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ABOUT THE RATIO BETWEEN THE INDIVIDUAL NEEDS AND THE FAMILY INCOME - ROMANIA 2010

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Abstract: *Reporting to the year 2010, in the present paper we intend to determine the level of the social inequality in Romania. The research was based on a national representative sample. Instead to use directly the total earnings of a person we suggest analysing the ratio between the individual needs and the family income. We applied statistical tests and we used frequently the stochastic order to establish possible differences among different subgroups selected by the residence type, gender or by the age criterion. For every studied subgroup the average opinion reveals a general dissatisfaction state imposed by the reduced chance to have a decent level of life. More, we proved that the discontent degree increases regularly with the age of the individual. The most affected persons are the elderly and the people living in the rural area.*

Keywords: *income, social inequality, family, poverty*

1. Trends in evaluating social inequality

Following a general European and world trend we noticed lately an increasing number of economy and sociology papers focusing on the measurement of the level of inequality existing between the inhabitants of Romania. Inequality may take various aspects. We may thus speak of material, cultural, ethnic, religious, gender inequality, or more subtle, discrimination based on the social status of the individual.

Initially, I started from the idea of the direct measurement of the material inequality within the Romanian society based on the available complex data regarding the income and consumption of the different categories of people and households in Romania of the 2010 years (Quality of life diagnosis, 2010). I noticed, however, several peculiar problems which made us to give up gradually this approach. Thus, besides the aspects pertaining to the correctness of the individual statements from the questionnaires, we

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also encountered an array of difficulties of processing and interpreting the existing information, many times because of the lack of a national standardization (Slesnick, 1998).

Below is an attempt to construct a new point of view in measuring the social inequalities while highlighting particular aspects that might alter substantially our conclusions.

The socio-economic research often mentions that the determination, as accurate as possible, of the level of social inequality within a community should never be neglected (Cowell, 2000; Duclos & Araar, 2005).

The presence of major inequalities between the individuals of a population often leads directly to the display of different types of social conflicts (Esteban & Ray, 2011). This aspect is revealed particularly when large material differences exist within a society: a large, very poor category of people living at the limit of subsistence, the lack of a consistent middle class, a high level of polarization between the rich and the poor.

The theoretical modelling focusing on the axiomatic approach of the states of social conflict is exquisitely treated by Esteban and Ray (2011). Thus, they present a pattern of conflicting situation closely related to the phenomena of inequality and polarization. They consider indicators of polarization based on the existence of poles of concentration or, as alternative, the level of decrease of the "middle class". They highlight the importance of finding, within a given system, the unique characteristics of equilibrium which vary, however, within an imposed context. The deviation from the "state of equilibrium" might be a good measure of the latent state of conflict within a given population.

Complex sociological researches on income polarization in Romania are those of Molnar (2013). In evaluating the level of "poor-rich" polarization of the Romanian society, Molnar uses both indicators revealing the two characteristic poles of income distribution, and coefficients that measure the extent and consistency of the middle class. Thus, he analyses years 1995, 2000, 2006, 2007 and 2008 using 7 indicators of polarization. Taking into consideration only these years, Molnar noticed the higher coefficient of polarization in Romania in 2008 (Molnar, 2013). These seven indicators of polarization were constructed following different principles of evaluation. The agreement between the resulting values strengthens the veracity of the above conclusion of Molnar (2013).

Poverty, polarization and, more generally, social inequality, are intensely studied by the sociologists and economists. Usually, these evaluations use different indicators because poverty, polarization and inequality don not necessarily intercondition in all real situations (Ştefanescu, 2011a: 197-216; Ştefanescu, 2011b). Thus, the Gini coefficient, the most popular indicator used the measure the aspect of inequality cannot be always applied in order to evaluate the level of poverty within a community (Ştefănescu 2010a, Ştefănescu 2011b).

The existing literature displays the frequent use of an ordinal type of approach, which provides a high level of validity to the evaluation of poverty and social equity (Duclos &

Araar, 2005; Cowell & Victoria-Feser, 1996). Within this context, we notice the relation of stochastic order (Kleiber & Kotz, 2003), which will be used in the subsequent sections to classify some variables and to highlight the disfavoured groups.

Following are some brief details that will highlight the problems that may appear within the process of measuring the social inequality.

The literature has very many indicators which measure the level of poverty and inequity within a given population (Duclos & Arar, 2005; Cowell & Jenkins, 2003). Generallyu, these indicators depend on the values of some specific parameters which have correct significance for the, as accurate as possible, interpretation of the results (Duclos & Arar, 2005). Major difficulties arise when we have to set correctly the "poverty thresholds" (Duclos & Arar, 2005): the literature shows at least two distinct currents. One methodology relies in the actual definition of the "poverty threshold". Thus, the poverty threshold is determined depending on the actual distribution of the income, being often regarded as a specific quantile of this distribution (for instance, the 0.20 probability quantile or, very frequently, the first quartile). The other approach is more objective because it relies on the stringent necessities of the person. Thus, the poverty threshold is determined in relation with the value of the "minimum consumption basket", basket designed using particular concrete criteria. One criterion used in practice stipulates the requirement that each person may live a *decent living* (Duclos & Arar, 2005). Depending on this requirement, the people whose income is below the lowest admitted value for the consumption basket are stated to be "poor".

