International Journal of Business and Management Invention
ISSN (Online): 2319 – 8028, ISSN (Print): 2319 – 801X
www.ijbmi.org || Volume 5 Issue 6 || June. 2016 || PP—14-22

The prognosis of Basel III costs in Albanian Economy

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***ABSTRACT**: This article is based on the basic hypothesis according to which the implementation of Basel III will be associated with costs in the economy. Studies show that tightening of requirements for capital and liquidity under Basel III is expected to reduce the level of GDP in the long term. The aim of the study is to prove correlation between bank indicators and GDP, and then if it is proved the correlation, to calculate the costs.Banks can implement the increased capital and liquidity requirements under Basel III using different strategies. The goal is to predict the impact of these new macro strategies of banks in the framework of Basel III.Also an important part of this article is to understand the operation and impact of the banking system in some macroeconomic indicators. From the study it can be said that there is not a direct relationship between the level of capital and GDP, and the same for liquidity and GDP level connection. It is proved the link between the level of liquidity and interest rates as well as the link between the lending and interest rates.*
***Keywords:** Basel III, Costs, Albanian Banks*

I. INTRODUCTION

The increased demand for capital and liquidity bring their costs. In an attempt to meet these requirements, the banks could follow one of the following strategies, separately or coordinated with each other, which will give them the effects of macroeconomics:
(i)issue new capital;
(ii) increase retained earnings by:
- reducing dividend payments;
-increasing operational efficiency;
- Increasing the average spreads between rates on borrowing and lending;
- The growth of non-interest income (income from services);
(iii) reduction of risk assets by:
- Reducing the loan portfolio;
- Tightening lending requirements;
- Reducing the duration of the loans;
- Reducing or not selling not borrowed assets
- Transforming the composition of bilance towards assets with less risk.

In its interim report, MAG (2010a) assumed that Basel III requirements will be achieved primarily through a combination of increases in lending spreads and a tightening of lending standards, particularly in riskier parts of loan portfolios. These will have an impact on the economy by reducing debt-financed investment and consumption. In addition, MAG (2010a) expects that once the targets are achieved, lending spreads will gradually retrace some of the widening and lending standards will be relaxed.Averaging results of various empirical estimations from several countries, the interim report shows that a 1 percentage point increase in the target capital ratio implemented over four years will lead to a maximum reduction in GDP to a level 0.19% below its baseline level - equivalent to a reduction in the annual growth rate of 0.04 percentage points over the period, followed by a gradual recovery of growth towards the baseline.In this context we tend to calculate the costs in the case of Albania.The paper is organized in the following manner:

Part one: Analysis of empirical literature
Part II: Analysis of variables involved in the study and laying of hypotheses
Part three: Methods of work and testing of hypotheses
Part four: Analysis of findings and hypotheses.
Part five: Conclusions

1. Empirical Literature

Studies in connection with the issue are multiple. Methods and variables included, vary from study to study. Below I'm presenting a part of the studies, to which I have been referred.The main channel through which

changes in capital and liquidity regulation affect_economic activity is via an increase in the cost of bank intermediation. Banks will increase lending rates to compensate for the cost of holding more capital and liquidity. Owing to imperfect substitutability between bank credit and other forms of market financing, this leads to lower investment and lower output.

According to the researcher Miles et al doubling of the level of capital of 8.4% to 16.8% is expected to decrease the level of output by 15% for the british economy. While the researcher Moran on his analysis about the impact that provides recapitalization under the new Basel III in the United States finds that banking capital increases the ability of an economy to minimize collisions and after shocks, well-capitalized banking sectors experience a small reduction in bank lending. While according to Gambacorta (2010) by applying a VECM model and analyzing the effect of the two main indicators, the capital and liquidity impact of changes in capital and liquidity ratios to GDP are quite small long-term, calculated for the American economy as well.

II. THE DESCRIPTION OF THE DATA

To calculate the costs we have used the following variables: real GDP, the amount of loans to the private sector (comprising lending only by the banking sector), the real interest rate in short term, which we have calculated as the quarterly average 3-month interbank rate minus quarterly inflation rate, the spread of interest rates calculated as the difference between the quarterly average 3 month lending rate to quarterly average 3-month interbank rate, the quarterly average return on equity ratio (ROE) for banks and the the quarterly average ratio of tangible common equity to risk weighted assets (TCE / RWA) and the quarterly average net stable funding ratio (NSFR). Data belongs to the period 2010 Q1 2000 -T4 with the goal to avoid the period where the crisis was felt in our country because this period is difficult to prove long-term relationship between the variables.

