ANALYSIS MODELS OF THE LIFE QUALITY STANDARD IN ROMANIA

Prof. Constantin ANGHELACHE PhD (actincon@yahoo.com)

Bucharest University of Economic Studies / "Artifex" University of Bucharest

Prof. Alexandru MANOLE PhD (alexandru.manole@gmail.com)

"Artifex" University of Bucharest

 $\textbf{Assoc. prof. M\"{a}d\"{a}lina-Gabriela} \ \textbf{ANGHEL PhD} \ (\textit{madalinagabriela_anghel@yahoo.com})$

"Artifex" University of Bucharest

Assoc. prof. Florin Paul Costel LILEA PhD (florin.lilea@gmail.com)

"Artifex" University of Bucharest

Lecturer Mariana BUNEA PhD (maribunea@yahoo.com)

"Artifex" University of Bucharest

Abstract

The indicator that best expresses the quality of life (welfare) is gross domestic product per capita. The two factors that account for economic growth (number of employees and labor productivity) are taken into account, but the macroeconomic outcome must provide an average living standard for the entire population. The system of national accounts used by the Member States of the European Union as well as by other states as a form of evidence and macroeconomic analysis contains all the elements needed for such a study.

In the period under consideration, regardless of the method of calculating GDP, we obtain a precise quantitative amount that, compared to previous developments, suggests how the quality of life of the population has evolved. In analyzing the quality of life, we have to go from the structure of the population, number of employees, other categories, expressed by statistical indicators.

Keywords: standard of live, indicator, GDP per capita, correlation, banking product

JEL Classification: 1131, O15

Introduction

The Human Development Index (HDI) or human development indicator is a representative measure in the sense that it expresses the average achievements of a country in a three-dimensional space, namely: the average life expectancy indicator, the education index and the gross domestic product per capita. HDI starts from determining one indicator for each of the three dimensions. The indicator is equal to the current value minus the minimum value above the maximum value minus the minimum value.

The minimum life expectancy at birth is 25 years and the maximum is 85. The school enrollment rate is minimum 0 and a maximum of 100, and the national per capita product starts from a calculated minimum.

Literature review

Wagner (2010) discusses on the banks' attitude towards risks. Spreng, Mackenzie and Olshavsky (1996) analyze the factors of consumer satisfaction. Heskett, et.al. (1994) discuss on the capitalization of the service profit chain. Anghelache, Anghel, Popovici (2015) apply the principles of multiple regression in the analysis of private and public consumption. Anghelache, Manole, Anghel (2015) consider the impact of the final consumption and gross investments on the main indicator of the national economy. Claessens and Laeven (2004) analyze international data on bank competition. Hellmann, Murdock and Stiglitz (2000) focus on the characteristics of moral hazard in banking and prudential regulations. Anghelache, Manole and Anghel (2015) include the consumption related factors in the complex system of GDP formation, they use the multiple regression to validate the impact of these variables. Beck, Demirguc-Kunt and Levine (2006) study the link between bank concentration, competition and crisis. Caruana (2002) develops on the advantages of quality services, Gummesson (1993) discusses on the management of quality in service branch. Prabhakaran and Satya (2003) analyze the peculiarities of banking services, Peppard (2000) studies the characteristics of customer relationships in the branch of financial services, while Peppers, Rogers, and Homby (2004) take into account the customer intimacy in the scope of those services. Churchill and Surprenant (1982) study the factors that influence the satisfaction of the consumers, Levesque and McDougall (1996) focus on the same topic, but on the retail banking sector. de Guevara and Maudos (2007) develop on the factors that generate and influence power on the banking market, Keeley (1990) approaches the topic of market power from a different angle. Oliver (1980) presents a cognitive model of satisfaction. Reichheld and Sasser Jr. (1990) are preoccupied with the quality of services. Schaeck, Cihak and Wolfe (2009) evaluate the correlation between competitiveness and stability of the banking systems. Storbacka, Strandvik and Grönroos (1994) develop on the quality of customer relationships.

Methodology of research and data

Per capita income reflects all other dimensions of human development that have been explicitly introduced in the first two. The calculation relationship is:

 $HDI = \frac{average\ life\ expectancy + school\ occupancy\ rate + gross\ domestic\ product\ per\ capita}{3}$

In concrete studies, a number of other indicators such as HPI-1 (the human poverty index for developing countries), are being calculated, which measures derivatives (the distance) in the three basic dimensions of human development..