Because of the dependency of the actual value of the consumption basket on very many objective and subjective aspects, an error will result, which must necessarily be estimated (Ştefănescu & Mihăilescu, 2012).

Relying on the "*pro-poor*" principle (Duclos, 2009; Cowell, 2000), as soon as the subgroup of the poor people us clearly delimited by applying a specific procedure, we will estimate the level of social inequality existing within that particular population (Cowell, 2000); we may than proceed to make comparisons with other groups or countries, we may monitor the dynamic evolution of the populational structure and draft forecasts (using the stochastic simulation too, Ştefănescu & Mihăilescu, 2012), or we may propose different social policies that are adequate and efficient for that particular situation (Zamfir, 1999).

Such methodology has several vulnerable spots, however. Some of them are listed below.

- Usually, one accepts the hypothesis that the threshold of poverty is a p-quantile obtained by the distribution of the incomes of the overall population. However, this has no theoretic background. We therefore decided to relate the incomes to the basic requirements of the person (Cowell & Ebert, 2004), as shown in the following sections.
- We usually don't have available the distribution of the incomes of a particular community of people, and this distribution is actually estimated using representative samples. Within this context, we may notice a large variety of theoretical classes and

distributions that may be used to model the incomes of a particular population (Kleiber & Kotz, 2003). Such parameterized classes of distribution are not selected randomly, but are actually constructed observing particular axioms specific to the process of making an income (Kleiber & Kotz, 2003). Thus, the low incomes are better modelled using the lognormal distribution, while the higher incomes usually display a Pareto distribution (Kleiber & Kotz, 2003).

- After mentioning the distribution of the incomes and after determining the subgroup of "poor people", we will have to choose from a wide range of indices the best indicator to measure the level of inequality existing within the surveyed population (Cowell, 2000; Duclos & Araar, 2005; Slesnik, 1998). Within this context we remind you that the Gini indicator is the most used indicator to measure the inequality, coefficient which is not, however, always suitable to evaluate the level of poverty from a particular population (Ştefănescu 2010a, Ştefănescu 2011b).

In sociology and economy it is absolutely necessary to use specific indicators to measure the efficiency of governmental decisions. In this case our purpose is to measure the welfare of the population (Cowell & Jenkins, 2003).

Actually, the efficacy of the different public policies relies on the techniques used to measure the different forms of welfare (Cowell & Jenkins, 2003).

The welfare of people is often analysed in sociology through the prism of the actual income designed by the term "cash", while neglecting considerable amounts of resources which the individual receives as "*non-cash*". For details see the synthesis made by Smeeding et al. (1993).

The microsimulation of the socio-economic patterns is widely used lately to get qualitative and quantitative data necessary for the analysis of the effect which the public policies have. Thus, Bourguignon and Spadaro (2006) studied the influence of the taxes on the standard of living as well as actual modalities to redistribute the incomes. Microsimulation allows using extremely inhomogeneous "agents", characteristic which is frequently demanded by the social practice.

Actually, we used the Monte Carlo stochastic simulation to characterise in terms of probability the fluctuations of the threshold which defines the minimal decent standard of living in the case of the families with two people making incomes and with two children, living in an urban environment (Ştefănescu & Mihăilescu, 2012). The simulation algorithm can be easily adapted for other types of families from Romania.

Limiting the information that defines the material inequality just to the level of the person, while not taking into account the global income of the household is an important source of error, because this income affects a rather large number of people. At the same time, we recommend applying the questionnaire for several adult people that belong to the same household (Micklewright & Schnepf, 2007). Regarding the income of the individuals, we will use a battery of questions, rather than a single question. (Micklewright & Schnepf, 2007).

In order to avoid counting errors, rather than studying the total income of the individual or of the household, we will follow the weekly or monthly consumption, which is easier to manage.

With the intention to avoid some problems that often occur within the process of the direct evaluation of the social inequality we may focus on the indirect measurement of the inequality following an analysis of the effects due to the lack of equity (Cowell & Ebert, 2004; Devooght, 2003).

We would like to stress that material income is not very important in itself if it is not permanently correlated with the usual necessities of a particular person in the situation of a "decent standard of living" (Cowell & Ebert, 2004; Devooght, 2003). In this acceptation, we may say that a person is "poor" if his/her income doesn't provide the means to meet his/her basic necessities for a "decent standard of living" (also see Cowell & Ebert, 2004). Devooght (2003) theorized on this manner of interpretation.

Given this latter idea of approach, we will not study the distribution of the total income of the family, rather the ratio of the income to necessities within that particular family.

2. Methodological details

We will analyse the poverty level of the Romanian population in terms of meeting some necessities that are unanimously accepted for a "*decent standard of living*".

The survey was done in 2010 using a questionnaire with about 320 questions focusing on the diagnosis of the quality of life in Romania (Diagnosis of the quality of life, 2010). The sample designed by the Institute for Quality of Life Research – Romanian Academy, was representative at the national level (1161 persons).

Question *Q1* from the questionnaire concerns the ration of the family incomes and necessities, as it was formulated by the 2010 Diagnosis of the quality of life:

Q1 = *"How do you evaluate the total incomes of your family in relation with your necessities"?*

The interviewed people can choose between five responses encoded from 1 to 5:

1 = "not enough for the bare necessities";

2 = "enough just for the bare necessities";

3 = "enough for a decent living, but we cannot afford buying more expensive items (furniture, luxury clothing, car, house, etc.)";

4 = "we manage to buy some expensive items, but with effort";

5 = "we manage to buy everything we need with no big effort".

