INFLUENCE OF MACROECONOMIC INDICATORS ON QUALITY OF LIFE

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Abstract: *The main purpose of any human activity should be to ensure the highest possible quality of life, in full accordance with the personal ideals of each person. Quality of life is a concept that includes aspects associated with functionality and physical, mental, emotional, social health, personal perception, etc. Life satisfaction and well-being are more than the actual health of the body and the lack of disease, are a sum of aspects related to: physical health, mental health, emotional health, financial situation, occupation, education, social life, factors environmental. These factors are both objective and subjective and influence each other, the term quality of life being ultimately a cumulation of them.The article aims to describe the standard of living of the Romanian population in terms of quality of life. This will follow the evolution of macroeconomic indicators, at national and regional level, which highlight the standard of living between 1996 and 2020. The statistical data analyzed are taken from multiple sources: the database is Tempo-Online provided by the National Institute of Statistics, INS and EUROSTAT and are processed with Excel and Eviews software packages.*

Key words: quality of life, forecast, trend, statistical tests, GDP / capita.

JEL Classification Codes: D01, E24, E31, I3

1. INTRODUCTION

According to the World Health Organization (WHO), the quality of life depends on: the quality of the environment (MIC), the quality of the community environment (CMC) and compliance with all the defining requirements for the human condition (CU).

Quality is the character of a thing by which it specifically satisfies and adapts the absolutely particular requirements of the user.

Life is the totality of needs and requirements that must be met in order for the individual nature of a certain being to be able to express itself fully in its specific environment of existence according to the cosmic and ecological condition of that species. Quality of life is the ability of an existential environment to give a being the opportunity to achieve self-fulfillment. For the human being, however, this concept supports two connotations, derived from its particular specificity. Unlike the representatives of all other species that depend fundamentally in their existence on the external living environment and its resources, the human being, on the other hand, during its evolution acquires higher and higher degrees of emancipation under the tutelage of external factors.

Through its cosmic condition, the human being participates in two concomitant processes of transformation of the existential environment: the first concerns the changes made on and in the external environment, and the second the possibility for the human being to build another

type of environment, this time indoors. in its subjective reality, belonging to its own psychic system. In this way man discovers his basic mission specific to his personal condition: to become his own creator, that is, in other words, to participate actively, consciously through his own forces in shaping individual becoming, according to the processes of life evolution at the level of cosmic.

Man is a being who can only live and develop in the community. The quality of community life, however, is not the sum of the standard of quality of life of the individuals who make it up. On the one hand, since the community is not the sum of its members, but the result of a synergistic combination of factors; and on the other hand because the quality standard is determined subjectively. This means that, although objectively all the therapeutic conditions could be met for each member to be significantly satisfied with this quality of life requirement, the overall synergy should not be achieved. the whole community.

Quality of life expresses the conditions in which human life takes place, as they emerge from the comparison of objective / subjective realities with relevant human needs, values and general human aspirations. The evaluation of the quality of life can have a global expression, but it can also refer to distinct areas of life, such as mental well-being, interpersonal relationships, material well-being, quality of working life, social integration of the person, etc. (Zamfir, coord., 1984)

A basic indicator of the study of the quality of life of the population, such as the quality of life index is still in an exploratory stage from a methodological perspective, it does not yet have a unanimously accepted mathematical and even conceptual substantiation. Therefore, there may be different approaches to this concept, depending on the research interests of the authors. In the Romanian social exegesis, until now, a unitary concept for the quality of life index has not been elaborated yet, although some preoccupations in this sense have appeared in some scientific environments - for example, the approaches in the field of medicine.

According to Numbeo.com, the higher the quality of life index (the higher, the better) is a synthetic indicator, structured by combining in a mathematical formula several analytical indicators, which express the influences of factors of great impact on life. people. It can be considered an index of the living conditions of the population living or visiting the localities from which the data were collected. The respective analytical indicators are: the purchasing power index (the higher the better), the ratio between house prices and the income level of the population (lower is better), cost of living index (lower is better), safety index -safety (higher is better), health index (higher is better), traffic time index (lower is better), pollution index (lower is better), climate index is higher better.

2. RESEARCH METHODOLOGY

Eurostat has identified a number of indicators of quality of life that measure the progress of a society in nine dimensions: standard of living, productive activities, health, education, social interactions, economic security, governance and fundamental rights, the natural and living environment and satisfaction. of life (EUROSTAT, https://ec.europa.eu/eurostat/web/quality-of-life/data).