Recent quality of life standards reveal access to economic outcomes for the entire population:

$$HPI-1 = [1/3(P_1^3 + P_2^3 + P_3^3)]^{1/3}$$

 $HPI-1 = [1/3(P_1^3 + P_2^3 + P_3^3)]^{1/3}$ Another indicator is the HPI-2 (The Human Poverty Index for selected OECD Countries), which in turn expresses the removal or closeness to the quality of life (decent living standard).

Gross Domestic Product GDP Index is based on:

$$dimension \ index = \frac{actual \ value - minimum \ value}{maximum \ value - minimum \ value}$$

On the basis of those expressed in terms of standard and welfare, Top Priority Countries sau High Priority Countries are calculated. For each objective, it is grouped into two groups of countries with a high level of development and well-being, and countries with a lower level.

Progress is to establish real progress (RP) based on the formula:

$$RP = \frac{(x_{t1} - x_{t0})}{(t_1 - t_0)x_{t0}}$$
 and
$$RP = \frac{(x_{t1} - x_{t0})}{(t_1 - t_0)(100 - x_{t0})}$$

where: t_o is year 1990 or a near year 1990 for which statistical data are available, t_1 is the most recent year for which there are statistical data, x_{t1} , x_{t2} are the indicator values for those years, taken into account.

We will compare the quality of life (welfare) with the correlation between gross domestic product per capita and gross average salary, net average wage and final consumption.

It is possible to analyze the level of the quality of life (welfare) as compared to the offer of the national banking system.

The analysis of the quality of life (well-being) of the Romanian population, using econometric models, especially simple and multiple linear regression, considering variables as follows: Gross Domestic Product per capita, showing the value created in a one-year period of one people.

We chose to consider GDP per capita as a variable variable with the resulting variables, final consumption per capita, gross average salary in economy and net average wage economy.

We believe that there is a very close correlation between gross domestic product per capita and all other indicators that reflect the quality of life (well-being) and depends very much on the concrete results achieved over a one-year period.

A first interpretation can be made on the evolution of indicators reported to the population or active population, such as final consumption, gross average salary and net average wage per inhabitant. Deeper analysis can also be made by analyzing the purchasing power parity of income in Romania to reveal the strength or material and financial satisfaction of the population by considering the income at a given moment.

In households, the situation is analyzable on the basis of the household survey, which basically reflects the same trend.

Methods and models of life quality analysis through the correlation between gross average wage, loan volume, active population deposits and average interest rates

In the sensitivity analysis, an assessment was made of the quality of life (welfare) of the active population through an empirical (minimal) calculation for the same analysis period, with input variables: gross average wage, gain earned by placing deposits in deposits, the price paid for accessed credits (Table 1), and other expenses.

Evolution of gross average wage, loans, deposits of the working population and average interest rates

Table 1

				Credite				Depozite				
			Lei			Valută		Lei		Valută		
Perioada	Populație activă	Salariu mediu brut	mediu/pers		mediu/pers	Rata medie a dobanzii EUR	Rata medie a dobanzii USD	mediu/pers		Depozit mediu/pers	medie a dobânzii	Rata medie a dobânzii USD
Dec. 2016	9,056,000	2,681	7,298	6.88	5,199	4.45	6.97	7,445	1.29	4,530	0.55	0.64
Dec. 2015	9,159,000	2,415	5,742	8.24	6,059	4.97	6.88	7,211	2.13	4,525	1.15	1.11
Dec. 2014	9,243,000	2,298	4,339	10.28	6,721	5.31	7.52	7,071	3.32	4,565	1.90	1.57
Dec. 2013	9,977,000	2,223	3,467	12.56	6,910	5.44	7.83	6,382	4.76	4,193	2.68	2.05
Dec. 2012	9,964,000	2,117	3,444	13.30	7,066	6.31	8.10	6,062	5.67	4,007	3.30	2.30
Dec. 2011	9,868,000	2,022	3,550	14.09	7,042	7.11	7.92	5,835	6.58	3,527	3.17	2.16
Dec. 2010	9,965,000	1,836	3,604	15.81	6,668	7.28	8.39	5,018	7.70	3,366	3.09	2.11
Dec. 2009	9,924,000	1,693	3,911	17.22	6,220	8.09	9.02	4,321	11.98	3,039	4.95	2.73
Dec. 2008	9,944,000	1,550	4,117	15.18	5,891	8.63	10.31	2,770	8.99	1,947	4.31	3.21
Dec. 2007	9,994,000	1,270	3,359	14.53	3,815	8.97	11.25	2,447	6.73	1,734	3.41	3.79

Relevant to the way in which the income of the population under the influence of the Romanian banking system has evolved over the last ten years is an analysis of the main aggregates that give significance to this evolution. The number of active population is an indicator, which from 2007 to 2016 had

a decreasing trend, as well as the total population of Romania that registered the same way of evolution. Mortinatality had an increasing index, which led to a decrease in Romania's total population.

