ROMANIANS' INSATISFACTION REGARDING THE ANTI-COVID MEASURES TAKEN BY THE GOVERNMENT AT THE BEGINNING OF THE COVID-19 PANDEMIC – STATISTICAL STUDY, APRIL 2020

Maria Livia ȘTEFĂNESCU,
PhD in Sociology, Researcher, Research Institute for Quality of Life,
Bucharest, Romanian Academy, Romania
https://orcid.org/0000-0001-8482-6050, livia.stefanescu@gmail.com
DOI: https://doi.org/10.36004/nier.cecg.IV.2022.16.13

Summary

We will analyze to what extent Romanians are not satisfied with the anti-Covid actions promoted by the Romanian government during April 2020. This period marks the debut quarter of the Covid-19 pandemic in Europe. The present topic has been approached by the author before, but taking into account the period of May 2021, that is, little more than a year since the onset of the pandemic in the European area. The current paper fits into a series of analyses of the dynamics of Romanian government anti-Covid measures in the period 2020-2022. The research was carried out on a questionnaire basis, being interviewed in April 2020 a number of 1017 people from Romania. Specifically, the question act1ro used in this study has the following wording: "How satisfied or not are you with the measures of your government has taken so far against the coronavirus pandemic?". Interviewees in the Eurobarometer have several possible responses: Very satisfied (R1); Fairly satisfied (R2); Not very satisfied (R3); Not at all satisfied (R4); Don't know/Not applicable (DK). We mention that the Eurobarometer records were weighted, thus maintaining, in the last sample that is analyzed, the real proportions of the main socio-demographic characteristics of the Romanians from the beginning of 2020 year. In the statistical models used, the variable act1ro is a category variable of ordinal type with four ordinal classes R1-R4. The statistical processing of the data took also into account several individual characteristics X of respondents to the Eurobarometer questionnaire. We note in this context the following attributes X: the respondent's gender, the age category, the level of education, the work status, the social class of the individual, the attitude of the families with minor children, the development region of Romania to which belongs the respondent. In general, interpreting in this research the value of the Goodman-Kruskal association index GK(X, act1ro) we cannot speak of a significant association relationship between an individual characteristic X specified above and the individual's answers to the act1ro question. The application of a chi-squared statistical test of homogeneity allows us to decide whether the distributions of Romanians' opinions to the question act1ro could be considered the same from a statistical point of view in relation to an individual characteristic X specified before. The graphs of the two-dimensional distributions (X, act1ro) make it possible to nuance the dependence relations between the categorical variables X and act1ro.

Keywords: *anti-Covid strategy, Romania Eurobarometer, ordinal categorical variable, individual characteristic, statistical modeling.*
JEL: *C12, C43, C83, H12, H75.*
UDC: *316:303(498)*

Introduction

The aim pursued in this paper is to clarify to what extent certain categories X of Romanians agree with the measures imposed by the government to reduce the negative effects generated by the Covid-19 pandemic (variable *act1ro*). Index 1 which is present in the name of the variable *act1ro* signifies the first round in the data collection for that question.

We remind you that the statistical study which will be commented in this paper concerns the period of onset of the Covid-19 pandemic (April 2020). Comparing these results with those obtained from other researches that we have carried out in the issue of Covid (for example, Stefănescu 2022) we notice sometimes significant differences in relation to the period that was taken into account in the evolution of the pandemic.

We will detail some aspects regarding the collection of data representing the Romanians' answers to the *act1ro* question from the Eurobarometer questionnaire.

Specifically, the *act1ro* question has the following formulation: "How satisfied are you from the measures of the Government of Romania taken against the Coronavirus pandemic?".

Possible answer variants: Very satisfied (R1); Quite satisfied (R2); Not very satisfied (R3); Not at all satisfied (R4); I don't know (DK).

We mention that the effective sample used in this study was completed in the Spring of 2020 and comprises 1017 persons interviewed in Romania in April 2020 (Eurobarometer).

In addition to the variable *act1ro* the statistical processing study took into account the following individual characteristics X of the interviewees:

- gender (variable gen). Categories: men; women.
- age (variable age4). Categories: 16-24 years; 25-34 years; 35-44 years; 45-54 years.
- education (variable edu3). The age of the respondent is specified at the end of the last school completed: at most 16 years (low education); between 17 and 19 years (middle education); over 20 years (high education).
- education (variable edu2). Only the last two categories of edu3, namely middle education and high education are taken into account. The number of respondents to the *act1ro* question that have a low education is relatively small (4.9%).
- work (variable work2). Two categories: the person works; the person does not work.
- the social class of the respondent to the survey (variable soc). Three categories: high (high); middle (mid); below (low).
- families with minors (variable fam). Two categories: families have minor children; the other families.

- the development regions of Romania (variable reg4). Categories: North West / Center; North East / South East; South / Bucharest; South West / West.

