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The Effect of Credit Risk Management on Banks' Profitability in Kosovo

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Abstract

The concept of the credit risk management has gained momentum in recent years with financial institutions developing techniques aiming at minimizing credit risk and regulatory bodies coming up with policies ensuring banks adequately manage their risks.

This study was carried out to quantitatively determine how risk management affects the banks profitability. PCB, RBKO, NLB, TEB were selected as the sample banks for this study. The methodology involved extracting time series data from the annual reports of the banks to calculate the return on equity which was used as a measure of profitability and also to calculate the nonperforming loan ratio which was used as a credit risk management measure along with the risk asset ratio. Return on equity was expressed as a function of the risk asset ratio and non-performing loan ratio and substituted into a multivariate regression model. The data was run using SPSS software. To further examine the relation a simple linear regression was carried out along with a trend analysis. The output showed a substantial relation between the variables and reflected that a higher risk asset ratio would result in a marginal decline in profitability while higher nonperforming loans had a positive and more substantial effect. Further analysis showed a predominantly negative effect, highlighting the possible inadequacy of the multivariate model.

Keywords: credit risk management, interest income, nonperforming loans, nonperforming loans ratio, profitability.

1. Introduction

Commercial banks are financial institutions with the primary function of carrying out financial intermediation – this implies that they accept deposits from customers with extra funds and loan out the money to customers with a funding gap. The cost of receiving the deposits from customers, termed the interest expense, is primarily the interest paid to the customers while the money is loaned to other customers at a higher rate. The difference between the rate at which the money is loaned out and the rate paid on interest is the spread which accrues as interest income to the bank. In addition to the spread, financial institutions also invest funds at their disposal with the ultimate aim of making a return on their investments.

The industry today is globally characterized by stiff and intense competition which threatens the very survival of the institutions themselves. As the stronger banks try to consolidate their hold on the industry the smaller players develop strategies to compete. This leads to the creation of

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different banking products, varying from different types of accounts with varying attached benefits to different offers for loans and mortgages, thus increasing the pressure on the banks to extend credit and maximize profits.

These activities however come with risks which must be considered appropriately in the credit granting and investment making process to minimize loss in the event of the risks collapsing. The different banks have varying policies which determine their risk bearing capacities greatly influencing the type of credits they give and type of assets they invest in, thus may have an effect on their level of profitability. With no absolute certainty on the potential that a risky credit or asset will collapse and that the higher the risk is the higher the expected return will be, banks that give more credits or invest in more risky assets may consistently enjoy a higher rate of return in the event of those ventures, than banks that invest in less risky assets or give less credits, which equally assume a level of risk and also have a potential to crystallize.

These facts highlight the complexities in the banking business and motivated me to explore the actual effect of risk management on profitability of banks.

The importance of banks in economic growth cannot be over-emphasized as they are the primary source of credit to individuals and organizations. While the role and performance of banks research has been ongoing for the last twenty years, it has often been limited by availability of requisite data (Haselmann, Wachtel, 2006). To ensure their concern banks have continually developed policies that guide their activities. Regulatory agencies, both local and international, also exist to create boundaries for the operation of the banks and ensure a stable and sustainable banking industry. However, experiences have shown that despite periods of robustness, the banking system remains susceptible to shocks, a major source of which is due to credit risks.

1.2. Research Objectives and Questions

As the global world is becoming more competitive financial institutions have attempted to manage the risks of their exposure by introducing robust credit policy guidelines and frameworks to minimize the risk of exposures. Risk management models have also been developed to mitigate credit risk. These activities require both financial and human resources and thus it is important to determine empirically if these resources are justified to be based on the results declared by the financial institutions. My objective therefore is to analyze and determine through empirical data if risk management has any effect on the profitability of banks. This research will be restricted to credit risk management given that credit risk is one of the most important risks that commercial banks are exposed to. In addition due to availability of data, this study will be based on Kosovo banks and the research aims to answer the questions below:

1. What is the effect of credit risk management on net interest income
2. What is the of credit risk management on overall profitability of banks

1.3. Significance of the Research

A highly constricted lending policy will have a negative impact on a banks' bottom-line as the banks have to lend money to generate income. Furthermore, modern risk management methods come at a cost to the banks; thus a combination of reduced lending due to the applied credit risk strategies and the cost of the strategies being implemented result in reduced profits for the banks as resources have been utilized without income being generated.

The aim of this study is to justify or otherwise the resources that banks channel into the development of credit risk management initiatives, processes, models and techniques.

2. Literature review

A lot of studies have been carried out on banks and risk management practices in general, however much of the previous studies related to risk management and profitability have focused mostly on determining the extent of risk management tools usage and its effect on the overall banks' performance. These studies include Fatemi and Faloodi (2006) who carried out a qualitative investigation of large US based financial institutions to determine the extent of banks engagement in credit risk management practices and their utilization of house generated models or vendor marketed models. They found out that only a minority utilize any of the models. Fan (2004) carried out an investigation and concluded that profit efficiency is connected with credit risk while

Al Tamimi and Al Mazrooei (2007) in conducting a research found out that UAE banks have developed a level of expertise in managing their credit risks.

Various studies have also focused on the motive beyond risk management and its applicability. Santomero (1997) identifies some of the motives such as a managerial self interest, the cost of financial distress, a non-linearity of tax structure and capital market imperfections. Tekavcic et al (2008) emphasizes the cost of bankruptcy as a motive, stating that firms face large legal, administrative and monitoring costs which ultimately reduces the firm value, while Graham and Rogers (1999) state that management of risk reduces the volatility of the firm's pre-tax income and it benefits economically as it reduces the expected tax liability of the institution, especially if the firm has a convex tax function, a situation where tax liabilities increase with earnings' volatility. The managerial self interest raises a special interest which introduces a concept of agency theory. Eisenbeis and Kwan (1995) referred to Jensen who stressed that the role of managers as the custodians of the business is awash with the conflict of interest which exists between managers taking the risk of management decisions to protect their interests at the expense of maximizing shareholders wealth. In addition, Fatemi and Faloodi (2006) and Eisenbeis and Kwan (1995) assert that management of an institution are more likely to make decisions which will guarantee the security of their jobs or tend to increase their performance bonus; thus they point out that managers can either be risk averse and eliminate risks, which if taken could increase profitability or be overly pro-risk and take more risk to increase their chances of higher rewards. However, in any given situation the goal of the institution should be to add value to the shareholders thus the most important aspect of the risk management process should be maximizing the risk return trade-off. The immense impact the risks of the banks in the case that they bankrupt is a clear motivation of studies to devise means to manage them. Al-Mazrooei and Al-Tamimi (2007) clearly state that the foundation of prudential banking is risk management and it is crucial to the survival of the organization; however they attach more importance to the liquidity, the interest rate, the foreign exchange and the credit risk. Many researchers seems to be in agreement that those four are the most important risks that a bank faces (Santomero 1997, Boffey, Robson 1995), thus most studies describe how these four risks are managed. This perspective however neglects counterparty risk which is quite related to the credit risk and could pose a significant threat depending on the trading volume in the question, as its magnitude directly determines the extent of the risk. A market risk is also a very important risk but it can be argued that aspects of it are covered by elements of the four mentioned above.

The focus on risk has increased over the years with increased regulations compelling banks and other financial institutions into adopting risk based measures and practices. These have not been without their challenges in particular as risk is difficult to quantify and according to Bessis (2002) may not be visible until it begins to degenerate into a loss. However more and more banks globally are integrating risk and risk management process into their system, arguably though the extent of implementation is more based on compulsion than on the perceived need to do it.

2.1. Credit Risk

Credit risk remains widely regarded as the major influence on a bank's performance and the major cause of bank failures, largely due to their limited capacity to absorb losses from bad loans (AlMazrooei and Al-Tamimi 2007, Boffey and Robson 1995). These losses are generally categorized into three namely.