The surveyed groups were denominated as follows: *E* (the whole **s**ample), *B* (**m**en), *F* (**w**omen), *R* (**r**ural), *U* (**u**rban), *T* (**y**oung), *A* (**a**dult), M (**m**ature), *V* (**o**ld).

The definition of categories *T, A, M, V* was related to their age of the person, as follows: young people *T* (age < 30), adult *A* (30 <= age < 45), mature *M* (45 <= age < 60), old *V* (age >= 60).

The selection of these age categories is arguable. For instance, in the European Union, the old people are those aged 65+. However, considering that the life expectancy in

Romania is considerably lower than in the EU, we decided for the lower threshold of 60 years to characterise the group of old people.

We will now show the possible differences exiting between groups *A-V* defined previously. To this purpose we will operate with the repartition functions of variables *A-V* which quantify the answers to *Q1* for those particular subgroups.

It is known that the repartition of a simple discrete random variable with *m* "distinct possibilities of answer" is uniquely determined by specifying just *m-1* moments of that variable. Therefore, the random variable *Q1* will be fully specified if we know its first four moments. Consequently, the class of repartitions that defines variable *Q1* is fully characterized by four parameters.

Within this context we will have a good approximation of the random variable *Q1* if we will only use the first two moments of *Q1*, which are the mean and its dispersion. Given this latter issue, in the following sections we will give graphics of variable *A-V* or we will make statistical tests using just two defining parameters for those repartitions, i.e. the mean and its dispersion.

The statistical tests will mainly analyse the intensity of the difference between means μ_1, μ_2 of two arbitrary groups *Gr1* and *Gr2* selected from the multitude {*E*, *B*, *F*, *R*, *U*, *T*, *A*, *M*, *V*}.

Therefore, the null hypothesis H_0 of the statistical test is $H_0 : \mu_1 = \mu_2$ with the alternative hypothesis $H_1 : \mu_1 \neq \mu_2$. We designate by *t* the statistics of that particular test, parameter *q* being the "threshold" calculated on a critical domain that corresponds to a level of significance α. Applying the statistical test we will get value 1 (if $t \leq q$ we accept hypothesis H_0, case in which means μ_1, μ_2 presumably being equal), and value 0 (if $t > q$ we reject hypothesis H_0 accepting its alternative H_1, means μ_1, μ_2 presumably being different).

We will actually operate with two variants within the case of the null hypothesis $H_0 : \mu_1 = \mu_2$, i.e. $\sigma_1 = \sigma_2$, and $\sigma_1 \neq \sigma_2$. Values σ_1, σ_2 are the square mean deviations (standard deviations) which resulted for groups *Gr1* and *Gr2* whose means we are comparing. The standard deviations σ_1, σ_2 are taken to be theoretically unknown and they are to be estimated from the experimental data.

In order to distinguish between the two variants of test we will note in a different manner statistics *t* and the rejection threshold *q* in such situations. More precisely, in the case of H_0 with $\sigma_1 = \sigma_2$ we will use notations *t** and *q** instead of *t* and *q*. In the case of H_0 with $\sigma_1 \neq \sigma_2$ *t*, *q* parameters will be designed by *t***, and *q***.

Details on the actual way of defining the statistics *t**, *t*** and the actual rejection thresholds *q**, *q*** for the null hypothesis are presented in the Statistics Encyclopaedia drawn up by Iosifescu, Moineagu, Trebici and Ursianu (1985: 393-405).

In order to compare the repartition of the random variables *A-V* attached to the different groups, we will use in section 5 the relation of stochastic order (Kleiber & Kotz [11]).

Thus, be *X*, *Y* two discrete simple random variables that may take the distinct values *1, 2, 3, ..., m* and which have the repartition functions $F(k)$, and $G(k)$, $1 \le k \le m$. We define the stochastic order $X \underset{S}{\le} Y$ if and only if $F(k) \ge G(k)$ for any $1 \le k \le m$.

Within this context we mention that in order to measure the inequality existing between the random variables *X* and *Y* we may also use different types of order relations.

Thus, $X \underset{M}{\le} Y$ if and only if $Media(X) \le Media(Y)$ (inequality "mean").

In our statistical analysis we will not use operator " $\underset{M}{\le}$ "because extremely different repartitions of the data can lead sometimes to equal means.

The most popular indicator used in economy and sociology to measure the level of inequality of the distribution of the values of variable *X* is the Gini coefficient.

Relying on the concept of inequality in the meaning of Gini, $0 \le Gini(X) \le 1$, we define inequality $X \underset{G}{\le} Y$ between the random variables *X* and *Y* if and only if $Gini(X) \le Gini(Y)$.

We mention that the relation of stochastic order is "more restrictive" than the order relations based on the Gini index or on the indicator "arithmetic mean". More precisely:

- For any random variables *X*, *Y* if $X \underset{S}{\le} Y$ then $X \underset{M}{\le} Y$;
- Furthermore, whichever of the random variables *X*, *Y* if $X \underset{S}{\le} Y$ we also have $X \underset{G}{\le} Y$.

The reciprocals of two propositions are not true, however. Thus, variable *X* can be "smaller" than *Y* in the meaning of the arithmetical mean or in the Gini meaning, while the relation of stochastic order between *X* and *Y* must not necessarily remain.