Methodological aspects

The initial database that characterizes the Eurobarometer sample was later weighted taking into account the real proportions of the Romanian population of persons in relation to several demographic and social characteristics specific to Romania in 2020.

Within the statistical analysis we will interpret the R1-R4 answers of the Romanians to the *act1ro* question as observations from a random categorical variable with four ordinal classes (Agresti 2010; Kotz et al. 2006). The proposed statistical models will take into account this interpretation.

The Romanians' opinions *act1ro* will be compared for several categories in the population whose individuals are differentiated by their individual characteristics mentioned above: gender (gen), age (age4), education level (edu3, edu2), work (work2), social status (soc), families with minor children (fam), the development region of Romania from which the respondent comes (reg4). The variables like, gen, age4, edu3, edu2, work2, fam are also categorical ordinal variables.

We will apply the Chi-square test to validate the H0 homogeneity hypothesis (Alkarkhi, 2021). Thus, for any individual characteristic X the null hypothesis H(X) has the following formulation: "The distributions of the R1-R4 answers to the *act1ro* question can be considered statistically homogeneous in relation to the various categories of the individual characteristic X".

For example, hypothesis H0(fam) means that the distribution of the R1-R4 answers to the *act1ro* question given by families with minor children do not differ statistically by the R1-R4 distribution of the other families (practically the two distributions can be considered identical).

The Chi-square test of homogeneity computes the value of the standard statistics *chi2*(X) and also establishes the rejection threshold *rej*(X) of the null hypothesis H0(X).

So, if *chi2*(X) < *rej*(X) then the null hypothesis H0(X) will be accepted with the risk α of making a wrong decision. It was opted for the classic value $\alpha = 0.05$ (the value α is the level of significance for the statistical test; Alkarkhi, 2021).

In order to obtain more accuracy in the interpretation of the Chi-square statistical test of homogeneity, the probability p(X) (p-value is the level of observed significance level for the statistical test; Alkarkhi, 2021). So, the probability p(X) estimates the risk of rejecting the homogeneity hypothesis H0(X) of the distribution R1-R4 answers to the *act1ro* survey question in the case of a precised individual characteristic X.

If the risk p(X) takes relatively high values (for example, in our case, p(X) > 0.1) then we will decide to accept the homogeneity hypothesis H0(X).

We are also interested in highlighting a possible dependence between an individual feature X and the answers R1-R4 to the *act1ro* question received from the interviewed persons. In this context, the Goodman-Kruskal GK(X, *act1ro*) indicator

will apply. The value of GK index estimates the intensity of the association relationship between the two ordinal categorical variables X and *act1ro* (Everitt, 2007). We specify that $-1 \leq GK(X, act1ro) \leq 1$. The GK(X,Y) index has a behavior similar to the Pearson standard correlation coefficient Corr(X, Y) when X,Y are both categorical ordinal variables.

Few results and comments

We will illustrate in the following ten figures some of the results that we have achieved in this research. At the same time, we will briefly comment on some aspects of the figures presented.