- Expected loss (EL), which is classed as predictable and counted as part of the cost of business thus is factored in the pricing
- Unexpected Loss (UL) which are unanticipated losses above the expected and
- Loss Given Default (LGD), which refers to the loss incurred by the bank with a loan default.

According to Boffey and Robson (1995) a bank's capacity to absorb bad loans comes mainly from its profits and its capital and a single substantial bad loan can have such a significant impact on the business that it is imperative that banks manage their credit risks proactively. The statistical evidence from the research conducted by Sparaford (1988) showed that 98 % of bank failures were as a result of incidents related to poor asset quality due to factors such as poor loan policies, a non compliance with policies and guidelines and a poor supervision. Sparaford (1988) further asserts that the factors highlighted above are as a result of a poor credit culture, a position corroborated by Colquitt (2007) and Boffey and Robson (1995). Expatiating on this concept, Colquitt (2007) posits

that a bank's credit culture determines the attitude, style, perception and behavior that will be exhibited by the bank and is largely determined by the attitude of management towards credit risk and could actually be in conflict with the policies of the bank. In a similar vein Bessis (2002) asserts that a credit culture might be more disposed towards the relationship of the bank with its customers and may not put modeling into consideration. While this may work in the short run, the long term implication is that resources committed to developing sophisticated risk models may be unjustifiable and the danger is that the bank may more prone to more risk if adequate factors and parameters are not considered and monitored to determine the loan quality. In light of these ideas McKinley (1991) identifies four main credit cultures that define financial institutions. They are the following:

1. Value driven financial institution which has a strong credit culture and consistently strikes a balance between the quality of advanced loans and the drive to increase profitability.
2. Market share driven institution which signifies very ambitious banks that may compromise on credit quality to take a significantly higher risk to keep the market share growing.
3. Immediate performance driven institution which is depicted by banks that are consistently under pressure to increase earnings. These are perceived to be banks that are trying to catch up with their competitors.
4. Unfocused institution which are yet to find their feet.

The big issue is that of all the categories listed to name which is the most profitable. While it is obvious that the market leaders will fall between the value driven and market share driven institution, there is the insufficient data to ascertain which class is the market leader, a situation which again questions the real impact of risk management on profitability. McKinley (1991) however asserts that the major difference will reflect in the volatility of the bank's earnings.

2.2. Measures of Bank Performance: Profitability Indicators

Studies in this line that have involved measuring the performance of banks have traditionally utilized financial ratios such as Return on Assets and Return on Equity as measures of profitability (Mathuva 2009; Wet and Toit 2006) but most of them have focused on determining the efficiency of the banks. However, the ratios have proved useful in the interpretation of company's financial and management accounting data (Halkos and Salamouris, 2004). Breaking down the components of Return on Equity (ROE) Wet and Toit (2006) assert that it is one of the best measures of company performance as it combines the components of the profitability, efficiency and financial leverage. Further stressing the relevance of financial ratios Halkos and Salamouris (2004) stress that they are useful in making both inter and intra industry comparisons while targets can be set by benchmarking. However, they not oblivious of their shortcomings. Highlighting some of the deficiencies, Oberholzer and Westhuizen (2004) and Chen and Yeh (1997) assert that these ratios have limitations in their capacity to give a robust measurement of a bank's performance and indeed the performance of firms in general. According to them the ratios are inadequate as measures of future performance since they are drawn from the past performance thus analysis drawn from them should be seen as the starting point for any future research. They further emphasize that the ratios are measures of short term performance and that they lump together all the aspects of the bank's performance making it impossible to identify specific areas where actual performance has been outstanding or below expectation. In addition, Lei (2005) while emphasizing that financial ratios remain a quick, useful and reliable means of analyzing the performance of banks, acknowledges that the accuracy of financial ratios may be distorted by inflation and also the timing of the release of the financial reports. Other criticisms state that ratios ignore importance of some other parameters such as the cost of capital (Colquitt 2007) while others state that they are subject to manipulation within acceptable accounting standards (Wet and Toit 2006). Consequently several other approaches have been employed as a means of measuring the comprehensive performance of banks, one of which is the Data Envelopment Analysis which is being researched, adopted and compared to financial ratios (Ho and Zhu, 2004; Halkos and Salamouris, 2004; Oberholzer and Westhuizen, 2004; Chen and Yeh, 1997).

Data Envelopment Analysis (hereafter called DEA) is a linear programming model that considers multifactor inputs for measuring the efficiency of Decision Making Units (Ho and Zhu, 2004; Talluri, 2000). Talluri (2000) reflected on the several models developed under DEA technique while Chen and Yeh (1997) show that the concept behind the models, which is to identify

the most efficient Decision Making Unit (DMU) and make it the standard DMU for comparison with the other DMUs, is the same across the models. Ho and Zhu (2004) however express that though a lot of research has utilized the DEA concept, most have been based on the operational efficiency, thus establishing a correlation between the financial ratios and DEA as a measure of a bank's performance has not yielded very positive results. Oberholzer and Westhuizen (2004) conducted a study to compare results of DEA and financial ratios as measures of performance and based on the obtained results, concluded that DEA should be used as a complement to the financial ratios as there was no significantly established relationship between the outputs. Similarly, a measurement of the efficiency of Greek banks by Halkos and Salamouris (2004) incorporated financial ratios into the DEA model and sought to compare the results with that of the financial ratios resulted in a recommendation that DEA to be used as a compliment, emphasizing that both suffer a common limitation of depending on accounting data and not market figures. Previous comparison by Chen and Yeh (1997) yielded similar results. Again, Ho and Zhu (2004) in their study incorporated profitability ratios as part of their input variables for the DEA model and also highlighted the limitations of the model. A significant conclusion from these studies is the practical confirmation that DEA is not a complete substitute for the financial ratios and as confirmed by Ho and Zhu (2004) means that is better for measuring efficiency within bank units. However, in terms of measuring profitability of the banks or a firm as a whole, its applicability remains questioned.

Risk adjusted performance measures have also been introduced to factor in elements of risk embedded in the transactions into the measure of performance. Topmost of these is Risk-adjusted Return on Capital (RaRoC) which is used to determine risk based profits while a variant of it is the Return on Risk-adjusted Capital (RoRaC) (Bessis, 2002). To determine RaRoC, income is first adjusted for risk by deducting probable loss from income generated and then calculating the ratio of the outcome to allocated capital (Crouhy et.al., 2006) while RoRaC is calculated by determining the ratio of income to economic capital, which is allocated capital that has been adjusted for risk by adjusting for potential loss (Crouhy et.al., 2006). Risk adjusted measures are useful in both risk management and performance measurement as they are used in quantifying the volume of capital required for all operational activities by determining the capital requirement of all business units (www.valuebasedmanagement.net). Another type of risk adjusted performance measure is the Riskadjusted Return on Risk-adjusted Capital (RaRoRaC) which as the name implies is obtained by adjusting both income and capital for risk (www.qfinance.com). These measures however have inherent complications which require deep analysis thus making them difficult for external parties to utilize (Crouhy et.al., 2006). Additionally, Hosna et. al. (2009) and Demirguc-Kunt and Haizinga (1999) assert that aspects of the data that have been adjusted for risk are information that is internally available thus not quite accessible thus limiting the use of the terms as performance measures. These factors give justification for the continuous use of financial ratios for analysis by researchers.

3. Methodology

This study will be conducted via a positivist philosophical approach with an epistemological view. The study will employ a deductive approach as the aim is to test the validity of the proposed the using the data gathered from the four international banks based in Kosovo. A quantitative technique will be utilized via the regression analysis to test the data.

Four large Kosovo banks namely PCB, RBKO, NLB, TEB Royal will be used for the study and all data pertaining to the study will be extracted from the financial reports of the selected companies from 2006-2015. The aim is to obtain the maximum number of observations possible. Given that the aim is to determine if a relationship exists between parameters utilized in credit risk management and parameters utilized in profitability, the parameter to be used as the profitability indicators is the Return on Equity (ROE) while parameters for credit risk management are non performing loan ratio (NPLR) and risk asset ratio (RAR), thus the dependent variable will be ROE while RAR and NPLR will serve as independent variables.

