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AN EMPIRICAL ANALYSIS OF THE BENEFITS FROM THE IMPLEMENTATION OF BASEL III IN THE ALBANIAN ECONOMY

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Abstract

The purpose of this paper is to measure the positive effects of the implementation of Basel III in the Albanian economy. The article proposes a model of evaluation of the probability of banking crises in the context of bank equity indices and long-term liquidity. The study shows the importance of qualitative improvement mainly to capital and liquidity indicators in the bank in order to make the banking system more sustainable and stable against potential crises. The paper also highlights the importance of Basel III, also made an overview of the effects of the recent crisis and its impact on the domestic economy. The proposed model also gives the opportunity of evaluating the benefits in terms of GDP by implementing rules Basel as in the short term, as well as in the long term that in the case of Albania turns out to be only 0.22% in the short term and 5% in the long term concerning the implementation of the capital requirements are expected to reduce the probability of crises with 3,06%. While meeting the requirements for liquidity reduces the probability of banking crises with 12,14%, while benefits are calculated minimum.

Keywords: Banking, Basel III, Financial crisis, Performance, Albania

INTRODUCTION

The recent global economic anf financial crisis brought the necessity of improving or increasing requirements for banks with the aim to manage not only the specific risk, but also systemic risks that threaten the whole economy. For the first time in the history of international supervision, emphasis was placed on macro-prudential policies in order to instill effect on the macroeconomic level.

This article consists of an empirical analysis to assess the importance or the impact of banking indicators on the probability of the banking crisis and then financial crises. According to Walter 2010, the probability of crisis moves between 4-5% for developed economies as well as emergence economies. Despite the fact that emergent countries such as Albania, not directly affected by the crisis, they feel and show the serious consequences for their economies. This was evident years after the crisis of 2008-2009, which did not appear immediately in our country, but brought its negative consequences in the years that followed, specifically in 2010-2012. Many experts even believe that its effects continue to be felt yet. In this context, my goal is getting to know the importance of having a well-capitalized banking system , but also liquid with a view to highlighting their importance in the avoidance of potential crises.

As in an analysis carried out by the Basel Committee and Angelini et al, 2011, for banking supervision, the benefits of the new Basel requirements are precede losses (expressed in terms of GDP) from the banking crisis. So initially I calculated how change the probability of crises in the context of new requirements for capital and liquidity and then I calculated the expected losses from a potential crisis by multiplying the benefits of this “reduction of probability”.

EMPIRICAL LITERATURE

Efforts to assess this aspect of regulative Basel have been numerous and have been proposed different models regarding the evaluation of measurable benefits of Basel III.

Most of the studies consist of a cost-benefit analysis of the implementation of Basel III or specifically on an analysis of the economic impact. (EDI). I am referring to empirical analysis which aim to assess the impact of bank capital and liquidity in the probability of crises and empirical analysis on the best approaches which allow to be evaluated in order to approximate losses of GDP that accompanies a banking crisis.

Regarding the importance of banking capital and liquidity on crises probability i am referring to a model implemented by Yan Meilin, which accounts the reduction in the probability assuming full implementation of Basel rules. According to his study, meeting the requirements of Basel, for capital and liquidity are expected to reduce the probability of banking crises in the case of Britain with 4.996% and 2036% respectively.

Studies with a similar purpose, but applying different methods are held by Barrel et al (2009), according to which, the increase to 1% of bank capital and liquidity would reduce the probability of crises in the UK with more than 6% and less in other eurozone countries. With the same method Kato et al, 2010 and Wong et al (2010) in the case of janponeze economy have estimated that the increase of 1% in the level of capital, the probability of occurrence of a crisis falls to 10.3% without any increase in liquidity level and the probability of a crisis falls by 2.8% when a 1% increase of the level of capital associated with 10% increase in the ratio deposits / total assets. By Wong et al also, increased over 7% of banking capital is not expected to bring significant reduction in the probability of banking crises. Marginal benefits become apparent zero, when the ratio of the banking capital to risk-weighted assets tends to be higher than 11%.