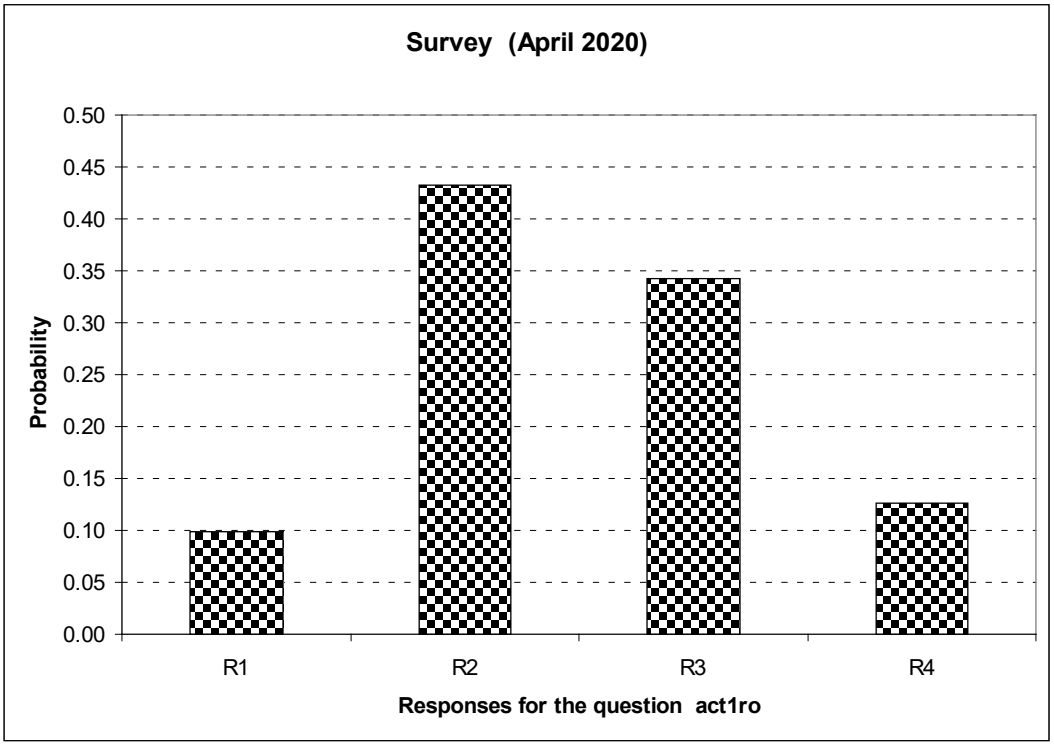

***Figure 1*. The distribution of R1-R4 answers to the *act1ro* question.**
Source: Own computations.

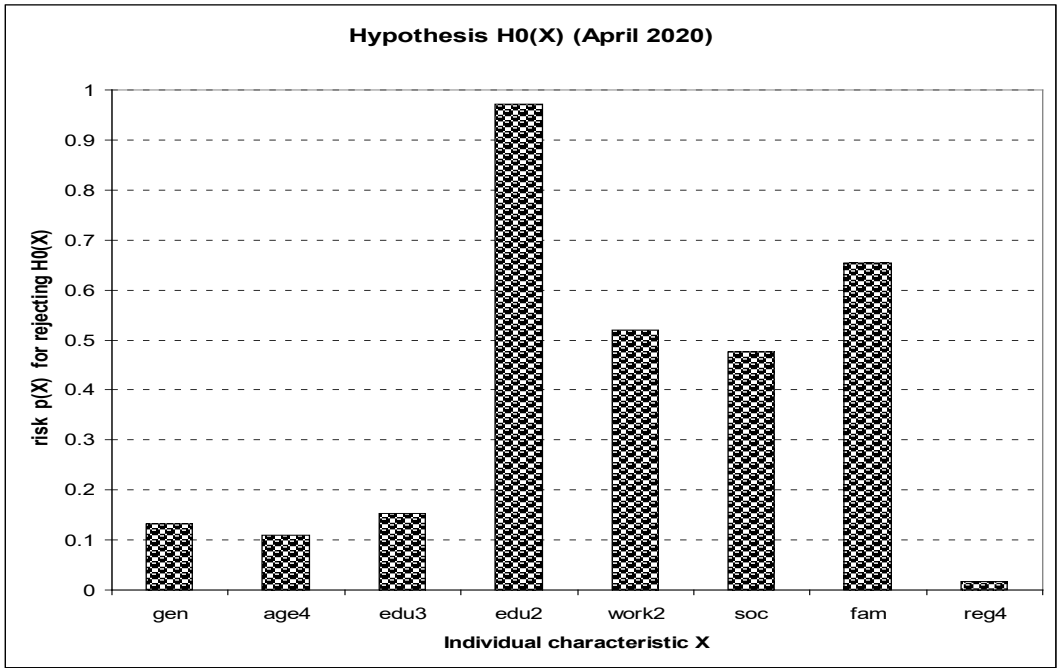

***Figure 2*. Acceptance of the homogeneity hypothesis H0 (X) for individual characteristic X.**
Source: Own computations.