The more the volume of nonperforming loans on banks' books is the greater the amount of provision that has to be made. This will likely reduce the earning capacity of the bank and drive down profits. My proposition is that a high NPLR is an indication of inadequate risk management and should reduce profitability. I also propose that banks that hold very high capital ratio have tied

down assets that could generate revenue and will have less return. My hypothesis thus is stated with the corresponding null hypothesis as:

1a. Hypothesis 1: An increase in NPLR will result in a decrease in ROE as the two variables will have an inverse relationship

1b. Null Hypothesis: NPLR and ROE do not have a direct relationship, thus increase in NPLR will have no effect on ROE.

In addition banks need to utilize funds at their disposal to generate income. Holding substantial capital reduces their capacity to lend and generate income. My second proposition thus becomes:

2a. Hypothesis 2: Increase in capital reserves thus RAR will reduce profitability and create a negative relationship between the two 2b. Null Hypothesis: Increase in capital reserves and RAR will not reduce profitability and no relationship exists between the two variables.

This is to answer the research questions which are stated thus:

- What is the effect of credit risk management on net interest income?
- What is the effect of credit risk management on the overall profitability of banks?

3.2. The Regression Analysis

Regression analysis is a statistical technique used to analyze the relationship between a predictor variable(s) and predicted variable(s) with the assumption that there exists a linear relationship between the two variables; a relationship which is dependent on the certain unknown parameters which will be generated through the regression exercise from the data imputed. The most common regression analysis in use is the linear regression of which the ordinary least squares method (OLS) is the most popular. The regression technique adjusts the values of the slope and intercept to determine the line that best fits the equation or that best predicts Y from values of X. In its simplest form, the linear regression model is expressed as:

$Y = \alpha + \beta X + \varepsilon$.

Where the parameters are defined as:

Y is the predicted or dependent variable X is the predictor or independent variable

α is the intercept of the line β represents the slope and ε represents the inherent error in the system.

The parameters α and β are determined from the regression. Being the coefficient of X, β determines the nature of the relationship between the two variables. To account for inexplicable variations in the patterns of the variation of the dependent function Y as the independent variable X changes, a random or stochastic error function, ε, is introduced. This is because there is the tendency that the value of Y observed in reality may not be exactly equal to the predicted value based on the model, thus the function accommodates all variations between X and Y that cannot be explained by the model and thus is known as the random component of the function. Such variations could be due to a number of reasons which may range from measurement and calculation errors to the possibility that the relationship between the variables in question may be non-linear.

For the study being conducted there are two predictor variables being RAR and NPLR and one predicted variable, ROE, thus a multivariate regression model which accommodates more than one predictor variable will be used. This is mathematically expressed as:

$Y = \alpha+\beta_1X_1+ \beta_2X_2+...+ \beta_nX_n+ \varepsilon$.

Where:

Y remains the predicted variable

X_1, X_2...X_n are the various predictor variables β_1, β_2..... β_n are the coefficients of the independent variables.

3.3. Resolving the Research Questions

The model equations are the framework for determining the effect of risk management on interest income and on the profitability of banks as a whole. Based on the multivariate regression equation, the model equations for this study become:

$ROE1 = \alpha + \beta1(RAR) + \beta2(NPLR) + \varepsilon$
$ROE2 = \alpha + \beta1(RAR) + \beta2(NPLR) + \varepsilon$

Where ROE1 and ROE2 are measures of profitability based on net interest income and profit attributable to shareholders

RAR (risk asset ratio) is the first independent variable

NPLR (non-performing loan ratio) is the second independent variable, α, β and ε remain as previously stated.

The regression will be carried out for each measure using data from the banks. This will generate the constant term (α) and (β1, β2) the coefficients of the predictor variables or the regression coefficients, which are the parameters that will significantly define the nature of the relationship between the variables.

4. Input Data For Multivariate Linear Regression

The relevant data required for the analysis is shown in this section. All the required data have been extracted from the financial reports of the banks concerned and have been used to calculate the required predicted (ROE) and predictor (NPLR) variables. The risk asset ratio (RAR) is also extracted from the financial reports.

4.1 Input data: The input data computed is shown in the tables below:

Table 1. PCB Data Input

Year	NPLR	RAR	ROE1(NETINTINC/E QUITY)		ROE2(PAT/EQUITY)
2015	0.033203	10.8		0.3174	0.045471905
2014	0.026497	11.4	61555	0.4547	0.061202466
2013	0.01829	13.6	76635	0.2949	0.14928995
2012	0.015634	13.5	04806	0.3182	0.145719507
2011	0.015234	12.8	77466	0.3389	0.163157781
2010	0.018121	12	95153	0.3590	0.149128984
2009	0.027755	12	15504	0.3437	0.11781451
2008	0.029122	13.3	21886	0.2950	0.119051254
2007	0.030432	13	04389	0.3202	0.108571304
2006	0.034802	13.3	54899	0.3011	0.145446566

Source: Own research

Table 2. RBKO Data Input

Year	NPLR	RAR	ROE1(NETINTINC/ EQUITY)	ROE2(PAT/EQUITY)
2015	0.040624	16.6	0.208654448	0.17868574
2014	0.027602	13.6	0.277049658	0.11761565
2013	0.025605	11.8	0.32140466	0.158978307
2012	0.017813	11.7	0.359663271	0.193304748
2011	0.019376	11.3	0.463388041	0.197807873
2010	0.015631	11.5	0.392834587	0.187632773
2009	0.018075	12.8	0.40089844	0.166575609
2008	0.022036	12.8	0.408089444	0.146662282
2007	0.021126	12.5	0.420733388	0.169906259
2006	0.020525	11.00	0.390915295	0.187533177

Source: Own research

Table 3. NLB Input Data

Year	NPLR	RAR	ROE1 (NET INT INC/ EQUITY)	ROE2 (PAT/ EQUITY)
2015	0.051305	16.1	0.212308326	-0.046400638
2014	0.024007	14.1	0.317175903	-0.409942424
2013	0.012841	11.2	0.238847619	0.137693729
2012	0.013459	11.7	0.268852126	0.15736324
2011	0.014098	11.7	0.279892761	0.152165938
2010	0.020109	11.8	0.31807035	0.086366771
2009	0.021435	11.7	0.290144906	0.072859678
2008	0.023586	11.5	0.248696597	0.067632151
2007	0.022317	11.5	0.250346081	0.079901367
2006	0.021906	12.1	0.41789624	0.184673965

Source: Own research

Table 4. TEB: Input Data

Year	NPLR	RAR	ROE1 (NET INT INC/EQUITY)	ROE2 (PAT/EQUITY)
2015	0.01853	16.5	0.278822238	0.123628383
2014	0.014811	15.6	0.333649503	0.153929539
2013	0.013616	15.2	0.300465206	0.136252458
2012	0.019474	14.2	0.310567851	0.133685397
2011	0.023651	13.6	0.299107894	0.151237165
2010	0.039301	15	0.372969769	0.17462952
2009	0.060962	14.6	0.38470512	0.131950745
2008	0.071054	14.2	0.421320495	0.116093535

Source: Own research

The data consists of a total of 10 observations each for PCB and RBKO, NLB and 10 observations for TEB. This gives a total of 38 observations for the whole analysis.

5. Data Output And Analysis

The results of the regression carried out and a detailed interpretation of it is contained in this section. The values of the alpha and beta of the model equation along with the statistical parameters that determine the strength of the relationships being tested are determined by the regression and shown in this section.

5.1. The Regression Output: The output of a regression on executed on Microsoft excel is shown below. An explanation of the parameters generated from the regression follows.