Also Gauthier et al (2010) using a "stress test" model has estimated that the increase of capital of 7% to 8%, without any increase in liquidity reduces the likelihood of a systemic crisis with two-thirds (ie from 4.7% to 1.7%) in the case of Canada.

Also there are numerous studies concerning the calculation of losses in terms of GDP by the crisis. In literature, the losses are classified into two groups: short and long term losses. To calculate short term losses is considered the period from the beginning of the fall of GDP to the period of recovery to levels of GDP before the crisis. While long-term losses are losses that can not be recovered and relate mainly to the declining trend in GDP growth. Starting from this Bordo et al (2001), Demirguc -kun et al 2000 and Hutchion and Noy (2002) have constructed models of short-term evaluation of losses, while Cerra and Saxena (2008), Roger et al (2010), Barrel 2010 have estimated losses permanently.

METHODOLOGY

Data descriptions

It is very important to clarify the variables used for empirical analysis, which I designed in two parts:

-An evaluation of the probability of crises

-And evaluations of potential losses.

The data are processed in the statistical model e-view-s.

The calculation of benefits

To calculate the probability of occurrence of a banking crisis, I am referring to a dummy dependent variable that takes only two replies, crisis or no crisis. I identified with the crisis period from the first quarter of 2010 and until the first quarter of 2012. The reasons for the identification of this period as crises is mainly related to the analysis of macroeconomic variables such as GDP, inflation, unemployment, depreciation in local currency compared with the currencies, the decline in investment, reduced remittances, reduced creditworthiness or increased non-performing loans, etc.

While as explanatory variables in this model is used the average level of capitalization banking TCE / RWA per the entire banking system, the average level of funding stable of banks (NSFR), the index of the prices of real estate RPI and the ratio of current account to GDP (CA). The reason for the inclusion of the index of real estate prices is explained by Barrell et al (2009). Substantially according to him this indicator has much larger predictive capabilities of crisis than other factors such as interest rates, or the ratio of return on assets. While the reason for the inclusion ratio of the current account to GDP as forecast economic crisis is that history has shown that a banking crisis is always accompanied by a crisis of exchange rates. So that a current account deficit may herald a crisis of exchange rates and as such could serve to model the probability of banking crises. All data are organized in quarterly and belong to the period: first quarter of 2005 to the fourth quarter of 2015. Sources of data are specified in the appendix to the paper.

Definition of liquidity and capital

In most similar studies total banking capital is variable used to represent the level of bank capitalization (Meilan et al, n.d.). Also, the loan to deposit ratio has been used to report with regard to the level of liquidity. But as the new rules of Basel III focus on other indicators I have used indicator as follows:

To express the level of bank capitalization i have referred to the ratio of tangible bank capital to assets weighted by risk TCE/RWA, being that the tangible bank capital includes only the share capital paid and retained earnings is qualitative indicator of the level of capitalization.

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

This indicator has been calculated for the purposes of this study through the formula above . Regarding the Basel III Liquidity refers to a long-term liquidity indicator which is showing the adequacy of liquidity available funds report stable to stable funding required.

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

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

Measurement

Measuring the economic benefits from the implementation of capital and liquidity requirements for Basel III:

As benefits of the implementation of Basel requirements for capital and liquidity i have considered reducing the possibility of occurrence of a banking crisis and multiplying it with the expected losses from the occurrence of a crisis.

Benifits = ΔPr * expected losses from the crisis

So assessment of benefits benefits requires double calculations, including calculation of the probability of a crisis, but also evaluation of losses expected if the crisis occurs.

