# AN ASSESSMENT OF MACROECONOMIC PERFORMANCE OF ALBANIA-A CLASSICAL AND THRESHOLD ECONOMETRIC APPROACH

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#### ABSTRACT

This research is concerned with macroeconomic performance of Albania. We assessed macroeconomic performance of Albania by estimating and commenting on a set of macroeconometric models. Based on economic theory and empirical research we assume that Gross Domestic Product (GDP), Gross National Income (GNI), Gross Fixed Capital Formation (GFCF), International Trade volume as a variable of economic openness, Imports of Capital Goods, Inflation, Government deficit, Tax revenue, and their interrelationships could substantially (but not thoroughly) characterize the macroeconomic performance of a country. We used time series econometric modeling, specifically classical and threshold and ARDL regression models. GDP, GFCF, Inflation, Tax revenue and Population consumptions are kept as key dependent aggregates and for each a specific cluster of models has been estimated to assess macroeconomic performance of Albania during its long transition from communism to free market. Among other, we found that GFCF and openness are among key determinants of GDP growth; GDP growth and Imports of capital goods are factors of GFCF or capital accumulation; Inflation is positively correlated with budget deficit. Based on estimation results, specific conclusions are drawn.

**Keywords:** Growth rate, threshold regression, ARDL model, macroeconomic performance, significant effect, economic freedom, transition index.

#### INTRODUCTION

Macroeconomic performance of a country is how well a country is doing to achieve its economic targets; it is a situation characterized by a combined effect of economic variables. Gross Domestic Product (GDP) and Gross National Income (GNI) growth, Inflation rates, Government budget deficit, Households' consumption, Public and private investment levels and their rates of change over time, Trade volume (both exports and imports), and more specifically Import of capital goods for countries that are in course of development, Tax revenue and their rate of change, are considered by pure economic theory and worldwide empirical research as being amongst the most important indicators of a country macroeconomic performance. They could also be considered to a certain degree also indicators of economic performance of a country's government.

*GDP* or better its *growth rate* is a key indicator for assessing the economic performance of a country. High growth rates are associated with more later private and public spending and investment, hence, the creation of new jobs, improved infrastructure, education and environment, and therefore with increased welfare. An alternative indicator to GDP could be *GDP per capita* or its *growth rate*, which seems more comprehensible when discussing about standards of living of the population. However, between GDP and GDP per capita or their

respective rates is expected a strong relationship because GDP is the major determinant of GDP per capita. Low inflation is very important in supporting a business climate and encouraging new private lending and investment, and also consumer optimism leading to higher and sustainable demand; this in turn tends to stimulate further growth in the future. Growth of GNI tends to stimulate larger consumption of the population, hence higher demand which in turn stimulates supply and growth as aggregate. In general GNI growth tends to have the same effects as GDP growth. Investment is a key for faster growth, because it increases capital accumulation, and creates preconditions for more jobs and production or services facilities. In this context, foreign direct investment inflow could be a powerful factor of growth for countries in development in particular. International trade volume is also extremely important; in case of imports it makes possible fulfilling local needs for capital, technologies, machineries, transport vehicles, fertilizers for agriculture, and raw material for processing industries, etc. But international trade brings home also advanced product and services standards, production, service and managerial knowledge, skills and experiences, by contributing so much to improvement of social capital. In case of exports trade brings home money, experiences and standards. All this could be great contributors to economic development of a country. International trade is considered also an indicator of the degree of openness of the local economy. And openness has been discussed largely in economic literature as a source of economic growth. Within international trade volume, import of capital goods, such as physical technology and machinery, transport vehicle, etc. is a major trade component likely to contribute significantly to economic development because they are the core component of new physical capital formation. Government budget deficit, depending of course on how much deficit, is also a potential indicator to macroeconomic performance of a country. Government spending is a factor likely to influence on inflation, employment and aggregate demand, but also on business operations and efficiency of public spending. Tax revenue and their rate of change in time are without any doubt at all, a very important factor for describing a good or bad macroeconomic performance of a country. Taxes are a major support to government spending making possible carrying out government tasks and functions. More income from taxes means more investment or spending for public infrastructure, improved environment, better education and also higher public safety standards. While higher tax rates are debatable and suspicious about their aggregate effect, more taxes through better fiscal performance is always welcomed. Unemployment is for sure a key macroeconomic indicator when evaluating a macroeconomic performance of a country. It reflects growth and is a good proxy for a country's economic standard of living. Unfortunately, unemployment figures has been constantly a means of political debate among ruling and opposition parties in Albania and we think this debate has produced inconsistent figures about level of employment and we don't believe they could produce sound research results. Some sources recommend also Current account deficit, public debt and  $M_2$  money aggregate as macroeconomic variables as having an effect on economic development of a country. We share the same conviction with them; but we don't want to put too much in just one paper and we are going to select, based on economic footing, but also based on econometric analysis, among all variables that seem more comprehensible. A background theoretical discussion on these aggregates but not only could be found in Dornbusch and Fischer (1994, Snowdon and Vane (2005), Gordon (1987), Case, Fair and Oster (2012).

