MACROECONOMIC AND BANK SPECIFIC DETERMINANTS OF COMMERCIAL BANK PROFITABILITY IN ETHIOPIA

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Abstract

The purpose of this study was to empirically examine the impacts of the macroeconomic and bank-specific variables on profitability of commercial banks in Ethiopia. For the purpose secondary data collected from seven banks over the period 2000-2017 and other sources were analyzed using a panel ordinary least squares regression model for the fact fixed and random effect model found inappropriate after the Hausman tests and Breusch-Pagan Lagrange multiplier (LM). The results of the study showed statistically significant negative impacts of broad money supply and credit risk. Inflation and GDP on the other hand was found with significant positive impacts. Yet, Cash reserve ratio and bank size showed no significant impact on the profitability of commercial banks in Ethiopia. The results suggested the need for enhancing credit risk management practice, optimizing the leverage ratio in increasing bank size. A thorough understanding of the strategic business environment also found highly relevant in commercial bank management for the fact macroeconomic variables and regulatory factors found to have significant implication on profitability.

1. Introduction

The financial sectors in Ethiopia have been witnessing growth in the past two decades. Currently there are 19 commercial banks (CBs) in Ethiopia. It is confirmed in previous studies that a significant and strong link show between the Financial Sector of a nation and the performance of overall country economy. There are evidence suggesting that financial sector development plays a huge role in economic development (Urgaia, 2016; worldbank, 2020) indicating the need for Establishing a healthy and sound commercial banking sector.

Establishing sound commercial banks is paramount to facilitate the economic growth of Ethiopia where banks play a key role of financial intermediation and facilitation of commerce and industries.

A well-established, responsible and profitable banking sector contributes to the stability of the financial system (Said and Tumin, 2011). Gwatiringa (2020) asserted that,

[b]anks have a significant part in the economy and their stability is important and relevant for the financial system. To sustain a firm financial intermediary purpose, banks must be profitable. Beyond the purpose of financial intermediation, the performance of banks has a substantial effect on the economic growth of a nation. (p.22)

Economies with a profitable banking industry have better ability to resist negative shocks and contribute to the stability of financial system (Athanasoglou et. al., 2005). It also contributes to sustainability of overall economic development. Identifying the factors that significantly determine the profitability of firms in the sector is vital to improve the profitability firms and contribution of the sector to overall economic growth (Sastrosuwito & Suzuki, 2011). The level of profit in a firm can be driven by external influences and by how the internal mechanisms are able to convert those influences to opportunity and business advantages (Rumler & Waschiczek, 2010).

The external influences on bank profitability literature focuses on economic growth and stability measured by the rate of GDP growth inflation, exchange rate movement, supply of money, and interest rate. The behavior of macroeconomic variables can have positive or negative effect on the firm performance depending on the nature of

variables (Kumar, 2013). Further, Hefferman (1996) asserts that macroeconomic factors are worsened by regulations imposed on banks, Chen, et al. (1986) are significant in explaining firm profitability. It is; thus, implied the importance of considering how business environment specific variable influenced the link between macroeconomic variables and profitability.

The financial health and soundness of Ethiopian commercial banks have taken the attention empirical studies including those focused on determinates of profitability (Yirgalem, 2015; Eneyew, 2013; Dawit, 2016; Tesfaye, 2013; Tadese, 2015; Amdemichael, 2012; Kokobe and Birhanu, 2015, Gizaw et. al., 2015; Elshady et. al., 2017). The results remained mixed and the studies didn't cover all variables covered in the current study. Therefore, this study hoped to fill the gaps on previously researches by including macroeconomic variables such as money supply, cash reserve requirement, rate of GDP growth, rate of inflation, on one hand, and credit risk, leverage ratio, and bank size which represents the firm specific variables hypothesized with significant influences on the profitability of commercial banks measured by ROA and ROE. With this backdrop, the objective of this study is to examine the impacts of macroeconomic and bank specific factors on profitability of commercial banks in Ethiopia. The specific objectives of the study include the following:

- To examine the impact of macroeconomic factors (GDP, Inflation, Money supply) on profitability of CBs
- To examine the impact of cash reserve requirement ratio on profitability of CBs
- To examine the impact of bank specific factors (credit risk, leverage ratio, bank size)