We remind that any relation of order " $\le$ " displays the property of transitivity because $X \le Y$ and $Y \le Z$ necessarily implies $X \le Z$. This fact will allow us to set a partial "local" hierarchy.

Many studies of sociology and economy often use the arithmetic mean in the process of making hierarchies, or even more often the Gini coefficient. By the aspects we

mentioned earlier, we motivate our option to use the relation of stochastic order (Kleiber & Kotz [11]) in order to highlight the disfavoured groups of individuals.

We have permanently in mind a systemic approach of the aspects generated by question *Q1* in the meaning of the aspects Ştefănescu presented in [22]. To simplify the discourse and in order to allow the easy acceptance of the conclusions, we preferred to use suggestive graphic representations of the proposed statistical models. We also purposely avoided using a sophisticated mathematical instrumentation based on measures of dissimilarity, indicators of inequality, diversity and polarization, techniques of selecting the main attributes and various methods of agglomerative hierarchical classification (details in Ştefănescu [22]).

3. Ration of the incomes to the needs

We will analyse the answers to question *Q1* about the relation between the family incomes and its necessities for subgroups *A-V* defined previously.

Table 1 shows the size of subgroups *A-V* together with the means and dispersion of these classes. Upon a first evaluation, we notice differences, sometimes outstanding, between the means of dispersion of *A-V* subgroups (Table 1). We will study these aspects using Figure 1. Points *A-V* are represented graphically in a rectangular system which has as coordinates the means and dispersions of those groups (Figure 1).

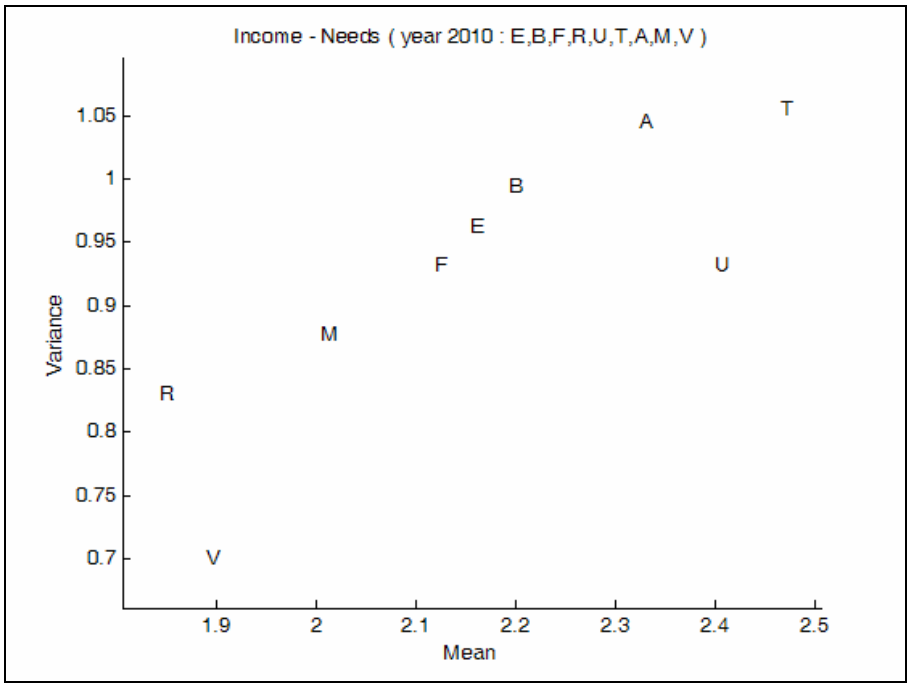
Table 1. Statistic characteristics of groups *A-V* depending on the response to question *Q1* ("incomes to necessities" ratio, 2010)

Indices	**Variables**								
	E	*B*	*F*	*R*	*U*	*T*	*A*	*M*	*V*
number	1161	549	612	514	647	228	334	278	321
mean	2.156	2.195	2.121	1.846	2.402	2.465	2.323	2.007	1.891
variance	0.964	0.995	0.933	0.830	0.933	1.056	1.045	0.878	0.702

Interpreting the data of *Table 1* and the graphical representation of points *A-V* in *Figure 1* we may notice:

- A decrease in the following order, *T*, *A*, *M*, *V* (the age classes: "young", "adult", "mature", "old") both of the means and of the dispersion of these variables, which shows the gradual worsening of the situation and a gradual decrease of the response fluctuation (an increasingly stable opinion for these subgroups, *Figure 1*). Therefore, the interviewed people are increasingly dissatisfied with their incomes as they grow older.
- Overall, the situation is "dramatic", all the means of the surveyed variables *A-V* being lower than 3 (*Table 1*, *Figure 1*). The mean value of 3 represents a "rather balanced" population in terms of income-necessities ratio (for instance, all response variants *R1-R5* at question *Q1* are represented in equal proportions for the studied community).

