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## Article

# Commercial Bank Performance and Credit Risk in Albania

Journal of Central Banking Theory and Practice

## Provided in Cooperation with:

Central Bank of Montenegro, Podgorica

*Suggested Citation:* Kola, Fatmira; Gjipali, Arsen; Sula, Erjon (2019) : Commercial Bank Performance and Credit Risk in Albania, Journal of Central Banking Theory and Practice, ISSN 2336-9205, De Gruyter Open, Warsaw, Vol. 8, Iss. 3, pp. 161-177, <https://doi.org/10.2478/jcbtp-2019-0029>

This Version is available at:

<https://hdl.handle.net/10419/217690>

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UDK: 336.71(496.5)

DOI: 10.2478/jcbtp-2019-0029

*Journal of Central Banking Theory and Practice*, 2019, 3, pp. 161-177

Received: 27 May 2018; accepted: 1 October 2018

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## Commercial Bank Performance and Credit Risk in Albania

**Abstract:** The banking sector is a complex system composed of a large number of stakeholders that interacts in a non-simple way continuously and which plays the key role in economic development of each country. The economies of developing countries like Albania are characterized by high demand for credit due to increasing investment. The revenues are even higher when the risk is greater. Of the high related risk, crediting leads to high returns. Credit risk is one of the most important types of risk in the banking sector that affect the bank performance, as it exhibits loss probability because of the failure of debtor to fulfill its obligations to bank. In June 2016, the level of non-performing loans in Albania appears in 24.4% of total loans, representing the major obstacle to the development and performance of the banking sector in Albania.

The purpose of the estimable model outlined in this section is to capture the effects of macroeconomic, bank specific factors and Herfindahl-Hirschmann index (HHI) in the industry of bank performance. We also include a range of bank-specific variables that have been used in previous empirical studies that examine drivers of bank performance. A recent decline in revenue was observed due to higher provisioning expenses, which reduce banks' profits. To identify factors affecting bank profitability, we have got to study those factors like bank-specific (internal) factors, industry specific and macroeconomic (external) factors. The internal factors that influence profitability are expressed in terms of efficiency, productivity, competition, concentration, soundness, safety and profitability. Industry specific factor is market concentration, while macroeconomic factors are Gross Domestic Product (GDP), Inflation Rate, and Real effective exchange rate (REER). In this paper, we will test whether lending decisions of all banks operating in Albania exhibit moral hazard. The study carried out an empirical investigation of the quantitative

effect of credit risk on the performance of 16 commercial banks in Albania organized quarterly over the period of 14 years (2002-2015).

**Keywords:** Credit risk, Financial Crisis, Non-performing loans, Macroeconomic Factors, Albania,

**JEL Classification :** G32, G01, G21, C23, F62

## Introduction

The transition from a centralized economy to a market economy in Albania was accompanied by fundamental changes in the banking system from 1992 to 2016. In 1992, there were only 3 state banks; as of 2007 and up to now, there have been 16 fully privately owned banks operating in the country. Despite the competition and the high ratio of banks in comparison to the number of population, lending interest rates are among the highest in the region.

The banking sector plays the key role in the economic development of each country. It is a complex system composed of a large number of stakeholders that interact in a non-simple way continuously. The banking sectors is classified as a complex system from various heritage (Barile, 2009). Economies of developing countries like Albania are characterized by high demand for credit due to increasing investment. Revenues are theoretically even higher when the risk is greater, leading to high returns. Credit risk is one of the most important kinds of risk in the banking sector affecting bank performance, as it exhibits the loss probability because of the failure of a debtor to fulfill its obligations to a bank. In June 2016, the level of non-performing loans (NPL) in Albania peaked to over 20% of total loans, representing a major obstacle to the development and performance of the banking sector in Albania.