2. Literature Review

Ayanda et al. (2013) examined the determinant of Nigerian Banks' Profitability in the case of First Bank of Nigeria using annual time series data from 1980 to 2010. The empirical result shows that bank size and cost efficiency did not significantly determine bank profitability in Nigeria. However, credit risk and capital adequacy had significantly negative effect on banks profitability. Loan to Asset ratio and Loans-to- Deposits ratio have significant negative and positive relationships with profitability respectively only in the short run. On the other hand, money supply growth had a positively association with Nigerian bank profitability whereas no evidence was found for inflation rate and GDP determination of profitability. Duraj & Moci (2015) analyzed bank-specific, industry related and macroeconomic determinants of banks profitability in Albania. The result indicates that except for credit risk all the factors i.e. liquidity risk, total loans, GDP and inflation were significant factors that influence banks profitability in Albania in the period under their study.

Samad (2015) examined the impact of bank specific and macroeconomic variables on profitability of banks in Bangladesh. The results showed that loan to deposit ratio, loan-loss provision to total assets, equity capital to total assets, and operating expenses to total assets were bank specific factors with significant effect on profitability. But the study showed no significant effect of bank sizes and economic growth variables.

Tesfaye (2013) indicated that bank specific factor, such as bank size, capital adequacy, operational efficiency, and liquidity risk and income diversification had significant effect on profitability of CBs in Ethiopian. He found that cost to income ratio and liquidity negatively affect the bank performance. There are also significant associations between Concentration and Bank Size with profitability. However, no evidence is found as to how GDP and inflation affected performance of banks.

Amdemichael (2012) investigated the factors affecting bank profitability for a total of eight commercial banks in Ethiopia. The findings of the study show that capital strength, bank size, income diversification and GDP have a positive and statistically significant relationship with profitability. Asset quality and operational efficiency have statistically significant and negative relationship with banks' profitability. However, the relationship for inflation, liquidity risk and concentration were found to be statistically insignificant.

Kokobe and Birhanu (2015) examined the determinants of financial performance of commercial banks in Ethiopia by using panel data of banks over the period 2002-2013. Based on the regression result income diversification, Ownership, industry size and inflation variables affect performance of the bank significantly and except inflation which was insignificant and positive for the performance measured by ROA. Whereas capital structure, operating cost, bank size, tax and GDP and market share affect performance of the bank negatively significant effect except GDP which was insignificant on the performance measured by ROA.

Elshaday et. al., (2017), the finding of the study shows that Capital Adequacy Ratio, Credit Interest Income and Size of the bank have positive and statistically significant effect on financial performance. Non-performing loans, loan

loss provision, leverage ratio and operational cost efficiency have negative and statistically significant effect on banks' financial performance.

Gemechu (2016) studied the effect of bank-specific, industry-specific and macroeconomic factors on banks' profitability in Ethiopia using a panel data regression model employed on data collected from eight commercial banks for the year 2002 - 2012. The study found a significant positive effect of bank specific factors save credit risk and expense management. Similarly, the macroeconomic factors such as economic growth, interest rate spread, and exchange rate have significant positive relationship with banks' profitability. On the other hand credit risk, and expenses management and bank regulation were found with significant negative effect.

3. Research Methodology

The overall objective of this paper was to examine the impacts of macroeconomic and bank-specific variables on the financial performance of commercial banks in Ethiopian. For the purpose secondary data was collected from the annual report of conveniently selected seven commercial banks for the year 2000 to 2017. The study covered 38.9 % of 18 CBs operating in Ethiopia (NBE, 2019) and has been exposed to cash reserve requirement regulation since the year 1996. Data related to Macroeconomic variables was collected from annual reports of NBE. STATA software package version 14.0 was used to conduct the multiple linear regression analysis which suits the study objectives.