In Albania's context, but not only, the macroeconomic performance could very likely a function of these indicators taken together. But there is a need to assess significance of any of them, and to determine which of them has played comparatively more a role in Albania's macro performance, during its long and challenging economic transition. Not to forget, a sound business climate is also a key factor for a high and sustainable macroeconomic performance. For extended information on Albania macroeconomic performance and issues see IMF (2017).

## LITERATURE REVIEW

Wide empirical research exists worldwide on reciprocal effects of macroeconomic variables. And we must say at the very beginning that in many instances findings of different authors and about same issue are not the same; perhaps different country socio-economic development context and different methodology yield different results.

According to Fischer (1983), there should be a negative relationship because inflation lowers real balances and reduces the efficiency of the production factors. Barro (2013) used data for 100 countries and found that an increase in average inflation by 10% brings about a 0.2-0.3% reduction in GDP growth rate. Gokal and Hanif (2004) studied also relationship between inflation and growth and found it to be negative, because they say high inflation has a negative impact on investment and capital accumulation. Datta and Kumar (2011) found that this negative relationship is only in the short run, but not in the longer run. Ahmad (2013) argues based on classical economics and says there is a neutral relationship between budget deficit and growth. Polin and Zhu (2006) found a nonlinear relationship between GDP growth and inflation. According to Faria and Caneiro (2001) that studied the relationship in the context of persistent high inflation in Brazil, inflation doesn't impact output in long run. Khan studied threshold effects between inflation and growth. Solomon et al. (2004) argue that due to monetization of budget deficit inflation is accountable for increases in the budget deficit. Datta and Kumar (2011) found that there exists a stable long run relationship between inflation and budget deficit. Metin (1998) studied Turkey and found that an increase in the scaled budget immediately increases inflation. Nayab (2015) did not found a significant relationship between growth and deficit in the case of Pakistan. Hayati and Rahman (2012) found for Malaysia that there is not a long run relationship between growth and budget deficit.

Mofrad (2012) studied relationship between GDP, export and investment in Iran. The result is a positive significant relationship between GDP on one side and export and investment on the other side; but the relationship between export and FDI resulted negative. Anwer and Sampath (1999) used unit root and co-integration techniques and data for 90 countries to assess relationship between GDP and investment. They found different results for different groups of countries. For some group didn't define any equilibrium, for some other group they found short run equilibrium and for other a long run co-integration; further they found only unidirectional casuality and for one other group of countries they found bi-directional casuality between GDP and investment. Diacona and Mahab (2014) used co-integration techniques and panel data to study the relationship between Consumption, Investment and GDP and found a significant relationship which was stronger for low and middle income countries. Dritsaki, Dritsaki and Adamopoulos (2004) investigated relationship between Trade, GDP and FDI for Greece data for years 1960-2002. They found that there is long run equilibrium between the three variables and they did Granger test to show that between the three variables there is a causal relationship. Again, Dritsakis, Erotokritos, and Adamopoulos (2006) investigated links between growth, exports, GFCF and FDI in Greece. They used multivariate VAR and found a unidirectional casual relationship between exports and GFCF, also between FDI and economic growth. Using regression analysis, Anghelache (2011) investigated relationship between GDP and final consumption and found that between them there exists a strong correlation. Amin (2011) used Keynesian Consumption function to study relationship between growth and consumption expenditures. He used regression analysis techniques co-integration and Granger Casuality test to show that consumption is dependent on GDP and not vice-versa. Chioma (2009) studied the case of Nigeria the effect of GDP growth on personal consumption expenditure of the population and surprisingly found that growth of GDP doesn't have any influence on consumption expenditures. Pavlesku (2008) studied the effect of GFCF on economic growth in EU and EU-candidate countries. From the analysis he found that GFCF contributed positively to economic growth, but influence was greater in NMS-12 than in the older EU-15 states. Elizabeth, (2013) used OLS to estimate a regression between GDP and government Deficit, Taxes and Inflation on the other side. They also run a regression between Deficit and Inflation, GDP and Taxes. She discovered a significant relation between Deficit and Taxes, Inflation and unemployment, but no relationship was established between Inflation and Deficit. Hauner and Kyobe (2008) argue that Inflation, Income per capita and Openness are basic economic determinants of government efficiency. Karagöz and Keskin (2015 used Bayesian VAR model and found that government revenues and expenses have limited impact on GDP and inflation. Afonso, Schuknecht, and Tanzi (2003) use Income distribution inequality, GDP capita, GDP growth, stability of GDP growth and unemployment as basic indicators to be included when assessing the efficiency of the public sector. Khramov and Lee, (2013 propose a composite index of economic performance of a country, as they called, EPI, by combining inflation, GDP growth, unemployment and government deficit. The used this method with US data from 1790 to 2012 and found it performed quite well.