The relationship between business cycle and bank loan losses has been one of the hottest debates in the recent economic literature especially in relation to financial stability analysis. The quality of loans can be one of the factors that limit the banks' loan supply and effects investment spending. A recent decline in revenue in the Albanian banking sector has been observed due to higher provisioning expenses, which reduce banks' profits. In this context, the control on bank risks is one of the most important factors from which the profitability of the bank depends on (Fiordelisi, Marques-Ibanez & Molyneux, 2011). Profitability is one of the main reasons for the existence of business enterprises, making it one of the most important indicators for the investors and business enterprises to motivate their operation.

Albania ranks among the countries with the highest return on equity, which indicates high efficiency in the usage of equity capital at the end of 2007 (Bank of Albania, 2008). ROE generally remained at the level of 19-23% during the years from 2002 to 2007. In these years the GDP represented the highest increase. The banking system's earnings after taxes for 2008 were 7.3 billion ALL, representing an annual decline of 26.5%. By contrast, the average shareholders' equity increased, but its pace of growth varied through the years, with an average of 19% in the period 2002-2008. The annual increase in shareholders' equity was 31.6% at the end of 2008. In June 2016, the banking sector reported a positive financial result of about 5.1 billion ALL or 3.2 billion less than an earlier year (Bank of Albania, 2016). Although the rising cost of provisioning was the main factor for this drop in profit, the main banking activity also showed a decline, affecting the decline of interest income.

This paper is organized as follows. Section 2 provides a background of literature review on the factors that affect performance. In Section 3 explores the Methodology and Data to help apply used to examine the loans performance to the corporate sector in Albania. Section 4 explains results, leading to the project conclusions in Section 5.

## 2. Background

According to Basel Committee on Banking Supervision (1999), for most banks loans are the largest and the most obvious source of credit risk. However, credit risk could stem from activities relating to both on and off balance sheet of transactions. The credit risk is defined as the risk that the counterparty to a transaction could default before the final settlement of the transaction's cash flows (Basel Committee on Banking Supervision - BCBS, 2006). An economic loss would occur if the transactions or portfolio of transactions with the counterparty has a positive economic value at the time of default. Unlike a firm's exposure to credit risk through a loan, where the exposure to credit risk is unilateral and only the lending bank faces the risk of loss, the counterparty credit risk creates a bilateral risk of loss: the market value of the transaction can be positive or negative to either counterparty to the transaction.

The market value is uncertain and can vary over time with the movement of underlying market factors. In this context, the analysis of the credit risk is essential because it can provide signs of alarm when the financial sector becomes more vulnerable to shocks. This can help the regulatory authorities to take measures to prevent a possible crisis (Agnello and Sousa, 2013). According to Heffer-

nan (2005), the analysis of the credit risk is also important because many banks' bankruptcies are related to the huge ratio of non-performing loans to the total loans. Credit risk arises from the potential that a creditor is either unwilling to perform an obligation or his ability to perform such obligation is impaired, resulting in economic loss to the bank (Heffernan, 1996). As introduced in Berger and Udell (2004), lending often increases significantly during business cycle expansions and then falls considerably during subsequent downturns. According to Dugan (2009), the loan loss provisioning should reflect the confidence of bank managers about their loan portfolio quality, which means that provisions should cover the entire spectrum of expected credit losses.

Bank performance is expected to be sensitive to macroeconomic control variables. Thus, Gross Domestic Product (GDP) as a control for cyclical output effects, would have a positive influence on bank profitability. As GDP growth slows down, and in particular during recessions, credit quality deteriorates and defaults increase, thus reducing bank returns. In particular, Pesola (2005), Jesus and Gabriel (2006), Bohachova (2008) and Bonfim (2009) conclude that the result of wrong decisions of financing will become apparent only during the period of recession of the economy and this will cause the growth of non-performing loans and loan losses. Demirgüç-Kunt and Huizinga (1999), and Bikker and Hu (2002) find a positive correlation between bank profitability and the business cycle.