3.1. Model Specification

An econometric model, based on based on the review of related literature, had been developed to represent hypothetical relationship between bank profitability and bank specific and macroeconomic variables. The study had measured profitability in terms of ROA and ROE. Thus, the dependent variables in this study were Return on Asset (ROA) and Return on Equity (ROE) employed in two separate models. The macroeconomic and bank specific variables assumed to explain profitability in the models included: broad money supply (MSP), cash reserve ratio (CRR), GDP, and inflation (INF), bank size (BSZ), leverage (LVRG) and credit risk (CR). The multiple linear regression equation which had been used in similar studies (Khalid, 2012: Ngugi, 2013: Kokobe and Birhanu, 2015; Elshaday et. al., 2017) was used to express the hypothetical relationship between variables as follows:

Model 1: ROA = $\beta 0 + \beta 1 \ln MSP + \beta 2 CRR + \beta 3 GDP + \beta 4 INF + \beta 5 LVRG + \beta 6 CDR + \beta 7 \ln (BSZ) + \mu$

Model 2: ROE = $\beta 0 + \beta 1 \ln MSP + \beta 2 CRR + \beta 3 GDP + \beta 4 INF + \beta 5 LVRG + \beta 6 CDR + \beta 7 \ln (BSZ) + \mu$

Where,

ROA – Return of Asset

ROE – Return of Equity

$\beta 0$ – Constant Coefficient

$\beta 1$- $\beta 7$ – Regression Coefficients of independent variable

ln MSP – Natural Logarithm of Broad Money Supply

CRR – Cash Reserve Ratio of Banks

GDP – Annual Growth of GDP

INF – Inflation Rate

LVRG – Leverage Ratio

CR- Credit risk

ln BSZ – Bank Total Asset

μ – Error

3.2. Description of Study Variables

The dependent variable in the study was commercial profitability measured by return on assets (ROA) and return on equity (ROE). ROA is measured by dividing net profit before tax by total average assets. It gives an idea on how far efficient management practices have been employed in the earning process (Mutua, 2013). ROE is measured by the ratio of net profit to average share holders' equity. It indicates the extent at which the management generated sizable return on shareholders" equity (Olweny & Shipho, 2011). The independent studies in the study include the following selected macroeconomic and bank specific variables:

Broad Money Supply: The money supply (or money stock) is the total value of monetary assets available in an economy at a specific time. Money supply is basically determined by the central bank's policy and affects the behavior of banks and their profitability. This study measured it by transformed natural logarithm of money supply.

Cash Reserve Requirement (CRR): it is the specified minimum fraction of the total deposits of customers which commercial banks have to hold as reserves either in cash or as deposits with the central bank (Dornbusch and Fischer, 1990). CRR is set according to the guidelines of the central bank of a country and is computed by dividing cash reserves by total deposits.

GDP growth: GDP growth is defined as the annual change of the GDP, used as proxy to measure the economic condition.

Inflation rate: Inflation is the rate at which the general level of prices for goods and services is rising in economy overtime. Inflation erodes the purchasing power of consumer because we buy fewer good and services with each unit of currency. The relationship between bank profitability and inflation was introduced by Revell (1980).

Leverage Ratio: Financial leverage is the degree to which net operating assets are financed by borrowing with Net Financial Obligation (Stephen, 2010). The degree is measured by taking a ratio of the debt to equity called leverage ratio.

Credit risk: it is source of risk in commercial banks and it is one of the key drivers of banks' profitability which is measured by the ratio of loan loss provisions over total loans and advances used in the study done by Heffernan and Fu (2008), Sufian and Chong (2008) and in Mirzaei and Mirzaei (2011), Tadese (2015) and Elshaday et.al (2017).

Bank size: it is used total asset of Banks from banks balance sheet. Asset size is calculated by taking natural log of total asset of bank (Ashraf, 2013).

3.3. Results of Diagnostic Tests

The estimators of models should satisfy all OLS assumptions before the estimation is carried out (Brooks, 2008). If the estimators of the model satisfy the OLS assumptions it is possible to say the estimators are BLUE (Best Linear Unbiased Estimators). Accordingly, appropriate diagnostic tests for each OLS assumptions were conducted.