As explained above the probability of crises is related with some independent variable as the following:

$Pr=\phi(\alpha_i*TCE/RWA+ \beta i*RFNS+\gamma_i*Zi)$

Where, TCE / RWA represent bank capitalization level

NFRS represents net stable funding to banks

While Zi is a vector of the macroeconomic variables, comprising the index of real estate prices and the ratio of current account in terms of GDP.

According to the calculation of losses caused by a crisis, I am referring to data on real GDP throughout the period under consideration. As mentioned in the literature a crisis is associated with temporary loss and permanent loss , so i have estimated potential losses in both cases. As temporary losses i have considered total collapse of GDP during the crisis as a ratio to GDP before the crisis.

To estimate the probability of occurrence of a banking crisis i have used probit statistical model which is a model that is widely used in similar cases. I am referring to a nonlinear probit model with the aim to assess the impact of factors together, not separately. This is because the expected requirements of Basel for capital and liquidity are set to be implemented together and my goal is not to assess only the individual impact of each factor, but also the impact of their combinations on probability of crises.

EMPIRICAL RESULTS

The results of the measurements made by probit are shown in Table No. 1. I consider like more convenient model number 11.

Table 1: Probit anaysis

	Combined				Only in linear terms				Only nonlinear term			
Variabli/ Specifikimi	1	2	3	4	5	6	7	8	9	10	11	12
TCE_RWA*NSRF	217.51	161.67	4.68	-168.76					-32.96 **	-36.58 **	-31.37 **	-29.09 **
TCE_RWA	-121.13 *	-91.03	-22.14	58.75	-29.42 *	-24.53 *	-20.14	-12.44				
NSRF	1.89	-0.08	2.44	2.41	4.39	2.48	2.49	-0.23				
RPI	-75.88	-97.47	-184.50 **	-231.51 **	-49.93	-88.60	-184.29 **	-219.01 **	-54.47	-89.00	-169.51 **	-220.71 **
CA	-15.15 *	-18.03 **	-13.76	-12.10	-11.65	-15.03 *	-13.68 *	-16.23 *	-11.87 *	-15.08 **	-15.57 **	-16.09 **
Lag	0	1	2	3	0	1	2	3	0	1	2	3
Log likelihood	-14.90	-14.20	-13.02	-11.73	-16.01	-14.70	-13.02	-12.16	-17.34	-15.35	-13.28	-12.02

Disclamer >significance level : * 90%, ** 95%, *** 99%.

Model 11 is the best, because the three coefficients are important with level of significance 95% (all three have **). Also model 12 satisfies this condition , but there Log likelihood is -12.02, while the model 11 has -13.28. In addition, the model 12 has lag 3, while model 11 has lag 2. In general, high lag is not preferably, especially when the results are the same. So model 11 is the best.

From the analysis of the model 11 we see that all resulting significant coefficients have received the expected mark. Negative signs of non linear variable TCE / RWA and NSFR taken together shows that higher capital and liquidity in the banking system may prevent the emergence of a crisis. The positive signs of coefficient before RPI variable (the variable that indicates the real estate prices) shows that high rates of inflation in this market are predisposition for banking crises. Also negative sign before the coefficient of CA variable indicates that a experienced positive current account reduces the probability of crisis.

The purpose of building the probit model in assessing the probability of a crisis in our banking system, was not only to estimate the impact of variables of consern, but to estimate the benefits from the implementation of regulatory requirements. Table 2 shows the connection between the levels of TCE / RWA or NSFR variable and changes in the probability of crisis.Initially i have calculated the probability of a crisis based on the average of all variables. Keeping other factors unchanged, increasing by 1% of banking capital in our banking system turns out to reduce the probability of crises around 3.34%. Probability of crises resulting to reduce about 2.87% when capital level is about 12% .As NSFR ratio goes to value 1, the probability reduced by 0.14%.

