

Eris Zeqo¹

Ass.Prof. Lindita Mukli²

Dr. Jona Mulliri³

COMPARING THE RESULTS OF THE STANDARD METHOD FOR CALCULATING REGULATORY CAPITAL FOR CREDIT LOSSES WITH THOSE OF VALUE AT RISK (VAR) MODEL IN ALBANIA

Abstract

One of the main problems in the Albanian financial market is the high rates of Non Profit Loans (NPL). As part of this problem, banks need to predict and calculate the level of regulatory capital to cover the possible losses from these loans. Currently in Albania these calculations are made based on the standard method imposed by the Bank of Albania.

The objective of this paper is to study whether the level of regulatory capital calculated from the standard method is sufficient to cover losses from Non Profit Loans. These results will be compared with those of a Value at Risk (VaR) model with 99% confidence level which was created as part of a study for the possibility of implementing VaR models to forecast the level of future NPL in the Albanian market. For this purpose we use the official data provided by the Bank of Albania regarding the quality of loans in Albania.

¹ "Aleksandër Moisiu" University of Durrës, Faculty of Information Technology, Albania

² "Aleksandër Moisiu" University of Durrës, Faculty of Information Technology, Albania

³ Agricultural University of Tirana, Economy and Agribusiness Faculty, Albania

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1. Introduction

As a result of the global financial crisis, the regulations of financial institutions were changed to improve and to avoid the repetition of scenarios where losses of financial institutions were paid by governments (taxpayers).

One of the highlights of these regulations is the minimal level of capital a bank must hold to cover potential losses as a result of exposure to various types of risks. Central banks, as the supervisor authority, define the models that commercial banks must use for the calculation of the level of regulatory capital that these banks should have. One of the functions of bank capital is to provide a buffer to protect a bank's debt holders against peak losses that exceed expected levels. Losses above expected levels are usually referred to as Unexpected Losses (UL). Regulatory capital has a loss-absorbing function and is needed to cover the risk of such unexpected losses and part of it is calculated to cover losses from Non Profit Loans (NPL).

The worst case that can happen would be that banks lose their entire credit portfolio in a given period. This event is highly unlikely, and holding capital against it would be economically inefficient. Banks have an incentive to minimize the capital they hold, because reducing capital frees up economic resources that can be directed to profitable investments. On the other hand, the less capital a bank holds, the greater is the likelihood that it will not be able to meet its own debt obligations. Thus, banks and their supervisors must carefully balance the risks and rewards of holding capital so that they can perform the right level of investments while exposing to an acceptable risk level of becoming insolvent.⁴

⁴ An Explanatory Note on the Basel II IRB Risk Weight Functions - <http://www.bis.org/>

The possibility to use personalized valuation methods, different from traditional methods, was introduced for the first time in June 2004 as part of Basel II recommendations. Normally, these methods must be evaluated and approved in advance by the supervisor authority. Although these methods are introduced for more than a decade, in Albania the use of these models is not implemented as it should. At the moment these models can be limited as complementary and not as a substitute of the traditional model.

An important part of the regulatory capital is calculated based on the exposure to credit risk. The objective of this paper is to study if the regulatory capital calculated by the standard method is sufficient to cover the losses from NPL. These results will be compared to those of a 99% confidence level VaR model.

2. The Standard Method imposed by the Bank of Albania

Based on Basel regulations⁵, there are two classifications for the models used to calculate the capital needed to cover the credit risk exposure:

- **Standard method.** Banks evaluate their risk exposure using outside estimates (ratings). All exposures are assigned to a specific risk group. This method specifies the capital required for each risk group. The standard method has its basis from Basel I, but is more detailed on Basel II and Basel III.
- **Internal rating based (IRB) methods.** Banks rely on their internal evaluations of some (basic IRB) or all (advanced IRB) risk components. These components are the probability of default, lost given default, exposure at default and effective maturity.