## **Research Hypothesis**

In our research we do not aim at proposing an aggregate indicator of macroeconomic performance of Albania; we want only to assess it through different perspectives taking into consideration a number of macroeconomic indicators and present a set of models helping to make this assessment. Based on that, we have formulated a number of research hypotheses.

1-GDP growth is in relationship with growth of international trade volume, Gross Physical Capital Formation rate, inflation rate, government budget deficit, and volume of imports of Capital Goods.

2-GPCP is in relationship with GDP growth rate and budget deficit, inflation and import of Capital Goods

3-Inflation is in relationship with GDP growth rate and budget deficit

4-Current Tax revenue is in relationship with current GDP and also lagged GDP and Tax revenue.

5-Consumption of the population is in relationship with GNI and also lagged consumption and Inflation.

#### METHODOLOGY

In this research we are going to measure the business climate with two indicators: economic freedom index, and the transition index, supplied by the Heritage Foundation and EBRD, respectively.

We used time series data of Albania for GDP (Gross Domestic Product), GDP per capita, GDP and GDP per capita growth rates, Gross National Income (GNI), Gross Fixed Capital Formation (GFCF), Foreign direct investment inflow, (FDI) Consumption by population (PCON), Inflation rate (INFL), Tax collection (TAXES), Trade volume (TR) as the sum of exports and imports, Budget Deficit (DEF), Imports of Capital Goods (IMPCAP), Index of

Economic Freedom (ECFREED) and Transit Reform Index (TRANSIT) for the period 1996-2015.

Transition index reflects situation and progress in a number of priority areas, such as structural reforms, price liberalization, trade and foreign exchange reform, and competition policy. The minimum value of transition index is 1 and the maximum is 4+. Index of economic freedom reflects situation and progress in 12 areas such as property rights, tax burden, business freedom, government spending, trade freedom, investment freedom, etc. Minimum value possible of it is 0 and maximum is 100.

We use time series based classical econometric models and ARDL (Auto-Regressive Distributed-Lag) models. In ARDL model we have lagged values of the dependent and independent variables. For one dependent Y and one independent X an example of an ARDL model could be:

$$Y_t = a_0 + a_1 X_t + a_2 X_{t-1} + a_3 Y_{t-1} + e_t$$

In this model, lag is equal to unit, but might well be also greater than unit. For detailed background of classical time series regression and ARDL models see (Wooldridge, 2009), (Gujarati 1995), (Greene 2003), EViews User's Guide II. We use also threshold regression models. For one dependent variable Y and one independent variable X a threshold regression model with one threshold C (so with two states, regimes and equations) could be:

$$Y_t = a_0 + a_1 X_t + e_{1t}$$
 for  $t \le C$   
 $Y_t = b_0 + b_1 X_t + e_{2t}$  for  $t < C$ 

We used EViews 9 to carry out statistical estimation procedures. Detailed information about these models the reader can find in Brooks (2008), EViews 9 User's Guide II.

First we created a new variable, T=1, 2, 3, 20 which is representing time trend for each year from 1995 to 2015. T We use three modeling alternatives; we use levels of variables, log forms, or difference form of variables. In some models we use de-trending approach by putting the trend variable T in the model, as an alternative to using first differences of variables to eliminate trend in data. In models with levels of variables, or in difference form, the coefficient close to each of every independent variable is expected change in the dependent variable for one unit change in the value of each independent variable, other variables remaining constant. In the log form models each coefficient close to independent variables is a partial elasticity.

Based on our research hypothesis we choose GDP or GDPCAP, GFCF, PCON, TAXES and INFL as key dependent variables, thus determining a five dimension analysis.

