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Factors Affecting the Capital Adequacy Ratio of Private Banks in Ethiopia

Kassahun Tafese Keneni*

Abstract

The objective of the study was to assess the factors affecting the capital adequacy ratio of the private banks in Ethiopia. Data was gathered from the financial documents of all 16 private banks in Ethiopia over eight years, from 2013 to 2020. The independent variables were ROA, ROE, bank size in terms of total asset, loan loss provision to total loan, total capital to total asset, total debt to total equity, and liquid asset to total asset. The dependent variable was the capital adequacy ratio. The random-effects model was used, based on the Hausman test of a specification, to analyse the panel data regression model. The result indicated that ROA, bank size in terms of total asset, total capital to total asset, total debt to total equity, and liquid asset to total asset were statistically significant, at a 5% level of significance, in affecting the capital adequacy ratio of the private banks in Ethiopia.

Keywords: Capital Adequacy, Panel Data, Random Effect, Commercial Banks, Ethiopia

Introduction

Capital adequacy is the amount of capital required by a financial regulator to be held in financial institutions, and it is frequently articulated in terms of CAR. It is one of the most important current issues (Bateni, Vakilifard & Asghari, 2014) in banking sectors to evaluate the efficiency and stability of the banks. The importance of CAR to the banks is that it increases bankability by eliminating the shortage of funds which may cause the risk of losses. Early detection helps build and maintain depositors' confidence and prevent banks' bankruptcy from occurring due to capital insufficiency. In the dynamic nature of the world economies, the contemporary financial setting has been changed due to business computation, research and development, the emergence of new banking services, and the introduction of diverse markets in the financial system. To cope with this complex financial stress, the Basel committee on banking supervision voluntarily took initiatives to safeguard banks from operational failure. The Bank of International Settlements (BIS) (Alajmi & Alqasem, 2015) developed a framework needed for calculating the CAR of a group of ten industrialised countries' (G-10) banks. Debajyoti and Roy (2013) stated that the Basel committee set the meeting at the city of Basel, Switzerland, and formed an agreement called the Basel accord to determine the CAR for the banks. The responsibility (Jablecki & Juliusz, 2009) of the Basel committee was to investigate the contemporary situation of the modern banking system in the group of countries and come up with appropriate solutions, supported by detailed guidelines, for further supervision. Since the establishment of the Basel committee, three Basel guidelines have been formulated, with different objectives, to improve the CAR in banks (Gujrati, 2016).

Kaur and Kapoor (2014) and Salgotra and Wadhwa (2012) stated that the Basel I guideline, introduced in 1988, stipulated a minimum of 8% capital adequacy ratio requirement for the commercial banks as a regulatory framework. This capital accord is mainly proposed to use as regulatory capital requirements more responsive to the risk of losses caused by credit disbursement of the banks' total portfolio of both balance sheet and off-balance sheet tasks. According to the Basel accord, banks' capital was classified into Tier 1 core capital and Tier 2 supplemental capital. This has worked as a benchmark worldwide for banking regulations since then. The Basel II in 2004 came with more risk-sensitive frameworks on capital

* Andhra University, India. Email: kassahuntafese@gmail.com

measurement and standards. The Basel II accord has improved the effectiveness of banking supervision and regulation through the adoption of a more risk-responsive and innovation-supportive regulatory framework. Basel II was introduced to cover the loopholes of Basel I, for improvement. According to Nikaido (2007), this accord has three pillars: (1) regulatory, (2) supervisory, and (3) discipline. Such pillars help banks in supervisory review, risk management guidelines, supervisory transparency, accountability, and to develop a set of disclosure requirements. In practical application and dynamicity of the financial system, the Basel II accord revealed a deficiency at the time of the global financial crisis. Due to this reason, the Basel committee in 2010 established Basel III rules, to reduce the probability and severity of the future crisis. This accord (Sajid, 2019) was proposed to reinforce banks' capital requirement through enhancing liquidity position of banks and minimising the leverage of these banks.

The National Bank of Ethiopia (NBE) also stipulated the CAR in the regulation of banks, by directive No. SBB/50/2011, determining the minimum capital requirement for banks in licensing and supervising banking business in Ethiopia. In this regulation, the NBE determined the minimum capital to risk-weighted assets ratio of 8% at all times.