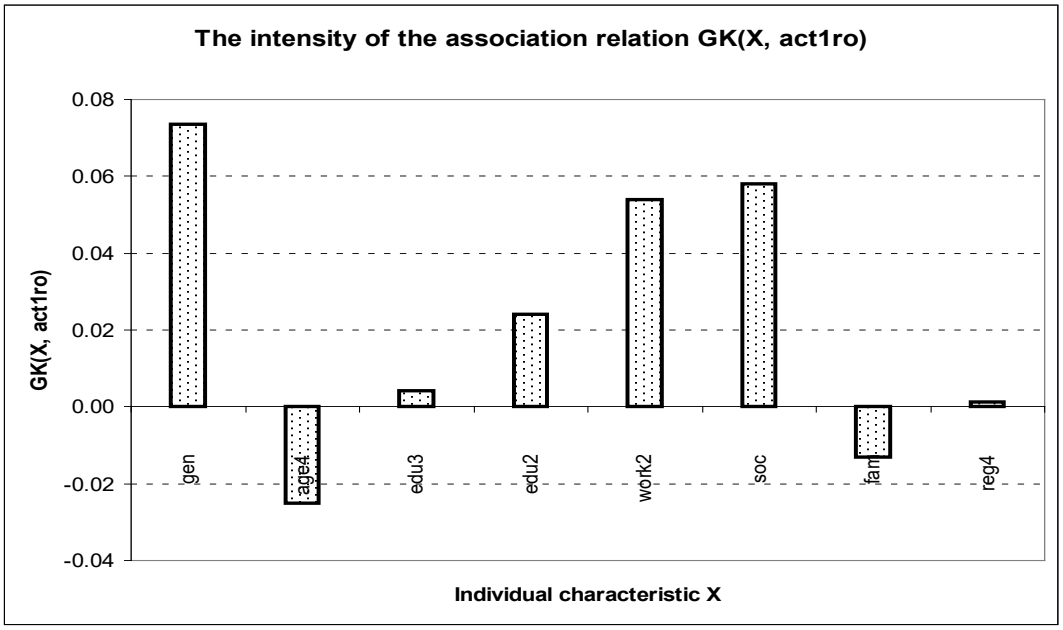

***Figure 3*. Intensity of the GK association relationship (X, *act1ro*)**
Source: Own computations.

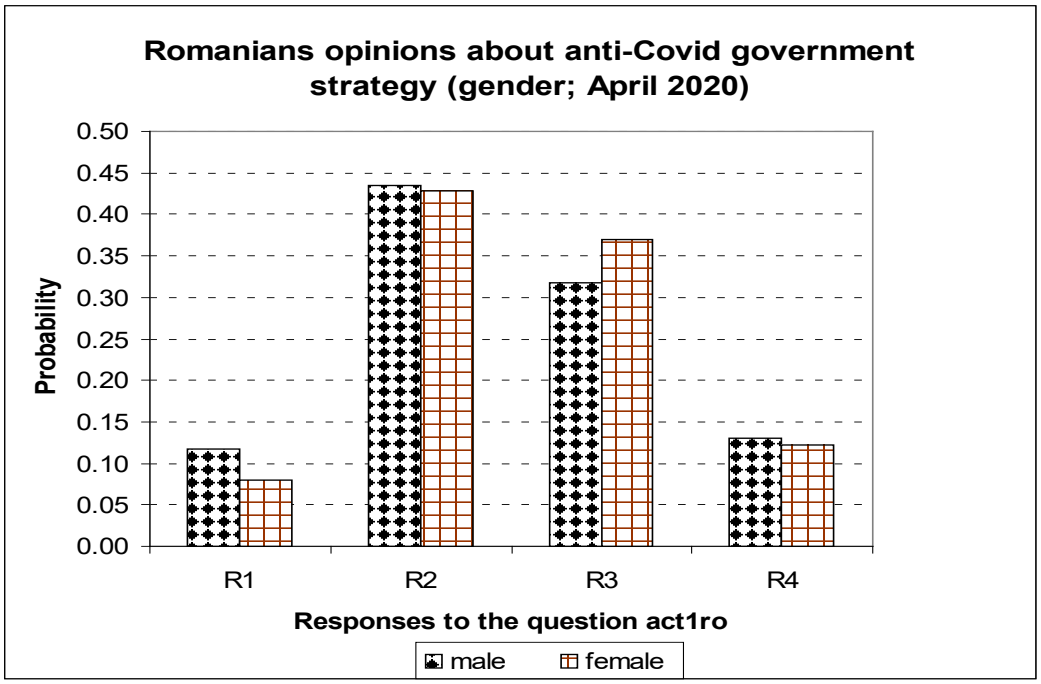

Figure 4. **The distribution of the R1-R4 answers to the *act1ro* question according to the gender of the person.**
Source: Own computations.

