Default Risk Management &Financial Performance of Commercial Banks in Ethiopia

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Abstract:
This study is aimed to identify the effect of credit risk management on profitability of commercial banks of Ethiopia over the period of 2012-2022 G.C. The researcher employed quantitative research approach with explanatory research design. The result of regression analysis of random effect model was applied to investigate the effect of explanatory variables on the profitability. The findings of this study show that, capital adequacy has positive and statistically significant effect on financial performance of commercial banks in Ethiopia. Besides, variables like loan to deposit ratio and loan provision ratio have positive and statistically significant effect on profitability of commercial banks. In opposite direction, non-performing loan, loan to total asset ratio and cost per loan have negative and statistically significant effect on ROA respectively. The profitability measured through ROA was best explained by explanatory variables incorporated in the model. Hence, the researcher suggested that the financial performance of commercial banks can be improved through improving credit risk management function of banks by giving attention on the studied variables with statistically significant effect on profitability.

Introduction
Banks today operate in an environment marked by rising customer expectations, increasing regulatory requirements, technological innovation and mounting competition which cannot free from different type of risks. Therefore, all banks, whatever their size (large, medium or small), in whatever markets they operate and no matter what products and services they provide, are constantly faced with a credit risks. Indeed, businesses can only prosper by successful risk taking. In commercial banks, credit risk considered the most important factor of earnings (profitability). Therefore, banks have to balance the relationship between credit risk and financial performance. Managing credit risk systematically and professionally becomes a more important task of bank managers. It can be said that credit risk takers has survive, effective credit risk managers have prosper and credit risk averse are likely to perish.

According to Ahmadyan (2018) sound credit risk management boosts the profitability and bank survivability. The poor credit risk management reduces the profitability and survival of banks. Credit risk management is the process of managing an institution's activities which create credit risk exposures, in a manner that significantly reduces the likelihood that such activities will impact negatively on a bank's earnings and capital (Kargi, 2011). The commercial banks credit risk management needs strong attention & follow up regarding performer capacity building in order to minimize high incidence of non-performing loan (Hiwot, 2019). Therefore, it is a significant issue to know and understand the effect of Credit risk management and its influence on financial performance of commercial banks of Ethiopia.

Different researchers has addressed the topic and reached on different conclusion. For instance Tadesse (2014), Girma (2011); Agegnehu (2013); Mekasha (2011); Behailu (2015), and Tibebu (2011) addressed the effect of credit risk management on profitability of banks by selecting private commercial banks as the sample. Hence, the aforementioned studies failed to disclose the literature gap by incorporating those government commercial banks in their samples. Also, they didn't considered capital adequacy and loan to asset ratio as explanatory variable. Therefore, this study incorporated both government and private commercial banks and tried to disclose the variable incorporation gap and incorporated capital adequacy and loan to asset ratio as an additional independent variables. So, the journey of this paper, the researcher aimed to identify the effect of credit risk management indicators such as capital adequacy ratio non-performing loan ratio, loan to deposit ratio, loan to total asset, loan loss provision, and cost per loan on profitability of selected commercial banks from 2012 up to 2022 G.C.

The rest of the paper was organized as follow: section 2 reviews related literature. Section 3 describes the

methodology. Data analysis and discussion is included in section 4. Section 5 provides concludes the paper. Section provides direction for future research.

2. Related literature
2.1. Meaning of credit Risk
According to Raghavan (2003); Koulafetis (2017) and Dvorský et al. (2018) credit risk is the risk of a loss resulting from the debtor's failure to meet its obligations to the bank in full when due under the terms agreed). Credit risk is the potential that a bank borrower or counterparty will fail to meet its obligations in accordance with agreed terms. Generally the credit risk is associated with traditional lending activities of banks and it is simply described as risk a loan not being repaid in part or in full. Credit or default risk is the risk that the promised cash flows from loans and securities held by financial institutions may not be paid in full. Should a borrower default, both the principal loaned and the interest payments expected are at risk (Saunders and Cornett, 2007). A credit risk is risk of default on a debt that may arise from a borrower failing to make required payments. In the first resort, the risk is that of the lender and includes lost principal and interest, disruption to cash flows, and increased collection costs.