2.1 DATA

Variable	Definition	Source
TCE/RWA	The quarterly average rate of tangible common equity to risk weighted assets	Bank of Albania
NSFR (ASF/RSF)	The quarterly average net stable funding ratio	Bank of Albania + calculation of the author
ROE	The Quarterly average return on equity ratio	Bank of Albania
i-π	The quarterly real interest rate in short term	Bank of Albania
r-i	The spread of interest rates	Instat and Bank of Albania
RPI	The quarterly real estate price inflacion rate	Instat
CA	The quarterly rate of current account balance to nominal GDP	Bank of Albania Instat
GDP (Y)	Albanians quarterly real GDP	Instat
L	Quarterly rate of real banking lending to private sector	Banka e Shqiperise

The definition of capital and liquidity

In most similar studies the total banking capital is the variable used to represent the level of bank capitalization. Also, the loan to deposit ratio has been used to report with regard to the level of liquidity. But given that the new rules of Basel III focus on other indicators, we were focused precisely as follows: To show the level of capitalism banking we referre to ratio of capital to tangible banking to assets weighted by risk TCE / RWA, being the capital of tangible banking that includes only the share capital paid and retained earnings, which is the indicator of quality level banking capitalism:

$$\textbf{TCE/RWA=} \quad \frac{\text{Banking paid-up capital + Retained earnings}}{\text{Total risk-weighted assets}}$$

This indicator has been calculated for the purposes of this study through the above formula, because it was not found in the required databases .

Regarding the Liquidity Basel III refers to a long-term liquidity indicator which is showing the adequacy of liquidity funds available funds in balance to stable funding required.

This indicator was found not ready on the data published. For its calculation I have applied the following

formula:

$$\text{NSFR} = \frac{\text{Capital} + \text{liabilities owing 1yr} + 85\%\ \text{deposit} < 1\text{yr} + 70\%\ \text{Other deposits} < 1\text{yr}}{5\% + 50\%\ \text{state debts \&loan businesses} < 1\text{yr} + 85\%\ \text{private loans} < 1\text{yr} + 100\%\ \text{Other assets}}$$

2.2 Main Hipothesis

Basic assumptions of this study are:

- H: 1 Implementation of the report requests increased TCE / RWA does not cause changes in real GDP in the long term
- H 2 Implementation of the requirements of liquidity ratio (NSFR) does not cause changes in real GDP in the long term.
- H 3 TCE ratio Increase / RWA under Basel requirements do not increase the real interest rate banking.
- H 4 Increase fair value of NSFR ratio required by Basel 1 does not lower the real interest rate.
- H 5 level of creditgiving (L) has no effect on the real rate of bank interest.

III. METHODOLOGY

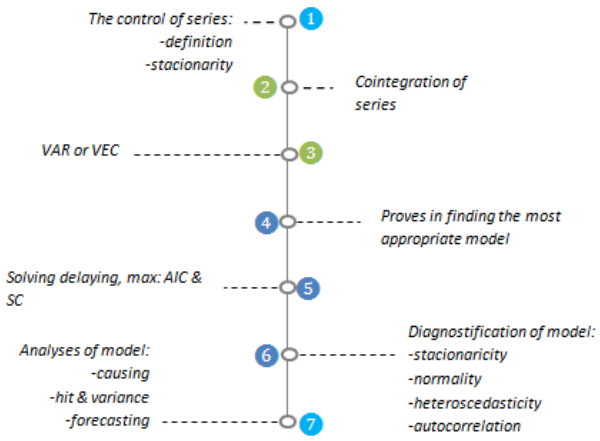
To test the long-term relationships between variables we have referred to a VAR model which in a generalized form can be written:

$$Y_t = C + \sum_{i=1}^{\rho} A_i Y_{t-i} + U_t$$

Where:

- Yr-is vector backbone of endogenous variables with n rows, at the time t,
- n is the numbor of endogenous variables.
- C is the vector of free parameters n×1 size.
- size matrix A is the matrix n×n regressors model coefficients in the i-th delay, where the delay is the maximum value of ρ.