Considering the gross average salary in the economy, and finding that it had an upward trend in the sense that from 1270 lei / employee (person) reached to 2681 lei on 30.12.2016, interesting is how the population used to access the credits banking. Those who have used credits have taken note of the interest rate applied to each of the three currencies and, as a rule, without taking into account the effect of the exchange rate between the leu and the euro or the dollar.

Many of the creditors' calculations have led to losses for people who have recourse to this source to increase their income. In line with the increase in the average gross salary, the average credit per person also increased from December 2007 when it was 3359 lei / person up to 7298 lei in 2016.

The loans in ROL were certain syncope, in the sense that this growth was not uniform, especially in the last three years, 2014-2016.

Interest on bank lending in the banking system followed, on average, a declining trend, from 14.53% in December 2007 to 6.88% in December 2016. During the period when the effects of the economic crisis were pronounced, interest Followed a rising course from 2008 to 2011.

A situation that influenced both the volume of credits extended to the population was constituted by the banking policy in the field of deposits granted to the population. The deposits in lei increased gradually with the increase of the average gross salary from 2.447 lei / person in 2007 to 7.445 lei / person in 2016.

The average interest rate on deposits deposited by the population declined gradually from 6.73% in December 2007, with small fluctuations during the economic-financial crisis 2008-2010, at 1.29 on December 30, 2016.

On the basis of statistical analysis, we can determine the correlation between the volume of loans and the volume of interest. But the most suggestive is the formation of a regression model based on the straight line function of the form:

$$Y=a+b x_i + \varepsilon$$
Equation of the proposed regression model is:

$$C=a+b \text{ GWA} + \varepsilon$$

Dependent Variable: LAP

Method: Least Squares (Gauss-Newton / Marquardt steps)

Date: 04/19/17 Time: 18:27 Sample: 2007 2016 Included observations: 10 LAP = C(1)+C(2)*GWA

	Coefficient	Std. Error	t-Statistic	Prob.
C(1) C(2)	181.8437 2.039919	1576.187 0.768504	0.115369 2.654403	0.9110 0.0291
R-squared Adjusted R-squared S.E. of regression Sum squared resid Log likelihood F-statistic Prob(F-statistic)	0.468292 0.401829 985.4048 7768181. -82.00419 7.045854 0.029057	Mean depende S.D. depende Akaike info cr Schwarz crite Hannan-Quin Durbin-Wats c	ent var iterion rion n criter.	4283.100 1274.095 16.80084 16.86136 16.73445 0.496347

The regression model considered becomes:

$$C = 181,8437 + 2,039919 \text{ SMB} + \varepsilon$$

The value of the R-squared coefficient, as well as the Adjusted R-squared, does not exceed 50%. The average credit variation is explained less than 50% by the evolution of the gross average wage.

At a variation of 1 leu of the average wage, more than double the average credit growth is expected. The free term has a significant value, almost 100 times higher than the C (2) coefficient, indicating the presence of additional factors that influence the credit level in addition to the gross average wage.

Similar is the model used when considering the value of the indicators expressed in euro or US dollar.

Dependent Variable: LAP

Date: 04/19/17 Time: 18:38 Sample: 2007 2016 Included observations: 10 LAP = C(1)+C(2)*IRA

	Coefficient	Std. Error	t-Statistic	Prob.
C(1) C(2)	8260.856 -310.5438	1018.358 77.15456	8.111934 -4.024957	0.0000 0.0038
R-squared Adjusted R-squared S.E. of regression Sum squared resid Log likelihood F-statistic Prob(F-statistic)	0.669425 0.628104 776.9854 4829651. -79.62788 16.20028 0.003815	Mean depende S.D. depende Akaike info cr Schwarz crite Hannan-Quin Durbin-Wats o	ent var iterion rion n criter.	4283.100 1274.095 16.32558 16.38609 16.25919 0.843787

The resulting regression function can be written:

$$C = 8260,856 - 310,5438 \text{ IRA} + \varepsilon$$

R-squared and Adjusted R-squared coefficient values are greater than 62%, which represents a significant level of confidence that can be attributed to the model.