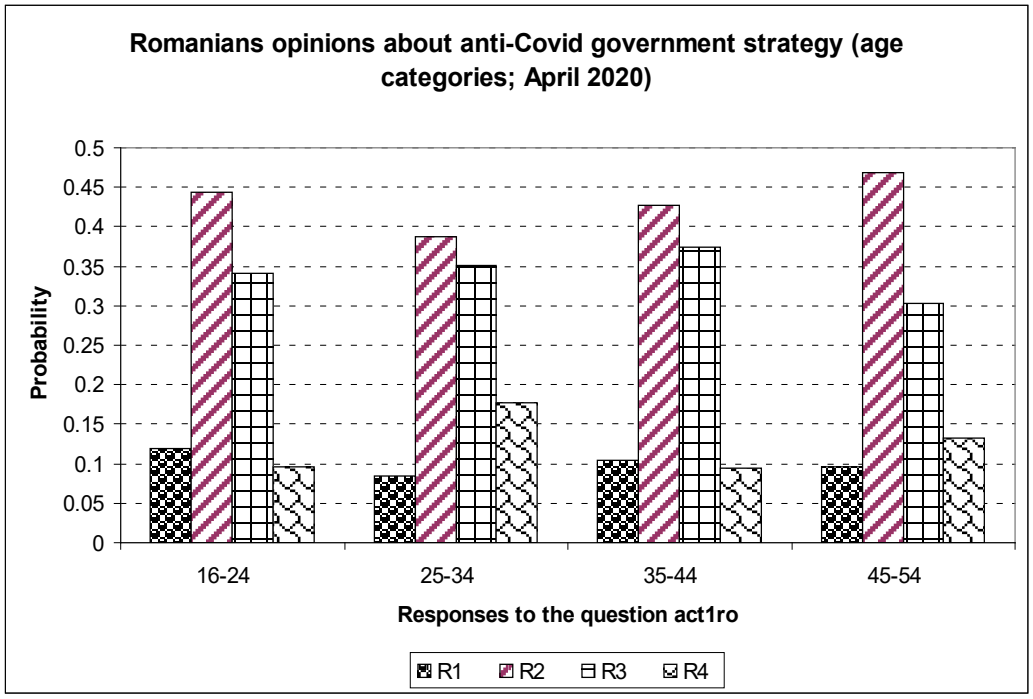

Figure 5. **The distribution of the answers to the *act1ro* question according to the person's age.**
Source: Own computations.

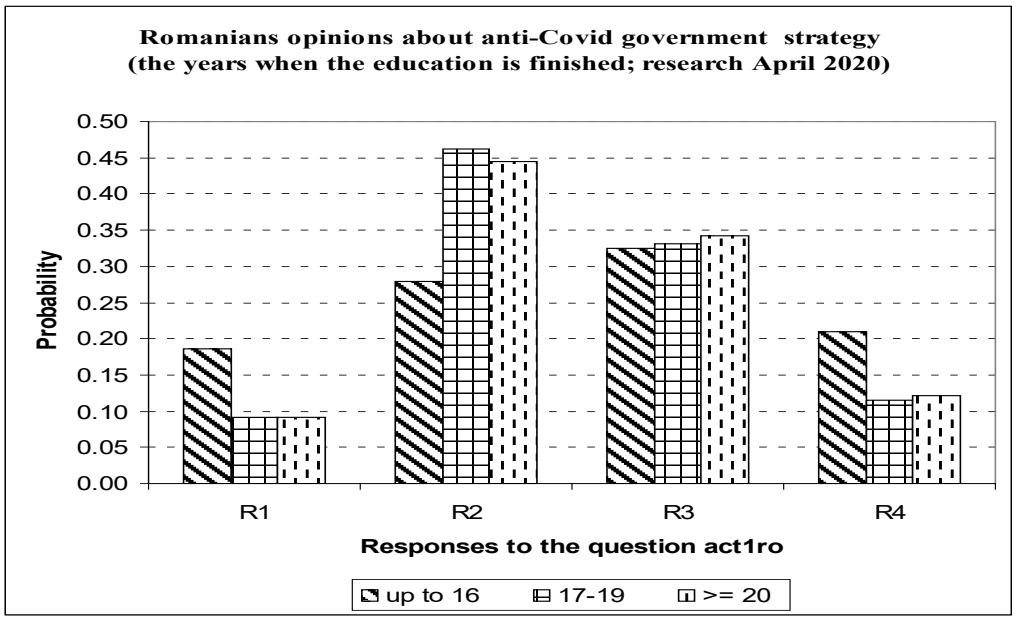

Figure 6. **The distribution of the answers to the *act1ro* question according to the person's education.**
Source: Own computations.

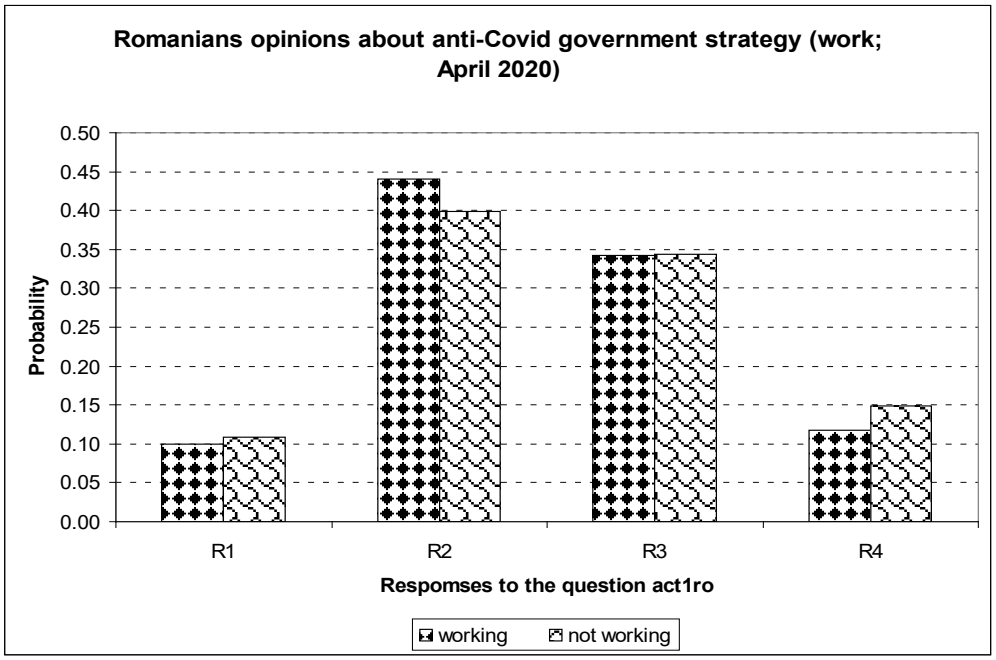

Figure 7. **The distribution of the answers R1-R4 to the *act1ro* question according to the activity of the person.**
Source: Own computations.