The purpose of capital adequacy is to facilitate financial stability in the banking system, as well as in the entire economy. The role of the individual institution is of paramount importance in the stability of financial flows in the financial system. The broad objective of this study was to investigate the determining factors that affect the CAR of the private banks in Ethiopia. The study considered seven internal factors, namely ROA, ROE, LOGTA, LLPTL, total capital to total asset, total debt to total equity, and liquid asset to total assets. Generally, such factors could be summarised as profitability, bank size, asset quality, leverage, and liquidity.

Literature Review

The essence of the CAR is measuring the amount of capital a bank should hold compared to its risks of losses. As a result, banks should retain the minimum amount of capital stipulated by the national regulatory body of the respective country. To harmonise the capital adequacy ratio, the Basel I accord provided formal capital requirements to the banks as a banking rule. Capital standards (Nikaido, 2007) all over the globe are converging at the request of the Basel Committee on Banking supervision towards the so-called Basel II norms. The Basel II resolved the shortcomings of Basel I and stipulated more effective changes on capital regulation. Both Basel II and Basel III had great significance in maintaining adequate capital to ensure the smooth operation and solvency of the banks in the financial system (Susy Muchtar, 2021). Basel III accord is the continuation of Basel I and Basel II, and was introduced to improve the ability of the banking sectors to deal with financial and economic pressure, to improve risk management, and strengthen the transparency of the banks (Gujrati, 2016). The Basel guidelines stressed the banks to maintain higher capital adequacy ratios to protect banks against excess leverage and liquidity problem; it protects them from the difficulty of coping with the contemporary complex banking activities (Gunawardhana & Damayanthi, 2021).

CAR is evaluated as total capital divided by risk-weighted assets (RWA).

$$\text{CAR} = \frac{\text{Tier 1} + \text{Tier 2 capitals}}{\text{RWA}} \%$$

More specifically, (Ahooja, 2011; Kumar & Alam, 2018; Chowdhury, 2010; Fatima, 2014),

- CAR = Total Capital (core capital + supplementary capital) / (market risk + credit risk + operation risk)

Tier 1 (Core Capital) includes *"Ordinary capital, Retained Earning, and (Share Premium − Intangible Assets)"* (Kumar & Alam, 2018: p. 147). *"Tier 1 capital = (paid up capital + statutory reserve + disclosed free reserves) − (equity investments in subsidiary + intangible assets + current assets and brought forward losses)"*. Generally, core capital (Jablecki & Juliusz, 2009) is the sum of common shares and non-cumulative perpetual preferred stock issued and fully paid and disclosed reserve. The core capital (Białas & Solek, 2010), from the view point of the supervisory board, is of paramount importance. The supervisory body could check the values with regards to the protection of the depositors and any other creditors against losses due to bankruptcy of the banks.

Tier II (Supplementary Capital): "Is the sum of undisclosed reserves, general bad debt provision, revaluation reserves, subordinated debt, and redeemable preference shares" (Kumar & Alam, 2018: p. 147). *"Tier 2 capital = Undisclosed reserves, general loss reserves, hybrid debt capital instruments, and subordinated debts, where risk can either be weighted assets or the respective national regulator's minimum total capital requirement*". Generally, supplementary capital is everything except core capital, like undisclosed reserves, a property where value changes, bonds, and so on.

The separate description of tier 1 and tier 2 capital is to understand their function and their components. Accordingly, tier 1 capital is able to absorb losses while the banks continue operation without interrupting the banking services. On the other hand, tier 2 capital could absorb losses in the event of a winding-up of the banking services and a bank ceasing its operation. Moreover; it provides a lesser degree of protection to depositors. The Basel accord suggested banks to hold no less than 8% total capital or 4% tier 1 capital (Jablecki & Juliusz, 2009).