# **RESULTS Descriptive Analysis**

Graphs 1 to 4 below show the dynamics of some of main variables as shown at the bottom of boxes. GDP, GNI, GFCF, PCON TAXES, IMPCAP and TR have a positive trend with no excess variability. Inflation rate and deficit rates present a downward trend with less and less variability over time. In particular, GDP, PCON and GNI seem to be too much closely related.

From these pictures we expect strong relationships between variables. On the other side, based on the steepness of the diagrams speed of change, may be except trade, seems generally low; this might be one of major characteristics of Albanian macroeconomic aggregates during transition.



#### **Econometric Models for GDP**

At the very beginning we want to explain that only models with significant independent variables effect well be presented. First we regressed GDPCAP on GDP and time trend T. The very high determination coefficient R-squared of 0.999 shows that these two variables are extremely closely related (Table 1, Model 1); this means further on we could use GDP or GDPCAP equally for GDP related modeling. We have chosen GDP, because it makes more sense when used together with TRADE, TAXES or other variables.

GDP results positively dependent on trade TR, deficit DEF and Trend (Table 1, Model 2). One unit increase in TR brings about 0.4 unit increase in GDP if deficit remains unchanged, and one percentage increase in Deficit is expected to bring 7100 units increase in GDP, Trade remaining constant. Trend is also responsible for a large yearly increase of GDP.

We estimated the same model but in log form, the DEF variable resulted insignificant and we excluded it from the model (Model 3). From this model, one unit percent increase in Trade brings 0.42% increase in GDP.

Next model (4) shows that GFCF also has significant effect on GDP growth; one percent increase in GFCF is responsible for 0.28% increase in GDP. But since the determination coefficient of both models is very high, we could say that TR and GFCF are collinear and we cannot put both variables in one model. This is proved also by regressing TR on GFCF in log form (model 5) Relationship between these variables is significant and there is a very high coefficient of determination for this model.

Nr	Model	C R.	Prob (F-
111	mouch	squared	statistic)
1	GDPCAP = -18.497(***) + 0.00038*GDP(***) - 1.7527*T(*)	0.999	0.000
2	GDP = 102425.35(***) + 0.40075*TR(***) + 7100.68*DEF(***)	0.998	0.000
	$^{1}+44210.3*(T_{***})$		
3	LOG(GDP) = 7.6527(***) + 0.4205*LOG(TR)(***) + 0.0353*T(***) (2)	0.998	0.000
4	LOG(GDP) = 9.4992(***) + 0.280188*LOG(GFCF)(***) + 0.058265*T(***)	0.994	0.000
5	LOG(TR) = 4.575(***) + 0.65*LOG(GFCF)(***) + 0.056*T(***)	0.983	0.000
6	D(GDP) = 49439.58(***) + 0.310234*D(TR) (***) - 1209.421*INFL(***)	0.797	0.000
7	INF = 0.7365 + 1.82*DEF(***) - 1.5*GDPGR(***)	0.720	0.000
8	LOG(GDP) = 9.12775(***) + 0.307788*LOG(GFCF) (***) + 0.0052925*DEF	0.994	0.000
	- 0.0001346*INFL + 0.058044*T(***)		
9	LOG(GDP) = 10.034656(***) + 0.1013476*LOG(IMPCAP)(***) + 0.1013476*LOG(***) + 0.10136*LOG(***) + 0.1	0.998	0.000
	0.128878*LOG(GFCF) (***) -0.001381*INFL(*) + 0.062829*T(***)		
10	LOG(GDP) = 6.5548(***) + 0.0412089*ECFREED(***) +	0.998	0.000
	1.3965*TRANSIT(***)		
11	GRCAP = 5.235(***) + 0.91*GRGDP(***) - 0.127674407446*T	0.483	0.004

The following model (6) shows that inflation also has a significant negative effect on GDP. One percent more inflation means 1209.4 units less GDP. Model 7 arguments that between INFL and DEF there is a significant positive relationship, so they are collinear. If put together in one model the result would be that both variables have insignificant effect on GDP, as the following model (8) shows, which the opposite result to the previous one that inflation has a negative effect on GDP.

Model 9 shows that GDP growth is also significantly and positively related to import of capital goods, and to growth of GFCF, and negatively related to inflation increase. One percent more import of capital goods brings about 0.1% growth in GDP effect of inflation is moderate, since one percent increase in inflation is expected to bring only 0.00138 % decrease in GDP growth rate.