2.2. Credit risk management
Credit risk management is the practice of mitigating losses by understanding the adequacy of a bank's capital and loan loss reserves at any given time a process that has long been a challenge for financial institutions. Experiences elsewhere in the world suggest that the key risk in a bank has been credit risk. Credit risk management means the process of risk identification, measurement, monitoring and control (NBE, 2010). Banks need to manage credit risk inherent in the entire portfolio as well as the risk in individual credits or transactions. Additionally, banks should be aware that credit risk does not exist in isolation from other risks, but is closely intertwined with those risks (NBE guideline issued in 2003). Effective credit risk management is the process of managing and institution's activities which create credit risk exposures, in a manner that significantly reduces the likelihood that such activities will impact negatively on a bank's earnings and capital. Credit risk is not confined to a bank's loan portfolio, but can also exist in its other assets and activities. Likewise, such risk can exist in both a bank's on-balance sheet and its off-balance sheet accounts (NBE guideline issued in 2003).

2.3. Principles of credit Management
According to *Yhip & Alagheband (2020)* and *Zaidi & Sarwar (2013)* assert that banks have traditionally focused on the principles of five Cs to estimate borrowers' creditworthiness. These five C's are:
i. Character. This refers to the borrower's personal characteristics such as honesty, willingness and commitment to pay debt. Borrowers who demonstrate high level of integrity and commitment to repay their debts are considered favorable for credit.
ii. Capacity. This also refers to borrowers' ability to contain and service debt judging from the success or otherwise of the venture into which the credit facility is employed. Borrowers who exhibit successful business performance over a reasonable past period are also considered favorable for credit facility.
iii. *Capital.* This refers to the financial condition of the borrower. Where the borrower has a reasonable amount of financial assets in excess of his financial liabilities, such a borrower is considered favorable for credit facility.
iv. *Collateral.* These are assets, normally movable or unmovable property, pledged against the performance of an obligation. Examples of collateral are buildings, inventory and account receivables. Borrowers with a lot more assets to pledge as collateral are considered favorable for credit facility.
v. **Condition.** This refers to the economic situation or condition prevailing at the time of the loan application. In periods of recession borrowers find it quite difficult to obtain credit facility.

2.4. Meaning and Measure of Profitability
Profitability is a business's ability to produce a return on an assets invested. So, return on asset is a financial ratio that shows the percentage of profit that a company earns in relation to its overall resources. It is known as a profitability or productivity ratio, because it provides information about how managements are efficient at using its assets to generate earnings and to measure their progress against predetermined internal goals, a certain competitor, or the overall industry (Zergaw, 2015). It shows the profits earned per birr of assets and indicates how effectively the bank's assets are managed to generate revenues. It measures how well the institution uses all its assets. It is also an overall measure of profitability which reflects both the profit margin and the efficiency of the institutions. Studies such as Popa et al. (2009); Kargi (2011); Girma (2011); Tibebu (2011); Agegnehu (2013); Ahmadyan (2018) and Hiwot (2019) were employed return on assets (ROA) as measurement of profitability. In this study, return on asset (ROA) was applied as the dependent variable.

Empirical Review of Related Studies

Credit risk is among the very important risks considered in banking industry. So the empirical findings in relation to the relationship between credit risk indicators such as capital adequacy ratio, non-performing loan ratio, loan to deposit ratio, loan to total asset, loan loss provision, and cost per loan and profitability were reviewed by researcher as follow:

a) Capital Adequacy and Profitability

Capital adequacy ratio is a measure of a bank's financial strength expressed by the ratio of its capital (net worth and subordinated debt) to its risk-weighted credit exposure in the form of loans (Economic Times Bureau, 2010). Flamini et al. (2009) forwarded that capital is an important variable in determining bank profitability and a well-capitalized bank could provide a signal to the market that a better-than-average performance should be expected. Well-capitalized banks are less risky and generate lower profits as they are perceived to be safer. According to Iloska (2014) in addition, well-capitalized banks face a lower cost of going bankrupt which reduces their cost of funding and are considered relatively safer and tend to have a better margin of profitability. The empirical studies by Unuafe (2013); Tenriola (2019); Ozili, P. (2017; Miranda, M. (2018); Sangmi and Nazir,2010); Datta & Mahmud (2018); Naceur (2003); and Damena, (2011), and Amdemikael,(2012); Ajayi et al.(2019); and Nguyen (2020) were found out that there is positive relationship between capital adequacy and financial performance. The positive and significant relationship between capital adequacy and bank's profitability suggests that banks with more equity capital are perceived to have more safety and such advantage can be translated into higher profitability. The higher the capital ratio, the more profitable a bank will be. For this study, the following hypothesis is formulated:

H1: Capital adequacy has positive and statistically significant impact on profitability

b) Non-Performing Loans Ratio (NPL) and Profitability

Non-performing loan ratio is a ratio that measures the proportion of non-performing loans as against the total loans for a period. It gives an assessment of the total borrowers default on the conditions of loans and advances for a given period. Non- performing loans are also commonly described as loans in arrears for at least ninety days and it can be treated as undesirable outputs or costs to loaning banks which decreases the bank's performance (Guy, 2011). It is indicated by the amount of NPLs to Total Loan and advances. According to Miranda, M. (2018); Sheeba, J. (2017); Tesfaye (2018) and Bhattarai (2020), there is significant negative association between non-performing loan and financial performance of the banks. Therefore, it can be hypothesized that:

H_2: Non-performing loan has negative and statistically significant impact on profitability

c) Loans to deposit Ratio and Profitability

Loan to deposit ratio is the bank capability valuations in repaying the funds redemption that is done by the depositors by depending on the credits that is allocated as liquidity sources. It is the most important ratio to measure the liquidity condition of the bank in terms of deposit. The banks of Ethiopian banking industry; this implies that when loans and advances increase, financial performance of banks will increases. Here, loan means the advances for the conventional banks. Empirical studies include Aprianti (2018); Miranda, M. (2018); Roslan & Rauf (2019); Aminul (2014); Sari & Septiano (2020); Sukmadewi (2020); Sianturi & Rahadian (2020); Lee & Liu (2017); Sulistiyaningrum & Lisiantara (2018) were foud out that loan to deposit ratio have positive effect on banks profitability. Hence, it can be hypothesized as:

H3: Total loans to deposit ratio positive and statistically significant effect on profitability

d) Loan to Total Asset and Profitability

According to Altunbas (2005), loan to total asset measures the percentage of assets that is tied up in loans and the exposure level of the Bank to credit risk. He has investigated banks with higher loan to total asset ratio have high exposure to credit risk and affects the financial performance negatively. The ratio of loans to total asset which mainly measures bank's exposure to credit risk through converting the deposit liabilities they collected from customers to pertinent borrowers. Bank loans are expected to be the main source of income and are expected to have a positive impact on bank performance. Other things constant, the more deposits are transformed into loans, the higher the interest margin and profits. However, if a bank needs to increase risk to have a higher loan-to-asset ratio, then profits may decrease Tadesse (2014); Doyran (2012); Miranda, M. (2018); Therefore, the researcher can developed the tentative statement as:

H4: Loan to total assets has statistically significant and negative effect on profitability.

e) Loan provision to Total loans and Profitability

The bank is regulated to back up the bad debts by providing adequate provisions for loan losses. The ratios of provision for loan loss to total loans take in to account to measure the quality of loan portfolio. Loan loss provision is an expense set aside as an allowance for uncollected loans and loan payments. This provision is used to cover a number of factors associated with potential loan losses including bad loans, customer defaults and renegotiated terms of a loan that incur lower than previously estimated payments. The loan loss provision is a balance sheet account that represents a bank's best estimate of future loan losses. If the LPTL is become

high, the provision for loan losses should be probably high. According to Altunbas (2005); Miranda, M. (2018); Lucky *& Nwosi (2015);* found that there is positive relationship between LRTL and profitability. Such situation is happen in cases of countries having a well- managed credit risk as revealed in the lowest share of nonperforming loans from their loan books. It has positive relationship with financial performance when the development banks have estimated the future loan losses carefully.

H5: *Loan loss provision has statistically significant and positive effect on profitability.*

f) Cost per Loan Assets and Profitability

Cost per loan asset is the average cost per loan advanced to customer in monetary term. Purpose of this is to indicate efficiency in distributing loans to customers. Different researchers have tried to shows the relationship between cost per loan assets and financial performances of commercial banks. To this end, Paudel (2012); Nwanyanwu (2014); Rex (2016); Sheeba, J. (2017); Akula (2020); Kurawa & Garba (2014); Bhattarai (2017); has found negative and statistically significant association between cost per loan assets (CLA) and bank profitability (ROA), this is in line with researcher expectation. have found significant positive association between cost per loan advanced and profitability. That means, there is negative relationship between cost per loan asset and financial performance of development bank.