Susy Muchtar (2021) stated that the profitability variables, such as ROA and ROE, to measure banks' profit in terms of assets and equity, respectively, had significant importance in contributing capital funds to the firm. Bank size is proxied by the logarithm of total assets, which is an important factor in the determination of capital adequacy, since it is interconnected with financial markets to facilitate access to capital. The bigger the bank size, the greater the access of capital to cope with the market. However, according to Vu and Dang (2020), bank size has a negative correlation with capital adequacy ratio, since big banks have risky assets compared to small banks. The loan loss provision is the amount of money reserved to cover the estimated potential risk of losses in the credit investment portfolio. The liquidity ratio is also very important, in that it reflects a bank's capability to meet its current commitments, like loan demand and cash payments for the smooth running of the banking operation. Liquidity, in general, is all about the flow of cash. Therefore, the liquidity ratio (Keqa, 2021) determines the debtor's ability to pay its debt obligation without requiring an external source of capital. The leverage ratios (Mekonnen, 2020) allow financial institutions to raise the potential gains or losses on investment. In the balance sheet of the firm, when total asset exceeds the total equity of the firm, such a balance sheet is said to be leveraged. Leverage ratio is the ratio of debt to an asset expected to have a positive relationship with capital adequacy ratio.

The study conducted by Alajmi and Alqasem (2015) was on the factors that determine the CAR in Kuwaiti banks in the period 2005 to 2013. Using both fixed and random effect methods of data analysis, the researcher found that bank size, in terms of total liability to total assets, and ROA were significantly and negatively affecting the CAR, while dividend payout ratio, loan to asset ratio, loan to deposit ratio, non-performing loan to total loans, and ROE did not have any significant effect on CAR in the Kuwaiti banks under the fixed effect analysis. Under the random effect model, bank size and ROA had a negative and significant impact on CAR, whereas the loan to deposit ratio had a positive and significant impact on CAR. However, ratios such as dividend payout, non-performing loan to total loan, loan to asset ratio, and ROE had an insignificant impact on CAR. The study conducted in the South-Eastern European region (Acikalin, Bakin & Celik, 2015) indicated that bank size, ROA, leverage, liquidity, net interest margin, and risk had significantly affected the CAR of the banks in the region. The study conducted in Indonesia (Sudiyatno, Puspitasari, Susilowati, Sudarsi & Udin, 2019) indicated that bank size and loan to deposit ratio negatively and significantly affected the CAR, whereas loan loss provision did not. Keqa (2021) observed that bank size and liquidity had a positive impact and ROA had the largest impact on CAR in Western Balkan countries, while leverage had a negative impact. Gunawardhana and Damayanthi (2021) stated that ROA, ROE, equity ratio, and risk asset ratio were influencing factors in the Sri Lanka domestic licensed banks. According to the study conducted by Annor, Obeng and Nti (2020) in Ghana, non-performing loans has a negative relationship with CAR, while ROA has a positive relationship.

Based on the literature studied so far, the null hypotheses (H_0) of the study is developed as follows:

H_{01}: ROA has no significant impact on CAR.

$H_{02:}$ ROE has no significant impact on CAR.

$H_{03:}$ Bank size, in terms of natural logarithm of total asset, has no significant impact on CAR.

$H_{04:}$ Loan loss provision to total loan ratio has no significant impact on CAR.

$H_{05:}$ Total capital to total asset ratio has no significant impact on CAR.

$H_{06:}$ Total debt to total equity ratio has no significant impact on CAR.

$H_{07:}$ Liquid asset to total asset ratio has no significant impact on CAR.

Research Methods, Design, Data Source, and Type of Study

The study was a descriptive and analytical type of study, which was conducted based on secondary data sources from 16 private banks in Ethiopia. The secondary data was collected from audited financial documents of the respective banks over eight years, from 2013 to 2020. The data was retrieved from the financial statements and transformed into a ratio form to facilitate analysis. All 16 private banks in the country were incorporated in the study, since they fulfilled the requirements and time frame of the study. The study used Eviews software to attain objectives and to test the hypotheses of the study. The research design applied to assess the study data were descriptive statistics, a correlation between variables, and panel data regression analysis. Descriptive statistics helps facilitate data visualisation and contributes to the decision-making process (Ferreira, 2020).

Correlation is, in broad terms, defined as a measure of a relationship between two variables. The coefficient value tells us how the two variables are related to each other; it also shows the magnitude and direction of the relation. Moreover, change in correlation value of one variable will change the other variable either in the same direction or the opposite. If either both variables are positive or both are negative, it is said to be in the same direction. On the other hand, if one variable is negative and the other is positive, then it is said that the variables are correlated in the opposite direction (Schober & Schwarte, 2018).

