Montenegro presented in this study is based on the absolute poverty line constructed using key parts of the World Bank methodology described in Ravallion (1994)<sup>1</sup>. Absolute poverty line was calculated in details by Statistical Office of Montenegro (MONSTAT) based on Household Budget Survey (HBS) data for 2006. Poverty line for 2006 was estimated at €144.68 per equivalent adult. This poverty line serves as “anchor” to which the poverty line estimations and all poverty indicators are connected in the entire period 2006-2008. For purpose of poverty estimation for 2006 and 2008 absolute poverty line from 2006 is modified for inflation rate, i.e. with average annual price that is shown by living costs index.

Main data for poverty analysis is taken from HBS. It is nationally representative survey carried out regularly by MONSTAT since 2005 and harmonized with international standards and EUROSTAT recommendations. The data on income and expenditures of households, supply with permanent consumer goods, demographic and socio-economic characteristics of households and other are collected by the HBS questionnaire filled in by every selected household.

Methodology for providing absolute poverty line for 2006 is consisted of four main steps: (i) calculation of total consumption from HBS data, (ii) adjustment to differences in the household size and structure, (iii) adjustment to differences in regional prices; (iv) constructing of absolute poverty line for 2006.

- (i) The consumption is used as the main indicator for living standards estimation in Montenegro. It was taken into account that within mutual comparison higher consumption value indicates higher living standard for certain households. For this reason the first step in poverty estimation was construction of consumption indicators compliant with this request. Consumption is estimated based on HBS with certain modifications in relation to standard calculation of household consumption. The aggregate of household consumption needed for poverty estimation includes the following categories:

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<sup>1</sup> See at Ravallion, M. 1994. *Poverty Comparisons*, Fundamentals of Pure and Applied Economics 56. Chur, Switzerland: Harwood Academic Press.

- Food, alcohol and tobacco: expenses related to purchase of food products are included together with estimated consumption value from own production and estimated value of gift. Only consumption for personal use of household is taken into account, while products purchased for business or agriculture are excluded. Also, expenses from giving gifts are excluded.
- Non-food products: there are included expenses of (a) clothes and footwear, (b) housing, water, electricity, gas, and other fuels, (c) small household appliances and regular maintenance of dwelling, (d) health, (e) transport, (f) communication, (g) leisure and culture, (h) education, (i) restaurants, café bars and hotels, and (j) other goods and services.

It should be said that expenses from purchase of large permanent goods in this study are not included in total household consumption because they happened occasionally and in large amounts, and because of this they are not connected consistently with household financial state. Namely, large expense in one month for purchase of certain permanent consumption product (for ex. refrigerator) does not need to mean that this household has high living standard.

(ii) For purpose of better comparison of living standards between households of different number of members and their age, total consumption calculated at the household level is adapted to these differences by using of modified OECD scale. Modified OECD scale has been selected because of its simplicity and harmonization with current Eurostat practice. The same scale is prevailing in most of studies on living standards across Europe.

Accordingly, equivalent household size is firstly calculated as a weighted sum of number of household members, where first adult in household is calculated as 1, second adult as 0,5, and each child up to 14 years as 0,3. Total consumption in household is divided with equivalent household size so that consumption by adult equivalent (or equivalent consumption) can be received. This consumption measure is used for all comparisons of living standards by households. The higher equivalent consumption of certain household is, it is considered that household has higher living standard. It is considered that all members within one household has the same living standards.

(iii) Consumption of households is adapted to price differences between regions. For this purpose there are constructed special indices for three main regions in Montenegro (North, Central, and South region) in this study on the basis of price information collected by HBS. Regional price indices indicate that price level in the South region is, for example, higher than price level in the North region. Total consumption of each household is divided by regional price index, and that index has average prices in Montenegro as a basis (Montenegro=100). In this way it is possible that certain amount of consumption (for ex. €100) gives possibility purchasing of equal goods and services quantity no matter in which part of Montenegro a household is situated.