Construction of VAR model passing through a follow several steps. The literature of the field can deduce the following map for this. Since the process steps are similar to a ride with stops in metro, using the analogy of the terms of a subway map. "Departure station" is control data making descriptive statistics and investigation unit root or stationarity for each of them. Descriptive statistics helps us become acquainted with certain moments of data, for example, average, higher values of those smaller, standard deviation etc. Stationarity has to do with the time series. The series must be stationary or identified in order to be used in the modeling. If they are not stationary, then it handled the operation of differentiation to turn it into a stationary process.



- ***Figure 1.****Map and "stations" analysis VAR / VEC.*

The next stop is the cointegration of the series. Time series can often perform trend similar to each other in the long run, therefore tend to a common long-term average. This means that there is a combination of a linear

equation between series, which in the VAR's language is known as cointegrating equation. That may be unsettling for evaluating empirical model as a downgrading ignoring the results, suggested by statistical test of student andFisher.

In simple terms, this translates into a problem for modeling the series. Literature reference model for these cases VAR model suggests passing Vector Error Correction (VEC). This model is VAR model but with a condition where his conditioning is cointegrating series equation. According to the literature (Lütkepohl, 2005; Lada & Wójcik, 2007; QMS, 2009; Osman, 2010) if between series x and y is an equation cointegrating Final simply $y = \beta \cdot x$, then performed differentiation as the (ek. 1). To be noted is that the parameters $\alpha 1$ and $\alpha 2$ express right balance adjustment speed long series, and εt expressed avoiding long-term equilibrium. (Ek. 1)

Verification of cointegration series presents important and requires special attention. If series cointegrate, then we should not use VAR and VEC model. Johansen procedure is commonly used to investigate the cointegration of the series. A detailed summary of this procedure is given by Enders in Econometrica Applied Time Series. Osmani (2010) gives a simple explanation for cointegration testing. While the view of the execution of this test is explained in the second guide EViews 7 (FV. 685-692) and in Time series data analysis using EViews (Agung, 2009).

After verifying the cointegration of the series, comes the decision to use the VAR or VEC model, which, as explained above, are different between them. Three stations constitute the first stage in being nourished done with the aim of bringing the series as ready for model building. Further, the station hotline number 4 is the evidence of numerous different service of finding the most appropriate model. Here discussed what factors should be included in modeling and reconciliation and what form should be required (Linar, of what shape power, logarithmic or other). This can be solved on the basis of suggestions of literature, avoiding multiple trials.

The next stop is what gives the answer what should be the maximum delay, then order parameter ρ. Here it helps the criteria used Akaike information (AIC) and Schwarz (Schwarz - SC), where the required minimum value of them, that model has the smallest value of these criteria, it is the right model to autoregresivit order. The sixth station is diagnostification of VAR analysis of the selected model. Here you answer the question how healthy, if we may say so, is the model. To achieve this control stationarity model (judged on roots inverse of the characteristic polynomial AR, which should be within the segment in the community of complex numbers, known as "county unit"), the normality of the term of error (judged on criteria of Jarque-Bera, where its probability is required to be higher than 0.05); heteroscedasticity of the error term (term stock should have to attribute homoscedasticity error) and autocorrelation (term error model should not depend on ourselves and investigated with serial correlation test criteria Lagrange multiplicator-LM).

Arrival station "metro" is our own analysis model that has passed the tests of a diagnostic control. At first it is important to judge about the underlying factors using Greinxherit causality test (Granger-cause), which shows which series can be used to forecast the next series. Clive Granger, has argued that there is an interpretation of a set of tests to discover 'something' on causality. It would be more correct to state that this set of tests show us which series appear earlier in time than other series. And if this test is passed, then x causes y, then it is correct to say that the series x helps in predicting the series y (Gujarati, 2004; Agung, 2009; QMS, 2009).

Analysis of shock constitutes perhaps the most important part of VAR analysis. It traces the response / reaction of endogenous shocks factor / factor exogenous impulses. A striking feature of response tracks the impact of a blow to one of the remaining terms on current and future values of the endogenous variables. Variances dissolved answers p + jes explained how a certain fluctuation of endogenous factor from other elements of the system. It provides information about the relative importance of each stroke affecting variables in the VAR. More simply, the answer the question what is the importance of the system as a whole one of the factors explaining the current fluctuation of endogenous factor. The forecast is a strong point of VAR models. Usually they used several different scenarios to create an idea for the next trend factors. Simple explanation for forecasting using VAR models is provided by Gujarati (2004). The essence is to use the values of parameters to evaluate the method of least squares for alleged levels of factors found in the right side of each equation of the system.