The object of study of this paper is the macroeconomic indicators within the "standard of living" dimension, namely: Gross Domestic Product per capita, is the indicator that best expresses the quality of life, the average gross nominal wage, final consumption per capita, employment rate and unemployment rate.

The analysis of the evolution and short-term trend of these indicators is performed with the help of linear and polynomial type II analytical functions. The analysis of the quality of life is also performed through the prism of the correlations between the macroeconomic indicators presented above. We used linear regression functions to analyze the correlations between these macroeconomic indicators. We considered that GDP / capita is a factorial variable with the variables resulting from the average gross nominal earnings, the final consumption per capita and the unemployment rate. Instead, the employment rate is a factorial variable for GDP / capita which is, in this case, a resultant variable.

The stationary character check of the series is performed using the Augmented Dickey-Fuller test. Time series are stationary if t_Statistic ≥ t_Critical and the probability p is less than the significance threshold $\alpha = 0,05$ (Șerbănescu and Necșulescu, 2013).

3. ANALYSIS OF DATA AND RESULTS OF RESEARCH ACTIVITY

The analysis of the descriptive statistics of the macroeconomic indicators studied in this paper, establishes that the data series are normally distributed (according to the distribution χ^2, the critical value of the Jarque_Bera statistical test for a significance threshold of 0.05 is 5.99 and the calculated values of the statistical test are between 1.36 and 2.06 with higher probabilities than the significance threshold $\alpha = 0.05$), the distributions are symmetrical (Skewness test values are lower than ± 1) and are not accelerated (Kurtosis test values are lower than ± 3) and are homogeneous (values of coefficient of variation are lower than 35%).

Table 1. Descriptive statistics for macroeconomic indicators expressing quality of life

	GDP / inhabitant - lei	Net average nominal earnings - lei	Final consumption / inhabitant - lei	Occupancy rate%	Unemployment rate %
Mean	22797.38	1214.37	16182.54	64.13	6.40
Median	26065.8	1309	18536.4	63.4	6.6
Standard Deviation	17211.93	935.88	11891.43	3.39	1.06
Coefficient of variation	17.55	17.71	17.35	5.30	16.55
Kurtosis	-0.93	-0.51	-0.86	-1.29	0.68
Skewness	0.36	0.56	0.35	0.31	-0.72
Jarque-Bera	1.49	1.58	1.36	2.06	2.03
Probability	0.47	0.45	0.51	0.36	0.36
Count	25	25	25	25	25

Source: Processing data taken from sites:
http://statistici.insse.ro:8077/tempo-online/#/pages/tables/insse-table,
https://ec.europa.eu/eurostat/databrowser/view/sdg_08_30/default/table?lang=en
https://ec.europa.eu/eurostat/databrowser/view/tps00203/default/table?lang=en

Analyzing the results of the processing presented in Table 2, we can say that for GDP / capita and final consumption / inhabitant, the series are stationary if we accept a significance level of 5% and for the average net nominal earnings, employment rate and unemployment rate, the series are stationary if we accept a significance level of 1%.

Table 2. Augmented Dickey-Fuller test results

	t-Statistic	Prob	t-Statistic	Prob	t-Statistic	Prob	t-Statistic	Prob	t-Statistic	Prob
	GDP / inhabitant - lei		Net average nominal earnings - lei		Final consumption / inhabitant - lei		Occupancy rate%		Unemployment rate %	
Augmented Dickey-Fuller	-3.0007	0.0497	-4.7139	0.0012	-3.5966	0.0146	-8.0487	0.0000	-11.1518	0.0000