At the same time, the relationship of inverse proportionality between the main indicator and the independent variable, respectively the increase with a unit (percentage point) of the interest rate will result in a decrease by 310 lei of the average credit value.

The same correlation also arises if we consider the same model, but taking into account the indicators expressed in another currency. The model is of the form:

$$C_v = a + b EIRA + \varepsilon$$

where:

EIRA = average interest rate on foreign currency loans.

Dependent Variable: ELAP

Method: Least Squares (Gauss-Newton / Marquardt steps)

Date: 04/19/17 Time: 18:47 Sample: 2007 2016 Included observations: 10 ELAP = C(1) + C(2) * EIRA

	Coefficient	Std. Error	t-Statistic	Prob.
C(1) C(2)	7559.617 -210.4142	1442.522 211.3043	5.240554 -0.995787	0.0008 0.3485
R-squared Adjusted R-squared S.E. of regression Sum squared resid Log likelihood F-statistic Prob(F-statistic)	0.110280 -0.000935 1013.870 8223455. -82.28896 0.991593 0.348515	Mean depend S.D. depende Akaike info cr Schwarz crite Hannan-Quin Durbin-Watso	ent var iterion rion in criter.	6159.100 1013.396 16.85779 16.91831 16.79141 0.719422

The regression function can be written:

$$C_v = 7559,617 - 210,4142 EIRA$$

Coefficient values reflect a poor correlation between the two variables. We note the reverse link between the independent variable and the factorial variable, as well as its magnitude.

The free term, in conjunction with the R-squared and the Adjusted R-squared, determines the need to perform additional analyzes to delineate significant influences on the average value of credits expressed in foreign currency.

The correlation between the average deposit per person in lei and the gross average salary in lei is as follows:

$D = a + b GWA + \varepsilon$,

Dependent Variable: DAP

Method: Least Squares (Gauss-Newton / Marquardt steps)

Date: 04/19/17 Time: 18:55 Sample: 2007 2016 Included observations: 10 DAP = C(1) + C(2)*GWA

	Coefficient	Std. Error	t-Statistic	Prob.
C(1) C(2)	-2706.652 4.060111	728.3443 0.355120	-3.716171 11.43307	0.0059 0.0000
R-squared Adjusted R-squared S.E. of regression Sum squared resid Log likelihood F-statistic Prob(F-statistic)	0.942328 0.935119 455.3483 1658737. -74.28429 130.7150 0.000003	Mean depend S.D. depende Akaike info cr Schwarz crite Hannan-Quir Durbin-Watso	ent var iterion rion nn criter.	5456.200 1787.657 15.25686 15.31738 15.19047 1.588273

$$D = 2706,652 + 4,060111 \text{ GWA} + \varepsilon$$

The values of the statistical tests applied on the model confirm a close correlation between the evolution of the average deposit per capita and the Gross Average Salary indicator. The model is sufficiently representative for over 93% of the situations.

Increase with a unit of wages is expected to result in increases of over 4.06 on the average deposit. The significant level of the C (1) coefficient indicates the presence of additional factors, which were not considered in the construction of this model and which have an overall negative influence.

The correlation between the average deposit per person in lei and the average interest rate in lei is as follows:

$$D = a + b DIRA + \varepsilon$$
.

Dependent Variable: DAP

Method: Least Squares (Gauss-Newton / Marquardt steps)

Date: 04/19/17 Time: 19:02 Sample: 2007 2016 Included observations: 10 DAP = C(1) + C(2) * DIRA

	Coefficient	Std. Error	t-Statistic	Prob.
C(1) C(2)	7924.051 -417.2192	851.8617 127.8073	9.302040 -3.264440	0.0000 0.0115
R-squared Adjusted R-squared S.E. of regression Sum squared resid Log likelihood F-statistic Prob(F-statistic)	0.571197 0.517596 1241.623 12333015 -84.31541 10.65657 0.011451	Mean depende S.D. depende Akaike info cri Schwarz crite Hannan-Quin Durbin-Watso	ent var iterion rion n criter.	5456.200 1787.657 17.26308 17.32360 17.19670 0.885179

$$D = 7924,051 - 417,2192 DIRA + \varepsilon$$
.

