Multiple Regression Analysis used in Analysis of Private Consumption and Public Final Consumption Evolution, case of Albanian Economy

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Abstract

This paper approaches the evolution of the final consumption recorded at the level of Albanian economy. According to statistical methodology the public and private consumption are two of the components of the final consumption. The main variable of our study is final consumption, which is set to be influenced by at least two independent variables, such as public and private consumption. Lately, Albanian economy has been presented with a new and different macro economic policy, a new form of partnership of investments between public and private sector. We are highly interested in the impact of these changes on final consumption .The correlation between the main parameter and its influence factors is analyzed through a regression model. Eviews is the software that the data will be processed under standard methods. The model and the results are part of the paper. To be emphasized is that the reliability of the multiple regression model does not exclude the possibility to analyze the single correlation between the parameters, in parallel.

Keywords Consumption, fiscal policies, private consumption, public consumption, private to public partnership

Introduction

Some of the factors that contribute to the calculation and the evolution of Gross Domestic Product are private consumption and public consumption. Private and public consumption are two of the components of final consumption. We have used previous studies and economic analysis by applying econometric methods to realize our study for the correlation between main factor, that is final consumption and its two independent factors, private and public consumption. Anghelache (coord.,2014) approached the use of econometric models in macroeconomic analysis in calculating and forecasting macroeconomic indicators. The basis of statistical and econometric instruments and concepts were provided by Anghelache (2008), Voineagu et al (2007). Multiple regression analysis is a great statistical technique able to estimate the relationship among two or more variables. (Anghelache et al. 2014) offers a number of advantages compared to unifactorial alternative because it is conducted under the assumption of the simultaneous action of several important factors and it generates information on the structure of the process by quantifying causal links thus increasing determination ratio, numerically expressed by its proximity to 1 (or 100%) and offers a more accurate description of the economic process.

According to Anghelache et al 2014 a significant argument in using multiple linear regression can be considered to be the high enough value of free that could be specific to be encountered in single factor approaches, where the main indicator keeps its role as dependent variable and the influence factors become, in turn, independent variables in distinct, dedicate models. In this paper, we give a model of the multiple linear regression to make a prescription of economic development in Albanian economy. The data have been derived from World Bank, Eurostat and INSTAT for a period approximately for ten years. Lami.E, Kächelein.H, Imami. D (2014) have been conducting previous studies related to consumers' expectations before elections, the main factors underlying expectations, and the way in which these

expectations influence their behavior toward spending, and consequently the macroeconomic outcomes, deploying standard econometric methods widely applied in PBC related research. According to their research results, households' consumption spending decreases before elections because of the higher uncertainty about their future economic situation due to the highly politicized public employment. Çakerri.L ,Petanaj.M, Muharremi.O (2014) took under the study one of the most important factors the role and size of public spending, where his positive link between economic growth is a undisputed fact .So, the role and size of public spending is considered as an element key development and economic growth. Thy concluded that government spending positively affect economic growth, unlike reportedly mostly in theory. This conclusion is because Albanian economy is a transition economy where the public sector is very important in the progress of economic reform, private sector development, etc.. Productive expenditures also positively affect economic growth, as predicted in theory. Merko.F, Kalaj.E, Zisi.A (2017) empirically investigate the relationship between the private consumption and fiscal policy in Albania by using the static multiple regressions for data over the period 2000–2016. Their findings have an important implication in terms of policy recommendations. Private consumption is positively affected by the government spending, income growth, and deficit. Second, policy-makers also need to anticipate the country's demographic structure and income level. However, they recommend that further research of the issue of how private consumption promotes economic growth in Albania should be on the focus of researchers. Curcija. M (2018) found that the analysis on GDP per capita, credit to private sector and investment ratio to GDP in Albania for the period from 1993 to 2015 shows similar results with those of other works in this field of study. In this paper it is noted that contracting institutions have a limited impact (enforcing contracts on gross capital formation) or no impact on the economic outcomes considered. A possible explanation is that individuals have different instruments to reduce the risks of loss following failure to comply with the contractual terms by the counterparty.

Our attention has been mostly attracted by publications and economic development of Rumanian Economy, because Albania has had very similar steps toward its economic development as a transitory economy and has faced similar challenges to Rumanian economy. For these reasons in conductiong this search will take into the consideration the studies conducted by Censolo and Colombo (2008) where they study the composition of the public consumption in a growing economy, as they consider that the Romanian economy is generally perceived as growing. The households' consumptions and the correlation between private and public consumption was studied by Bastagli and Hills (2013) . Scutaru et al. (2009) focus on the study of the two components of the consumption from the perspective of the GDP. Various aspects of public and private consumption were also approached in the works of Wolff et al. (2003), Mir Nahid and Mansur (2012), and Bachman (2011). Anghelache.C, Anghel M.G, Popovici.M (2015) designed a model that was representative for the purpose of their research and it accurately described the relationship between the final consumption and its factors such as household consumption and public consumption. They concluded that the indicator of final consumption was significantly influenced by private and public consumption indicators. The author stated that the reliability of the multiple regression model designed in this paper does not exclude the possibility to analyze, in parallel, the single correlations between the indicators.

Research methodology. Dataset

MRA multiple linear regression is a significant method in macroeconomic studies in Albanian economy. MRA is the statistical method that expresses the attitude or variation of a definite number of factors otherwise known as independent variables with the only purpose to express the influence they have on the other factor; otherwise known as dependent variable. This is a technique or method that requires relatively a satisfactory number of data. A sufficient dataset helps to have a higher level of confidence. To analyze the correlation among the selected variables we have selected a dataset from a period of 10 years.