Table 2. Output based on model 11 estimation

TCE/RWA	Cumulative probability of probit function	The reduction of probability	NSFR	Cumulative probability of probit function	The reduction of probability
10%	17.2%				
11%	13.86%	3.34%	0.50	11.44%	3.54%
12%	10.99%	2.87%	0.55	8.54%	2.90%
13%	8.57%	2.42%	0.60	6.23%	2.31%
14%	6.58%	2.00%	0.65	4.44%	1.79%
15%	4.96%	1.62%	0.70	3.09%	1.35%
16%	3.68%	1.28%	0.75	2.09%	0.99%
17%	2.68%	1.00%	0.80	1.39%	0.71%
18%	1.92%	0.76%	0.85	0.90%	0.49%
			0.90	0.56%	0.33%
			0.95	0.35%	0.22%
			1	0.21%	0.14%

Note: NSFR is taken as the value in the last quarter, 0.40785
and for TCE / RWA is taken mean value , 0.1496.

From the calculations on the loss or decline in the level of real GDP for the period of crisis, results that crisis (though not directly in Albania) has caused a decrease by 7.7% of GDP, which is considered as short-term loss. To calculate long-term cumulative loss we have referred to the formulas proposed by BCBS 2010, which turns out 161.7% for the case of our economy. In this context, I have estimated the marginal benefit from increased capital requirements and liquidity. Table 3 shows these calculations where noted that the banking capital stands at 12% of capital levels expected in the short-term benefits are only 0.22% and 5% in the long term.

Table 3. Estimated the marginal benefit from increased capital requirements and liquidity

TCE/RWA	Cumulative probability of probit function	The reduction of probability	The expected profits in Short-Term	The expected profits in Long-Term
10%	10.52	3.89%	0.30%	6%
11%	17.15%	3.45%	0.26%	5%
12%	14.09%	3.06%	0.22%	5%
13%	11.43%	2.66%	0.19%	4%
14%	9.14%	2.28%	0.15%	3%
15%	7.22%	1.93%	0.12%	3%
16%	5.62%	1.60%	0.10%	2%
17%	4.31%	1.31%	0.08%	2%
18%	3.26%	1.05%	0.06%	1%

We have calculated in the same way the benefits of increased requirements for liquidity as shown in Table 4. As it is shown, the expected benefits of short-term as well as long term, are very small, which shows a liquid banking system.

Table 4. Benefits of increased requirements for liquidity

NSFR	Cumulative probability of probit function	The reduction of probability	The expected profits in ASH	The expected profits in AGJ
0.50	2.98%	1.97%	0.152%	3.185%
0.55	1.71%	1.27%	0.098%	2.054%
0.60	0.93%	0.77%	0.059%	1.245%
0.65	0.48%	0.45%	0.035%	0.728%
0.70	0.24%	0.24%	0.018%	0.388%
0.75	0.11%	0.13%	0.010%	0.210%
0.80	0.05%	0.06%	0.005%	0.097%
0.85	0.02%	0.03%	0.002%	0.049%
0.90	0.01%	0.01%	0.001%	0.016%
0.95	0.00%	0.01%	0.001%	0.016%
1	0.00%	0.00%	0.000%	0.000%

CONCLUSIONS

In conclusion of all this, we see that capital ratios and liquidity is important for their impact on banking crises. The probability of crises is negatively correlated with the level of capitalization and liquidity.

Table 5. Summery of Emprical Results

Variable	Expected result	Result received
TCE/RWA & NSFR	negative	negative
CA	negative	negative
RPI	negative	negative

This means that the higher is the level of capitalization and more liquid is the banking system, the lower is the probability of crises and therefore prevent losses that brings a typical banking crisis.

Implementation of the growing requirements for Basel III proposes especially for bank capital brings significant benefits in terms of GDP. Specifically, if we refer to Table 3 it results that the number of benefits are about 0.22% on short-term and in long-term is ranked about 4.64%.

Regarding the importance of the level of liquidity in the probability of crisis, we see that the benefits are very small, almost negligible (refere table nr. 4). If we analyze table nr. 2.2 we can see that the ratio of liquidity if the value goes to 1, the probability of crisis reduced by 12:14%.