Next in this section we have a regression of GDP growth on Economic freedom index and Transit Index (Model 10). Countries with index of economic freedom scores between 60 and 70 are considered moderately free, when index is 50-60 countries are mostly un-free. Countries with score index from 70 to 80 are considered mostly free. Albania is considered moderately free since its score for year 2017 is 64.4. The estimation result is that GDP growth in Albania is positively and significantly dependent on economic freedom and transition reforms carried out in the country. But there is too much space for improvement and if economic freedom increases by 10 units, GDP would increase by 4.12 %. If transit index is increased by one unit, then GDP is expected to grow by 1.396 %.

<sup>&</sup>lt;sup>1</sup> (\*\*\*) means significant at prob. 0.01 or lower

<sup>(\*\*)</sup>means significant at prob. <0.05 but >0.01

<sup>(\*)</sup>means significant at prob. <0.1 but >0.05

#### **Econometric Models for Gross Fixed Capital Formation**

GFCF represents investment transformed into capital assets. Estimation results show that investment is significantly and positively related to GDP growth and GFCF growth, but negatively related to inflation (Table 2, Model 12).

Nr	Model	R- squared	Prob (F- statistic)
12	LOG(GFCF) = 6.0086(***) + 0.471*LOG(IMPCAP)(***) - -0.01294*INFL(**) +0.0367*T(**)	0.9319	0.000
13	LOG(GFCF) = -25.399(***) + 2.899*LOG(GDP)(***) - 0.15236*T(***)	0.9565	0.000
14	LOG(GDP) = 4.278(***) + 0.704278*LOG(TR) (***)	0.9838	0.000

## Table 2: Models estimated for GFCF as dependent variable

One percentage unit increase of GDP as by (Model 13) is expected to increase investment by 2.89%, while one % increase in IMPCAP is expected to increase GDP by 0.47%. Inflation has a negative effect of 0.0129% per each unit increase. Since GDP and TR are positively related (Model 14), then also trade has a positive effect on GFCF growth. So GDP growth has resulted as the most important determinant of GFCF growth. But Trade TR and IMPCAP also result as determinants of capital investment growth; this seems quite logical since IMPCAP is much part of TR and TR has a significant effect on GDP.

We used a threshold regression of GFCF on GDP growth to identify possible different regimes, so a potential non-linear relationship, and also thresholds for this relationship. To do this we used GDP as threshold variable.

In the case of GDP as a threshold variable (Model 15), we identified two thresholds, thus three different regimes (equations). In each regime the effect of GDP on GFCF is significant, but the size of effect is various. For years 5 to 14 the effect has been highest, 0.93% for one unit increase in GDP, and for 4 first years it has been the lowest, 0.88%. So the best performing period for investment growth has been period 1999-2008. As for the other variable, inflation, the result is that its effect is also significant, in the two first regimes its effect on GFCF has been negative, and it has been positive in the last third regime corresponding to last 6 years (2000-2015), see Table 3.

Table 3: Threshold model estimated for GFCF as dependent variable						
LOG(GFCF) = (GDP<501198.9)*(0	.8858*LOG(GDP)	- 0.00382*INFL) +	(GDP>=501198.9 A)	ND		
GDP<1239644)*(0.931266*LOG(GI	DP) - 0.044*INFL)	+ (GDP>=1239644	)*(0.891*LOG(GDP)	) +		
+ 0.07007*INFL) + 0.00266*YEAR	Method: Thresho	old Regression, Thr	eshold variable: GD	Р,		
Threshold values used: 501198.9, 12	239644 (15)					
Variable	Coefficient	Std. Error	t-Statistic	Prob.		
	GDP < 501198.9 4 observations					
LOG(GDP)	0.885352	0.003054	289.9287	0.0000		
INFL	-0.003821	0.001507	-2.535040	0.0249		
501198.9 <= GDP < 1239644 10 observations						
LOG(GDP)	0.931266	0.007033	132.4169	0.0000		
INFL	-0.044085	0.020998	-2.099423	0.0559		
1239644 <= GDP 6 observations						
LOG(GDP)	0.891438	0.010038	88.80441	0.0000		
INFL	0.070075	0.027105	2.585342	0.0226		
Non-Threshold Variables						
Т	0.002657	0.005772	0.460319	0.6529		
R-squared	0.995580	Mean dependent	t variable	12.35809		

#### **Econometric Models for Taxes**

The following model is in differences (Table 4, Model 16) of order one shows that between Taxes collected and GDP there exists a positive and significant relationship; for one monetary unit increase in GDP it is expected an increase of 0.266 monetary units in the volume of taxes collected. The determination coefficient of 0.218 or 21.8% shows that GDP could but explain a low proportion of variance in Taxes; this means a low efficient system of tax collection and or other factors influence tax collection rather than GDP growth.