| test statistic											
Test critical values:											
1% level	-3.752946										
5% level	-2.998064										
10% level	-2.638752										
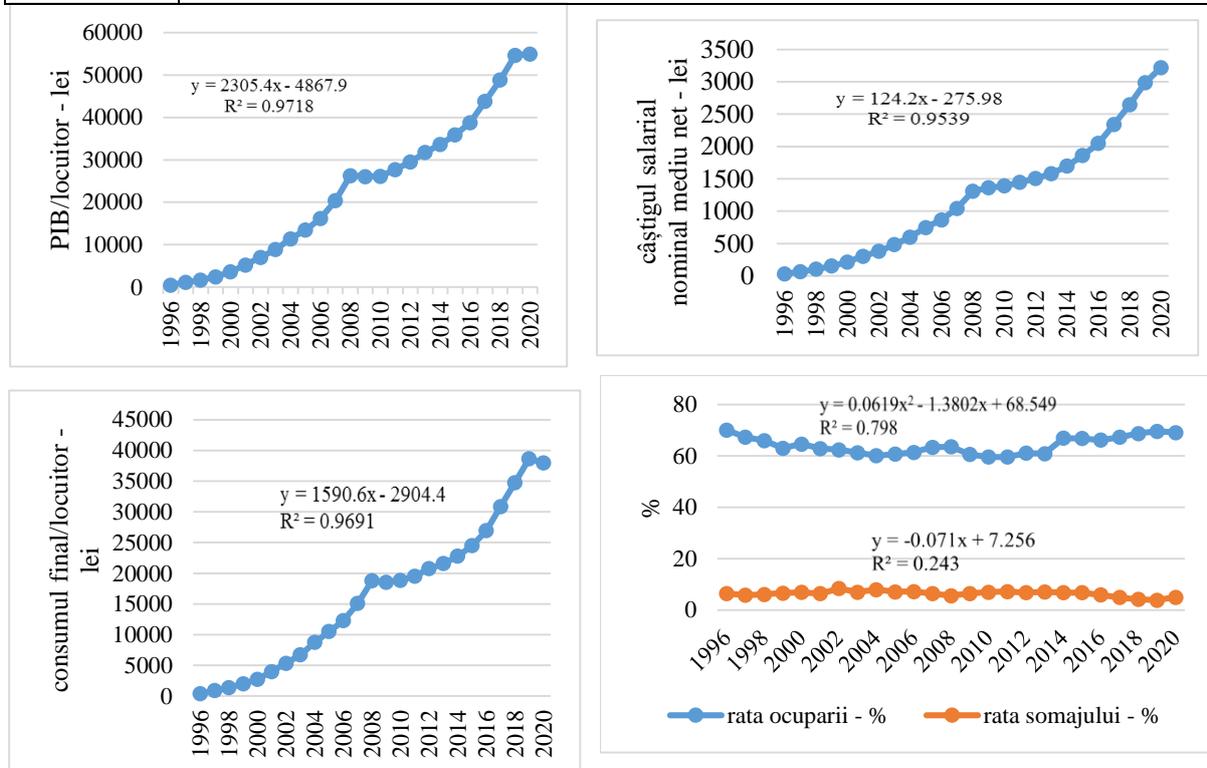
Figure 1. Evolution of macroeconomic indicators describing quality of life

Between 1996 and 2020, all the macroeconomic indicators analyzed have an increasing trend, except for the employment rate and the unemployment rate which have a decreasing trend. Thus, the GDP / inhabitant increases annually by an average of 2305.4 lei, the average net nominal earnings increase by an average of 124.2 lei / year, the final consumption / inhabitant increases annually by an average of 1590.6 lei, instead the employment rate and the unemployment rate decrease on average by 1.38 percentage points / year and 0.071 percentage points / year, respectively.

Before the beginning of the pandemic (2019), the GDP / inhabitant is 54654.3 lei. In the pandemic (year 2020), GDP / inhabitant increases by 321.4 lei, thus reaching 54975.7 lei, placing Romania on the 26th position in the EU, ahead of Bulgaria. In both 2019 and 2020, Romania has a GDP / capita of just under 50% of the EU average (50.6% and 49.9% respectively).

The average net nominal nominal earnings registered at the level of the economy, as GDP / inhabitant, will increase in 2020 compared to 2019 by 7.74 lei, reaching 3217 lei from 2986 lei. In 2019, Romania is considered a country with high earnings, but the crisis triggered by the pandemic has repositioned our country in the group of those with average earnings

Although GDP / capita is often used to measure the quality of life in countries, it is not always appropriate for the standard of living of households. For this purpose, a better indicator is the final consumption / inhabitant. Compared to 2019, in 2020, the final consumption / inhabitant is reduced by 1.75 percentage points, reaching from 38659.7 lei in 2019 to 37984.6 lei in 2020.

Final consumption / capita is more homogeneous in relation to GDP / capita (43.79% compared to 66.01%), but there are still significant differences between EU member states. Regarding the final consumption / inhabitant, Romania is in the year 2020 on the 22nd position, with approximately 30 percentage points below the EU average.

With the onset of the pandemic crisis (2020), the employment rate decreases compared to 2019 by 0.5 percentage points (reaching 69.1% from 69.6%) in parallel with the 1.1 percentage point increase in the unemployment rate (reaches 5% from 3.9%).