Table 5. Sample Output

SUMMARY OUTPUT						
Regression Statistics						
Multiple R	0.747115548					
R Square	0.558181643					
Adjusted R Square	0.477851032					
Standard Error	0.112815241					
Observations	14					
ANOVA						
	df	*SS*	*MS*	*F*	*Significance F*	
Regression	2	0.176872385	0.088436193	6.94855	0.0111903	
Residual	11	0.140000066	0.012727279			

Total	13	0.316872451				
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	1.38242571	0.360685933	3.832768576	0.00278	0.5885613	2.1762901
NPLR	8.826756498	5.390365213	1.637506208	0.12979	-3.037357	20.69087
RAR	-0.1240184	0.036986563	-3.35306622	0.00644	-0.205425	-0.042612

Source: Own research

The multiple R, also known as the multiple correlation coefficient, gives an insight into the relationship between the variables by determining the extent of linearity between them thus assessing the fitness of the data to the linear model. The correlation coefficient can vary between -1 and +1 and the closer it is to either value of 1 the stronger the linear relationship between the parameters while the closer it is to zero the weaker the linear relationship between the parameters under investigation. The difference is that a multiple R that is close to +1 indicates a positive correlation between the variables while one closer to -1 implies a negative correlation. However a correlation coefficient of zero implies there is no linear relationship between the two variables. Thus in this case the multiple R determines the fitness and extent of linearity between ROE1 expressed as a function of NPLR and RAR.

The regression also determines the square of R (or R squared, also termed the coefficient of determination).The R squared is a parameter that estimates the percentage of the variance in the predicted variable that is accounted for by the model and thus the extent to which the model can be used to predict the dependent variable. It is however noted to overestimate the extent of linearity. The adjusted R squared serves the same purpose and is deemed to be more accurate relative to R squared having taken cognisance of the number of independent variables in the model. The standard error determined from the regression defines the extent of the variance of the data points along the regression line and is computed as the standard deviation of the data points as they are spread around the regression line.

The Analysis of Variance (ANOVA) gives another reflection of how the model accounts for the predicted variable is generally used to ascertain if the relationship between the variables involved is statistically significant. The Table 5 is split into three components, the first is the part that is accounted for by the model termed, regression, and the other part is not, termed residuals while the last part is the total which is the sum of the first two. Each component has a corresponding degree of freedom (df) associated with it. The df for the regression is the number of independent variables in the model while that of the total is the total number of observations (n) minus one (i.e. n-1). The df for the residual is the difference between the total df and the residual df. The sum of squares (SS) describes the variability in the predicted variable (ROE1) in the both the regression and the residual. The variance that is not accounted for by the predictor variables is termed the error. The total sum of squares defines the total amount of variability of the predicted variable and refers to the overall variation in the data that cannot be explained by the model.

MS refers to the mean square and is determined by dividing the sum of squares (SS) of each component of ANOVA (i.e. regression, residual and total) by its corresponding degree of freedom (df).

The F in the table is the result of the F-test, a test of the null hypothesis which reflects the overall significance of the model while Significance F is the associated P-value for the F-test. These are the most important aspects of ANOVA and their values are a function of the regression analysis and the confidence level selected and are the basis on which the null hypothesis is rejected or otherwise. The F-value obtained is a function of the degrees of freedom and must be compared to a critical value of which it must be greater than for the model to be valid. However, the validity of the F-value is inherently determined by its corresponding P-value. This determines the probability that the F value obtained will be statistically relevant to reject the null hypothesis. The lower the P-value the greater the significance of the model but it is also compared to a critical significance level which the P-value must be less than. In finance, for a confidence level of 95 %, the required

significant level is 0.05, thus a P-value that is greater than 0.05 (i.e P>0.05) suggests that the relationship between the variables is not statistically significant. Conversely a P-value less than 0.05 (i.e P<0.05) suggests that the relationship between the two is statistically significant.

The last table shows the coefficients and associated statistics. The intercept defines alpha which is an estimate of the predicted variable when the predictors or their coefficients are zero; it is however not the most relevant of the data. The coefficients of the predictor variables (betas) are also shown on the table. The size of the coefficients of NPLR and RAR determines the level of influence each variable has on ROE when the other independent variable is held constant, thus the larger the coefficient the larger the influence of NPLR and RAR on ROE. However a negative coefficient signifies that NPLR or RAR has a negative relationship with ROE. The standard errors are associated errors of the regression coefficients and are defined by the square root of the variance.

The t-stat, i.e t-statistic, is a significance test that determines the statistical significance of the independent variable in predicting the dependent variable by measuring the number of standard errors by which the coefficient is close to or away from zero. The figure is obtained by dividing the coefficient by its standard error and the greater the t-stat the more reliable the coefficient is as a function in the regression model. The associated P-values serve the same function as that of the model equation as a whole, determining also the statistical significance of the coefficients. The upper and lower confidence intervals determine the range within which the coefficients are likely to fall 95 % of the time. This implies that the confidence interval is the likely region within which the true values of the coefficients will fall. The values at the boundary of each interval are termed confidence limits. Inherent within the confidence interval is the precision of estimation and the wider the confidence interval the less the precision. The confidence level is said to be statistically significant if it does not overlap to zero. Finally the regression results also show the standardized coefficient. Whilethe unstandardised coefficients are the actual coefficients of the independent variables the standardized coefficients are the coefficients that are obtained when the variables have been standardized by deducting the mean and then dividing by the standard deviation (SD). The standardised coefficients attempt to verify which independent variable has a more significant effect on the dependent variable, given that the independent variables are measured in different units. However this may not be practical as changes in SD in the independent variables may not be equivalent, they are thus not considered as relevant parameters.

Not all these parameters are relevant in interpreting the output; the most important parameters in the output are the multiple R, adjusted R square, P-values, un-standardised coefficients, and the P-values of the coefficients and these will be the focal point of the discussion.

6. Discussion of the Results

6.1. PCB: Analysis of the Regression

Relevant extracts from the regression on PCB data are shown in the Table 6.

The Multiple R or correlation coefficient was determined to be approximately 0.6. Being distant from 0 which signifies no linearity, the result implies that a partial linear relationship exists between the variables being investigated. R squared is estimated to be 0.36 while adjusted R squared is 0.28. This implies that approximately 36 % of the variance in ROE1 is accounted for by the model. This level of predictability is further reduced by the R squared which by reading 0.28 implies that 28 % of the variance in ROE1 has been accounted for by the model. This leaves a residual of 72 %, implying that 72 % of the variance in ROE1 is not accounted for by the predictor variables (RAR and NPLR).Fvalue of 4.5 and a corresponding P-value of 0.028 the resulting data demonstrates a level of statistical significance being less than 0.05. The implication of this is that the probability the model can predict ROE1 is 97.2 %.

However the result of the beta coefficients of the independent variables proves to be rather interesting. With beta a coefficient of 0.003, the implication is that RAR has a small but positive impact on ROE1. Also, a coefficient of 2.261 shows a significant positive influence of nonperforming loans on the interest income. Thus for a unit increase in NPLR, ROE increases by 2.261 when RAR is held constant. Similarly for a unit increase in RAR when NPLR is held constant, ROE1 will increase by 0.003, implying NPLR has a greater influence on ROE than RAR. However the t-value of 0.332 and the associated P-value of 0.744 signifies a level of statistical insignificance

for RAR while with a Pvalue of 2.959 and corresponding t-stat of 0.009, NPLR is of statistical significance. This shows the level and nature of influence exerted by capital ratio and non-performing loans requires further examination as both RAR and NPLR are hypothesised to have a negative impact.

Replacing ROE1 with ROE2 results in a multiple correlation coefficient of 0.857, implying that a higher degree of linearity is exhibited. R squared and adjusted R squared estimates of 0.734 and 0.701 respectively imply that approximately 70 % of the variance in ROE2, which is based on profit after tax, is accounted for by the regression model. This however has no bearing on the statistical significance. An F-value of 22 and an extremely low P-value of almost zero highlights the significance of the model to be statistically significant. The coefficients of NPLR and RAR are 0.35 and .033 respectively, indicating that both have a positive relationship with ROE2, however a t-value of 6.5 with the P-value at almost 0.00 for RAR exhibits statistical significance while corresponding values of 0.894 and 0.385 for NPLR reflects a level of insignificance.