Nr	Model	R-	Prob
		squared	(F-statistic)
16	D(TAXES) = -194.376468711 + 0.2660145101*D(GDP)	0.2182	0.0437
17	TAXES = -0.40989*TAXES(-1)(***) - 0.99145*TAXES(-2)(***) +	0.9986	0.000
	0.292029*GDP(***) +0.263458*GDP(-1) (***) - 103627.82(***)		

#### Table 4: Models estimated for TAXES as dependent variable

We then estimated an ARDL model (17). This model shows that volume of taxes collected depends (positively) also on GDP at lag one, and also but negatively on the level of taxes at lag one and two, or taxes collected in two previous years. This last result might not have a convincing explanation but it may be puts forth the idea of a cyclical dynamic behavior in tax collection process, which of course needs further investigation.

Then we estimated a two threshold regression model for taxes to see whether GDP-TAXES relationship remains linear through time or not and whether there are distinct linear equations in different time sub-periods.

In the first model (Table 5, Model 18) we used the trend variable T as threshold variable. One threshold value is identified (two regimes), meaning that GDP-TAXES relationship is nonlinear and effects of GDP growth in the two regimes statistically different. In the first regime we have 17 observations and the effect of GDP growth in taxes is 0.235 monetary units per one unit increase in GDP. In the second regime we have two years (very few in fact) and effect of one unit increase GDP in taxes is much more, 0.818 monetary unit. This might be discussed as an improvement in the efficiency of the tax collection process, because two years are very few as to consider it statistically consistent.

Table 5. Threshold model I estimated for TAMES as dependent variable				
D(TAXES) = (YEAR < 19)*0.2359*D(GDP) + (YEAR > 19)*0.81845*D(GDP) (18) Method: Threshold				
Regression, Threshold variable: YEAR, Threshold value used: 19				
Variable Coefficient		Std. Error	t-Statistic	Prob.
T < 19 17 observations				
D(GDP)	0.235907	0.041243	5.719960	0.0000
$19 \le \text{T} 2 \text{ observations}$				
D(GDP)	0.818450	0.185938	4.401731	0.0004
R-squared	0.495714	Mean dependent	variable	15211.79

#### Table 5: Threshold model 1 estimated for TAXES as dependent variable

In the second model (Table 6, Model 19) we used GDP as threshold variable. The results are identical with the case of Trend T as threshold variable, so no need to discuss its results.

D(TAXES) = (GDP < 1394419) * 0.235907 * D(GDP) + (GDP > = 1394419) * 0.818445 * D(GDP) (19) Method:				
Threshold Regression, Threshold variable: GDP, Threshold value used: 1394419				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
	GDP < 1394419 -	- 17 observations		
D(GDP)	0.235907	0.041243	5.719960	0.0000
	1394419 <= GDP	2 observations		
D(GDP)	0.818450	0.185938	4.401731	0.0004
R-squared	0.495714	Mean dependent	variable	15211.79

#### Table 6: Threshold model 2 estimated for TAXES as dependent variable

#### **Econometric Models for Population Consumption**

First we estimated the following model, which in econometrics literature is called the Koyck model, (Model 20, Table 7). We did this in two forms, in level and in log form of variables. As it can be seen, consumption of the population in a time period is a function of GNI in this time and consumption realized in the previous period, or consumption at lag one. So, when deciding how much to consume in the next time period consumers take into account the actual consumption level.

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Nr	Model	R- squared	Prob (F-statistic)
20	PCON = 19101.96 + 0.357338*GNI(***) + 0.55969*PCON(-1) (***)	0.9957	0.000
21	LOG(PCON) = 0.66321*LOG(PCON(-1)(***) + 0.301858*LOG(GNI))	0.9957	0.000
	(***) +0.447805(*)		

This model could help to directly read or calculate a number of valuable indicators. First, coefficient 0.357 before GNI is a short run multiplier, meaning that if actually income increases by one unit, this same period consumption is expected to increase by 0.357 units. The coefficient 0.559 in front of PCON (-1) shows that every year the effect of one unit Income on consumption decreases by approximately 60%. We can also calculate the total or long-run multiplier, which results 0.81. We can also calculate the mean lag, which results 1.26; this means that the effect of changes in Income on consumption is expected to happen on the average 1.3 years later. (See for calculation formulae (Gujarati, 1995, pp 592-596). Then we estimated the Koyck model in log form (Model 21). Results are significant and approximate in values.