Mean value of errors was tested through including a constant term in the regression model since the mean value should be zero. To test multicollinearity of the variables, Variance Inflation Factors (VIF) and tolerance level were checked. Normality assumption is also tested by using Shapiro Wilk test and skewness and Kurtosis test. Then Breusch-Pagan test was also used to test the problem of heteroscedasticity which Breusch-Pagan test assumes the error variance is constant. Below table indicated that all assumptions were satisfied the model except the presence of heteroskedasticity in model 2. Since this problem detected, robust standard error was used. Additionally, Hausman test and Breusch-Pagan LM test were employed to select the appropriate model then OLS regression model was chosen for this study.

Table 1 Results of Model Assumption tests

Assumption/ Model	Tests	Model	Pro. F-Stat	Decision		Variables	VIF	1/VIF
Heteroscedasticity	Breusch-Pagan LM	ROA	0.4297	Fail to reject		ln(BSZ)	8.74	0.114382
		ROE	0.0000	Reject		ln(MSP)	6.26	0.159652
Normality	Shapiro-Wilk	ROA	0.2638	Fail to reject		LVRG	3.96	0.252620

		ROE	0.18772	Fail to reject		CRR	1.52	0657052
Normality	Skewness/Kurtosis	ROA	0.0731	Fail to reject		INF	1.48	0.676637
		ROE	02791	Fail to reject		GDP	1.42	0.704885
Omitted Variables	Ramsey RESET	ROA	0.0903	Fail to reject		CDR	1.40	0.712632
		ROE	0.0073	Reject		*Mean VIF*	*3.54*	
Hausman test	Fixed	ROA	0.8661	Fail to reject				
		ROE	0.9729	Fail to reject				
OLS	*Breusch-Pagan LM*	*ROA*	*0.1030*	*Fail to reject*				
		ROE	*0.3185*	*Fail to reject*				

Source: STATA Output based on data from NBE, 2019

4. Descriptive Statistics

The study revealed the performance level of two dependent variables (ROA and ROE) on table 2. The first is ROA that is measured by the operating income before tax divided by average total asset has a mean value of 3.80 percent. This shows that the selected commercial banks on average earned an operating income before tax of 3.80 percent of the total asset. Since ROA of banks indicates the management efficiency of a firm in generating profit before tax from all the resources invested in the institutions, the higher ROA shows that the firm is more efficient in utilizing its resources. The standard deviation for ROA was 1.3%, hence, this indicates that the profitability variation among the selected banks was small.

The second one of dependent variable is the ROE has a mean value of 35 percent. This also shows that the sample banks on average generating an operating income of 35 cents of each birr invested in. The high variation of which is 19.3% of standard deviation was recorded in the selected banks during the study period.

Table 2 Descriptive Summary of Dependent and Independent Variables

Variable	Mean	Std. Dev.
ROA	0.038	0.013
ROE	0.36	0.193
CRR	0.15	0.095
GDP	0.09	0.038
INF	0.12	0.111
CDR	0.01	0.011
LVRG	8.63	4.585
Asset in million	25153.91	67924.87
Money Supply in million	155384	161357.10

Source: Stata Output from NBE Data, 2019

5. Results and Discussion

The result of the panel regression model used in this study is presented in table 3. The result indicated that macroeconomic and bank specific factors used in the regression model explained 44.8% of profitability of commercial banks in Ethiopia measured by ROA. The adjusted R-square on model 2 was 75.93% indicating the explanatory variables more explained profitability of Banks in Ethiopia when measured by ROE. in the model explained profitability respectively. According to Hsiao (2003) cited on Nyamsogoro (2010) the R-square value is considered as large if it exceeds 20 in a panel data regression model. Both models were also found fit as showed by statistically significant F-statistic.