3.1 Results Of Vec Model (2)

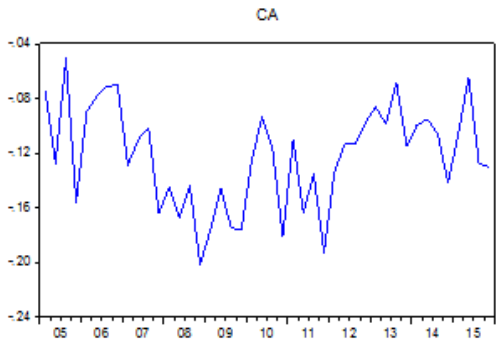
In accordance the steps described above we build VAR model and investigate the cointegration of variables. Of course before this there are observed time series variables in terms of their normality and it is checked for stationarity of the series. In the last one, it was observed that the series needed to be transformed.

Variables i-π, r-i, roe, RPI and TCE / RWA result not stationary and is required to apply the difference of the first level to turn them into stationary processes, while variable NSFR requires the second level of difference.

On the other hand, the variable L and Y were transformed by logarithm operator. Further, it is also the aspect of normal control of the series. Stationarity tests for the series are as follows. VEC: CA d (i_□) y d (l) d (r_i) d (roe) d (nsrf 2) d (tce_rwa)

Variable	**Level of stationarity**
CA	On level (I = 0)
I_P	The first difference (I = 1)
Y	Level (I = 0)
L	The first difference (I = 1)
ROE	The first difference (I = 1)
NSRF	The second difference (I = 2)
TCE_RWA	The first difference (I = 1)

In a few word, stationarity has to do with the existence of a trend upward / downward for the series. If the series is not such a trend, then it is stationary and as such can be used in modeling. If it is not stationary, then it should intervene in such return. One of the most recommended ways to achieve this is the use of spreads (recommended no more than two differences).Verification of stationarity done with Augmented Dickey-Fuller test (ADF). The smaller the value of this argument, compared to critical levels 1%, 5% or 10%, the more certain we are on this test. In the case of CA we would have the following:



Null Hypothesis: CA has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

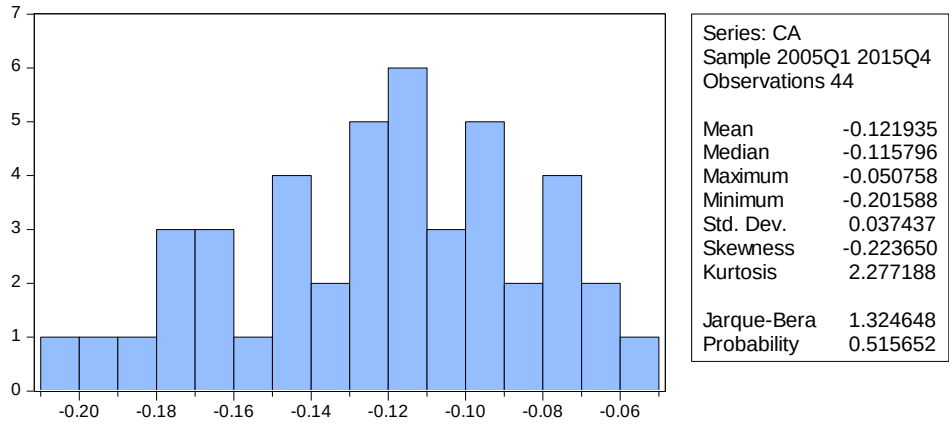
		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.532957	0.0007
Test critical values:	1% level	-3.592462	
	5% level	-2.931404	
	10% level	-2.603944	

*MacKinnon (1996) one-sided p-values.

The same is repeated for all variables.

Descriptive statistics helps us to understand the normality of distribution and relevant. For normality we look carefully for Skewness and Kurtosis criteria. Jarque-Bera is acceptable criterion for this. As seen only L and RPI have problem with normality.Normality, simply put, it is shown by the histogram. If the histogram takes the form of a bell, then we are dealing with a variable that has a normal distribution. We emphasize that the researchers are not very passionate with this criterion. That is left a little bit neglected. The main focus is on stationarity. In fact a stationary series has chances to be a series with a normal distribution.