Table 6. PCB Model and Coefficient Summary

Dependent Variable: ROE 1				
R	R Square	Adjusted R Square	F	Sig.
.600[a]	0.36	0.28	4.5	.028
Un-standardised Coefficients	RAR	0.003		0.744
	NPLR	2.261		0.009
Dependent Variable: ROE2				
R	R Square	Adjusted R Square	F	Sig.
.857[a]	0.734	0.701	22.092	.000
Un-standardised Coefficients	RAR	0.033		0
	NPLR	0.35		0.385

Source:Own research

These distinction hypothesis 1 and 2 results, show an increase of NPLP and RAR that refers us to corresponding for an increase in after-tax interest income and in other comprehensive income.

With this positive results of RAR profit impact also the author did notice those distinctions [CITATION All \l 1033], and higher capital ratios with a reduction in profitability [CITATION Gle15 \l 1033]. Also the impact of the benefit of contrast results also appear at the works of researchers as Kanas et al., (2012); Ani, Ugwunta, Ezeudu and Ugwuanyi (2012); Bolt et al., (2012). Taking into account the outcome of ROE2 into our ROE1 model, both variables have displayed a similarity with profitability relationship.

6.2. RBKO: Analysis of the Regression

The result of the regression on data from RBKO parameters give a multiple R of 0.93 which implies a good fit for the model equation. R squared is 0.869 while adjusted R squared is 0.85 implying that about 85 % of the variance in ROE1 is can be explained by NPLR and RAR.

Table 7. RBKO Model and Coefficient Summary

Dependent Variable: ROE 1				
R	R Square	Adjusted R Square	F	Sig.
.932[a]	0.869	0.853	53.049	.000
Un-standardised Coefficients	RAR	-0.057		0
	NPLR	2.57		0.001
Variable	: ROE2			
R	R Square	Adjusted R Square	F	Sig.
.574[a]	0.329	0.246	3.929	.041
Un-standardised Coefficients	RAR	-0.01		0.255
	NPLR	-1.462		0.066

Source: Own research

With an F-value of 53 and a P-value of approximately zero the model is statistically significant. The coefficients of the variables show that again NPLR has a high but positive impact on ROE1 which is statistically significant based on the t-values and corresponding P-value of 0.001. RAR has a smaller but negative effect and with a t-stat of -7.5 and P-values of approximately zero for RAR, the model is statistically significant. Thus for a unit increase in NPLR, ROE increases by 2.57 when RAR is constant while for a unit increase in RAR with NPLR constant, ROE will decrease by -0.057.

Substituting interest income for profit after tax as the dependable variable gives a partial linear correlation defined by a correlation coefficient of 0.574. A correlation of coefficient of 0.329 implies that 32.9 % of the characteristic of ROE2 is influenced by NPLR and total RAR. The adjusted R squared puts that figure at 24.6 %.The result can be said to be statistically significant with an F value is 3.93 and P-value of.041. At -1.462 the coefficient of NPLR is negative and has a more bearing influence on ROE relative to the coefficient of total RAR which has a smaller and negative influence of -0.01.However the P-value of 0.066 and 0.255 shows that both NPLR and total RAR are not significantly good predictors of profitability.

6.3. NLB : Analysis of the Regression

The regression output is shown in Table 3. Again there is a partial linear relationship between profitability, non-performing loans and capital reserves as exemplified by an R of 0.512. However a maximum of 26.2 % of variance in ROE is accounted for by the model due to the R square of 0.262; the predictability of is reduced by adjusted R squared of 0.128, putting the estimate at 12.8 %. The model is also statistically insignificant with Pvalue of .188.

The betas of the independent variable again show that with a beta of 6.4, NPLR has a greater controlling effect on ROE while capital reserves has a lighter effect with a beta of -0.062. However the statistical significance is at variance with NPLR exhibiting a high degree of insignificance with Pvalue of 0.186 and RAR exhibiting the same with P-value of 0.075.

Table 8. NLB; Model and Coefficient Summary

Dependent Variable: ROE_1				
R	R Square	Adjusted R Square	F	Sig.
.512[a]	0.262	0.128	1.952	.188
Un-standardized Coefficients	RAR	-0.062		0.075
	NPLR	6.472		0.186
Dependent Vari able: ROE_2				
R	R Square	Adjusted R Square	F	Sig.
.747[a]	0.558	0.478	6.949	.011
	RAR	-0.124		0.006
Un-standardized Coefficients	NPLR	8.827		0.13

Source: Own research

Replacing ROE_1 with ROE_2 results in a multiple R of 0.747, this gives a higher degree of linearity between the variables. An R square and adjusted R square of 0.559 and 0.478 respectively also show that there is improved accuracy in the predictive capacity of the model, given that between 47.8 % and 55.9 % of the variation in profit can be attributed to NPLR and RAR.

The model also proves to be statistically significant with an F-value of 6.958 and a P-value of 0.011. NPLR again shows a greater degree of influence on profits with a positive beta of 8.8 while RAR has a milder effect with a negative beta of -0.12. However with P-values of 0.13 and 0.006 respectively, the beta of NPLR is statistically insignificant while beta of RAR reflects a level of significance.

6.4.TEB: Analysis of the Regression

The model showed a very strong linear relationship between the variables with an R of 0.936. An R squared and adjusted R squared of 0.87 and 0.84 shows that statistical variance of ROE1 is significantly explained by NPLR and RAR. With an F-value of 24.7 and a P-value of 0.001 the model is statistically significant. Furthermore the betas of the model show NPLR has a greater effect which with a P-value of approximately zero is quite significant. However RAR capital has a minimal effect which is not statistically significant given the P-value of 0.981.

Again replacing ROE1 with ROE2 reflects a partial linear relationship with a multiple coefficient of 0.535. However with adjusted R square of .083 shows that very little of the variance in income is explained by RAR and NPLR. Furthermore an F-value of 1.4 with corresponding P-value of 0.306 implies a degree of statistical insignificance. Furthermore both NPLR and RAR appear to have a negative effect on net income with coefficients of - 3.97 and -0.012 respectively. Again it shows that NPLR has a greater impact on net income relative to RAR. However based on the t-stat values of -1.192 and -1.45 and corresponding P-values of 0.272 and 0.188 respectively, the statistical status of the predictors is insignificant.

This result again supports hypothesis 2 but is inconclusive on hypothesis 1. This is because the effect on ROE_2 corroborates the hypothesis it while the output on ROE_1 contrasts with it.

Generally the results showed that the extent of the influence of capital reserves on profitability was small in all the banks and had a predominantly negative impact. In RBKO, NLB and TEB the beta of RAR shows a negative effect on both profits after tax and net interest income while it was all positive in PCB which appeared an exception.

Table 9. TEB -Model and Coefficient Summary

Dependent Variable: ROE 1				
R	R Square	Adjusted R Square	F	Sig.
.936 [a]	0.876	0.841	24.788	.001
Un-standardized Coefficients	NPLR	2.203	0.325	0
	RAR	-0.004	0.008	0.981
Dependent Variab le: ROE2				
R	R Square	Adjusted R Square	F	Sig.
.535 [a]	0.287	0.083	1.406	.307
Un-standardized Coefficients	RAR	-0.397	0.333	0.272
	NPLR	-0.012	0.008	0.189

Source: Own research

Unlike capital reserves, non-performing loans had a larger and predominantly positive effect on profitability, with beta being negative only on TEB and RBKO when ROE_2 was the dependent variable but reflecting a positive effect in all other instances.

Looking at the statistical significance, the overall model was statistically significant in PCB and RBKO with P-values less than the 0.05 benchmark but was insignificant for NLB when net-interest income was the dependent variable and insignificant in Standard Chartered when profit after tax was the dependent variable. Similarly the predictive tendency of the coefficients oscillated between statistical significance and insignificance at different times.