Continuing the study, we will extend the analysis of quality of life by using regression models applied to macroeconomic indicators that describe the well-being of the population.
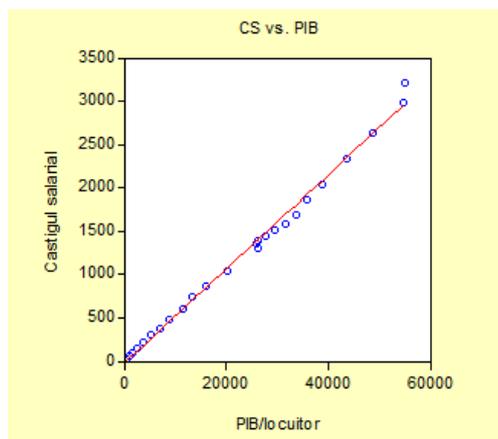
Figure 2. Correlation between GDP / capita and average monthly net nominal earnings

The regression function that describes the link between GDP / inhabitant and average monthly net nominal nominal earnings is of linear type: : $y = a + b*x + \varepsilon$ and the equation of the proposed regression model is: $CS = a + b* GDP / inhabitant + \varepsilon$ (ε is the residual variable).

There is a high-intensity direct link between GDP / capita and the average monthly net nominal earnings (Multiple R = 0.9969). The variation of the average net monthly nominal salary is justified in proportion of 99% by the GDP / inhabitant dynamics (R-squared = 0.9939 and Adjusted R-squared = 0.9936).

The validity of the chosen regression model is given by the calculated value of the statistical test F (3747,751 - value higher than the theoretical level $F_{0.05;1;23} = 4.28$), as well as by the probability associated with the test which is almost zero.

The parameterized econometric model is:

$CS = -21.46 + 0.054*PIB/locuitor + \varepsilon$
Multiple R = 0.9969
R-squared = 0.9939

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Equation: UNTITLED   Workfile: UNTITLED                    [ – ] [ □ ] [ ✕ ]
View Procs Objects | Print Name Freeze | Estimate Forecast Stats Resids

Dependent Variable: CS
Method: Least Squares
Date: 01/24/22   Time: 09:14
Sample: 1996 2020
Included observations: 25

        Variable      Coefficient   Std. Error   t-Statistic    Prob.

           C          -21.45924     25.10993     -0.854612     0.4016
          PIB          0.054209     0.000885     61.21887      0.0000

R-squared              0.993900     Mean dependent var        1214.360
Adjusted R-squared     0.993635     S.D. dependent var        935.8975
S.E. of regression     74.66551     Akaike info criterion     11.54053
Sum squared resid      128223.6     Schwarz criterion         11.63804
Log likelihood        -142.2566     F-statistic               3747.751
Durbin-Watson stat     0.537626     Prob(F-statistic)         0.000000
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Figure 3. Estimation of the parameters of the linear regression model between GDP / capita and average monthly net nominal earnings using the least squares method (OLS)

The annual increase of GDP / inhabitant by one leu determines the increase of the average net monthly nominal earnings on average by 0.054 lei / year. The high value of the free coefficient (a), more than 100 times the regression coefficient, indicates the presence of non-specific factors in the model with a significant and negative influence on the resultant variable (average monthly net nominal earnings).
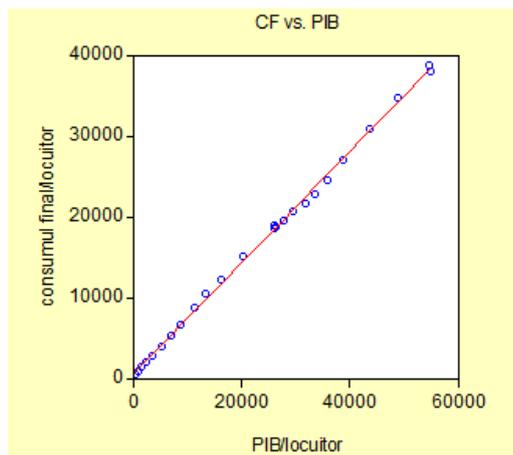
Figure 4. Correlation between GDP / capita and final consumption / inhabitant

The link between GDP / inhabitant and final consumption / inhabitant is described by the linear regression function: $y = a + b*x + \varepsilon$ and the equation of the proposed regression model is: $CF = a + b*PIB/locuitor + \varepsilon$

The link between the two variables, GDP / inhabitant and final consumption / inhabitant, is direct and of high intensity (Multiple R = 0.99985). The regression model explains in a proportion of approximately 99.8% the variation of final consumption / inhabitant by the variation of GDP / inhabitant (R-squared = 0.9989 and Adjusted R-squared = 0.9984).