An inflation rate that is fully anticipated raises profits as banks can appropriately adjust interest rates in order to increase revenues, while an unexpected change could raise costs due to imperfect interest rate for adjustment. Bourke (1989), Molyneux and Thornton (1992), Demirgüç-Kunt and Huizinga (1999), have found a positive relation between inflation and long term interest rates with bank performance. Revell (1979) introduces the issue, noting that the effect of inflation depends on whether banks' wages and other operating expenses increase at a faster rate than inflation. Moreover, according to the literature, exchange rate also affects banks' asset quality. This because exchange rate depreciation might have a negative impact on asset quality, particularly in countries with a large amount of lending in foreign currency and interest rate hikes affect the ability to service the debt, especially in case of floating rate loans (Louzis, Vouldis and Metaxas, 2012).

Herfindahl-Hirschman Index or HHI serves as a measure of the size of firms in relation to the industry and an indicator of competition between them. According to the Structure Conduct-Performance hypothesis, higher industrial concentration expressed by higher HHI leads to higher bank profitability. The index is an economic concept widely applied in competition law, antitrust and technology

management. Davis (2007) analyzed the sensitivity of HHI into two compound parts: the number of banks in the market and the inequality in market shares among the different banks. He found that the index becomes less sensitive to changes in the number of banks, to the larger number of banks in the industry.

Changes in credit risk may reflect changes in the health of a bank's loan portfolio (Cooper, Jackson & Patterson, 2003), which may affect the performance of the institution. As lower capital ratios suggest a relatively risky position, one would expect a negative effect of this variable (for a thorough discussion see Berger, 1995). Theory predicts that equity financing can reduce the ability of creditors to exert market discipline (Diamond and Rajan, 2001) but also that it may induce banks to screen borrowers more intensively (Mehran and Thakor, 2010). However, it could be the case that higher levels of equity would decrease the cost of capital, leading to a positive impact on profitability (Molyneux, 1993). Moreover, an increase in capital may raise expected earnings by reducing the expected costs of financial distress, including bankruptcy (Berger, 1995). Most studies that use capital ratios as an explanatory variable of bank profitability (e.g. Bourke, 1989; Molyneux and Thornton, 1992; Goddard, Molyneux & Wilson, 2004) observe a positive relationship between the two measures. Athanasoglou, Brissimis & Delis (2008) suggest that capital is better modeled as an endogenous determinant of bank profitability, as higher profits may lead to an increase in capital (also see Berger, 1995).

Bank size is generally used to capture potential economies or diseconomies of scale in the banking sector. This variable controls for cost differences and product and risk diversification according to the size of the credit institution. The first factor could lead to a positive relationship between size and bank profitability, if there are significant economies of scale (Akhavain, Berger & Humphrey, 1997; Bourke, 1989; Molyneux and Thornton, 1992; Bikker and Hu, 2002; Goddard et al., 2004), while the second to a negative one, if increased diversification leads to lower credit risk and thus lower returns. Regarding credit risk in this paper we observe the role of the non performing loans to total loans ratio. Berger and De Young (1997) show that declines in cost efficiency precede increases in problematic loans. According to Fiordelisi et al. (2011), reductions in cost and revenue efficiencies increase banks' future risks thus supporting the bad management and efficiency version of the moral hazard hypotheses.

According to the literature non-performing loans lead to inefficiency in the banking sector as found by Altunbas, Liu, Molyneux & Seth (2000), Fan and Shaffer (2004) and Girardone, Molyneux & Gardener (2004). This is because efficient banks are better at managing their credit risk as highlighted by Berger and

DeYoung (1997). The indicator Z-score measuring bank stability, soundness and safety of banks (Mercieca, Schaeck & Wolfe, 2007; Demirgüç-Kunt and Detragiache, 2008; Beck, Hesse, Kick & von Westernhagen, 2009; Delis & Kouretas, 2011, Shijaku, 2017) is as well often used to estimate the return on equity. A higher Zscore therefore implies a lower probability of insolvency.

In the following section, the data and methodology to estimate the effect of the macroeconomic factors elaborated above will be explained for the case of Albanian banking sector profitability.