Relations which were mostly positive between non-performing loans and profitability were opposed period provided that the increase in bad loans the banks will deny revenue and would interfere with the reduction of potential profitability. This indicates that there is approximately a link between NLP and ROE, the result is not sensitive to the preaching of the hypothesis 1. As mentioned earlier with the work of Mario (2014) which is based on his work and in other comparative studies, he did reached the conclusion that the non-performing credits show a negative holder is the probability, similar work also appear Jamal H. Zubayr and Shazia Farooq (2014). This reflects on the further analysis.

In connection with RAR, the results largely confirm the hypothesis 2 Which emphasizes that higher capital reserves are an obstacle for benefits because of the collapse of the credit and simultaneously reduces the fall of the risk taking. Although they are not absolutely convincing because in both cases the PCB were contradictory. This has a tendency to agree with the work of Bateni, Leila; Vakilifard, Hamidreza; Asghari, Farshid. (2014) who point out that the higher capital ratios represent a reduction of banking risk and reduces the repayment, while in contrast this with findings such as authors Sonia Narula, Monika Singla (2014), conclude that with the capital increase the return of the loans will increase.

Further Analysis

To further check the validity of the results due to these variances, I conduct a simple linear regression on all the banks using excel software with NPLR and RAR used independently as independent input variables. The summary of the results, shown in Table 10, confirms that NPLR has a greater effect on ROE than RAR across all the banks as its beta coefficient was larger than the beta of RAR. Also the nature of the effect of NPLR and RAR on ROE was similar to the output from

the multivariate model. Beta coefficient for RAR was predominantly negative replicating the multivariate model, the noted difference being a negative coefficient for PCB when ROE1 is the dependent variable. For NPLR the beta coefficients again oscillated between a positive and negative effect though the negative effect was more pronounced when PAT was the dependent variable and was more pronounced compared to the multivariate model, again bringing to question the accuracy of the multivariate model. However the F and associated P-values obtained from the models again reflected a level of statistical insignificance at certain points.

To further examine the relationship between these variables I conduct 10 year trend analysis based on real net-interest income, profit after tax, total loans, non-performing loans and non-performing loan ratio. This is reflected in the folowing figures.

A comparison of net interest income across the period shows that all the banks recorded year on year growth in net-interest income from 2006 – 2015 but all experienced a decline between 2014 and 2015, a situation that could be attributed to the economic meltdown.

Table 10. Beta Coefficients from the Simple Linear Regression

Dependent: ROE2		**Dependent: ROE1**	
NPLR	RAR	NPLR	RAR
RBS			
-5.410	-0.045	-0.62865	-0.02257
HSBC			
0.491	0.014	2.274906	-0.03548
Barclays			
-1.766	-0.021	4.298716	-0.0705
SCB			
-0.268	-0.005	-2.205185	-0.02257

Source: Own research

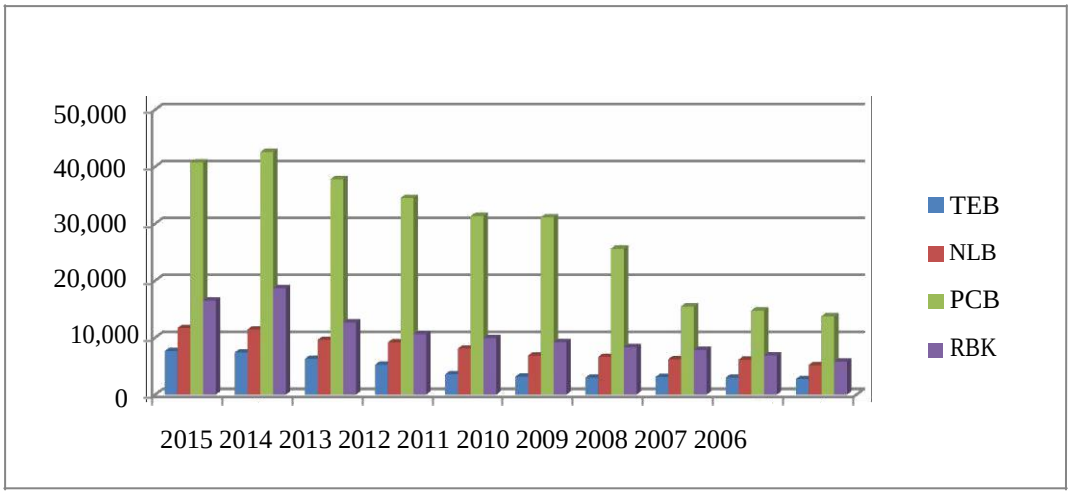
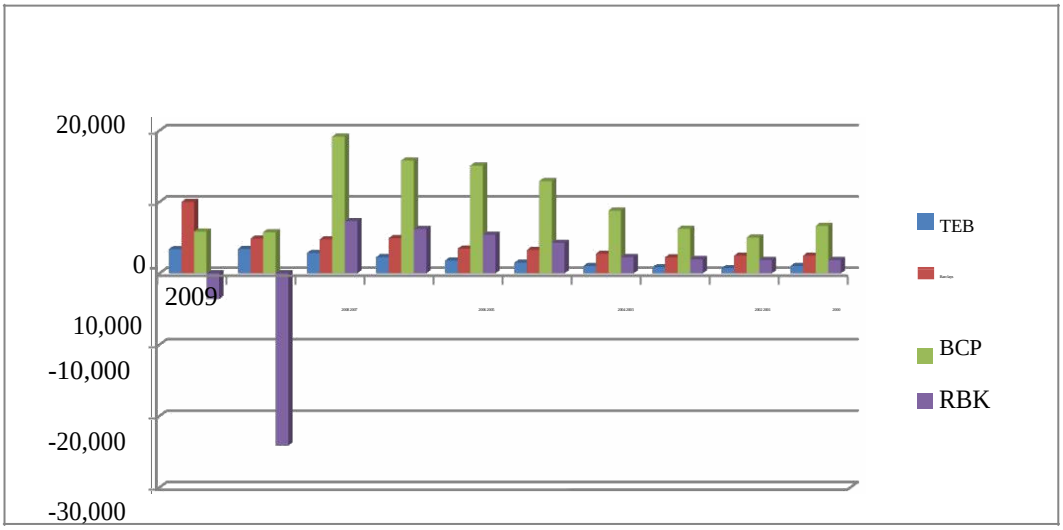


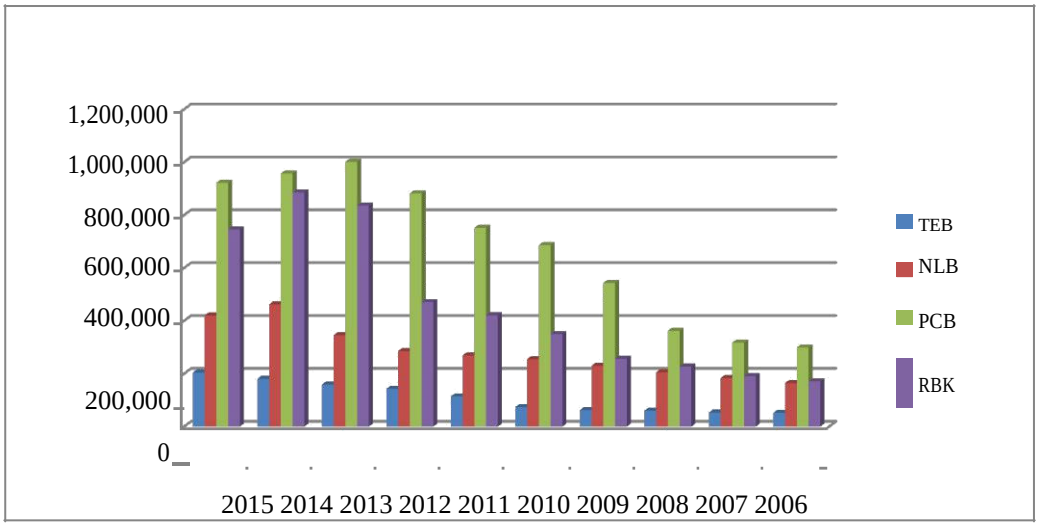
Fig. 1. Net Interest Income - A 10 Year Comparison

A similar trend is displayed for profit after tax and total loans given. But parameters experienced a decline after 2013, PAT having a more drastic drop; prior to the recession both had been growing steadily. The drop was much more significant in NLB which experienced the largest loss, however all the banks were showing signs of recovery by 2015.