The model is applicable in excess of 51%. The value of the regression coefficient is negative, which implies high volatility and, of course, the inversely proportional level of deposits compared to the interest rate over the period under review.

For the 10 observations subjected to the estimation exercise, the freeterm level means the presence of additional factors with positive influence, which would lead to the theoretical conclusion of the direct proportionality between the interest rate on deposits and the average deposits.

The correlation between the average deposit per person in foreign currency and the average interest rate on foreign currency deposits is as follows:

$$Dv = a + b EDIRA + \varepsilon$$

Dependent Variable: EDAP

Method: Least Squares (Gauss-Newton / Marquardt steps)

Date: 04/19/17 Time: 19:09 Sample: 2007 2016 Included observations: 10 EDAP = C(1) + C(2) * EDIRA

	Coefficient	Std. Error	t-Statistic	Prob.
C(1) C(2)	5160.290 -567.1659	578.1510 185.0511	8.925506 -3.064915	0.0000 0.0155
R-squared Adjusted R-squared S.E. of regression Sum squared resid Log likelihood F-statistic Prob(F-statistic)	0.540063 0.482571 747.7779 4473375. -79.24473 9.393705 0.015467	Mean depend S.D. depende Akaike info co Schwarz crite Hannan-Quir Durbin-Wats	ent var riterion rion nn criter.	3543.300 1039.555 16.24895 16.30946 16.18256 0.867543

$$Dv = 5160,290 - 567,1659 EDIRA + \varepsilon$$

The parameters of the estimated model for the foreign currency-denominated variables lead to the same general conclusions as in the previous model, constructed with the variables measured in ROL.

The regression coefficient expresses an inverse link between the independent and dependent variables. The value of the free term is sufficiently significant to consider the existence of additional factors of influence, which overall have a positive influence on the main indicator.

Linear Multiple Regression Analysis

In order to quantify the evolution of the quality of life (welfare) we will expand the analysis by using the regression model applied to macroeconomic indicators such as gross domestic product per capita, gross average wage, net average wage or final consumption.



Regression function:

$$AGW = a + b GDP + \varepsilon$$

Proposed regression function:

$$AGW = 93,51080 + 0,077559 GDP + \varepsilon$$

Estimated regression model parameters indicate a high level of precision associated with the resulting equation.

Dependent Variable: AGW
Method: Least Squares (Gauss-Newton / Marquardt steps)
Date: 04/21/17 Time: 13:05
Sample: 1995 2016
Included observations: 22
AGW = C(1) + C(2)*GDP

	Coefficient	Std. Error	t-Statistic	Prob.
C(1) C(2)	93.51080 0.077559	29.56207 0.001412	3.163203 54.94479	0.0049 0.0000
R-squared Adjusted R-squared S.E. of regression Sum squared resid Log likelihood F-statistic Prob(F-statistic)	0.993419 0.993090 84.09347 141434.2 -127.6707 3018.930 0.000000	Mean depend S.D. depende Akaike info cri Schwarz criter Hannan-Quin Durbin-Watso	nt var terion rion n criter.	1384.976 1011.610 11.78824 11.88743 11.81161 0.890184

The evolution of the gross average wage can be explained by more than 99% GDP GDP per capita: the increase by one unit of GDP per capita determines the increase by over 0.77 monetary units of the gross average salary.

The value of the free parameter is significant and demonstrates the existence of additional factors that influence the independent variable and whose cumulative impact is positive.

Correlation between net average wage and gross domestic product per capita

Dependent Variable: ANW

Method: Least Squares (Gauss-Newton / Marquardt steps)

Date: 04/21/17 Time: 13:08 Sample: 1995 2016 Included observations: 22 ANW = C(1) + C(2) * GDP

	Coefficient	Std. Error	t-Statistic	Prob.
C(1) C(2)	79.40148 0.055845	22.03077 0.001052	3.604118 53.08589	0.0018 0.0000
R-squared Adjusted R-squared S.E. of regression Sum squared resid Log likelihood F-statistic Prob(F-statistic)	0.992953 0.992601 62.66962 78549.63 -121.2015 2818.112 0.000000	Mean depend S.D. depende Akaike info cri Schwarz criter Hannan-Quin Durbin-Watso	nt var terion rion n criter.	1009.288 728.5547 11.20014 11.29932 11.22350 0.838889

ANW = 79,40148 + 0,055845 GDP + ε

We note the major influence of gross domestic product per capita, which explains the evolution of the independent variable for over 99% of cases.