H6: *Costs per loan asset has negative and statistically significant effect on* profitability

Conceptual framework of the study

Conceptually, the study delaminated to identify the effect of seven explanatory variables such as capital Adequacy, non-performing loan, Loan to deposit ratio, loan to total asset, Loan loss provision and Cost per loan on one dependent variable which is financial performance of development of Bank of Ethiopia by adopting random effect model. This has shown as follow:

Figure 1: Conceptual Frameworks
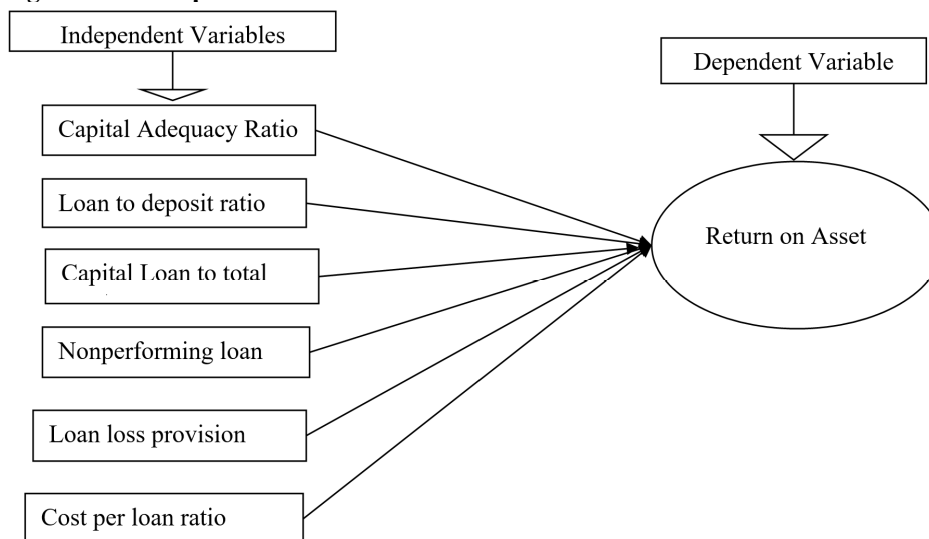
Source: Own development based on the literatures reviewed (2023)

Methodology of the Study

Research design and Approach

The researcher has been used quantitative research approach with explanatory study design to the objective of the study since the main objective of this study was to investigate the cause and effect relationships between financial performance and its determinants (credit risk management system).

Data type and Tools of data collection

In this study, the secondary data sources were used to the objective of study. It has collected through review of nine commercial banks' purposively selected with 11 year audited reports. The source of the data was national bank of Ethiopia.

Target Population, Sample Size and Selection Techniques

Target population refers to the population to which the study findings are generalized. The study was conducted on nine (9) oldest Ethiopian Banks such as commercial Bank of Ethiopia (CBE), Dashen Bank (DB), Awash International Bank (AIB), Abyssinia Bank (AB), Co-operative Bank of Oromia (CO-OP), Wegagen Bank (WB), United Bank (UB), Nib International Bank (NIB), and Lion International Bank (LIB). The characteristics of the

members of the target population are similar except being state owned and private owned. The population of the study is eleven (11) consecutive years' financial statements and nine oldest purposively selected banks (9*11) = 99 number of the observation; out of eighteen (18) targeted population of currently operating Ethiopian commercial banks. The sampling size of the study was nine oldest banks purposively selected banks and its 11 years audited financial statements. The reason why purposively selecting the size of the sample is due to obtain a 11years audited financial statement of the banks because all banks do not have a 11 years audited financial statements; particularly those which have not founded before ten years.

Table 1: Measurement of Dependent and Independent Variables.

Category	Variables	Measurement	Expected Sign
Dependent variable	Return on Asset (ROA)	ROA = Net Income/Total Asset	
Independent Variables	Capital Adequacy Ratio (CAR)	CAR = Equity /Total Asset	+
	Non-performing loan (NPL)	NPL Ratio = Non-Performing Loans ÷Total loan amounts	_
	Loan to total Deposit Ratio (LDR)	LDR = Total Loans and advances ÷ Total Deposits	+
	Loan to total Asset Ratio (LTA)	LTA Ratio = Total loans ÷Total Assets	_
	Loan Provision Ratio (LPR)	LPR = Loan loss provision ÷ Total loans	+
	Cost per loan (CLA)	CLA Ratio= Total Operating Cost ÷Total amount of loans	_

Source: Own work based on literature review (2023).