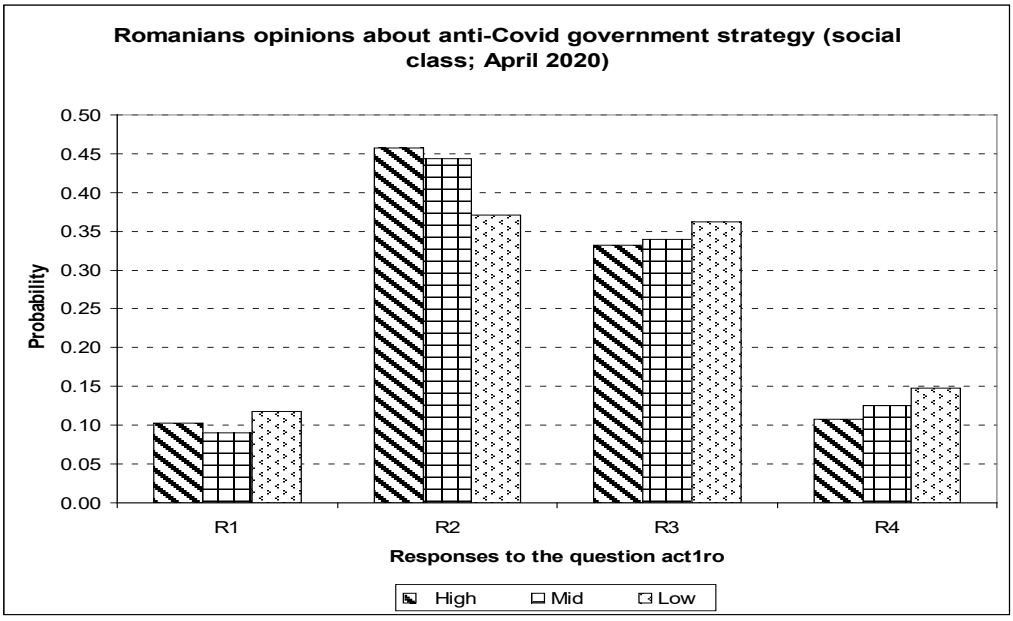

Figure 8. **The distribution of the *act1ro* answers according to the social class of the respondent.**

Source: Own computations.

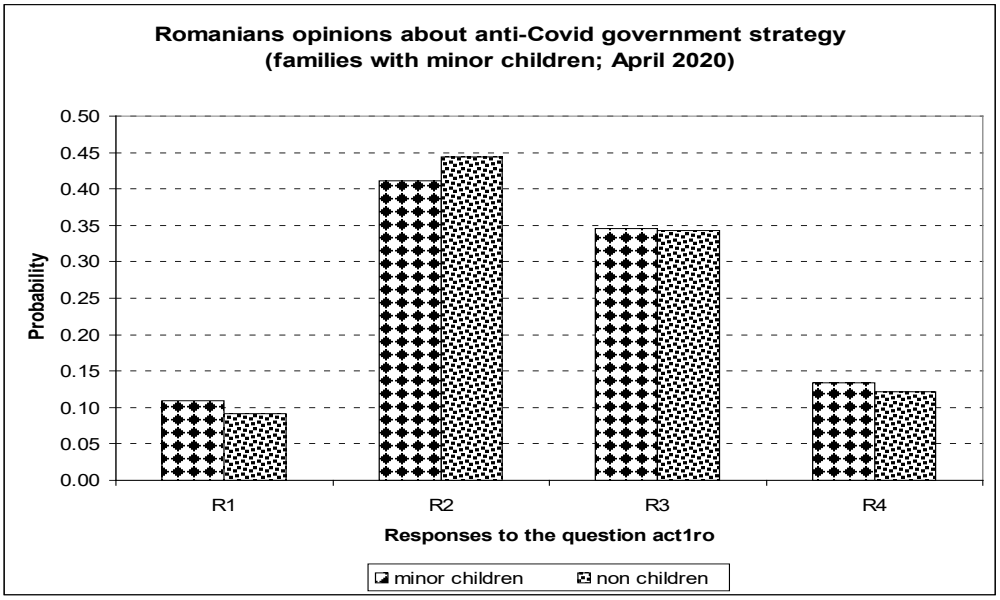

Figure 9. **The distribution of *act1ro* answers according to families with minor children.**

Source: Own computations.