### 3. Data and Methodology

#### 3.1. Data

We use secondary data of the micro and macroeconomic level to estimate factors that impact profitability of banking sector in Albania. The macroeconomic data are drawn from the databases of the national institute of statistics (INSTAT) and the Bank of Albania. The bank level data are extracted from the report of each 16 actual Banks, Albanian Association of Banks (AAB) and Bank of Albania. The purpose of the estimable model outlined in this section is to capture the effects of macroeconomic, bank specific factors and Herfindahl-Hirschmann index (HHI) in the industry of bank performance. We also include a range of bank-specific variables that have been used in previous empirical studies that examine the drivers of bank performance.

We test two models separately. In the first model we study the impact of macroeconomic factors on the Return of Equity (Equation 1) and in the second model we analyze the impact of bank specific factor factors and Herfindahl-Hirschmann index on the Return of Equity (Equation 2).

Equation 1:

$$\text{Performance} = \beta_0 + \beta_1 \text{GDPg}_{i,t-1} + \beta_2 \text{INFL}_{i,t-1} + \beta_3 \text{REER}_{i,t-1} + \varepsilon_{i,t};$$

Equation 2:

$$\text{Performance} = \beta_0 + \beta_1 \text{NPL}_{i,t-1} + \beta_2 \text{Efficiency}_{i,t-1} + \beta_3 \text{Capitalization}_{i,t-1} + \beta_4 \text{HHI}_{i,t-1} + \varepsilon_{i,t};$$

Where the subscript  $i$  denotes bank,  $t$  indicates time in quarterly periods, and  $\varepsilon_{it}$  stands for the error term (Petria, Capraru & Ihnatov, 2015).

The Z-score is calculated as equation 2<sup>1</sup>. It is estimated as is the standard deviation of ROA. A higher Z-score implies a lower probability of insolvency, providing a direct measure of soundness that is superior to analyzing leverage.

Bank capital adequacy is measured as the equity to assets ratio, quantified as the value of total equity divided by the value of total assets. Herfindahl-Hirschmann index (HHI) is calculated as the sum of the squares of all the banks' market shares in terms of total assets. The following section elaborates the methodology developed for the investigation of the relationship between the dependent variable Performance, measured by the Return on Equity and the macroeconomic, bank specific factors and market concentration. Altogether, the sample consists of an unbalanced panel of 16 banks, organized quarterly for 14 years between Q1:2002-Q3:2015. According to Rinaldi and Sanchis-Arellano (2006), unbalanced panel data include more observations and their results are less dependent on a particular period.

In order to investigate the factors affecting the Bank performance in Albania, we use ROE to measure the bank performance. The rationale is that it represents a risk-adjusted return on capital, or RAROC. RAROC takes ROE to a fully risk-adjusted metric that can be used at the entity level and that can also be broken down for any and all lines of business within the organization. ROE is also Warren Buffet's favorite measure of performance that believes that the return that a company gets on its equity is one of the most important factors in making successful stock investments. Return on capital is also important in finding out how well a company is doing.

### 3.2. Methodology

To express the risk profile of the banks we use the stock of Non Performing Loans to Total Loans (NPLt-1). Capital adequacy (Capitalization, t-1) is the ratio of equity to total assets rather than a regulatory risk-weighted ratio attribute the decline in risk weights to the strategic use of internal risk models by banks. (BCBS, 2013; EBA, 2013; Le Leslé and Avramova, 2012; Mariathasan and Merrouche, 2012; 2014). The variable used is first level cointegrated, hence one period lagged values are used in the models estimation. Capitalization of the banking system

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<sup>1</sup> Calculated the data bank-by-bank from authors



is satisfactory, providing sustainable hedging of bank's exposures against risks. It is sufficient to withstand a relatively high level of losses, which may arise from exposure to credit risk. The efficiency (Efficiency,  $t-1$ ) of bank's management is measured by the ratio of Income to Cost, where a reduction in costs, driven by improved managerial efficiency, is expected to increase profitability. Higher Z-score, signifying overall greater market risks, also positively and significantly raises profits, following risk-return convention. Real effective exchange growth rate (REERg), affect banks' asset quality, because exchange rate depreciation might have a negative impact on asset quality, particularly in countries with a large amount of lending in foreign currency. Bourke (1989), Bauer, Berger, Ferrier & Humphrey (1998) and Bauer, Berger & Humphrey (1993), among others, suggest that any functional form of bank profitability is qualitatively equivalent to the linear.