⁵ <http://www.bis.org/>

| Table 1: Standard Method Classification | | | | |
|--|-----------------------------|---------------------------|---------------------|----------|
| Nr | Category (portfolio) | Regulatory Capital | Delay (days) | P |
| 1 | Standard | 1 % | 1 - 30 | P1 |
| 2 | In Pursuit | 5 % | 31-90 | P2 |
| 3 | Substandard | > 20 % | 91-180 | P3 |
| 4 | Doubtful | > 50 % | 181-365 | P4 |
| 5 | Lost | 100 % | > 365 | P5 |
| NPL = P3 + P4 + P5 | | | | |

Currently in Albania the classification of loans and the rates for calculating provisions for each main category are based on the rules of the Bank of Albania. Loans are divided in 5 risk groups based on the period of delay in payment by the borrower where the last 3 groups form the NPL. Subject to the above categories and norms, banks create reserve funds to cover potential credit losses.

Currently the classification of loans and the rates that calculate provisions for each main category, based on the Bank of Albania Regulation "On Credit Risk Management from Banks and Branches of Foreign Banks"⁶, is as indicated on table 1.

3. Methodology

The objective of this paper is to make a quantitative research. We use the official time series data offered from the Bank of Albania on loans distribution into the five portfolios of the standard method (credit quality). The unit used for this data is in percentage. The study of these time series will be made for the January 2002 - March 2016 period and values will be divided into 3-month periods (quarters). Values before January 2002 are not taken into consideration

⁶ <https://www.bankofalbania.org/>

because earlier periods are influenced by the unusual economic situation caused after the collapse of financial institutions in Albania in 1997. The NPL values in the period October 1998 - June 2001 were at the level of 33.4% - 55.1% while in the third quarter of 2001 they went down by 29% reaching a value of 11.2%.

Based on the above explanations, for the standard method we use the following function:

$$NPL_{t+1} = 0.01 * P_1 + 0.05 * P_2 + 0.2 * P_3 + 0.5 * P_4 + P_5$$

Regarding the VaR model we use the data from a related study made by the authors for the extend of use of this models for predicting the level of regulatory capital needed to cover unexpected losses from NPL. This study has proven the normal distribution of the variance of NPL values⁷. Based on this results we use the following functions for the VaR model:

$$Max(NPL_{t+1})_{99\%} = NPL + VaR_{99\%}$$

$$Max(NPL_{t+1})_{99\%} = NPL + (avg + Z_{99\%} * stdev)$$

The Value at Risk (VaR) can be described as “the worst expected loss over a given horizon under normal market conditions at a given confidence level”.⁸ In this study we will use a 99% confidence level. The goal is to calculate the needed level of regulatory capital to cover losses from NPL in 99 out of 100 cases.

We calculate the results for each quarter with the two methods. After that, we run the descriptive statistics based on this results and compare the output of both methods (standard and VaR) to see which is more appropriate.

4. Results and Conclusions

From the study of the VaR model for the normality distribution of the values for the variance of NPL we get a mean = 0.3545 and a standard deviation = 0.80302 (table 2). Also from

⁷ The impact of seasonality on the implementation of Value at Risk (VaR) models for predicting future Non Profit Loans (NPL) values in Albania - E. Zeqo, L. Mukli, J. Mulliri

⁸ Jorion, 2001

the standard normal distribution table, for 99% level of confidence, we get a Z score = 2.327. Replacing this values on the initial VaR function we get the following results:

$$Max(NPL_{t+1})_{99\%} = NPL + (0.3545 + 2.327 * 0.80302)$$

$$Max(NPL_{t+1})_{99\%} = NPL + 2.223$$

If we interpret the results of this model we can state with a 99% level of confidence that NPL values for the next quarter will not increase more than 2.23%. This calculations can help in predicting the regulatory capital the bank needs to hold to cover the expected losses from NPL.