(iv) Absolute poverty line has been constructed in compliance with the method „expenses for basic living needs“ and it is consisted of main components: (a) poverty line for food (i.e. expenses of minimal consumption basket) and (b) appropriate expenses for purchase of basic non-food products. Both components summed up together give total absolute poverty line. Minimal food basket was selected to satisfy basic nutrition needs of population in this part of the world (2288 kcal/daily per person) under FAO proposal (Food and Agriculture Organization). Composition of minimal food basket reflects population nutrition of lower material welfare. Expenses of minimal food basket are calculated by multiplying quantities from minimal food basket with appropriate prices. Expenses of minimal food basket are the basis for total poverty line calculation. The idea is that those households spending on food exactly as expenses of minimal food basket are, actually they spend on all other products as much as minimum of basic needs is. Linear regression model was used for practical estimation in the study so that minimal expenses for other products can be estimated on the basis of expenses of minimal food basket, and in this way to calculate total poverty line as a sum of minimal expenses for food and minimal expenses for other products. Regression method was used in estimation of absolute poverty line and in other countries in the region.

Appliance of methodological steps (i)-(iv) on the data from HBS for 2006 gave the poverty line of €144.68 by equivalent adult per month (see Monstat and World Bank, 2008). Thus relatively complicated method for absolute poverty line estimation is not repeated every year, and the poverty line for 2006 can be used for other years too, but it has to be adapted for inflation compared to base 2006. As inflation measure there should be taken total price changes of goods and services for personal consumption. Appropriate measure in Montenegro for now is average annual change of living costs index (in the future consumer price index). Poverty line for 2007 has been increased with living costs of 8.5% in 2008 so that the absolute poverty line for 2008 can be calculated amounted now €163.57per equivalent adult.

When comparing poverty in the period 2006-2008 Monstat ensured that (i) the same method for calculation of consumption aggregate is applied, (ii) the same equivalence scale and comparable regional price indices are applied, and that (iii) data sources that are used (HBS) as well as all estimation procedures are comparable during the years observed.

Absolute poverty line used by Monstat for poverty analysis is nationally specific line and cannot be used for international comparisons, only for monitoring of state and change of poverty in Montenegro.

## ANNEX 2:

### MEASURES INEQUALITY AND POVERTY INEQUALITY

#### Poverty measures

Indicators (or measures) of poverty are statistical functions that convert the relation between consumption and poverty line for observed households and persons into one number representing perceived poverty status.

Nowadays, three poverty measures from so called FGT measure group (Foster, Greer and Thorbecke, 1984)<sup>1</sup> are used for purpose of absolute poverty researches, and these are poverty rate  $P(0)$ , poverty gap  $P(1)$ , and squared poverty gap  $P(2)$ .

#### *Poverty Rate – $P(0)$*

**Poverty rate** (poverty index, poverty incidence) is the simplest and the most often used measure calculated as a share (percentage) in total population of persons with equivalent consumption less than poverty line:

$$P(0) = \frac{q}{n}, \quad (1)$$

$q$  is number of the poor, in other words, persons living in households with equivalent consumption  $c$  less than poverty line  $z$ . Thus,  $P(0)$  simply measures proportion of population (persons) living in the poverty.

Basic information on poverty is provided by the poverty rate, but are the poor equally poor or are some extremely poor, and are other very close to poverty line is information not provided by the poverty rate. Because of this, also other indicators are used in the poverty analysis.

#### *Poverty gap – $P(1)$*

**Poverty gap** is a measure which takes into consideration how much the consumption of the poor is in average less than poverty line. Poverty gap is calculated using formula:

$$P(1) = \frac{1}{n} \sum_{i=1}^q \frac{z - c_i}{z}, \quad (2)$$

$z$  is poverty line,  $c_i$  is equivalent consumption of persons  $i$ ,  $q$  is number of poor persons, and  $n$  is total number of person in population. Measure  $P(1)$  is sum of relative difference between equivalent consumption and poverty line and that difference is counted only for poor persons and it is divided with total population ,actually it is shown “ per citizen” and “ comparing to poverty line “. For measure  $P(1)$  is often said that it indicates **poverty depth**.