If all other variables are held at their average and unchanged may conclude that the probability of banking crises, the estimated model probit, if you will refer to the values of the last quarter to take review (Q4 2015) for variable TCE / RWA is 17:15% on average. While the consider the probability of crisis , when all other factors are kept and only NSFR average level of the last quarter, it turns to be 14.98%. We see clearly, a system which has predisposition to be the exhibited to risks, and a non-sustainable system. All these make us understand the importance of implementing the new rules proposed by Basel III, with aim to strengthen the banking system and to avoid possible losses from potential crisis.

LIMITATION OF STUDY AND POSSIBLE FUTURE RESEARCH

This study has it limitations , which can serve as new perspectives for other researchers .One of the major constraints was the lack of some of the data, which are calculated by us. If anyone can provide these data, or provide data for a longer period of time , he can make a better reflection of aspects of the article.

This field is extremely wide and experts can find motivation for further research.One possible subject would be calculation of cost from the procces of implemetation of Basel III. Another sugestion is analyzing the forms of implementation of basel III requirements in order to evaluate the best way.

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APPENDICES

Variables concluded in the study

Variable	**Definition**	**Source**	
Cr	Crises or not (1 or 0)	Calculation of the author	Depended variable
TCE/RWA	Quarterly average rate on bank capital to risk-weighted assets.	Bank of Albania	Explanatory variables
NSFR (ASF/RSF)	The average quarterly rate of sustainable funds	Bank of Albania	Explanatory variables
RPI	Quarterly rate of change of prices of real estate	Instat	Explanatory variables
CA	Current account quarterly rate of foreign trade to real GDP	Bank of Albania Instat	Explanatory variables

12 The Models of Probit

Dependent Variable: DUMMY
Method: ML - Binary Probit (Newton-Raphson / Marquardt steps)
Date: 04/23/16 Time: 12:28
Sample: 2005Q1 2015Q4
Included observations: 44
Convergence achieved after 8 iterations
Coefficient covariance computed using observed Hessian

Variable	Coefficient	Std. Error	z-Statistic	Prob.
TCE_RWA*NSRF	217.5123	153.9303	1.413057	0.1576
TCE_RWA	-121.1337	71.21508	-1.700956	0.0890
NSRF	1.894314	4.970046	0.381146	0.7031
RPI	-75.88093	76.00418	-0.998378	0.3181
CA	-15.14721	8.923292	-1.697491	0.0896

Mean dependent var	0.204545	S.D. dependent var	0.408032
S.E. of regression	0.352470	Akaike info criterion	0.904519
Sum squared resid	4.845165	Schwarz criterion	1.107268
Log likelihood	-14.89943	Hannan-Quinn criter.	0.979709
Deviance	29.79886	Restr. deviance	44.58428
Avg. log likelihood	-0.338623		
Obs with Dep=0	35	Total obs	44
Obs with Dep=1	9		

Dependent Variable: DUMMY(1)

Method: ML - Binary Probit (Newton-Raphson / Marquardt steps)

Date: 04/23/16 Time: 12:28

Sample (adjusted): 2005Q1 2015Q3

Included observations: 43 after adjustments

Convergence achieved after 7 iterations

Coefficient covariance computed using observed Hessian

Variable	Coefficient	Std. Error	z-Statistic	Prob.
TCE_RWA*NSRF	161.6728	160.5258	1.007145	0.3139
TCE_RWA	-91.02903	69.55482	-1.308738	0.1906
NSRF	-0.076934	4.725004	-0.016282	0.9870
RPI	-97.47419	69.58197	-1.400854	0.1613
CA	-18.03200	8.944925	-2.015892	0.0438