The change by one lion of GDP per capita determines, according to the regression model, the 5.58-fold change in net average wage.

It is also noticed the high level of free expression of additional factors not included in this model, whose combined influence is positive.

Final consumption and GDP per capita

Dependent Variable: FC

Method: Least Squares (Gauss-Newton / Marquardt steps)

Date: 04/21/17 Time: 13:09 Sample: 1995 2016 Included observations: 22 FC = C(1)+C(2)*GDP

	Coefficient	Std. Error	t-Statistic	Prob.
C(1) C(2)	1681.211 15.07845	4351.897 0.207802	0.386317 72.56148	0.7033 0.0000
R-squared Adjusted R-squared S.E. of regression Sum squared resid Log likelihood F-statistic Prob(F-statistic)	0.996216 0.996027 12379.59 3.07E+09 -237.4919 5265.168 0.000000	Mean depend S.D. depende Akaike info cri Schwarz criter Hannan-Quin Durbin-Wats c	nt var terion rion n criter.	252757.7 196393.0 21.77199 21.87118 21.79536 1.075636

$FC = 1681,211 + 15,07845 GDP + \varepsilon$

The values of R-squared and Adjusted R-squared coefficients confirm that the model explains the change in final consumption by GDP / capita over 99.6%.

The increase by one unit of GDP per capita leads to an increase of approximately 15.07 lei of final consumption. The free coefficient C (1) is more than 100 times higher than the regression coefficient C (2), so we observe the presence of factors that are not part of the estimated regression model and whose influence, in total, is positive.

Conclusion

In this research, the authors sought to highlight how the quality of life (welfare) of the population has evolved from the macroeconomic results and the evolution of the population's incomes.

It was revealed the possibility of using econometric models, in the present case using primarily the simple linear regression model on the basis of which the regression parameters with the meanings mentioned in each case were calculated.

Starting from the fact that it is the banking system that offers the possibility to increase the financial resources available to the population, the study also pointed out, based on the aggregate indicators of the banking system, how this banking system contributed to the increase of the Life (welfare).

The banking system offers these possibilities, but the number of those who use natural resources to fill their own resources through bank resources is not that big. A coefficient of covariance was used in this regard, and then the simple linear regression model was used, on the basis of which the regression parameters were calculated, reflecting how the banking system is useful for all the citizens of the country.

Aggregate indicators can be a source of analysis and interpretation of how the quality of life (welfare) has evolved, and if it is necessary to analyze it, it can also be extended by international comparisons using the indicators reported to a person. Only in this way are the results achieved enlightening.

The results of the present study revealed a positive correlation between the volume of the credits of the population and the volume of the population's availability, which demonstrates the final consumer's interest towards the products offered by the Romanian banking institutions.

Also, there was a lack of correlation between the volume of credits and the return on assets (ROA).

Behavior or consumer appetite for accessing banking products (in this case credit) is not influenced by the profitability of the supplier banking institutions.

The "welfare" of consumers of banking products is influenced by the level of earnings gained from labor remuneration, being influenced to a small extent by the saving component.

This is manifested in the context of a decreasing trend of the interest rates on the deposits attracted by the banking institutions, reaching values close to zero.

Even if there is no direct influence on the profitability of banks and the quality of life (welfare) of consumers of banking products, they will continue to take steps to strengthen the trust of beneficiaries by reducing the "burden" of loans granted through optimal solutions offered to consumers in difficult situations Payment, through information and financial education on the cost of products and services offered, and on the constant reduction of interest rates on loans granted.

The authors believe that consumers need to be cautious about exposure to the risks arising from the consumption of banking products, so as to avoid the occurrence of inability to repay debts.

This study is a basis for the further research that can be done in this area, an important step being the influence of the fiscal burden, coupled with an analysis of the degree of influence of bank disputes, their alternative solution and, in the end, an in-depth analysis of Quality of life (welfare) of consumers of banking products.

The analysis was also made using econometric models based on other macroeconomic indicators such as gross domestic product per capita, gross average wage, net average wage or final consumption of the population.

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