The regression model is considered valid because the calculated value of the statistical test F (15652.13) is higher than the theoretical level $F_{0.05;1;23} = 4.28$ and the probability associated with the test is almost zero. So we can say that the regression model that describes the link between GDP / capita and final consumption / inhabitant is correct, which accurately reflects the evolution of the two macroeconomic indicators that describe the well-being of a country's population.
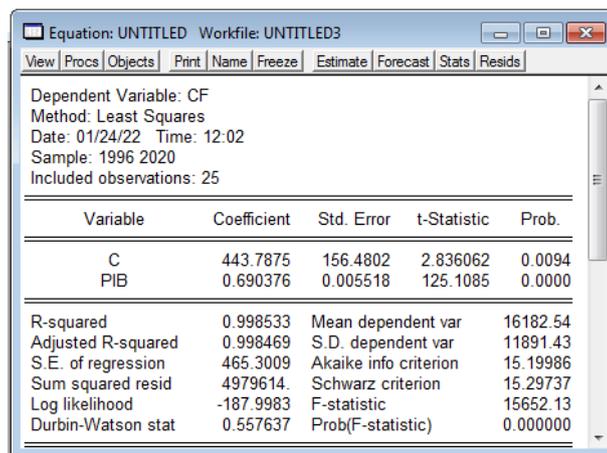
Figure 5. Estimating the parameters of the linear regression model between GDP / capita and final consumption / inhabitant using the least squares method (OLS)

The parameterized econometric model is:

CF = 443.79 + 0.69*PIB/locuitor + ε
Multiple R = 0.99985
R-squared = 0.9985

The annual increase of GDP / inhabitant by one leu determines the increase of final consumption / inhabitant on average by 0.69 lei / year. The value of the free coefficient (a) much higher than the regression coefficient, more than 100 times, indicates the presence of non-specific factors in the model with a significant and positive influence on the final consumption / inhabitant.
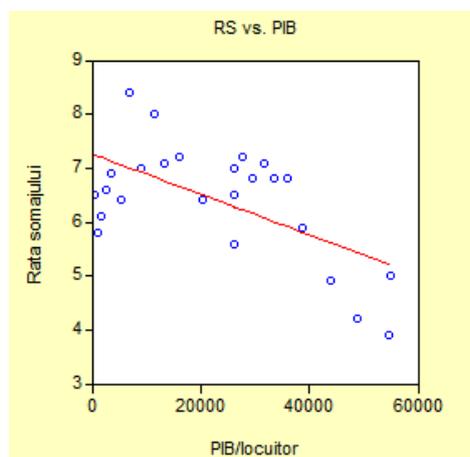
Figure 6. Correlation between GDP / capita and unemployment rate

The link between the two macroeconomic indicators, GDP / capita and unemployment rate, is described by the linear regression function: y = a + b * x+ ε   and the equation of the proposed regression model is: RS = a + b * GDP / inhabitant +ε

Figure 7. Estimating the parameters of the linear regression model between GDP / capita and unemployment rate using the least squares method (OLS)

The negative value of the regression coefficient and the rather small value of the correlation ratio, indicate an inversely proportional and medium intensity link between the unemployment rate and GDP / inhabitant (b = -0.000037 and Multiple R = - 0.6073 respectively). The model is applicable in proportion of over 34% (Adjusted R-squared = 0.3414) and the variation of the unemployment rate is explained in proportion of 36.88% by the variation of GDP / inhabitant (R-squared = 0.368848).

The regression model is considered valid because the calculated value of the statistical test F (13.44128) is higher than the theoretical level $F_{0.05;1;23} = 4.28$ and the probability associated with the test is almost zero.