After we calculate the results for each quarter with both functions, we run the descriptive

Table 2: Descriptive statistics (July 2001 - March 2016)

| | | Statistic | Std.Error |
|--------------|---------------------|-----------|-----------|
| NPL Variance | Mean | ,3545 | ,10731 |
| | Median | ,3323 | |
| | Variance | ,645 | |
| | Std. Deviation | ,80302 | |
| | Minimum | -1,20 | |
| | Maximum | 2,35 | |
| | Range | 3,55 | |
| | Interquartile Range | 1,03 | |
| | Skewness | ,202 | ,319 |
| | Kurtosis | -,140 | ,628 |

Figure 1: Frequency distribution of NPL variance values

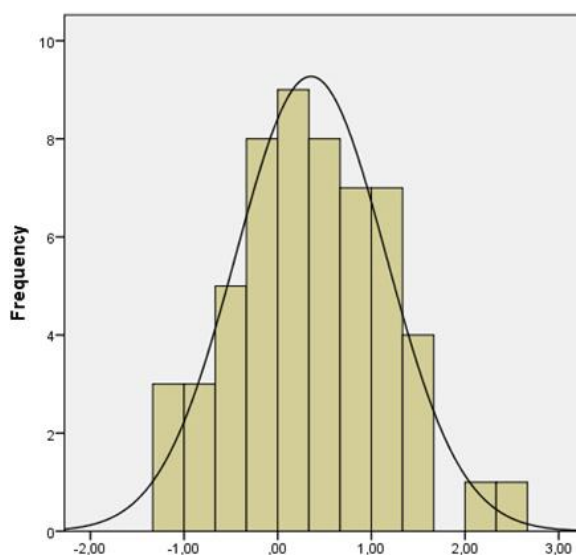


Table 3: Comparison between Standard Model and VaR

| Model | mean | Stdev | min | max | insufficient | | excessive | | Mean | |
|-----------------|-------|-------|--------|------|--------------|------|-----------|------|--------------|-----------|
| | | | | | nr | % | nr | % | insufficient | Excessive |
| Standard | -3.86 | 3.59 | -10.66 | 1.02 | 51 | 89.5 | 6 | 10.5 | -4.37 | 0.45 |
| VaR | 2.01 | 1.04 | -0.13 | 5.18 | 1 | 1.7 | 56 | 98.3 | -0.13 | 2.05 |

statistics and get the results indicated on table 3.

From these results we clearly notice that there is a considerable difference between these two models. The main difference lies in the distribution of the cases where the funds calculated by these methods are insufficient/excessive compared with the actual losses from NPL. As expected from the VaR model (99% level of confidence), in 98.3% of the cases the calculated regulatory capital is sufficient to cover the losses from NPL. On the other side, in 89.5% of the cases calculated with the standard method, the regulatory capital is insufficient to cover the losses from NPL.

Results become more controversial when we look at the difference of deficiency of the standard method. We have an average level of insufficiency of -4.37% with the worst peak reaching -10.66%.

For the VaR model we have an average of 2.05% of excessive request for regulatory capital with the worst peak reaching 5.18%. Even though in the opposite direction, these values are half of the values provided by standard method.

In all cases the VaR model requirements are greater than the requirements of the standard method. This indicates that banks should pay more attention to the degree of risk to which exposed. Banks and their supervisors must carefully balance the risks and rewards of holding capital. Based on Basel recommendations, a bank should hold enough capital to be able to cover losses with a 99.9 level of confidence (insufficient in 1 in a 1000 days). Based on the results of this study the standard method used by banks in Albania is too far from archiving this goal.

5. Recommendations

- Based on the results of this study we strongly recommend that commercial banks in Albania need to start implement their own IRB models as complementary models to the standard method. Using and relying only on the standard method makes them to be much exposed to credit risk.

- Using VaR models or similar IRB models will only get better predictions over time by increasing the number of values on the time series. Also this models can be adapted to calculate the (estimate) level of exposure that the bank want to applicate.
- The Bank of Albania, as the supervisor authority, needs to start working to adjust the current legislation relying on the Basel Committee recommendations to permit the use of IRB models.

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