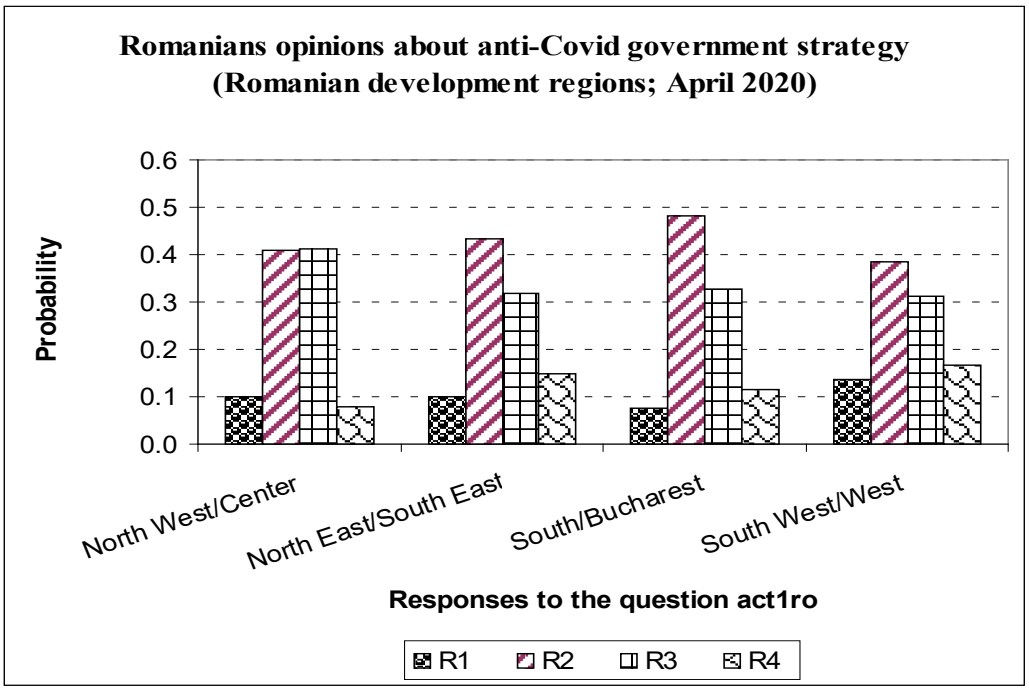

***Figure 10*. The distribution of the R1-R4 answers for the *act1ro* question according to the Romanian regions of development.**
Source: Own computations.

Comments

Romanians opt most commonly for the "quite satisfied" answer (R2) to the *act1ro* survey question (*Figure* 1). Moreover, the proportion of the "very satisfied"+"quite satisfied" responses exceeds the proportion of the answers "not very satisfied"+"not at all satisfied" (R1+R2 > R3+R4; *Figure 1*). Therefore, the Romanians approve in a greater proportion the anti-Covid actions promoted by the Government. This last assertion could also be justified by the value of the PSA progress index proposed by Stefănescu in 2015 (after computations is deduced PSA < 0.5).

Except for the individual characteristic reg4 (the four regions of development of Romania), all the values of the risk probability p(X) for an arbitrary individual feature X are above the threshold 0.1 (*Figure 2*). It is reached even the inequality p(edu2) > 0.9 (*Figure 2*; the edu2 characteristic has two components, the middle education of the respondent and a high education). So, interpreting *Figure 2*, in the reported cases we take a high risk when we intend to reject the null hypothesis H0(X).

Therefore, from *Figure 2* we deduce the homogeneity of the opinions of individuals at least in the case of operation with the following features X: edu2 (middle and high education), work2 (the individual works or does not work), soc (the three types of social classes were considered), fam (families who have minor children or other types of families).

In contrast, the opinions of the people are statistically heterogeneous of the R1-R4 answers to the *art1ro* question when we have taken into consideration the four development regions of Romania (variable reg4; *Figure 2*).

We cannot speak about a strong association relationship between an individual characteristic X and the attitude of the individual regarding the governmental measures anti-Covid (variable *act1ro*). We obtained | GK(X, *act1ro*) | < 0.08 (*Figure 3*).

However, we perceive small differences of opinions at least in relation to the gender of the respondent, its social class or for the people who work (*Figure 3*).

Men, compared to women, are more inclined for extremes R1 and R4 answers regarding the appreciation of the anti-Covid activity of the Government, See the "very satisfied" variants (R1) / "not satisfied (R4)" from *Figure 4*.

The distribution of R1-R4 answers to the *act1ro* question is visibly changed in relation to the four age groups that were taken into account (*Figure 5*). In order to assess a possible tendency of the response R1-R4 distributions, we could use the partial relation of stochastic order (Le Breton, Peluso 2009), as well as other indicators compatible with this relationship (Stefanescu 2015).