The parameterized econometric model is:

RS = 7.26 - 0.000037* GDP / inhabitant + ε
Multiple R = -0.6073
R-squared = 0.3414

The annual increase of GDP / inhabitant by one leu determines the reduction of the unemployment rate on average by 0.000037 percentage points / year. The value of free time identifies the presence of unspecified factors in the model with a positive and large influence on the unemployment rate.
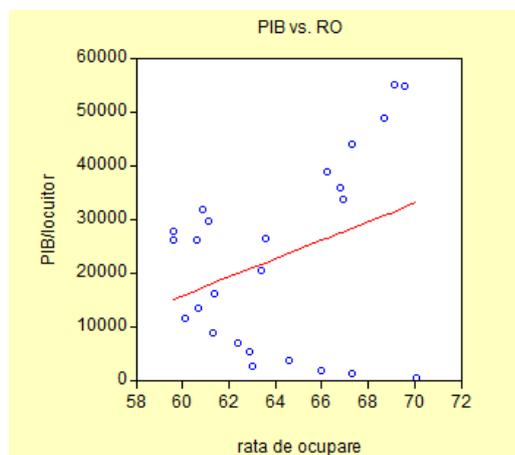

Figure 8. Correlation between employment rate and GDP / capita

The regression function that describes the link between the two indicators, the employment rate (the factorial variable of the model) and the GDP / inhabitant (the resultant variable of the model) is of the form: $y = a + b * x + \varepsilon$ and the equation of the model The proposed regression is: GDP / inhabitant $= a + b * RO + \varepsilon$
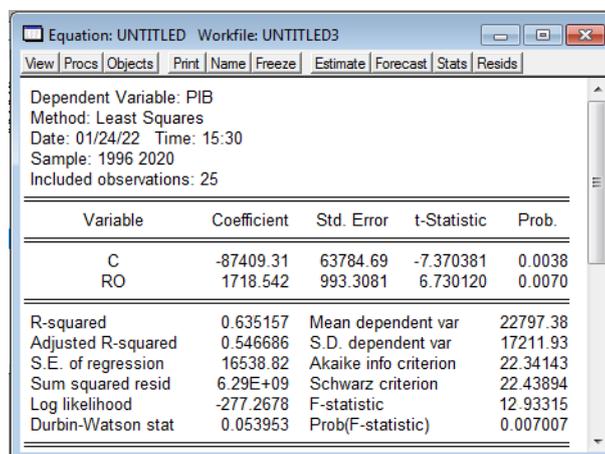
Figure 9. Estimating the parameters of the linear regression model between the employment rate and the GDP / capita using the least squares method (OLS)

We have a direct link of medium intensity (Multiple R = 0.7969) between the two macroeconomic indicators, employment rate and GDP / capita. The regression model is applicable in proportion of 55% (Adjusted R-squared = 0.5467) and the variation of GDP / inhabitant is explained in proportion of 63.52% by the variation of the employment rate (R-squared = 0.635157).

The proposed regression model is valid because the calculated value of the statistical test F (12.93315) is higher than the theoretical level $F_{0.05;1;23} = 4.28$ and the probability associated with the test is 0.007 is lower than the significance threshold $\alpha = 0.05$.

The parameterized econometric model is:

> GDP / capita = -87409.31 + 1718.54*RO + ε
> Multiple R = 0.7969
> R-squared = 0.5467

The annual increase of the employment rate by one percentage point determines the increase of GDP / inhabitant on average by 1718.54 lei / year. The value of free time identifies the presence of unspecified factors in the model with a negative and reduced influence on GDP / capita (the value of free time is about 50 times higher than the regression coefficient).

4. CONCLUSIONS

In 2020, the year that coincides with the beginning of the pandemic, the final consumption/inhabitant and the employment rate are the only indicators whose values decrease compared to 2019, otherwise there are slight increases for GDP / inhabitant, average monthly net nominal earnings , and the unemployment rate. The decrease of the final consumption / inhabitant and of the employment rate corroborated with the increase of the unemployment rate leads to the decrease of the quality of life of the population in Romania, thus placing it on the last places in the EU. Romania is among the countries with the highest increase in the unemployment rate during the pandemic as a result of the closure of some businesses in the field

of Horeca. The decline in the quality of life is diminished by the increase in GDP / capita and earnings.

Between 1996 and 2020, all the macroeconomic indicators analyzed have an increasing trend, except for the employment rate and the unemployment rate which have a decreasing trend.

The research results showed positive correlations between GDP / inhabitant, average monthly net nominal earnings and employment rate and negative correlation between GDP / inhabitant and unemployment rate. The strongest correlation is between GDP / capita and final consumption / inhabitant, followed by the correlation between GDP / capita and average monthly net nominal earnings.

Factors not specified in the proposed regression models have positive influences on the outcome variables: final consumption / inhabitant and unemployment rate and negative influences on the outcome variable average monthly net nominal earnings.

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