Mean dependent var	0.209302	S.D. dependent var	0.411625
S.E. of regression	0.350132	Akaike info criterion	0.892843
Sum squared resid	4.658500	Schwarz criterion	1.097634
Log likelihood	-14.19613	Hannan-Quinn criter.	0.968364
Deviance	28.39227	Restr. deviance	44.12065
Avg. log likelihood	-0.330143		
Obs with Dep=0	34	Total obs	43
Obs with Dep=1	9		

Dependent Variable: DUMMY(2)
Method: ML - Binary Probit (Newton-Raphson / Marquardt steps)
Date: 04/23/16 Time: 12:28
Sample (adjusted): 2005Q1 2015Q2
Included observations: 42 after adjustments
Convergence achieved after 7 iterations
Coefficient covariance computed using observed Hessian

Variable	Coefficient	Std. Error	z-Statistic	Prob.
TCE_RWA*NSRF	4.684039	170.6641	0.027446	0.9781
TCE_RWA	-22.13598	74.09132	-0.298766	0.7651
NSRF	2.440298	5.134438	0.475280	0.6346
RPI	-184.4975	90.83331	-2.031166	0.0422
CA	-13.75675	8.538082	-1.611222	0.1071

Mean dependent var	0.214286	S.D. dependent var	0.415300
S.E. of regression	0.347219	Akaike info criterion	0.858157
Sum squared resid	4.460764	Schwarz criterion	1.065023
Log likelihood	-13.02131	Hannan-Quinn criter.	0.933982
Deviance	26.04261	Restr. deviance	43.64471
Avg. log likelihood	-0.310031		
Obs with Dep=0	33	Total obs	42
Obs with Dep=1	9		

Dependent Variable: DUMMY(3)

Method: ML - Binary Probit (Newton-Raphson / Marquardt steps)

Date: 04/23/16 Time: 12:29

Sample (adjusted): 2005Q1 2015Q1

Included observations: 41 after adjustments

Convergence achieved after 7 iterations

Coefficient covariance computed using observed Hessian

Variable	Coefficient	Std. Error	z-Statistic	Prob.
TCE_RWA*NSRF	-168.7613	185.9157	-0.907730	0.3640
TCE_RWA	58.74567	78.61516	0.747256	0.4549
NSRF	2.405788	5.049134	0.476475	0.6337
RPI	-231.5094	93.34473	-2.480155	0.0131
CA	-12.09589	9.989673	-1.210840	0.2260

Mean dependent var	0.219512	S.D. dependent var	0.419058
S.E. of regression	0.327726	Akaike info criterion	0.815933
Sum squared resid	3.866562	Schwarz criterion	1.024906
Log likelihood	-11.72664	Hannan-Quinn criter.	0.892030
Deviance	23.45327	Restr. deviance	43.15577

Avg. log likelihood	-0.286016		
Obs with Dep=0	32	Total obs	41
Obs with Dep=1	9		

Dependent Variable: DUMMY
Method: ML - Binary Probit (Newton-Raphson / Marquardt steps)
Date: 04/23/16 Time: 12:33
Sample: 2005Q1 2015Q4
Included observations: 44
Convergence achieved after 8 iterations
Coefficient covariance computed using observed Hessian

Variable	Coefficient	Std. Error	z-Statistic	Prob.
TCE_RWA	-29.41976	15.38066	-1.912776	0.0558
NSRF	4.389131	4.322857	1.015331	0.3099
RPI	-49.93302	63.56801	-0.785506	0.4322
CA	-11.64513	8.243719	-1.412607	0.1578

Mean dependent var	0.204545	S.D. dependent var	0.408032
S.E. of regression	0.367269	Akaike info criterion	0.909640
Sum squared resid	5.395457	Schwarz criterion	1.071839
Log likelihood	-16.01207	Hannan-Quinn criter.	0.969791
Deviance	32.02414	Restr. deviance	44.58428
Avg. log likelihood	-0.363911		
Obs with Dep=0	35	Total obs	44
Obs with Dep=1	9		