Between the age4 individual features and the *act1ro* satisfaction with the anti-Covid actions promoted by the Romanian government there is a negative association relationship (*Figure 3*).

People with a middle education (interruption of the study at 17-19 years) or with a high (continuation of education after 19 years) have alike answers to the *act1ro* question (*Figure 6*).

In contrast, the distribution of R1-R4 answers to the *act1ro* question is different for people with a minimum education (interruption of schooling activity before the age of 16 years; *Figure 6*).

People who work compared to the other people, have given fewer extreme answers (R1 and R4) to the *act1ro* question ("very satisfied" (R1) / "not satisfied" (R4); *Figure 7*).

The structure of the R1-R4 answers to the *act1ro* question is perceived in relation to the social class (*Figure 8*). In addition, there is a positive association relationship, of low intensity, between the type of social class (variable soc) and the R1-R4 values taken by the *act1ro* variable (*Figure 3*).

People belonging to a higher social class are more satisfied by the anti-Covid activities imposed by the Romanian government (*Figure 3*).

The families with minor children, in relation to the other types of families, give more frequently the extremes answers R1 and R4 to the *act1ro* question ("very satisfied" *R1) / "not at all satisfied" (R4); *Figure 9*).

Except for the North West / Center region, all the other three development regions of Romania have similar distributions for the R1-R5 values of the *act1ro* question (see *Figure 10*). The validation of the previous statement can be achieved by computing the distances between the mentioned distributions (Euclidean distance, city-block similarity measure, etc.; Cox&Cox 2001).

Conclusions

We remind some aspects related to the present work:

Interviewed persons are rather satisfied with anti-Covid government measures promoted in April 2020 (*Figure 1*).

There are no significant differences between the R1-R4 answers to the *act1ro* question in the variants of gender, age, education, work, social status of the respondents or in the case of families with minor children (*Figure 2*).

Instead, there are significant differences between the opinions of the persons residing in the four development regions of Romania (variable reg4; *Figure 2*).

We cannot speak about a strong association relationship between an individual characteristic X and the attitude of the Romanian people regarding the governmental anti-Covid measures (see the values of the association index GK(X, *act1ro*); *Figure 3*).

However, perceptible differences of opinions are highlighted in relation to the gender, the social class or for the people who work (the values taken by Goodman-Kruskal indicator; *Figure 3*). We also notice the smaller differences of opinions in the case of the other individual features as: age, education, families with children (*Figure 3*).

The statistical study concerned the beginning period of the Covid-19 Pandemic (April 2020). However, the results obtained could be modified in relation to the stage that was taken into account in the evolution of the Covid epidemic. Thus, after only one year, in May 2021 we obtained GK(work2, *actro*) > 0.15 . This fact denotes the special importance of opinions for people who work to appreciate the anti-Covid activity of the Romanian Government (see also *Figure 11* from Stefanescu, 2022). This last result must be compared with the inequality GK(work2, *act1ro*) < 0.06 which was deduced in 2020 year; *Figure 3*).

The mathematical algorithms used in this research were programmed by the author in Matlab language.

REFERENCES

Agresti, A. (2010). Analysis of ordinal categorical data. New York: Wiley, second edition.

Alkarkhi, A.F.M. (2021). Applications of hypothesis testing for environmental science. Amsterdam: Elsevier.

Everitt, B.S. (1977). The analysis of contingency tables. New York: Springer Science + Business Media.

Kotz, S., Balakrishnan, N., Read, C., Vidakovic, B., Johnson, N.L. (2006). Encyclopedia of statistical sciences. New York: John Wiley & Sons, second edition.

Le Breton, M., Peluso, E. (2009). Third-degree stochastic dominance and inequality measurement. J. Econ. Inequal., 7(2009), 249–268.

Cox Trevor F., Cox Michael A.A. (2001). Multidimensional scaling, Chapman & Hall / CRC, London, second edition.

Stefănescu, M.L., Stefănescu, S. (2015). An indicator for measuring the evolution aspects for ordinal data. Paper presented at The 3rd International Conference *ESPERA-2015*, Bucharest, Romania, December 3-4, 2015, 10 pages.

Stefănescu, M.L. (2022). To what extent Romanians appreciate the governmental strategy concerning the Covid-19 vaccination in May 2021. International GAP Summit Scientific Research Congress, 1-3 July 2022. Editors: Hasan Çiftçi, Mohamed Yaşar, Adiyaman, Turkey 1050-1059.

***** European Commission, Brussels. Eurobarometer (Survey Round 1, 2020). GESIS Datenarchiv, Köln. ZA7736 Datenfile Version 1.0.0.

***** European Commission: Flash Eurobarometer 494: Attitudes on vaccination against Covid-19, May 2021. Ipsos European Public Affairs; GESIS Data Archive: ZA7771, dataset version 1.0.0. (2021).

***** Matlab, The Language of Technical Computing, Version 7.0.1, September 13, 2004.