Source: Own research

Fig. 2. Profit After Tax - A 10 Year Comparison

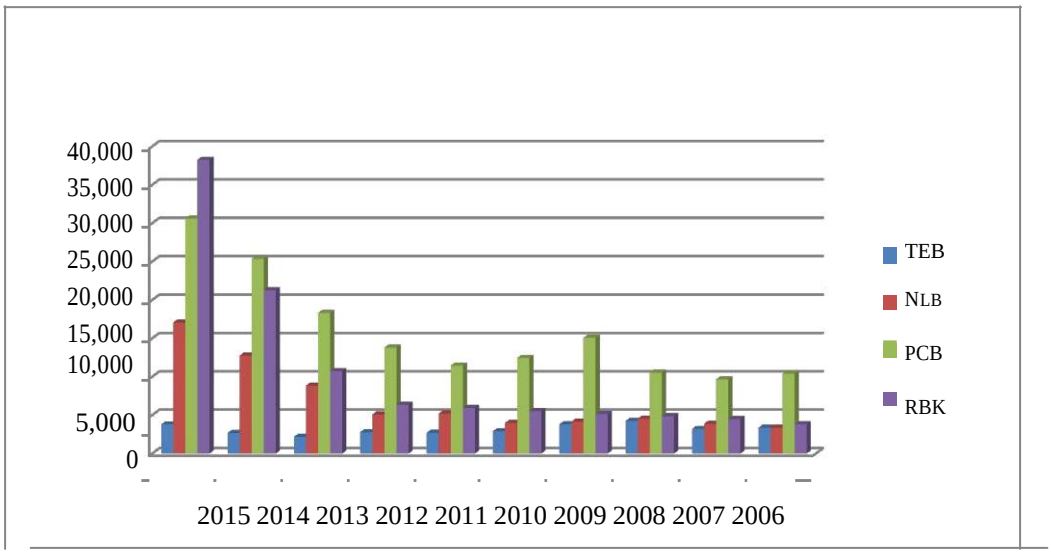


Source: Own research

Fig. 3. Total Loans – A 10 year Comperation

The trend also shows non-performing loans had grown steadily from 2006 to 2012 but contrary to other parameters which dropped, it further increased between 2013 and 2014. Again this distortion in the trend can be attributed to the recession which resulted in heavy loans default.

This shows that prior to the recession practically all the parameters showed a trend similar to each other as all experienced steady growth, giving a statistical impression that growth in non-performing loans could have a positive relationship with profitability. However a look at the trend on nonperforming loans ratio and annual percentage change in non-performing loans paints a different picture; as shown in Figures 4 and Figure 5.

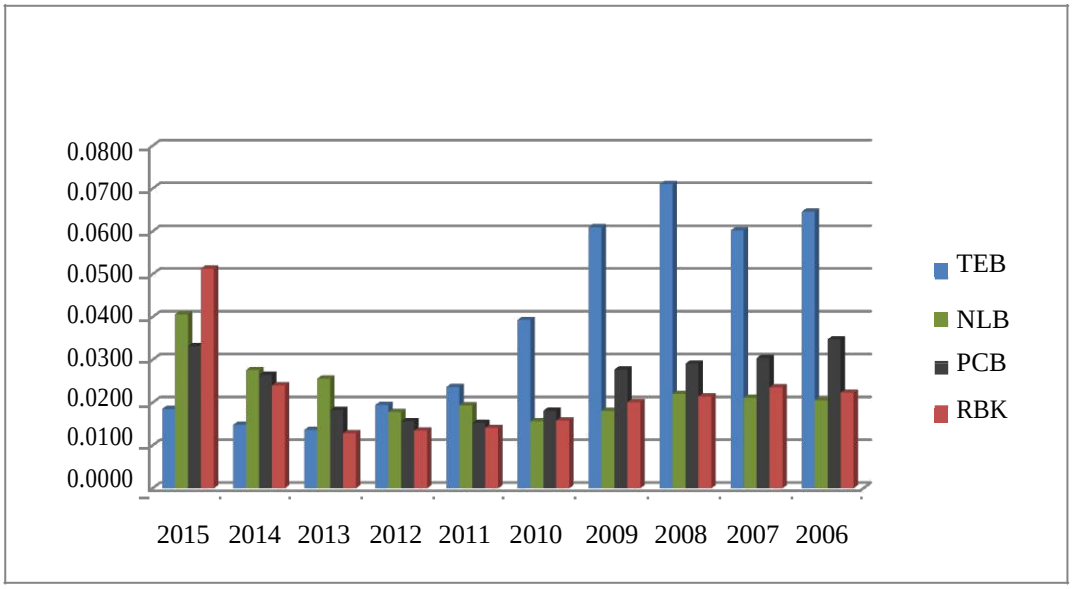


Source: Own research

Fig. 4. Total Non-performing Loans - A 10 Year Comprison

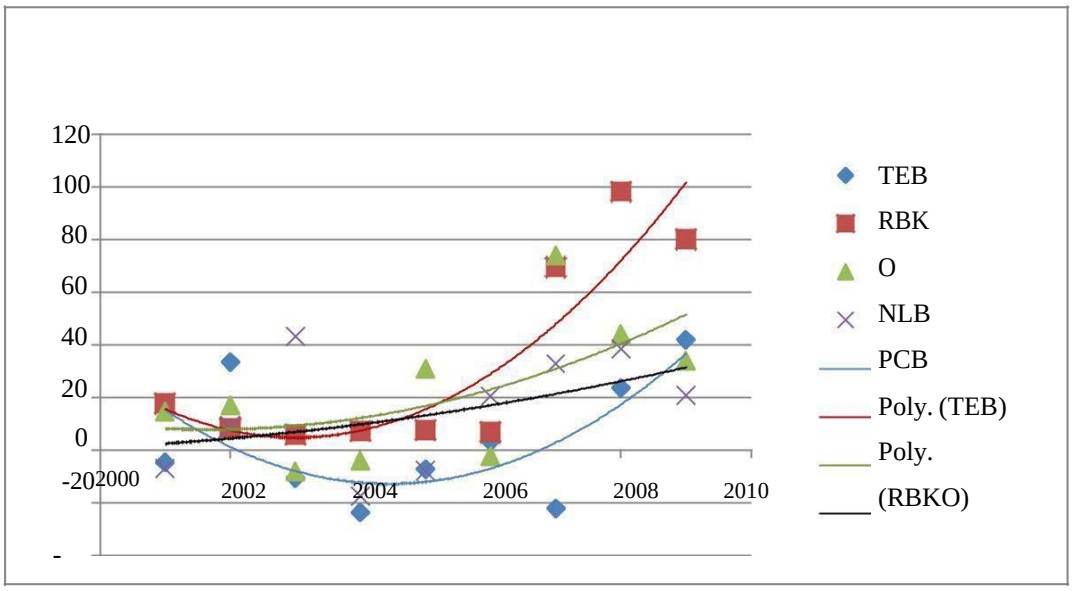
The trend also shows non-performing loans had grown steadily from 2006 to 2012 but contrary to other parameters which dropped, it further increased between 2013 and 2014. Again this distortion in the trend can be attributed to the recession which resulted in heavy loans default.

This shows that prior to the recession practically all the parameters showed a trend similar to each other as all experienced steady growth, giving a statistical impression that growth in non-performing loans could have a positive relationship with profitability. However, a look at the trend on non- performing loans ratio and annual percentage change in non-performing loans paints a different picture; as shown in Figure 5 and Figure 6.