In the case of CA we would have:



In a more detailed way we have:

	CA	I_P	L	NSRF	R_I	ROE	RPI	TCE_RWA	Y
Mean	-0.121935	0.037030	12.75455	0.447941	0.054007	0.114318	0.008492	0.149413	12.45006
Median	-0.115796	0.037250	12.97757	0.445520	0.054500	0.110000	0.005020	0.134984	12.52949
Maximum	-0.050758	0.056642	13.24224	0.507868	0.077500	0.250000	0.032735	0.244151	12.74642
Minimum	-0.201588	0.005705	11.20425	0.407852	0.037200	-0.020000	-0.005269	0.106000	11.91334
Std. Dev.	0.037437	0.012833	0.574430	0.020655	0.008395	0.078070	0.009202	0.035493	0.216052
Skewness	-0.223650	-0.438153	-1.220332	0.443360	0.345254	0.109377	1.052427	0.790760	-0.813855
Kurtosis	2.277188	2.614721	3.303466	3.318408	3.164158	1.629697	3.579225	2.647899	2.558390
Jarque-Bera	1.324648	1.679977	11.08971	1.627370	0.923540	3.530235	8.737509	4.812829	5.214847
Probability	0.515652	0.431715	0.003908	0.443222	0.630167	0.171167	0.012667	0.090138	0.073724
Sum	-5.365130	1.629300	561.2001	19.70939	2.376300	5.030000	0.373656	6.574153	547.8025
Sum Sq. Dev.	0.060267	0.007082	14.18871	0.018345	0.003030	0.262080	0.003641	0.054170	2.007170
Observations	44	44	44	44	44	44	44	44	44

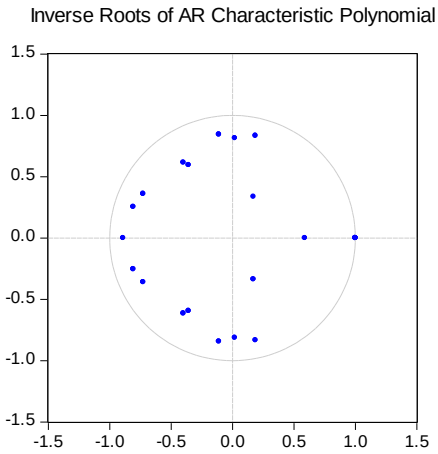
After going through these "filters" statistical series are ready to be used in the construction of VAR model. Upon the first time that VAR model is built, we check if it has cointegration relationship between the variables. For this helps us the Johansen cointegration test. As shown in the test, VAR model built characterized by some cointegrating equations. Trace criterion are 4 cointegrating equations, while based on the criterion of maximum property values (Maximum Eigenvalue) result 2 cointegrating equations. In the literature there is no definitive explanation which of these criteria are used (Trace or characteristic value). Although preferred and Trace criterion most frequently used, again the selection criteria of this test is in the hands of researchers. In the case of our paper, since the number of records is not very large, we prefer and select the maximum characteristic value criteria. This criterion reports 2 cointegrating equations.

Unrestricted Cointegration Rank Test (Trace)				
None *	0.966590	309.4025	159.5297	0.0000
At most 1 *	0.813125	176.8450	125.6154	0.0000
At most 2 *	0.641441	111.4296	95.75366	0.0027
At most 3 *	0.484758	71.42885	69.81889	0.0370
At most 4	0.383454	45.56725	47.85613	0.0808
At most 5	0.259550	26.70595	29.79707	0.1090
At most 6	0.179848	14.98656	15.49471	0.0595
At most 7 *	0.169731	7.254219	3.841466	0.0071
Trace test indicates 4 cointegrating eqn(s) at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values				
Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Hypothesized		Max-Eigen	0.05	

No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.966590	132.5576	52.36261	0.0000
At most 1 *	0.813125	65.41532	46.23142	0.0002
At most 2	0.641441	40.00078	40.07757	0.0510
At most 3	0.484758	25.86161	33.87687	0.3292
At most 4	0.383454	18.86130	27.58434	0.4253
At most 5	0.259550	11.71939	21.13162	0.5755
At most 6	0.179848	7.732338	14.26460	0.4066
At most 7 *	0.169731	7.254219	3.841466	0.0071
Max-eigenvalue test indicates 2 cointegrating eqn(s) at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values				

For the reason that series cointegrate, the VAR model is not suitable for the analysis of the phenomenon. In this case, as explained in detail elsewhere above, built model VEC (vector error correction). Akaike and Schwarz criteria used to determine the extent of lag and it resulted that the lag = 2. And in explaining the values of the current quarter attend the previous two quarters.