Regression analysis is used to measure whether the independent variables affect the dependent variables, and to what extent. In other terms, regression analysis measures the magnitude and direction of the effect of the independent variables on the dependent variables. The effect of the independent variables, such as ROA; bank size, in terms of TA and LLPTL; and leverage, in terms of TCTA, TDTE, and LATA, on the dependent variable, such as CAR, is studied.

The econometrics representation of the model specification is:

$$CAR_{it} = \alpha + \beta_1 ROA_{it} + \beta_2 LOGTA_{it} + \beta_3 LLPTL_{it} + \beta_4 TCTA_{it} + \beta_5 TDTE_{it} + \beta_6 LATA_{it} + \varepsilon_{it}$$

Where, α = regression line slope, β = regression coefficients, ε = error term, i = cross-section (banks), t = time in year.

Table 1: Description of Study Variables

Study Variables	*Ratio Measurement*	*Symbol*	*Expected Coefficient Sign*
Independent Variables			
Return on Asset	Net Income / Total Asset	ROA	positive
Return on Equity	Net Income / Total Equity	ROE	positive
Bank size	Natural logarithm of Total Asset	LGTA	negative
Asset quality	Loan Loss Provision / Total Loan	LLPTL	negative
Capital adequacy	Total Capital / Total Asset	TCTA	positive
Leverage ratio	Total Debt / Total Equity	DE	positive
Liquidity ratio	Liquid Asset / Total Asset	LATA	positive
Dependent Variable		Symbol	
Capital adequacy ratio	Total Capital / RWA	CAR	

Result

Descriptive Statistics

The descriptive statistics of the study describe the mean, median, maximum, minimum, and standard deviations of the variables. They are depicted in Table 2. The maximum and the minimum value of CAR were 52.60% and 4.45%, respectively and the mean value was 23.95%. The mean value indicates that the CAR of the private banks in Ethiopia was beyond the minimum amount required to be held by the banks. The result showed that the banks were compliant with the predetermined regulatory provisions. The standard deviation of CAR among the banks was 0.0922.

Table 2: Descriptive Statistics

	CAR	ROA	ROE	LOGTA	LLPTL	TCTA	TDTE	LATA
Mean	0.2395	0.0258	0.1769	23.0618	0.0053	0.1577	5.9876	0.4174
Median	0.2186	0.0253	0.1694	23.1830	0.0040	0.1428	6.0834	0.4230
Maximum	0.5260	0.0564	0.4275	25.2151	0.0787	0.9512	11.7041	0.8746
Minimum	0.0445	−0.0351	0.0320	18.6832	−0.0013	0.0787	0.0513	0.1276
Std. Dev.	0.0922	0.0089	0.0511	1.1355	0.0083	0.0809	1.8000	0.1542
Observations	128	128	128	128	128	128	128	128

The correlation of the variables indicates the strength and magnitude of the relation between two variables. If the correlation between two variables is approaching +1 or −1, it means they have a strong or perfect correlation. If it is approaching zero, then there is no correlation or little correlation between the two variables. If the two variables have a strong correlation, then they are susceptible to multicollinearity problems. If the absolute value of the Pearson correlation coefficient is close to 0.8, multicollinearity is likely to exist. However, as shown in Table 3, the correlation between the variables ranged between −0.70 and +0.73, indicating no multicollinearity problems. The multicollinearity problem can be detected in three ways: (1) Pearson correlation coefficient; (2) variance inflation factor (VIF), which should be less than ten to say no multicollinearity problem between the independent variables; and (3) the eigenvalue method (Shrestha, 2020). In this study, VIF was checked and was found to be less than ten.