Data Analysis Tools

To meet the objective of the study, the research was primarily based on panel data, which was collected through structured document review. The advantage of using panel data is that it controls for individual heterogeneity, less collinearity among variables and tracks trends in the data something which simple time-series and cross-sectional data cannot provide (Brooks,2008). The collected panel date was analyzed using descriptive statistics, correlations, multiple linear regression analysis so as investigate the relation between dependent and independent variables. And also, the multiple linear regressions model was run and ordinary least square/OLS regression approach including all of its assumptions was tested. The panel data which were collected from nine branches of development bank of Ethiopia was analyzed by using E- views 9 software package.

Regression Model *Specifications*

Since the dependent variable of the study was financial performance measured through ROA, the multiple regression models was employed to due to quantitative nature of data (return on asset). This study used ROA as dependent variables whereas capital adequacy, non-performing loan, loan to deposit ratio ,loan to total asset ratio, loan loss provision, and cost per loan are used as explanatory variables. Therefore, the models which incorporate all of the variables to test the hypotheses of the study are specified as follows:

$ROA_{it}= \beta_0 + \beta_1*CAR_{it}+\beta_2*NPL_{it}+ \beta_3*LDR_{it}\ \beta_4*LTA_{it}+\beta_5*LPR_{it}+ \beta_6*CLA_{it} +\varepsilon_{it}$……… (1)

The sign in the model reveal the expected relationship between the dependent variable and explanatory variables. Where:

ROA = Return on Asset

β_0 = the constant term

$\beta_1 – \beta_7$ are coefficients

CA = Capital Adequacy of ith DBEs at time t

NPL= Non performing loan of ith DBEs at time t

LDR= Loan to total Deposit ratio of ith DBEs at time t

LTA= Loan to total asset ratio of ith DBEs at time t

TPLT= Loan loss provision of ith DBEs at time t

CLA = Cost per loan of ith DBEs at time t

ε_{it} = the error term

Results of the study
Descriptive Statistics

This section presents the descriptive statistics of dependent and independent variables used in the study for the sampled DBE branches. The dependent variables used in this study were ROA while the independent variables were capital adequacy, non-performing loan, loan to deposit ratio, loan to total asset, loan loss provision, gearing

ratio, and cost per loan. Table 4.1 demonstrates the mean, maximum and minimum values and standard deviation of the dependent and independent variables over the study period.

Table 2 Summary of descriptive statistics

Variables	Financial performance (ROA)	Capital adequacy (CAR)	Non-performing loan (NPL)	Loan to deposit ratio (LDR)	Loan to total asset ratio (LTA)	Loan provision (LPTL)	Cost per loan (CLA)
Mean	0.035658	3.780646	4.737588	4.481661	3.592815	7.698209	0.006141
Maximum	0.095300	7.385400	8.293300	7.384900	11.87560	9.854500	0.057200
Minimum	0.005300	0.245500	1.180500	1.055600	1.104600	5.118900	0.001200
Std. Dev.	0.027387		2.147120	2.420117	2.642594	1.530665	0.009079
Observations	99	99	99	99	99	99	99

Source: Computed from E-views 9 results (2023)

According to table 3 above, the profitability of commercial banks as measured by ROA (net income to total asset) for 99 observations (panel data of 9 banks for 11years) has a mean value of 3.5 percent. The result indicates that, the sampled branches on average earned a profit of 0.035658 cents from one birr invested in the asset. The maximum value of the ROA was 9.53 percent and the minimum value of 0.5 percent with the standard deviation of 0.0276. This shows that profitable branches earned 0.0953 cents of profit for a single birr invested their assets. On the other hand, the least profitable branches earned 0.0053 cents of profit for each birr invested in their assets during the study period. The standard deviation of 0.2560 shows the profitability variations of banks. In relation to explanatory variables deployed in table 4.1 above, capital adequacy has also has the mean value of 378.0646 percent. The mean value result suggested that 3.780646 cent of one birr asset was financed by shareholders equity while the remaining 96.2194 cents was financed through debt. The maximum value of capital adequacy was 73.85400 percent and the minimum value of 24.5500 percent with a standard deviation of 2.002547. This shows that sampled branches financed their one birr asset using shareholders' equity range from 0.245500 cents to 7.385400 cents. On the other hand the mean value of non-performing loan was 4.73 which indicate that, the average ratio of NPL over total loan is more than 1 percent. The maximum of this ratio is 8.29 percent and minimum value is 1.18 percent. The maximum value of 8.29 indicates the presence of high credit risk in some of the banks. The standard deviation for NPLR of shows the deviation of 2.14 from the average mean value among banks credit risk exposure. This implies that the presence of non-performing loan of banks is ranges from 1.18 percent to 8.29 percent.