Figure 1. Position of groups *A-V* depending on the answer to question *Q1* (family incomes related to family needs, 2010)



- Men (*B*) and women (*F*) have about the same opinion, on the average (*Table 1*, *Figure 1*). Compared to the women, the men are more "optimistic" regarding the income-necessities (compare the mean values from *Table 1*). On the other hand, the opinions of the women are less fluctuating than the opinions of the men (see the dispersion values in *Table 1*).
- There are major differences (*Table 1*, *Figure 1*) between the young people (*T*) and the old people (*V*) or between the people living in the rural (*R*) and those living in the urban (*U*).
- Usually, the old people cannot have a decent standard of living unless they use own savings. Furthermore, the opinion of the old people is extremely stable (compare the dispersion of variable *V* in *Table 1* ; the ordinate of point *V* has the lowest value in relation with the ordinates of all the other points *A-V* from *Figure 1*).
- The young people are at the opposite end (variable *T* un *Table 1* and *Figure 1*). Just remember that the evaluation of the young people about their income shows general dissatisfaction, the average score being below the standard of a rather balanced society (case in which the mean of the answers to *Q1* is 3). However, compared to the old people, the opinion of the young people regarding the ration

of their incomes and necessities is much more favourable, in average (variables *T* and *V* in *Figure 1* and *Table 1*).

- We noticed a rather linear standing of the age categories defined generically by: "old people" (*V*), "mature" (*M*), "adult" (*A*), "young" (*T*). This suggests the possibility of using just one indicator (for instance the mean of the variable) and not two distinct coordinates(mean and dispersion) to compare the age subgroups.

Revaluating all these conclusions, we may naturally ask whether the differences identified in *Figure 1* or *Table 1* between variables *A-V* are actually significant. In the following section we will deal with this aspect.

4. Differentiation of the groups

Figure 1 shows value differences between the means of subgroups *A-V*, some of the differences being quite significant. The essential aspect is to see how statistically significant these differences are.

Following the specifications from the methodological section, we will now test the equality of the means μ_1, μ_2 for any of the two groups *Gr1* and *Gr2* selected from multitude { *E*, *B*, *F*, *R*, *U*, *T*, *A*, *M*, *V* }. Remember that all these means are calculated for the answers to question *Q1* ("income - necessities") from the questionnaire, considering only the individuals from subgroups *A-V*.

Table 2. Testing the differences between the means of subgroups *A-V* (for 2010).

Gr1	*Gr2*	t^*	q^*	H_0 $\sigma_1 = \sigma_2$	$t^{*}{}_{*}$	q_1^{**}	H_0 $\sigma_1 \neq \sigma_2$
E	B	-0.763	1.961	1	-0.759	1.962	1
E	F	0.718	1.961	1	0.721	1.962	1
E	R	6.091	1.961	0	6.269	1.962	0
E	U	-5.137	1.961	0	-5.161	1.962	0
E	T	-4.311	1.962	0	-4.181	1.968	0
E	A	-2.714	1.962	0	-2.654	1.965	0
E	M	2.293	1.962	0	2.359	1.965	0
E	V	4.412	1.962	0	4.824	1.964	0
B	F	1.283	1.962	1	1.281	1.962	1
R	U	-9.989	1.962	0	-10.056	1.962	0
T	A	1.614	1.964	1	1.612	1.965	1
T	M	5.237	1.965	0	5.189	1.965	0
T	V	7.193	1.964	0	6.951	1.966	0
A	M	3.954	1.964	0	3.985	1.964	0
A	V	5.902	1.964	0	5.925	1.964	0
M	V	1.599	1.964	1	1.587	1.964	1

Remember that the null hypothesis H_0 of the statistic test, $H_0 : \mu_1 = \mu_2$, has two sub-variants, $\sigma_1 = \sigma_2$ (the theoretical standard deviations are presumable equal), and $\sigma_1 \neq \sigma_2$ (the probabilistic model with different standard deviations). Statistics *t* and the decision threshold *q* of test H_0 are different in situations $\sigma_1 = \sigma_2$ and $\sigma_1 \neq \sigma_2$, this obtaining values *t**, *q**, and *t***, *q***, respectively *(Table 2).* The result of the statistical test will be 1 or 0 depending whether the null hypothesis H_0 is accepted (the theoretical means μ_1, μ_2 are presumable equal) or rejected (distinct μ_1, μ_2 means).

The square mean deviations σ_1, σ_2 are not actually known, being estimated from the experimental data (Iosifescu, Moineagu, Trebici and Ursianu, [10], p.393-405).

Table 2 is a synthesis of the results of the statistical test.

Table 2 shows clearly that irrespective of the sub-variant of operation $\sigma_1 = \sigma_2$ or $\sigma_1 \neq \sigma_2$, we accept the null hypothesis H_0 ("equal means") only for the pairs of variables (*E*,*B*), (*E*,*F*), (*B*,*F*), (*T*,*A*) and (*M*,*V*).

Therefore, there are no statistically significant differences between the means of the following groups: men-women; young-adult; mature-old. Furthermore, the mean of the whole sample for question *Q1* is equal with the mean of the group of men or with that of the group of women.

On the other hand, we notice extremely important differences for rural-urban and young-old categories. Just compare the value, much over the unit, of t/q ratio in variants $\sigma_1 = \sigma_2$ and $\sigma_1 \neq \sigma_2$. Thus, we have $t^*/q^* >> 1$ and $t^{**}/q^{**} >> 1$ for the values corresponding to situations (*R*,*U*) and (*T*,*V*) from *Table 2.*

A large difference is obvious between the subgroups of adult-mature people too; just look at (*A*,*M*) differences in *Table 2.*

In conclusion, in Romania of the year 2010 there are major differences between the income and necessities of the families depending on the type of locality of residence (rural-urban) or the age of the people (young-old). These results have already been noticed in the previous section by the bidimensional graphic representation of the random variables *A-V,* considering the coordinates "mean" and "dispersion" (*Figure 1*).