Table 3: Correlation Matrix

	CAR	ROA	ROE	LOGTA	LLPTL	TCTA	TDTE	LATA
CAR	1							
ROA	0.0718	1						
ROE	−0.2424	0.5006	1					
LOGTA	−0.6557	−0.0605	0.4074	1				
LLPTL	0.2092	−0.0635	−0.0697	−0.1593	1			
TCTA	0.2322	0.1892	−0.4194	−0.6470	−0.0167	1		
TDTE	−0.6619	−0.2165	0.4722	0.7280	−0.0330	−0.6937	1	
LATA	0.2353	−0.0815	0.0432	−0.2727	0.1563	0.0576	−0.0240	1

To extend the analysis using the regression model, the choice between fixed and random effect models for panel data was required. So, the Hausman test is the most common method (Baltage, 2001) and was conducted to select which model was better for the data under study. The random effect model was appropriate and was selected, since the Hausman test suggested that the corresponding effects were statistically insignificant, as depicted in Table 4. The probability value of chi-square was $\alpha > 5\%$. Therefore, H_0 was accepted. Where,

H_0: Random effect is appropriate.

H_1: Fixed effect is appropriate.

The random effect model requires that the number of unit cross-sections (in this case, the number of banks) must be greater than the number of time-series (number of variables studied in a given period).

Table 4: Correlated Random Effects – Hausman Test

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-Section Random	5.528713	7	0.5957

The coefficient of determination, R^2, (Keqa, 2021) shows how much of the overall variance in the dependent

variable could be explained by the independent variables. The regression result is shown in Table 5; the coefficient of determination indicated that the independent variables jointly explained 63.69% variance in the dependent variable, as seen in the value of the adjusted R-squared. The adjusted R^2 offers a more comprehensive description of the model, as well as more informative variables. The remaining 36.31% of the variance in the dependent variable was explained by other factors not included in the study. Out of the seven independent variables, five variables significantly impacted the dependent variable. The F-statistic measures the overall significance of all the independent variables of a model. Though some of the variables were individually insignificant, the probability value of F-statistic (P-value = 0.00) of the study showed that all the independent variables significantly impacted the dependent variable jointly.

The ROA, LOGTA, TCTA, and TDTE variables had negative coefficients, while ROE, LLPTL, and LATA had positive coefficients. The importance of a coefficient of the variable is that it indicates the magnitude of percentage changes in a dependent variable if one unit changes in an independent variable. The t-statistics and p-value define the individual significance of the independent variable on the dependent variable. The t-test is a hypothesis-testing tool that tests the significance of the independent variables. The t-value calculated should be compared to the t-critical value, and if t-calculated > t-critical (5%), then the null hypothesis is required to be accepted; otherwise, the null hypothesis is to be rejected. Regarding the significance of the impact of the individual variables on CAR, independent variables such as ROA, LOGTA, TATA, TDTE, and LATA had significantly impacted CAR at a 5% significance level of private commercial banks in Ethiopia. As a result, the null hypotheses of these variables were rejected. The ROE was significant at a 10% significant level, but the LLPTL variable had no significant impact on the CAR at a 10% significance level; therefore, the hypotheses for these variables were accepted.

Table 5: Regression Output

Dependent Variable: CAR				
Method: Panel EGLS (Cross-Section Random Effects)				
Variable	*Coefficient*	*Std. Error*	*t-Statistic*	*Prob.*
C	1.565183	0.132657	11.79877	0.0000
ROA	−1.175935	0.587204	−2.002600	0.0475
ROE	0.211054	0.116165	1.816843	0.0717
LOGTA	−0.046653	0.005828	−8.005135	0.0000
LLPTL	0.388097	0.447736	0.866798	0.3878
TCTA	−0.616500	0.066828	−9.225111	0.0000
TDTE	−0.032360	0.004702	−6.882327	0.0000
LATA	0.077218	0.030462	2.534876	0.0125
R^2	0.656862			
Adj. R^2	0.636845			
F-statistic	32.81619			
P-value (F-statistic)	0.000000			

Conclusion

The objective of the study was to assess the factors affecting the CAR of the private banks in Ethiopia. To attain this objective, all 16 private banks and seven independent variables based on literature review were incorporated in the study. The secondary data of eight years was collected from the financial documents of the respective banks and analysed using a random-effect model. The result of the study indicated that the return on asset, bank size, TCTA, TDTE, and LATA had a significant impact on the CAR of private commercial banks in Ethiopia, whereas LLPTL and return on equity had no significant impact at a 5% significant level.

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