Dependent Variable: DUMMY(1)

Method: ML - Binary Probit (Newton-Raphson / Marquardt steps)

Date: 04/23/16 Time: 12:33

Sample (adjusted): 2005Q1 2015Q3

Included observations: 43 after adjustments

Convergence achieved after 7 iterations

Coefficient covariance computed using observed Hessian

Variable	Coefficient	Std. Error	z-Statistic	Prob.
TCE_RWA	-24.53315	13.69948	-1.790809	0.0733
NSRF	2.479320	3.940358	0.629212	0.5292
RPI	-88.59909	66.32732	-1.335786	0.1816
CA	-15.02550	8.292802	-1.811872	0.0700

Mean dependent var	0.209302	S.D. dependent var	0.411625
S.E. of regression	0.356360	Akaike info criterion	0.869759
Sum squared resid	4.952704	Schwarz criterion	1.033592
Log likelihood	-14.69982	Hannan-Quinn criter.	0.930175
Deviance	29.39964	Restr. deviance	44.12065
Avg. log likelihood	-0.341856		

Obs with Dep=0	34	Total obs	43
Obs with Dep=1	9		

Dependent Variable: DUMMY(2)

Method: ML - Binary Probit (Newton-Raphson / Marquardt steps)

Date: 04/23/16 Time: 12:33

Sample (adjusted): 2005Q1 2015Q2

Included observations: 42 after adjustments

Convergence achieved after 8 iterations

Coefficient covariance computed using observed Hessian

Variable	Coefficient	Std. Error	z-Statistic	Prob.
TCE_RWA	-20.13514	12.88704	-1.562433	0.1182
NSRF	2.491702	4.758822	0.523596	0.6006
RPI	-184.2854	90.19007	-2.043300	0.0410
CA	-13.67987	8.060710	-1.697105	0.0897

Mean dependent var	0.214286	S.D. dependent var	0.415300
S.E. of regression	0.342687	Akaike info criterion	0.810556
Sum squared resid	4.462517	Schwarz criterion	0.976049
Log likelihood	-13.02168	Hannan-Quinn criter.	0.871216
Deviance	26.04337	Restr. deviance	43.64471
Avg. log likelihood	-0.310040		

Obs with Dep=0	33	Total obs	42
Obs with Dep=1	9		

Dependent Variable: DUMMY(3)
Method: ML - Binary Probit (Newton-Raphson / Marquardt steps)
Date: 04/23/16 Time: 12:33
Sample (adjusted): 2005Q1 2015Q1

Included observations: 41 after adjustments
Convergence achieved after 7 iterations
Coefficient covariance computed using observed Hessian

Variable	Coefficient	Std. Error	z-Statistic	Prob.
TCE_RWA	-12.44062	10.53526	-1.180855	0.2377
NSRF	-0.233673	4.248688	-0.054999	0.9561
RPI	-219.0145	91.00861	-2.406525	0.0161
CA	-16.22823	8.662509	-1.873386	0.0610

Mean dependent var	0.219512	S.D. dependent var	0.419058
S.E. of regression	0.330939	Akaike info criterion	0.788057
Sum squared resid	4.052274	Schwarz criterion	0.955235
Log likelihood	-12.15517	Hannan-Quinn criter.	0.848934
Deviance	24.31035	Restr. deviance	43.15577
Avg. log likelihood	-0.296468		

Obs with Dep=0	32	Total obs	41
Obs with Dep=1	9		

Dependent Variable: DUMMY

Method: ML - Binary Probit (Newton-Raphson / Marquardt steps)

Date: 04/23/16 Time: 12:34

Sample: 2005Q1 2015Q4

Included observations: 44

Convergence achieved after 7 iterations

Coefficient covariance computed using observed Hessian

Variable	Coefficient	Std. Error	z-Statistic	Prob.
TCE_RWA*NSRF	-32.95715	15.72286	-2.096129	0.0361
RPI	-54.46527	50.60211	-1.076344	0.2818
CA	-11.86879	6.576300	-1.804782	0.0711