The values of the statistical tests shown in Table 2 validate mathematically the general impression suggested by the systemic image shown in *Figure 1.*

5. Disfavoured groups

In this section we want to highlight the most disfavoured groups within the multitude { *B*, *F*, *R*, *U*, *T*, *A*, *M*, *V* } which was proposed for study..

For the partial classification of the groups we will prefer to you the relation of stochastic order " $\underset{S}{\leq}$ " mentioned in the methodological section.

Just remember that the relation of stochastic order is adequate to the evaluation of the inequality aspect, the intensity of the inequality phenomenon being often evaluated in practice by the value of the Gini coefficient. Indeed, the existence of the stochastic relation $X \underset{S}{\leq} Y$ necessarily involves the following order: $Gini(X) \leq Gini(Y)$ (Kleiber & Kotz [11]).

After making the calculations, we inferred the stochastic inequalities: $F \underset{S}{\leq} B$, $R \underset{S}{\leq} U$ (*Figure 2*), $A \underset{S}{\leq} T$, $M \underset{S}{\leq} T$ (*Figure 3*), $V \underset{S}{\leq} T$, $V \underset{S}{\leq} A$ (*Figure 4*), $M \underset{S}{\leq} A$, $V \underset{S}{\leq} M$ (*Figure 5*).

Therefore, depending on the age category will we have the following hierarchy: $V \underset{S}{\leq} M \underset{S}{\leq} A \underset{S}{\leq} T$. This order is inversely proportional to age of the individual. The older the person, the more acute he/she perceives the higher value of the ration between the basic necessities for a decent standard of living and the personal income.

Figure 2. Stochastic order for subgroups men-women and rural-urban

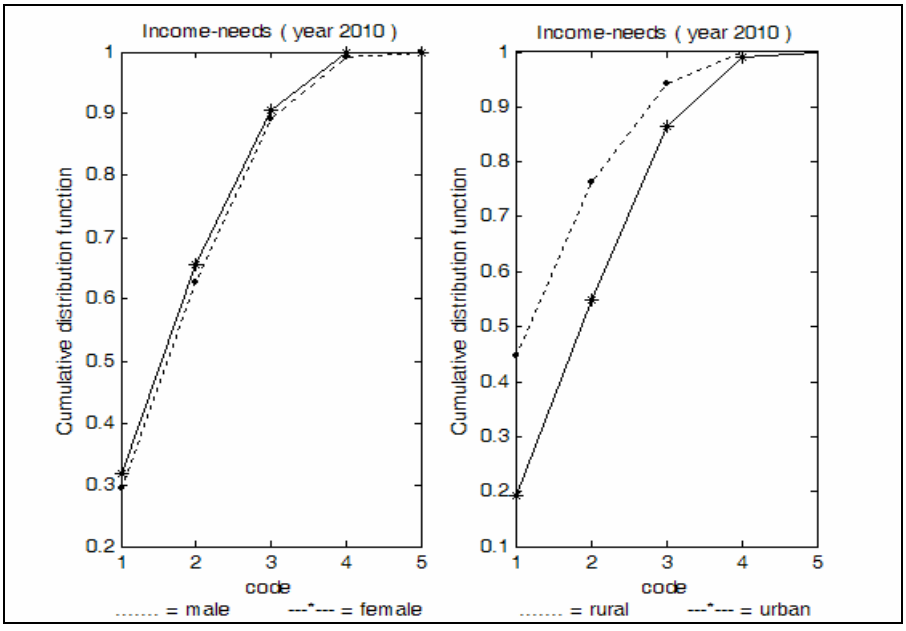


Figure 3. Stochastic order for the age groups *T-A* , *T-M*

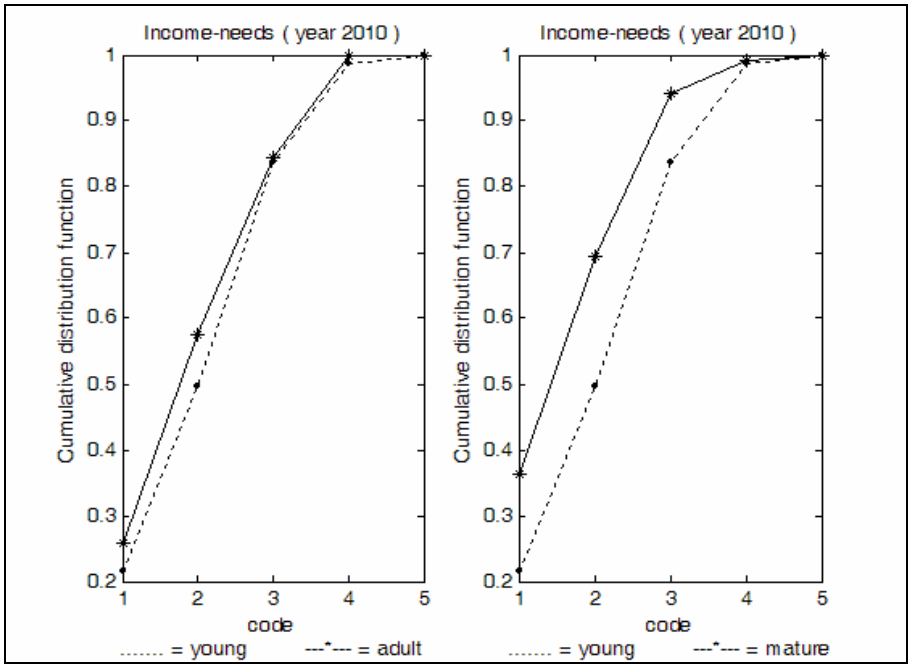


Figure 4. Stochastic order for the age groups *T-V* , *A-V* .