## 4. Results

In order to estimate the effects of the above mentioned variables into the ROE, the Fixed Effect (FE) model for the panel data and fixed effects cluster-adjusted standard error by banks estimation is performed in order to control for a limited form of endogeneity of repressors. The rationale for the chosen technique is that the "within logic" applies only with time-varying variables, as is the case of the variables that are taken into consideration in this analysis. Usually, the panel data and within estimation (FE) allows to identify causal effects under weaker assumptions, that is when time-constant unobserved heterogeneity does not bias estimates. Furthermore, the FE wipes out person-specific time-constant unobservable (fixed effects) by applying the within transformation and under the following assumptions (Wooldridge, 2010): (1) Full rank of the matrix of the demeaned repressors (no multicollinearity); (2) Idiosyncratic errors have constant variance across  $t$  (homoskedasticity); (3) Idiosyncratic errors are serially uncorrelated (no autocorrelation). In the static panel the fixed effects estimation is implemented in order to account for the time-constant unobserved heterogeneity between banks. The fixed effects estimator removes the impact of those time-invariant characteristics from the predictor variables, so the predictor's net effect can be assessed.

Another important assumption of the fixed effects model is that these time invariant characteristics are unique to each individual entity and should not be correlated with other individual characteristics. In an alternative approach the random effects method is used with the purpose of checking for unobserved heterogeneity problem. In order to correct for possible arbitrary serial correlation

and heteroskedasticity, the panel-robust standard errors for the fixed effect model are also presented in the second column of Table 3, which indicates estimated coefficients and the p-value for each of the effect of macroeconomic factors on the ROE in Albania. According to the results of the estimated econometric model (Table 3) it can be observed that the R-sq between is relatively low, the F indicates that all the coefficients in the model are different than zero. Value of rho, known as the interclass correlation, indicates that about 37,49% of the variance is due to differences across panels in the first model and 40.44% in the second model. The level to which the errors  $u_i$  are correlated with the regressors is relatively low (at about 15%). The p-values, testing hypothesis that each coefficient is different from 0.

In the first model the p-values are indicative of the significance of all the explanatory variables. As can be observed from the coefficient results, the GDP growth rate has a strong significant positive effect on the bank's performance in line with expectations and the corresponding literature. Regarding the current trends of these measures in case of Albania, a slowdown of GDP has led to lower ROE. An unfavorable economic situation reduces general investments and consequently the demand for loans, leading banks to possession of more liquidity and hence making them invest funds in investment forms with lower profit generation. REER is significant at 1 percent level of significance and the coefficient effect is in line with the literature.

According to the empirical results, the inflation rate positively and significantly affects profitability. According to the literature this implies that, with inflation, bank income increases more than bank costs, which may be viewed as the result of the failure of bank customers to forecast future inflation. Regarding the banking sector in Albania, about 65% of loans to the private sector are extended in foreign currency. The loan portfolio in foreign currency appears problematic in terms of its quality compared to the portfolio in local currency. This may be especially troubling because the risks and consequences associated with this portfolio are of great importance in creating capital expenditure for the bank loan portfolio vulnerability. The banking sector is significantly exposed to the market risk (including the exchange rate risk and interest rate risk) regardless of the reduction. However, risk increases when the assessment includes the indirect impact from the exchange rate, transmitted mainly through foreign currency loans to resident entities, whose main income is in local currency. Despite the decline in this loan category during the period, it accounts for about 26.5% of the total outstanding loans, which is considered as a high share of exposure size during the period.