Mean dependent var	0.204545	S.D. dependent var	0.408032
S.E. of regression	0.379402	Akaike info criterion	0.924586
Sum squared resid	5.901780	Schwarz criterion	1.046235
Log likelihood	-17.34088	Hannan-Quinn criter.	0.969699
Deviance	34.68177	Restr. deviance	44.58428
Avg. log likelihood	-0.394111		

Obs with Dep=0	35	Total obs	44
Obs with Dep=1	9		

Dependent Variable: DUMMY(1)

Method: ML - Binary Probit (Newton-Raphson / Marquardt steps)

Date: 04/23/16 Time: 12:35

Sample (adjusted): 2005Q1 2015Q3

Included observations: 43 after adjustments

Convergence achieved after 7 iterations

Coefficient covariance computed using observed Hessian

Variable	Coefficient	Std. Error	z-Statistic	Prob.
TCE_RWA*NSRF	-36.58416	16.45568	-2.223193	0.0262
RPI	-88.99533	58.67736	-1.516689	0.1293
CA	-15.07584	7.053692	-2.137297	0.0326

Mean dependent var	0.209302	S.D. dependent var	0.411625
S.E. of regression	0.358981	Akaike info criterion	0.853667
Sum squared resid	5.154680	Schwarz criterion	0.976541
Log likelihood	-15.35383	Hannan-Quinn criter.	0.898979
Deviance	30.70767	Restr. deviance	44.12065
Avg. log likelihood	-0.357066		

Obs with Dep=0	34	Total obs	43
Obs with Dep=1	9		

Dependent Variable: DUMMY(2)
Method: ML - Binary Probit (Newton-Raphson / Marquardt steps)
Date: 04/23/16 Time: 12:35
Sample (adjusted): 2005Q1 2015Q2
Included observations: 42 after adjustments
Convergence achieved after 8 iterations
Coefficient covariance computed using observed Hessian

Variable	Coefficient	Std. Error	z-Statistic	Prob.

TCE_RWA*NSRF	-31.36581	13.60215	-2.305945	0.0211
RPI	-169.5103	75.32816	-2.250292	0.0244
CA	-15.56937	6.786361	-2.294216	0.0218

Mean dependent var	0.214286	S.D. dependent var	0.415300
S.E. of regression	0.340062	Akaike info criterion	0.775228
Sum squared resid	4.510039	Schwarz criterion	0.899347
Log likelihood	-13.27979	Hannan-Quinn criter.	0.820723
Deviance	26.55957	Restr. deviance	43.64471
Avg. log likelihood	-0.316185		

Obs with Dep=0	33	Total obs	42
Obs with Dep=1	9		

Dependent Variable: DUMMY(3)

Method: ML - Binary Probit (Newton-Raphson / Marquardt steps)

Date: 04/23/16 Time: 12:35

Sample (adjusted): 2005Q1 2015Q1

Included observations: 41 after adjustments

Convergence achieved after 8 iterations

Coefficient covariance computed using observed Hessian

Variable	Coefficient	Std. Error	z-Statistic	Prob.
TCE_RWA*NSRF	-29.08630	13.00617	-2.236347	0.0253
RPI	-220.7063	89.76982	-2.458580	0.0139
CA	-16.08864	7.130539	-2.256301	0.0241

Mean dependent var	0.219512	S.D. dependent var	0.419058
S.E. of regression	0.324094	Akaike info criterion	0.732740
Sum squared resid	3.991401	Schwarz criterion	0.858123
Log likelihood	-12.02117	Hannan-Quinn criter.	0.778398
Deviance	24.04233	Restr. deviance	43.15577
Avg. log likelihood	-0.293199		

Obs with Dep=0	32	Total obs	41
Obs with Dep=1	9		