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<sup>1</sup> See in Foster, James, Joel Greer and Erik Thorbecke (1984) “A Class of Decomposable Poverty Measures,” *Econometrics*, 52(3), p. 761-766.

Poverty gap is a useful indicator for estimation of resources needed to deliver the poor from poverty by means of money transfers perfectly directed to the poor with unchanged other conditions. For example, poverty gap of 0.10 (or 10%) means that money transfers in the amount of 10% are needed for delivering of all persons, in average per inhabitant, from poverty.

### **Poverty severity – P(2)**

Measure under name poverty severity is received as squared poverty gap:

$$P(2) = \frac{1}{n} \sum_{i=1}^q \left[ \frac{z - c_i}{z} \right]^2, \quad (3)$$

By squaring of relative deviation from poverty line, higher weight is given to the poorest persons, in other words, to those whose consumption is more distant from poverty line. In this way also inequality among the poor is taken into account.

### **Inequality measures**

**Share in consumption of x%** is simple direct measure of inequality, useful when attention is to be directed only to the poorest, for example the poorest, 10% or 20%. When share of the poorest in distribution of total consumption decreases we can say that inequality in society increase observed from position of the poorest citizens.

**Ratio of quintal shares (s80/s20)** is relation of average consumption of 20% the richest and 20% the poorest citizens. Bigger ratio is, the differences are bigger among rich and poor, actually bigger is inequality in society.

**Gini coefficient** is the most popular measure of inequality. Comparing to the measures based on the shares in consumption of the poorest and the richest citizens, Gini coefficient takes into consideration all elements of distribution, actually consumption of all persons in society. Coefficient takes value between 0 and 1. . Bigger coefficient indicates bigger inequality. Value 0 indicates situation of complete equality (all persons have equal consumption or income), while value 1 indicates situation of complete inequality (one person has entire income or consumption in the society, all others have nothing).

There is number of mathematics expressions for calculation Gini coefficient. One of the most practical is:

$$G = \frac{2}{n^2 \mu} \sum_{i=1}^n i c_i - \left( \frac{n+1}{n} \right), \quad (4)$$

all persons are marked with index i in compliance with order in non-decreasing series of their equivalent consumption  $c_1 \leq c_2 \leq \dots \leq c_i \leq \dots \leq c_n$  (in other words i is ordinal number of place ordered by consumption size), average consumption is marked  $\mu$ , and n is number of persons in population.

### ANNEX 3:

#### SENSIBILITY OF ESTIMATION OF POVERTY ON ELECTION OF POVERTY LINE

Estimation of poverty are always connected with possibility that poverty line is not completely defined. Thus, it is useful to show main results with presumption that poverty line is slightly bigger, i.e. slightly less than line that was used in order to see whether results significantly change.

Sensitivity of poverty rate on poverty line is shown in table P1. If poverty line would be bigger for 5% than those used in this study, then poverty rate in 2008 would be 6.0% instead of 4.9%. It is possible to come to such deviation because of error in measure of the price change rate that the poorest are faced with. If the poverty line was undervalued on 20% , then will be recorded a higher rate of poverty in all years, 21.0% in 2006 , 14.9% in 2007 and 10.4% in 2008. In the case that the poverty line is lower than the one used in this study, the poverty rate would be significantly less. In case that poverty line is less for 5% than the one used in a study, poverty rate in Montenegro will be 3.8 % instead of recorded 4.9%.

**Table P1: Sensibility of Poverty Rate on Poverty Line, 2006 – 2008 (%)**

	Poverty rate		
	2006	2007	2008
Estimated poverty rate	11.3	8.0	4.9
+5%	13.6	9.4	6.0
+10%	16.0	12.1	7.0
+20%	21.0	14.9	10.4
-5%	8.9	5.5	3.8
-10%	7.0	4.6	3.2
-20%	3.9	3.2	1.7

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