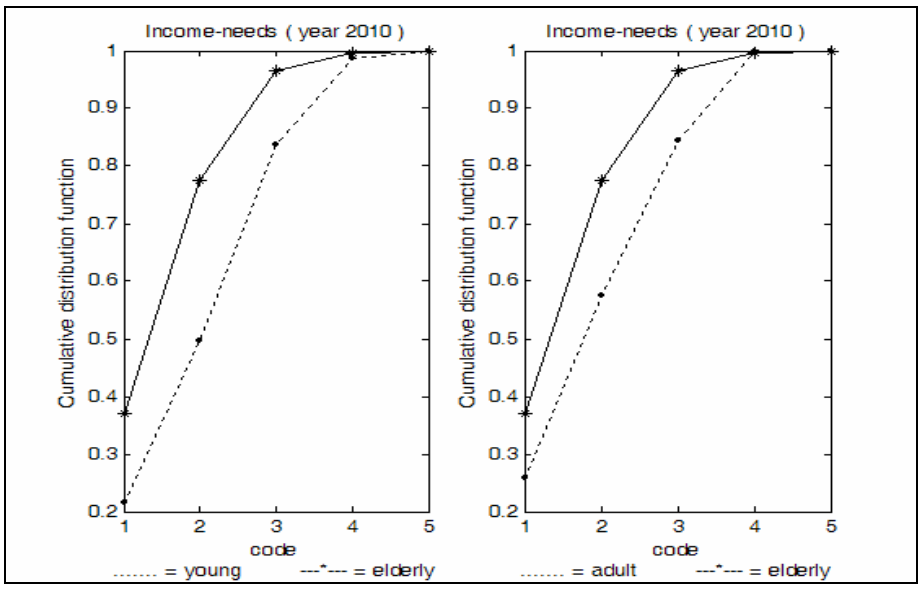
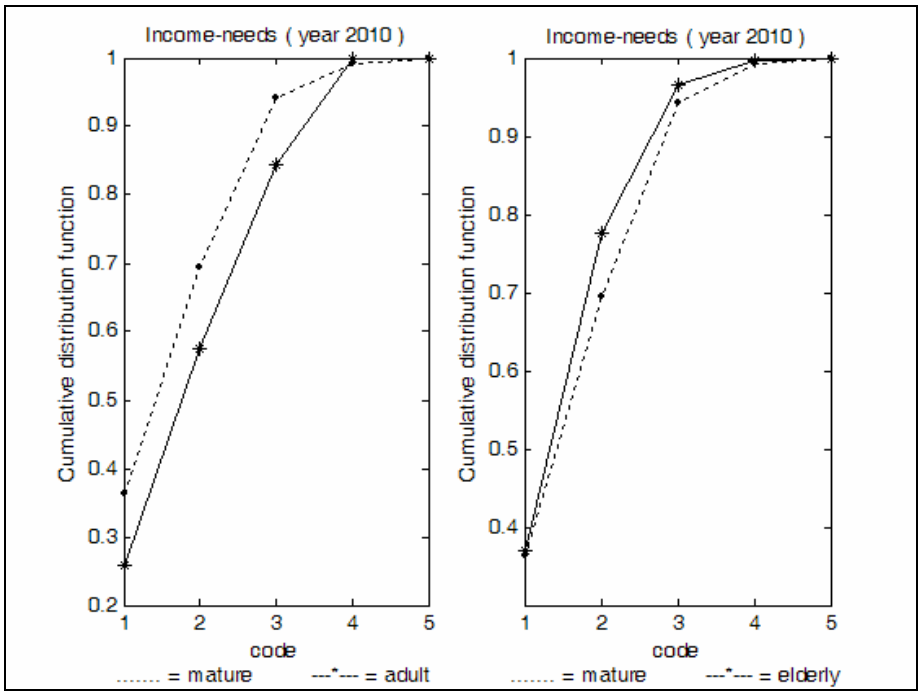


Figure 5. Stochastic order for the age groups *M-A* , *M-V*.



The size of the gap between the necessities and the income of the family is suggested in Figures 2-5 for the surveyed *A-V* groups.

If we refer to the relation of stochastic order " $\underset{S}{\leq}$ ", *Figures 2-5* bring additional information by the graphic representation of the size of the gap between the subgroups. The differences between men and women are not significant in terms of the necessities-income ratio, (*Figure 2*), This is supported by the statistical tests (*Table 2*). However, there are large differences between the rural and the urban (*Figure 2*) or between the young and the old (*Figure 4*, *Table 2*) concerning the sufficiency of the incomes in relation with the necessities of the family. More precisely, the differences are between the rather young people (categories of "young", "adults") and the older people (groups of "mature", "old"). See *Figures 3-5*.

