

The Correlation between Final Consumption, Gross Available Income and Gross Investment: An Econometric Analysis

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Abstract *This paper presents an econometric approach to the issue of analysis of the final consumption. Among its influence factors, the gross investments and the gross available income are considered to be especially important, since they reflect the destination of monetary resources. We have designed, tested and commented an econometric model that describes a correlation between these indicators.*

Key words Consumption, income, investments, econometric, influence

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1. Introduction

Aggregate demand and implicitly consumption in any economy are conditioned by the size of available income. In Romania's case, this principle is also supported by the very large share of final consumption in GDP that is approximately 70%. Gross available income measures the income available to the people that can be spent (final consumption) and savings that can be transformed into investment operations.

In this analysis, we have studied the correlation between final consumption, gross disposable income and gross investments in Romania for the reference time period 1990-2014. The objectives of this analysis is to determine the function that best describes the relationship between the indicators, observing the link that is established between these three measures and estimate an econometric model that is valid and statistically significant.

2. Literature review

Analysis of the contribution of each factor on final consumption evolves differently from one year to the next, while the factors are found simultaneously in different proportions in the interest of multifactorial approach that is realistic and provides a number of advantages compared to unifactorial models, namely a more accurate description of the economic process analyzed (measured through the values of the three indicators), because it is conducted under the impulse of the simultaneous action of several important factors, information on the structure of the process allows quantifying causal links, and increase the determination ratio to close by 1 (or 100%).

Anghelache (coord, 2013) provide a sound reference for use of statistical and econometrical models in analysis of macroeconomic indicators, both simple and multiple linear regression are approached in the chapters of this collective volume. Braun presents a critic on Rothbard's concept of gross investment.

The works of Anghelache (2008), Voineagu *et al.* (2007) offer our research a relevant theoretical and methodological base. A deep analysis of indicators pertaining to Romanian economy, at the macroeconomic levels, is presented by Anghelache (2014). Also, Catana is preoccupied with the study of macroeconomic indicators and phenomena, her approach is theoretical. Also, Văduva (2010) provides a theoretical presentation for some macroeconomic indicators and correlations.

3. Research methodology of research. Dataset

The multiple linear regression analysis can be used in final consumption recorded at the level of the Romanian economy. To build a linear multiple regression model, we defined the gross available income and gross investment as independent variables, while final consumption value was considered a dependent variable, that is the main variable of the model. To analyze the correlation between selected variables we used data on a yearly basis, starting in 1990 until 2014, regarding the Romanian economy. These data were drawn from the official printed and electronic publications issued by the National Statistics Institute of Romania. To ensure the full comparability of figures, the values of the indicators were deflated using the consumer price index, the basis for the official calculation of inflation rate. The base reference year was considered the first year of the interval, which is 1990.

Table 1. Evolution of final consumption, gross investment and gross disposable income in Romania during 1990-2014

Year	Final consumption (comparable prices) million RON*	Gross investments (comparable prices) million RON*	Gross available income (comparable prices) million RON*
1990	68,0	17,0	86,5
1991	61,9	11,7	83,8
1992	55,3	13,8	73,0
1993	51,0	12,0	69,0
1994	54,4	14,3	71,9
1995	62,7	16,5	78.1
1996	69,3	19,3	84,6
1997	66.1	16,2	77,0
1998	64,1	12,9	71,6
1999	63,1	12,6	73,4
2000	62,0	13,6	73,0
2001	66,2	16,0	79,3
2002	69.0	17,6	86,3
2003	79,5	20,0	95,4
2004	88,9	22,7	107,5
2005	97,0	26,5	113,0
2006	106,9	32,0	126,7
2007	118,3	43,4	144,2
2008	134,2	52,7	166,5
2009	122,9	37,2	155,3
2010	121,2	39,6	152,1
2011	118,8	41,4	154,2
2012	121,8	43,0	157,3
2013	122,2	38,2	160.4
2014	128,3	36,5	165,3

* Romanian currency, at the level of 1 \$ = 4,00 RON on August 5th, 2015

Source: Romanian Statistical Yearbook, INS, Bucharest, 2008, 2009, 2010, 2011, 2014

To analyze the correlation between the three macroeconomic indicators presented in the table above, considered relevant for the purpose of this research, it is necessary in a first step to identify the

characteristics of evolution for each separate measure within the timeframe analyzed. In this respect, using the software Eviews 7.2, we have studied in a first stage, the evolutions of three indicators:

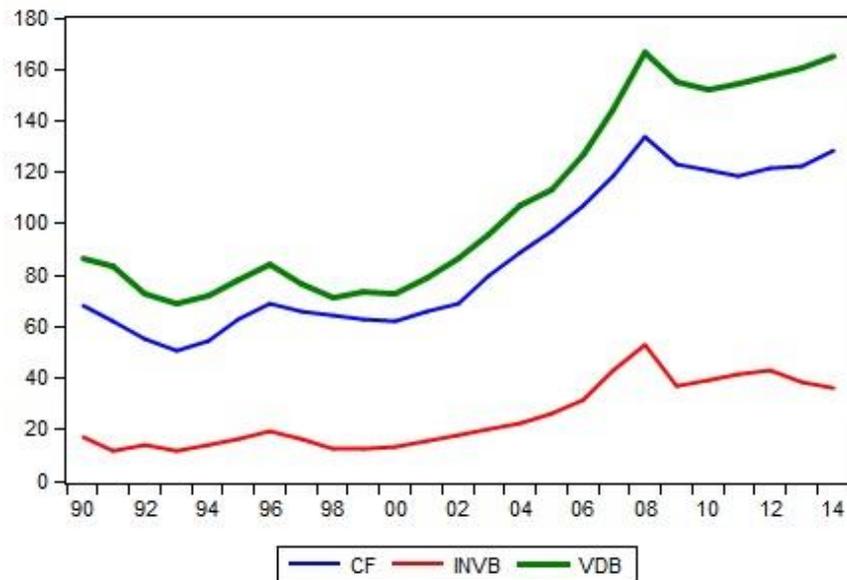


Figure 1. Evolution of final consumption, gross investment and gross disposable income in Romania, between 1990 and 2014

As can be observed from the dataset and figure 1, during the timeframe studied, the evolutions of the three indicators present similar trends. There is a steady growth from year to year, with small fluctuations of increases and decreases from 1990 until 2008, when it is found that, amid the economic – financial crisis that affected the global economy, especially since with the second half of 2008, the values of the three indicators for 2009 showed a decrease compared to the immediately preceding interval. From 2011 and until 2014, the values of the three indicators recorded a minor increase.

Based on this information, we have analyzed the existence of a possible correlation between the value of final consumption (the resultant variable), on the one hand and gross investment (first causal variable) and the gross available income (second causal variable).

The econometric description of such correlation between the three variables can be realized by using a multifactor model to explain the variation in final consumption based on the simultaneous influence of the two indicators mentioned above.

4. Research results. Econometric model

To estimate the multiple regression model, we used the instruments of Eviews 7.2, where we defined the proper variables: the resultant variable is the final consumption (CF), while gross investments (INVB) and gross disposable income (VDB) are the factorial variables. Using the least squares method for parameter estimation, we also envisioned the introduction of the free term (c), as it is a good econometric practice in considering other factors, not included specifically in the model we propose in this paper.

The estimation instrument of the software provided us the following results (figure 2).

The results from Eviews processing allow us to describe the econometric model through the following equation:

$$CF = 8,334791 + 0,416518 \cdot INVB + 0,62974 \cdot VDB$$

The analysis of the model itself leads to the following observations and conclusions:

- C is the constant term, so its coefficient is 8.334791 and describes the average level of the dependent variable all the factor variables are zero. Therefore, the final consumption will increase by 8,334,791 RON if both gross investment and available disposable income are zero. Since the t-test probability is lower than 5% means that the coefficient is significant from the statistical point of view;

- The coefficient of the gross investments is 0.416518, which means that if this increased by one million RON, while maintaining unchanged the other variables, the main indicator, the final consumption will record an average grow of 0.416518 million RON. Keeping the level of relevance at 5%, we consider this factor as insignificant;

- The coefficient for the gross available income is 0.62974, which means that the gross disposable income increase by one million RON, while maintaining unchanged the other explanatory variables, would generate an increase of final consumption by an average of 629,740 RON. This coefficient is significant.

Dependent Variable: CF
 Method: Least Squares
 Date: 07/28/15 Time: 02:21
 Sample: 1990 2014
 Included observations: 25

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	8.334791	3.414015	2.441346	0.0231
INVB	0.416518	0.231742	1.797336	0.0860
VDB	0.629740	0.079625	7.908810	0.0000
R-squared	0.985175	Mean dependent var		86.92400
Adjusted R-squared	0.983828	S.D. dependent var		28.54910
S.E. of regression	3.630618	Akaike info criterion		5.528850
Sum squared resid	289.9906	Schwarz criterion		5.675115
Log likelihood	-66.11062	Hannan-Quinn criter.		5.569417
F-statistic	731.0016	Durbin-Watson stat		0.467897
Prob(F-statistic)	0.000000			

Figure 2. The results of the regression model parameter estimates

The model allows us to conclude that there is a direct relationship between final consumption, gross investment and gross available income in Romania, for the analyzed timeframe.

We have further evaluated the accuracy of the econometric model drawn. From figure 2, we observe that the values of tests that R^2 and adjusted R^2 is close to unit, which allows us to say that the model is correctly estimated. Further, the model can be used for economic forecasts, for these indicators, at least at the level of the Romanian economy, for which the starting dataset is drawn.

The determination report is 98.52%, leading to the idea that the variation of the dependent variable is explained by the simultaneous variation the two factors, as a strong link exists between endogenous variable and two exogenous variables.

The statistical significance of the model is emphasized by the F-statistic test, as its value is more than the table reference level, and also the validity of the model is referenced by the significance level Prob (F-statistic), which is zero, lower than 5%.

5. Conclusions

Our research has evaluated the evolution of the three indicators: the final consumption, gross investments and available income, for the Romanian economy, during the last 25 years for which official annual data are available. The econometric approach has identified a model, based on the dataset described in table one, which can properly characterize the correlation that is the subject of our research. The tests applied on the model show its reliability and validity, even for future researches and forecasts. As final conclusion, we consider that the model we propose is relevant for the analysis of final consumption, depending on the gross investments and gross available income.

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