VEC model built (2) with two cointegrating equations. Cointegrating equations have the wording:The first cointegrating equation that links the current account deficit (CA) other factors: On the other hand, the second cointegrating equation connecting factor of - π other factors model: Also, the chart of cointegrating equations presented in the best as well. As seen from the graphs, cointegrating equations are stationary processes because they revolve value 0 and have no trend. VEC model thereafter execute and try to calculate the value of his lagu. This is accomplished by establishing and tried on lageve number, from 1 until accept the model. Akaike criterion based on the model already look lag = 2 is the most appropriate model.VEC model (ρ = 2) is a model that has stationed error term. This is proven by the fact that all its roots inside the circle fall by 1 unit. For more pictures below.



Further, the model has term error which "enjoys" the features of a series of normal distribution. Jarque Berra test helps us, likeliness of which is 0.1142. We remind that for this test we are interested for a much higher probability than 0.05.

IV. ANALYSES OF RESULTS

From the results of the model, we see that it is not proved a cointegrating relation between the level of output and capital ratio or liquidity. Our aim in the second part of the analysis was to prove whether such a bond is calculated change in output (GDP) as a result of change 1% of the TCE / RWA and NSFR and generated the results that compare the benefits found in the first analysis. Albanian economic reality does not show long-term relationship between the variables of interest in this model. However the VEC model results serve to analyze a good part of our working hypothesis. An important part of our thesis is the analysis and Granger-Causality tests after building the model, the results of which allow me to reach the following conclusions regarding the hypotheses.

Dependent variable: D(Y)			
Excluded	Chi-sq	df	Prob.
D(CA)	5.761797	2	0.0561
D(I_P,2)	9.565858	2	0.0084
D(L,2)	1.719536	2	0.4233
D(R_I,2)	6.528551	2	0.0382
D(ROE,2)	0.670823	2	0.7150
D(NSRF,3)	0.663971	2	0.7175 H1
D(TCE_RWA,2)	2.290167	2	0.3182 H2
All	30.50959	14	0.0065

Dependent variable: D(I_π,2)			
Excluded	Chi-sq	df	Prob.
D(CA)	6.816818	2	0.0331
D(Y)	6.032664	2	0.0490
D(L,2)	18.75587	2	0.0001 H5
D(R_I,2)	0.503383	2	0.7775
D(ROE,2)	1.497190	2	0.4730
D(NSRF,3)	5.082241	2	0.0788 H3
D(TCE_RWA,2)	3.125038	2	0.2096 H4
All	36.95542	14	0.0007

Testing Of Hypotheses

 H: 1 The implementation of the increased requests in report of TCE / RWA does not cause changes in real GDP. /Accepted

 H 2 The implementation of the requirements of liquidity ratio (NSFR) does not cause changes in real GDP. /Accepted

 H 3 The increased balance of TCE / RWA under Basel requirements do not increase the real interest rate banking. /Accepted

 H 4 The increase of right balance of NSFR towards 1, according to Basel Requrements does not lower the real interest rate. / Not accepted.

 H 5 The level of creditlending (L) has no effect on the real rate of bank interest. / Not Accepted

V. CONCLUSIONS

- Capital Banking and NSFR ratio resulted not affecting in real GDP, so we can not predict the expected negative correlation between them.
- Lack of a long-term connection allows us to forecast that costs will be negligible from the Implementation of Basel III on the banking system.
- Level of Banking capital does not show causation with interest rate. So the real rate implementation of growing capital requirements are not expected to raise interest rates.
- Sustainable level of liquidity is negatively correlated with the real rate of interest. The more it reaches the recommended value 1, the more it decreases (concretely 1% --- 7.7% decrease).
- Level of creditlanding affects the real interest rate indicating a positive relationship that can be explained by the concept: credit risk (concretely 1% --- 0.81%.
- The level of creditlending does not explain GDP, showing that panorama of the Albanian economy, that has to do with the high level of non-performing loans.

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