The opinions about the incomes and necessities are strongly divergent for the age categories under and above 45. The causes of these very different opinions should be analysed detailed within the current socio-economic context.

Finally, we would like to mention a substantial complementary sociological work which run in Romania in 2010 (Ştefănescu, 2011c). The study targeted the opinion of the population about some disfavoured social groups such as: the homeless, the

unemployed (unoccupied people), the old people, orphan or abandoned children, disabled people, poor people or families, families with more than three children and the Roma population (for details see Ştefănescu, 2011c). As completion to this comprehensive study, in this section we noticed the large differences between the villages and the towns, next to the problem of the old people.

7. Conclusions

Initially, using the database (Diagnosis of the quality of life, 2010) we started from the idea of a complex and direct statistical analysis of income distribution in Romania. Such approach would have produced serious errors, though, because of multiple risk factors that are not always taken into consideration coherently: determining the exact value of the different taxes and dues paid by the individuals, the evaluation, as accurate as possible, of population self-consumption preponderantly in the rural areas (large diversification depending on the type of household), influence of the inflation on the poor people particularly, the temporary work situations, failing to declare some incomes which often are rather stable (the grey economy holds an important position in the Romanian economy), presence of the different punctual social aids or rewards for particular groups of population (the "non-cash" applied, for instance, in education and health), the frequent cases of tax evasion.

Given the existence of such problems that often emerge in practice when evaluating the actual income of the families, we preferred to analyse the opinion of the individuals at question ***Q1***: *"How do you evaluate the total incomes of your family in relation with your necessities"*? (Diagnosis of the quality of life, 2010).

The selected subgroups *A-V* represent various situations of residence, gender or age of the interviewed people. This research can be easily expanded by taking into consideration other disfavoured subgroups from Romania (see for instance, Ştefănescu [2011c).

Instead of sophisticated statistical models we preferred to use comparative graphic images in order to get a general picture of the relations between the studied *A-V* variables. We permanently considered a systemic approach to show the relations between the different subcomponents. A general methodology in this respect has been proposed by Ştefănescu (2013). However, unlike the methodology proposed in this study (Ştefănescu, 2013), in this work we didn't use various measures of dissimilarity attached to the repartitions in order to delimit entities *A-V*, or efficient techniques to reduce the size of the representation area, but we aimed to get as suggestive graphs as possible.

Furthermore, in order to simplify the exposure, we used a bidimensional representation of the repartition of variables *A-V* taking as Cartesian coordinates the means and the dispersion of the variables. Using the stochastic simulation we will subsequently determine the size of the approximation error which resulted from such graphics.

Thus, we showed the disfavoured groups related to the rural environment R and to the old people V (Table 1, Figure 1). The statistical tests have confirmed mathematically these conclusions (Table 2). The very large differences between the t value of the statistics and threshold q of acceptance-rejection of the null hypothesis show once

more the major disproportions existing between the rural-urban subgroups (*R-T*) ort between the young and the old (*T-V*) in terms of their opinion the question Q1 (Table 2). The opinions of the men (variable B) regarding the necessity to income ratio are very close to the opinions of the women (subgroup F), which is very well shown in Tables 1-2 and in Figures 1-2.

Furthermore, relying on the relation of partial stochastic order "$\underset{S}{\leq}$" mentioned in the methodological section of the paper, in section 5 we determined the following stochastic inequalities: $F \underset{S}{\leq} B$, $R \underset{S}{\leq} U$ (*Figure 2*), $A \underset{S}{\leq} T$, $M \underset{S}{\leq} T$ (*Figure 3*), $V \underset{S}{\leq} T$, $V \underset{S}{\leq} A$ (*Figure 4*), $M \underset{S}{\leq} A$, $V \underset{S}{\leq} M$ (*Figure 5*). Finally, we may infer the hierarchical order $V \underset{S}{\leq} M \underset{S}{\leq} A \underset{S}{\leq} T$, relation which is inversely proportional with the age of the person. Therefore, the older is the person, the more acute he/she perceives the insufficiency of his/her income to meet the legitimate necessities for a decent standard of life.

We may certainly say that the income/necessities ratio doesn't advantage any of the A-V groups. The young people, T, have the most "optimistic" opinion on the use of their income to meet absolutely necessary requirements in an evolved society (Table 1, Figure 1). However, the mean expression of the young people, on a scale from 1 to 5, is rather low, just 2.5 (Figure 1, Table 1). More precisely, the opinions of the young people regarding the solution to the incomes-necessities problem is highly negative, the mean score being much below the threshold of 3. In this analysis, the value of 3 shows a state of relative "systemic equilibrium". These conclusions are supported directly or indirectly by other contemporary works. Some of them are those of Molnar (2013) and Ştefănescu (2010b, 2011c). Future analyses may consider the impact of the structural funds to alleviate the social inequality within the context in which the development of the conditions of life at the level of the rural communities depends on these funds (Mihalache, 2013: 144). Another important aspect that can be developed regards the impact of the austerity measures within the context in which they operate as a trigger which unloads the social tensions (Gubernat, R., Rammelt, 2012:264) on the background of the increasing social inequalities.

However, we must highlight that all these statements express a temporary state showing the evolution of the Romanian society in 2010, aspects that can improve or degrade in time, depending on the implemented governmental measures.

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