And at last, we estimated a threshold regression (22), using GNI as threshold variable, to estimate relationship between consumption and income, to see again whether the relationship between consumption and Income is linear or not. Only one threshold value is identified (equal to 992473), so we have two statistically distinct regimes with different equations alongside study period 1995-2015.

PCON = (GNI<992473)*(180207.857 + 0.28563*GNI) + (GNI>=992473)*(125668.769 + 0.4465*GNI) + 19698.78*T (22) Method: Threshold Regression, Threshold							
value used:	value used: 992473, Threshold variable GNI						
Variable	Coefficient	Std. Error	t-Statistic	Prob.			
	GNI < 992473 11 observations						
С	180207.9	35954.22	5.012148	0.0002			
GNI	0.285632	0.139828	2.042742	0.0591			
992473 <= GNI 9 observations							
С	125668.8	73920.12	1.700062	0.1098			
GNI	0.446524	0.152311	2.931665	0.0103			
Non-Threshold Variables							
Т	19698.78	8037.470	2.450869	0.0270			
R-squared	0.997513	Mean depen	dent variable	704231.9			

#### Table 8: Threshold model estimated for PCON as dependent variable

The first regime encompasses 11 years with GNI<992473 and 9 years with GNI>992473. In the first regime the effect of one unit increase in GNI on consumption is 0.2856 monetary units, 0.4465 being in the second regime. So we have clearly a non-linear relationship between consumption of population and GNI and with effects much higher in the last years; this is a result that certifies a great change in consumer behavior as far as proportion of income consumed.

#### DISCUSSION

GDP or GDP per capita are no doubt key indicators of macro-economic performance of a country. This is in full conformity with relevant literature and empirical research. In our research we found that between GDP and GDP per capita exists a strong relationship; this is quite comprehensible, since GDP is the base for calculating GDP per capita. Based on this we used GDP instead of GDP per capita; and based on GDP it's easy to make references about GDP per capita, since we could calculate GDP per capita rate of change by subtracting rate of population change from GDP rate of change.

GDP growth results to be significantly and positively correlated with Trade as a variable of market openness, Gross Fixed Capital Formation as a variable of capital accumulation, and Imports of capital goods. So, trade liberalization policies implemented by the governments over years, size of investment and trade of capital goods in Albania have had a strong positive result on GDP growth. This result is logical based on economic theory and findings of research worldwide. But, there is also a significant relationship between trade and imports of capital goods, because the latter is substantial part of imports, thus trade. Also, between Trade and Gross fixed Capital Formation and Imports of capital goods there is a positive relationship, because this purpose of this type of trade is mainly contribution to investment. In literature, as we mentioned, Foreign Direct Investment is considered a very important variable for the macroeconomic assessment of a country. This is true but we didn't include this variable in any of the growth models. First, because FDI is embodied in GFCF and its effect on GDP is exerted through GFCF. Second, as examples of literature have pointed out it might take years for FDI to start its effects on GDP because of implementation lags. GDP growth results negatively related to Inflation rate. This is acceptable on economic grounds, but also by most empirical findings in worldwide related research. This seems a full justification of tight monetary policies conducted in Albania as recommended by IMF. Between GDP growth and government deficit there is a significant positive relationship. In literature we found both cases, with negative as well as positive correlation between them. In

Albania's case this seems quite comprehensible because government spending has been a means to support infrastructure development, such as roads countrywide, agriculture infrastructure, but not only, which have been a support to sustainable growth. So, on the base of research findings and above discussion, the first research hypothesis is accepted.

One of the research findings is that Capital accumulation (GFCF) is positively and significantly related to GDP growth, Trade and Imports of Capital goods. This seems acceptable, because GDP growth means more potential for later investment, and more imports of machinery and technology means more investment. But GFCF is negatively and significantly related to Inflation. This also seems quite normal, because high inflation rates tend to reduce investment initiatives and impede efficient use of resources. And there isn't any relationship between GFCF and Government deficit. This finding could be justified by arguing that except for a few years of the study horizon the deficit has maintained low because of tight fiscal policies, and it is difficult to identify relationships when variability in data is low. Further on, we estimated two threshold models for GFCF, with two different threshold variables. Again government deficit resulted insignificant, but relationship between GFCF and GDP and Inflation resulted nonlinear; this means that parameters of relationship between GFCF and GDP and Inflation don't remain constant over time. When threshold variable is GDP, we have a finding that might seem controversial. Inflation effect on GFCF is negative in the two first regime and positive in the third regime that includes six last years. But I think this is reasonable, because in the third regime is characterized by very low and stable inflation rates. And effect of GDP growth on GFCF is in the second regime including 10 middle years. In conclusion, the second hypothesis is partly accepted; it's rejected in the case of government deficit.