Table 3 Results of Regression Analysis for Model 1 & Model 2

Model 1					Model 2				
ROA	*Coeff.*	*Std. Er.*	*t.*	*p>/t/*	**ROE**	*Coeff.*	*Std. Er.*	*t.*	*p>/t/*
ln(MSP)	-0.00455	0.00214	-2.13	0.035	ln(MSP)	-0.04612	0.02189	-2.11	0.037
CRR	-0.00665	0.01154	-0.58	0.566	CRR	-0.23129	0.14968	-1.55	0.125
GDP	0.11036	0.02751	4.01	0.000	GDP	0.82123	0.24231	3.39	0.001
INF	0.02290	0.00977	2.34	0.021	INF	0.31071	0.10795	2.88	0.005
CDR	-0.48017	0.10123	-4.74	0.000	CDR	-6.53971	1.18927	-5.50	0.000
LVRG	-0.00087	0.00039	-2.25	0.027	LVRG	0.02854	0.00521	5.48	0.000
ln(BSZ)	0.00250	0.00163	1.54	0.127	ln(BSZ)	0.02688	0.01691	1.59	0.115
cons	0.09644	0.03061	3.15	0.002	cons	0.64728	0.28543	2.27	0.025
	F(7,118)	*13.69*	R^2	*0.4481*		*F(7,118)*	*22.98*	R^2	*0.7593*
	Prob> F	*0.0000*	*Adj. R^2*	*0.4154*		*Prob> F*	*0.0000*		

Source: Stata Output from NBE Data, 2019

Regarding macroeconomic variables, Table 3 indicates that the broad money supply (β = -0.00455, t = 2.13, P< 0.05) had a statistically significant negative impact on profitability measured by ROA. Similarly, the result in model 2 showed a significant negative effect of the MSP (β=-04612, t =2.11, P< 0.05). These findings are found similar to Kwakwa (2014) but contradicted with Faith (2016). Results on table 3, on the other hand, showed a positive impact of GDP growth rate (β =0.11036, t =4.01, P=0.000) on ROA and (β =0.82123, t = 3.39, P < 0.001) on ROE in a similar vein to Hassan and Bashir (2003), Pasiouras and Kosmidou (2007), and Kosmidou (2008) who concluded a positive impact of GDP on the profitability of commercial banks. It can also be seen from Table 3 that the rate of inflation (β = 02290, t = 2.34, P < 0.05) had had a significant positive effect on ROA. The positive impact of inflation (β=0.31071, t=2.88, P < 0.001) was highly significant on profitability measured by ROE in model 2. This confirmed the study of Tesfaye (2013) and Ferede (2016) who had concluded a positive effect of inflation on the profitability of commercial banks in Ethiopia. Yet, the results on table 3 showed no significant empirical evidence s on how the cash reserve ratio affected the profitability of commercial banks in Ethiopia. The result in respect is similar to previous findings (Chimkono, 2016; Abid, 2015 and Mulwa, 2015).

It has also been observed from Table 3 that among the bank specific factors, the leverage ratio showed a mixed effect. It showed a significant negative influence (β = -0.00087, t = 2.25, P < 0.05) when profitability represented by ROA in the first model but the effect of leverage ratio becomes stronger positive (β=0.02854) and highly significant (P < 0.001) on profitability measured by ROE. Results on table 3 also showed that credit risk had a significant negative effect on profitability measured by ROA (β = -0.48017) and ROE (β= -6.53971) at a 1 % level of significance. These confirmed Tefera (2011) and Eneyew (2013) who had concluded a negative effect of credit risk on the profitability of commercial banks in Ethiopia. Similar empirical evidence had also been found in the context of other countries (Ara et. al., 2009; Kithinji, 2010; Al-Khouri, 2011). On the other hand, bank size showed a positive effect but was not statistically significant in both models even at 10% level of significance. This was found consistent with prior empirical evidence elsewhere (Sufian & Habibullah, 2009 and Kosmidou, 2008).

6. Conclusion

This study aimed at examining how macroeconomic and bank specific variables influenced the profitability of commercial banks in Ethiopia. The study hypothesized four macroeconomic and three bank specific variables as predictors of profitability measured by ROA and ROE in two separate models. Based on the findings, the study concluded that broad money supply negatively affected profitability of commercial banks in Ethiopia. Yet, it impels positive effect of GDP and rate of inflation. Nevertheless, the study found no empirical evidence to conclude on the observed negative effect of the reserve ratio. Regarding the bank-specific factors, the study implied a negative effect of bank size, and credit risk. However, the leverage ratio has a mixed effect. The effect of leverage ratio was found negative on ROA but it showed positive effect on ROE. The result, in general, suggested the need for enhancing credit risk management practice, optimizing the leverage ratio in increasing bank size. A thorough understanding of the strategic business environment also found highly relevant in commercial bank management for the fact macroeconomic variables and regulatory factors found to have significant implication on profitability.

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