Years	Private Consumption	Public consumption	Final Consumption
2008	10393900000	13669312300	24063212300
2009	9508449000	13263751174	22772200174
2010	9436425000	13200038170	22636463170
2011	10357530000	13272270782	23629800782

2012	9789527000	13666446062	23455973062
2013	10070900000	18159405940	28230305940
2014	10973450000	13813434771	24786884771
2015	9038930000	12638382236	21677312236
2016	9315567000	12887766990	22203333990

After we have created the table with all the data taken, we proceed with the econometric analysis of multilinear regression using Data Analysis Tool pack in Microsoft or Eviews. The regression analysis is realized through the least square method that can enable to fit a line through a set of observations. Method of the least square is the most common to use to define the regression equation by solving a system of simultaneous linear equations in which the unknowns are the constants of the regression equation ()

In our case, MRA is developed according:

Finding a correlation among the values of final consumption expenditure that is dependent variable y and two independent variables x_1 and x_2 ; that are private consumption expenditure and public consumption expenditure.

For this reason we will create a simple regression model between these variables:

A linear regression model between final consumption and private consumption that explains the variation among these two factors in Albanian economy.

A simple linear regression model that explains the correlation between final consumption and the level of public consumption in Albanian economy.

And last, a multi regression model, MRA that is based in the coherent role of two common factors of multi regression analysis.

Based on the previous assumptions on the variables that are part of this analyses we could present the following mathematical model of multi regression analysis:

$$Y_1 = b_1 + \alpha_{1i} {}^*x_1 + \alpha_{2i}\ x_2 + \varepsilon_i$$

Research model. Results

First we check and see the correlation that exists between private consumption and Final public- consumption. Here we look for any type of correlation among an independent variable and Dependent Variable: FINAL_CONSUMPTION

Method: Least Squares Date: 10/16/19 Time: 11:31 Sample: 2008 2019 Included observations: 12

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-5.31E+09	6.25E+09	-0.849885	0.4153
PRIVATE_CONSUMPTION	3.002219	0.668738	4.489382	0.0012
R-squared	0.668375	Mean dependent var		2.24E+10
Adjusted R-squared	0.635213	S.D. dependent var		5.37E+09
S.E. of regression	3.24E+09	Akaike info criterion		46.78928
Sum squared resid	1.05E+20	Schwarz criterion		46.87010
Log likelihood	-278.7357	Hannan-Quinn criter.		46.75936
F-statistic	20.15455	Durbin-Watson stat		1.857242
Prob(F-statistic)	0.001162			

Then as previously done we check for the correlation and the variable of significance for public consumption and its impact on final consumption.

Dependent Variable: FINAL_CONSUMPTION Method: Least Squares

Date: 10/16/19 Time: 11:32 Sample: 2008 2019 Included observations: 12

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	6.13E+09	1.09E+09	5.627890	0.0002
PUBLIC_CONSUMPTION	1.236083	0.078851	15.67610	0.0000

squared	0.960898	Mean dependent var	2.24E+10	Adjusted R-squared	0.956988	S.D. dependent var 5.37E+09
E. of regression		1.11E+09	Akaike info criterion 44.65145	Sum squared resid		1.24E+19
Schwarz criterion	44.73227	Log likelihood	-265.9087	Hannan-Quinn criter.		44.62153 F-statistic
	245.7402	Durbin-Watson stat 1.240166				
Prob(F-statistic)	0.000000					

Then we continue using a different statistical software, SPSS and we run a regression model and we check fo the correlation between variables.

Variables Entered/Removed

Model	Variables Entered	Variables Removed	Method
1	CPL, CPa	.	Enter

a. All requested variables entered.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	1,000a	1,000	1,000	,00000

a. Predictors: (Constant), CPL, CP

ANOVA[b]

Model	Sum of Squares	df	Mean Square	F	Sig.

1	Regression Residual Total	3,174E20	2	1,587E20	.	.a
		,000	9	,000		
		3,174E20	11			

Predictors: (Constant), CPL, CP

Dependent Variable: CF

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-	,000		.	.
	CP	1,000	,000	,272	.	.
	CPL	1,000	,000	,793	.	.

a. Dependent Variable: CF

Based on the aquired data of last 11 years on SPSS 7, to do the evaluation of model MRA on which three variables that are part of the model are in correlation with each other. The Final Consumption (CF) is the dependent vaiable product of correlation of two independent variable: private consumption and public consumption.

We can see another free term that expresses the influence of other factors, which is expresses in the traits of an error.

Equation that express regression:

CF= -0.001907 + 1.000272 CP + 1.000793 CPL

As it can clearly be stated by the equation, keeping a constant variable tells the norm of increase or decrease on the other variable.

We can say that Albanian economy for the period 2008-2019 there exists a linear correlation between Final Consumption and Public and Private Consumption. As we judge from statistical point of view, as we have used the least square method we can say that the values of R and R^2 are near maximum, so the build up model is significant. Its significance can easily be stated by the value of F statistics = 0.

Conclusions

Based on all information gathered from the analysis of Albania's final consumption using the regression model described above, we conclude that this indicator is significantly influenced by changes in private and public consumption.

The authors wish to state that the reliability of the multiple regression model designed in this paper does not exclude the possibility to analyze, in parallel, the single correlations between the indicators, as described above.

The model is representative for the purpose of this research, and it accurately describes the relationship between the final consumption and its factors: household consumption and public consumption.

References

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