As for Tax revenues, we found that current tax revenue is positively and significantly dependent on current and past value of GDP, as well as Tax revenue of lag one and lag two. It's quite logical that current tax revenue is dependent on current GDP volume, because more GDP means more business revenue to tax; but how could we explain the positive effect of ne year past GDP to current tax? We think this could be the result and the effect of the consolidation of tax administration system and business getting used or becoming increasingly aware of the obligation to paying taxes. Furthermore, we estimated two threshold models for taxes depending on GDP. The result is that this relationship is not linear and effect of taxes on GDP is much higher in last period than previous ones. This might be merit of greater government efforts to improve tax legislation and tax administration system; in fact, three years ago the tax legislation changed substantially for non-conformity with tax obligations. However, this could be the perhaps the object of another research. So, based on the above findings a discussion, the hypothesis three is accepted in full.

Inflation is positively related with government deficit and negatively related with GDP growth rate. Theoretically this makes sense but also empirically is a common result. So the third hypothesis is fully accepted.

When consumption of the population is the dependent variable, we found that current consumption is positively and significantly related with current Gross National Income (GNI) and also consumption one year before, but not inflation. Low coefficient of consumption per one unit increase of GNI (marginal propensity to consume 0.35) shows that Albanians are a highly investment-oriented population. On the other hand, the population tends to adjust consumption in the current period based on the consumption of one year before. The threshold model estimated for the relationship between consumption and GNI, showed that this relationship is explained better by a non-linear regression. The result is very interesting and shows that in the second regime, or 9 last years, the marginal propensity to consume has increased from 0.2856 to 0.445 per one unit of GNI. This means that the investment-oriented mind of the population has weakened over years. In conclusion, hypothesis 5 is accepted but partly.

#### CONCLUSIONS

Following discussion of results as above we can draw a number of conclusions:

GDP growth is in positive relationship with growth of international trade volume and specifically with imports of capital goods; this means that economic openness for Albania has worked. In this context, government of Albania should identify and address in an effective way all potential bottlenecks for a more open economy, and more imports of capital goods in particular.

GDP is also strongly and positively related with Gross Fixed Capital Formation; and the latter is positively related with trade and imports of capital goods. Thus, it is vital for Albania to design and pursue an import-friendly policy for capital goods, such as policy of low taxes and tariffs, identification and reduction of nontariff trade barriers, and good investment climate in general, which all work positively in the context of more imports of capital goods and investment.

GDP is positively related to budget deficit; this means that public money has had a positive effect on growth; this might be due to heavy investment in public infrastructure as roads and energy, but not only. However this could be a research hypothesis in itself, to identify which categories of public spending work more in support to higher rates of GDP growth.

GDP has been negatively influenced by inflation rate; as data show, during the 25 years of transition, there have been periods of high inflation rates, which are the reasons for such an effect. However, inflation rates have been reduced over years and policy of low and stable inflation rates has worked.

GDP growth rate has triggered lower inflation rates, but budget deficit has been positively influencing inflation rate. This conclusion supports the continuation of low and stable budget deficit policies.

Growth of GDP has an influence on tax revenue growth, and effect of growth in a given period (year) seems to have an effect on tax revenue beyond the current period (year). The same holds true for taxes, that is tax revenue in a given period seem to influence taxes not only in the current year but also on tax revenue of future years. This perhaps might be a specific behavior of taxpayers in Albania that needs further investigation.

Consumption of the population seems strongly correlated with consumers' expectations on future expected inflation rates and income. This means that the adaptive expectation hypothesis could hold true for the population consumption in the case of Albania

#### SCOPE FOR FURTHER RESEARCH

As it can be clear, a monetary dimension in the macroeconomic analysis is almost missing in our research. So scope for further research is straightforward and would comprise a more comprehensive macroeconomic performance assessment, by including a number of monetary aggregates variables we didn't mention here, such as interest and exchange rates, money aggregates, public debt and current account, loans to private sector, and the country's public debt. And, since Albania has been prone of several political instability shocks, effect of these shocks on country's macroeconomic performance could be of interest. And with longer time series, study of the foreign investment inflow could be more effective and easier to do, because we think the impact of FDI on GDP and other aggregates takes long to become effective.

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