Banks as well as borrowers should carefully evaluate the risks stemming from foreign currency lending, where the parties are exposed to adverse fluctuations of the exchange rate. The risk is transmitted through the gap between assets and liabilities of the banking sector according to reprising periods. This gap is negative and has widened somewhat in the short term. The risk would materialize in the case of an increase of the interest rate, which, due to the negative gap, would have a faster impact on the banking activity costs compared with its revenues. This risk has an indirect component related to the negative effect from the increase of interest rate on borrowers who have variable interest rate loan. According to the results in the second model it is necessary for banks to quantitatively assess the impact of adverse scenarios and work on reducing the exposure Credit risk (NPL, t-1) remains a concern for banking activity. The absolute value of non-performing loans fell during the period.

The loan restructuring process at banks may be more effective if viewed more than merely as a change in terms and loan installment. The risk for further deterioration of the loan quality is still present, and banks are urged to cautiously monitor the loan loss provisioning, suggesting its increase through a proactive approach. To address the non-performing loans, banks are taking more decisive actions with respect to the execution of the collateral, which is typically in the form of real estate. As a result, the value of real estate under banks' management is increasing at a steady rate. This phenomenon may put pressure on banks' resources for the management and maintenance of real estate, particularly if the sale pace in the market is low. Real estate management is not a typical function of a commercial bank. The non performing loans reduce the return on equity. The coefficient results in Table 6 are indicative of the significant effect of the NPL on ROE. The probability of default of a country's banking system (Zscore), calculated as a weighted average of the z-scores of a country's individual banks (the weights are based on the individual banks' total assets) is positively affecting the banking system performance in Albania. Z-score compares a bank's buffers (capitalization and returns) with the volatility of those returns. On the basis of the Regulation of the U. S. Department of Justice (1992) for the interpretation of the HHI, the Albanian banking market is considered to be highly concentrated in terms of assets. For applying the Panzar-Rosse methodology, in Albania's case, there were used data on individual banks of the Albanian banking system for the period of Q1:2002 – Q3:20015. In the Albanian banking sector continues to be highly concentrated, where four banks represent about 69.1% of total banking sector assets. HHI at previous time is strong correlate with performance refers to the degree of control of economic activity by large firms (Sathye, 2002).

The efficiency is strong correlate with return on equity, in line with literature. The banking sector in Albania has been characterized by very high liquidity levels. Given the enhanced competition and improved efficiency, it is objectively expected that liquidity indicators begin to shift downward. These factors hamper the setting of the optimum liquidity level, in which the enhanced efficiency in fund use does not shackle the institution's capacity to cope with the business risks. According to the empirical results, there exists a strong negative relationship between Capital adequacy and performance in Albanian banking system. High levels of capital imply that the bank is unlikely to earn high profits, but is also less liable to risk; therefore shareholders should be willing to accept a lower return on equity. According to the result of the second model using the fix effect the Capitalization is significant and negatively and significantly affects profitability, but using the alternative method Fixed effect with Standard Error adjusted by 16 clusters in Bank the sign of the coefficient is negative, but is not a significant relationship. The value of R-squared between increases is 0.4753. If, however, we use these estimates to predict the within model, we have an  $R^2$  of 0.4435. If we use these estimates to fit the overall data, our  $R^2$  is 0.4241. The F statistic tests that the coefficients on the regressors are all jointly zero. Our model is significant.

## 5. Conclusions

In the present study, are applied two econometrics model that helped us to identify the relationship between macroeconomic, bank specific factors and Herfindahl-Hirschmann index (HHI) and the bank industry performance in Albania. Aggregate data on a panel of 16 banks for the period Q1:2002- Q3:2015 are used implementing a Fixed effects and Fix effects clustering in STATA 12. We found strong impact on the bank performance of the various macroeconomic, bank-specific factors and HHI. According to the results, a slight increase of risks to financial stability in the banking sector, expressed in the model with the increase of non-performing loans, affects bank performance negatively.