Source: Own research

Fig. 5. Non-performing Loan Ratio (NPLR) - A 10 Year Comparison



Source: Own research

Fig. 6. Trend Analysis – Percentage Change in Non-performing Loans

Both figures show an initial decline in the non-performing loan parameters though the decline in figure 6 was more apparent in TEB and RBKO and less apparent in PCB and NLB, which reflected an initial stagnation or an almost constant rate of change. However for PCB while the nonperforming loan ratio followed other trends with an initial decline prior to subsequent increase, the year on year percentage change in nonperforming loans showed an initial low gradient rise before it became a steady climb, indicating a different trend from the others and shows an actual increase in the percentage change in non-performing loans throughout the period. However signs of increase in the parameters across all the banks became apparent from 2008/2009 as the volume of nonperforming loans increased in all the banks, again indicated by the curve in figure 6, showing there was an upward trend as the percentage change in nonperforming loans increased.

Conducting a similar trend analysis on profitability shows that percentage change in profit initially increased then experienced a downward trend in all the banks over a corresponding time period.

Comparing figures 5 and 6 shows that over the same time period as profitability parameters increased nonperforming loan parameters decreased and vice versa. This pattern agrees with the postulate that the relationship between profits and nonperforming loans is a negative relationship. However slightly deviating is PCB whose non-performing loan parameters indicated an initial marginal rise with profitability before the negative trend took effect. This trend which reflected an initial increase in the change in non-performing loans with profitability further explains why PCB aspects of the regression output indicate into a positive relationship between NPLR and ROE.

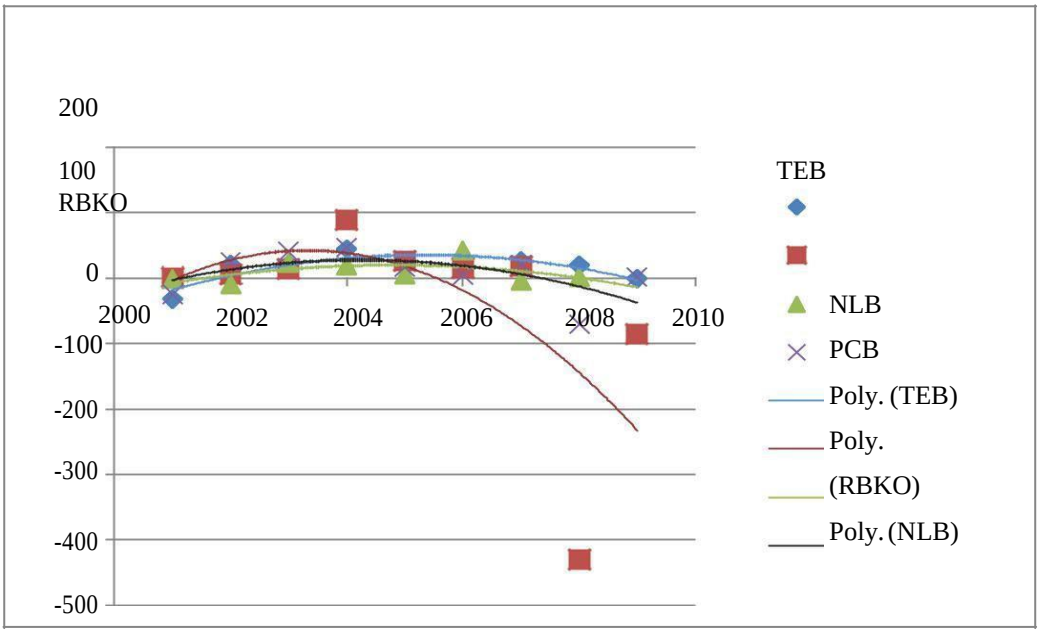


Fig. 7. Trend Analysis - Percentage Change in PAT

This outcome casts an aspersion on the overall statistical accuracy of the multivariate model due to its inability firmly establish a definite trend. However, there are limitations which could have affected the overall results of the model.

7. Conclusion

This study is an investigation into the effect of credit risk management on profitability with a focus on banks in Kosovo. Using data from PCB, RBKO, NLB and TEB.I sought to establish a link between credit risk management and profitability; profitability being measured from two perspectives which were interest income and profit after tax. The study was based on two propositions; Hypothesis 1 which states that an increase in nonperforming loans will result in profit erosion and thus a decrease in profit, implying that the two variables will have an inverse relationship; and

Hypothesis 2 which states that an increase in capital reserves will be an impediment to the income generating capacity of the banks, thus result in a decline in profitability, establishing a negative relationship between the two.

The aim was to answer the research questions:

- What is the effect of credit risk management on net interest income?
- What is the effect of credit risk management on the overall profitability of banks?

This was conducted using return on equity (ROE) as measures of profitability while nonperforming loan ratio (NPLR) and risk asset ratio (RAR) doubled as risk management measures. The return on equity (ROE) was determined from two measures namely interest income and profit after tax and used as a dependent variable which is postulated to be predictable by the independent variables NPLR and RAR.

The methodology involved extracting the figures for net interest income, profit after tax, total loans to customers and total nonperforming loans from the annual reports for the time period under consideration and using the figures to calculate the NPLR and ROE from the two measures.

The outcome from the multivariate regression showed across all the banks that a partial linear relationship existed between the credit risk management indicators and the profitability indicators. This was reflected by the multiple R figures which were largely between 0.5 and 0.9. NLB, TEB and RBKO had results which indicated that for both measures of ROE, an increase in RAR will result in a small decline in profitability. PCB however showed otherwise. For NPLR, PCB and RBKO reflected a positive effect on both measures of ROE while Barclays and Standard Chartered reflects a positive effect on ROE_1 and a negative effect on ROE_2.

Thus except for a few deviations from PCB, the beta coefficient of RAR generally reflected a small but predominantly negative effect on RAR, thus substantiating hypothesis 2 and demonstrating that a unit increase in RAR will result in a decrease in ROE if NPLR is kept constant. However the beta coefficient of NPLR from the multivariate model showed a larger but predominantly positive influence on ROE, implying that a unit increase in NPLR will result in an increase in ROE equivalent to the value of beta if RAR is kept constant, an outcome which was at variance with hypothesis 1.

These results were cross checked with a simple linear regression model and the result corresponded with the multivariate regression on RAR but to an extent contrasted with it on NPLR. Thus while the outcome on RAR significantly replicated that of the multivariate model, further substantiating hypothesis 2, the outcome on NPLR reflected more negative tendencies in the relationship between non-performing loans and profitability with only PCB exhibiting a positive relationship for both measures of ROE. This contrasted with the multivariate model but gave more credence to hypothesis 1 though not fully substantiating it.

Both results however are to be received with caution as both models had aspects of the overall model and individual P-values of the coefficients reflecting levels of both statistical significance and insignificance at certain points, emphasizing that the outcome is not entirely conclusive. To further check the relationship a trend analysis is conducted. The outcome of this aligned with hypothesis 1. This showed that in the long run and despite deviations from PCB, and though non-performing loans had increased across the banks over the period covered following the same pattern as profitability, net-interest income and total loans, when the loan parameters were expressed as a fraction of total loans and when the annual percentage change was determined year on year, it reflected a parameter that was on the decline while profit parameters were increasing.

From the outcome of the study it becomes imperative to draw a conclusion that for both hypothesis 1 and 2, the null hypothesis is rejected as it is clear that the beta of the coefficient variables is not zero. This conclusion is not only drawn from the multivariate model but from the combination of techniques that were applied.

Future research on this subject should strive to explore with more data so as to increase the number of observations and obtain more accurate results. A level of qualitative data which would involve interviews with staff in the selected banks to elaborate more on their credit risk management involvement and level of compliance should also form part of future studies. This would give the opportunity for interaction with risk management officers of the banks to ascertain their policies and practices as well as implementation.

Also for more accurate results the effect of non-banking subsidiaries should be controlled so that the data would reflect only the financial performance of the banking aspect of the business of the involved banks. Finally the investigation could be conducted on a non-linear basis and the results compared to the linear assumption to ascertain the true nature of the relationship between credit risk management and profitability.

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