The non performing loans are associated with a slight reduction of their coverage with reserve and capital funds. Increase of foreign currency loans in the banking sector, contributed negatively in the reduction of risks evaluation. Credit to enterprises, foreign currency credit and medium-term credit give the main contribution to this increase. For individual banks, the increase in provisioning expenses for credit, affected the establishment of the financial loss. Risk-Weighted Assets for credit risk in Albania expanded by around ALL 16.8 billion, compared to the end of 2015, up at ALL 677.1 billion.

The highest exposure of banking sector mainly relates to three classes of credit risk: (1) Exposure to high risk classified categories, which includes lending to non-residents and foreign currency lending when the borrower's income is in Albanian Lek (ALL); (2) Exposure to non-performing loans and (3) exposures to corporate. Problematic remains the level of non-performing loans. The increase in nonperforming loans points to the difficulty for their resolution and need to closely monitor this process.

## APPENDIX

**Table 1: Matrix correlation of macroeconomic factors and ROE**

	ROE	GDPg	INFLRg	REERg
ROE	1.0000			
GDPg	0.0737	1.0000		
INFLRg	0.0013	0.0586	1.0000	
REERg	-0.0635	0.2537	-0.5189	1.0000

**Table 2: Descriptive statistics of macroeconomic factors and ROE**

	Observations	Mean	Std.Dev	Min	Max
ROE	837	4.4451	19.029	-70.92	74.42
GDPg	821	1.5973	1.9276	-1.467	9.974
INFLRg	823	0.5242	2.0101	-23.01	3.898
REERg	821	0.1829	2.3768	-4.712	9.977

**Table 3: The effect of macroeconomic on the ROE in Albania**

ROE	Coefficient	Std. Error	t-Statistic	Prob
GDPg	0.9539	0.2767	3.45	0.004***
INFLRg	-0.5858	0.1984	-2.95	0.010**
REERg	-0.9808	0.2106	-4.66	0.000***
Cons	3.0961	0.51703	5.99	0.000***
Number of observation	821			
R-sq	0.061			
sigma_u	11.733			
sigma_e	15.149			
Rho	0.3749			
Prob > F	0.0000			

Source: Results obtained by the authors

The independent variable is one-period-lagged.

See Table 1 for other variable definitions. Superscripts \*, \*\*, \*\*\* indicate statistical significance at 10%, 5% and 1% levels, respectively

**Table 4: Matrix correlation of bank specific factors and HHI on ROE**

	ROE	NPL1	Efficiency	HHI	Zscore	Capitalization
ROE	1.0000					
NPL1	-0.0723	1.0000				
Efficiency	0.6627	-0.3688	1.0000			
HHI	0.3002	-0.3688	0.3153	1.0000		
Zscore	0.3002	-0.0151	0.1366	0.0611	1.0000	
Capitalization	-0.2185	-0.2771	-0.1935	0.1908	-0.0678	1.0000

**Table 5: Summary statistic of macroeconomic factors on ROE**

	Observations	Mean	Std.Dev	Min	Max
ROE	837	4.4451	19.0292	-70.923	74.42
NPL1	837	3449.6	6122.10	0	34714
Efficiency	837	104.32	21.7286	13.661	210.69
HHI	837	19.344	7.40157	13.607	210.69
Zscore	821	300.10	2876.23	-32037	46719
Capitalization	837	15.848	16.1720	0.2016	77.266

**Table 6: The effect of specific factors and HHI on the ROE (Fixed Effect)**

ROE	Coefficient	Std. Error	t-Statistic	Prob
NPL1	-0.0006	0.0000	-6.960	0.000***
Efficiency	0.4008	0.0226	17.73	0.000***
HHI	0.2263	0.0700	3.23	0.001***
Zscore	0.0003	0.0001	2.8	0.005***
Capitalization	-0.0894	0.0464	-1.93	0.054*
cons	-38.385	2.5918	-14.81	0.000***
Number of observation	821			
R-sq	0.4753			
sigma_u	9.2536			
sigma_e	11.4066			
rho	0.39690			
Prob > F	0.0000			

Source: Results obtained by the authors

The independent variable is one-period-lagged.

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