With regard to Loan to deposit ratio, the minimum of loan to deposit ratio (LDR) is 105.56 and 738.40 of maximum with the mean value of 448.16 percent. And has relatively large deviation from the mean value by 242.01 percent among the independent variables. High LDR indicates that a bank has taken more credit risk by making excessive loans and also shows risk that to meet depositors' claims bank may have to sell some loans at loss. Therefore, the figure 7.38 shows the maximum needs of increase profit and engaged on giving loans to the customers according to the deposit collected. The mean value is varying from minimum and maximum value by 2.4201. Regards loan to total asset, the mean value of Loan to total asset (LTA) is 359.28 percent with the minimum and maximum of 1187.56 percent and 1104.60 respectively and has 264.25 deviations from mean value which implies there are significant differences among values of loan to total asset (LTA). Concerning the loan loss provision, the mean value of Loan loss provision to total loan (LPTL) is 769.82 with the minimum of 511.89 percent and maximum of 985.45 percent. The standard deviation of statistics for LPL has shown that 153.06 percent deviation from its mean value. The maximum of 985.45 reserved or estimated per loan for future loan loss that would happen from bad loans, customer defaults and renegotiated terms of a loan that incur lower than previously estimated payments to protect the financial performance of commercial banks. Finally, the mean value of cost per loan is 0.6 percent indicates the cost incurred by the bank in providing one unit of loan is maximum 0.006 cents. The minimum and maximum of 0.12 percent and 5.72 respectively. The standard deviation of statistics for CLA shows that the maximum and minimum value 0.90 percent from its mean.

Correlation Analysis among Variables

According to (Brooks, 2008), Correlation between two variables measures the degree of linear association between them. To find the association of the independent variables with the dependent variable Pearson product moment of correlation coefficient was used. Values of the correlation coefficient between two variables are always ranged from positive one to negative one. A correlation coefficient of positive one indicates that a perfect positive association between the two variables; while a correlation coefficient of negative one indicates that a perfect negative association between the two variables. A correlation coefficient of zero, on the other hand, indicates that there is no linear relationship between the two variables. The following tables shows the result of correlation analysis to determine the relationship between dependent variable (ROA) and explanatory variables

(i.e., capital adequacy, non-performing loan, loan to deposit ratio, loan to total asset, loan loss provision, and cost per loan).

Table 3 Correlation matrix of ROA and Explanatory Variables

Variables	ROA	CAR	NPL	LDR	LTA	LPR	CPL
ROA	1	0.44907	0.2120	0.6353	-0.5508	-0.4168	0.0012
CAR	0.4490	1	0.4913	0.49343	-0.4237	-0.4226	0.0626
NPL	0.2120	0.4913	1	0.6722	-0.4470	-0.63895	0.0265
LDR	0.6353	0.49349	0.67227	1	-0.7239	-0.8746	0.2042
LTA	-0.5508	-0.4237	-0.4470	-0.7239	1	0.7059	-0.1645
LPR	-0.4168	-0.4226	-0.6389	-0.8746	0.7059	1	-0.2305
CPL	0.0012	0.0626	0.0265	0.2042	-0.1645	-0.2305	1

Source: computed from E-views 9 result (2023)

As shown in the table 4.3 above capital adequacy, none performing, loan to deposit ratio, cost per loan were positively correlated with ROA with a correlation coefficient of 0.4490, 0.2120, 0.6353 and 0.0012 respectively. This correlation shows that capital adequacy (CAR), none performing loan (NPL), loan to deposit ratio (LDR), and cost per loan (CPL) were increases return on asset and also moves to the same direction. Other variables loan to total asset (LTA) and loans provision (LPR) with coefficient (-0.5508) and -0.4168) were negatively correlated with ROA. This implies that, as the as variables increases, return on asset moves to opposite direction.

Regression Result

Ordinary Least Squares (OLS) is the most common estimation method for linear models and that's true for a good reason. As long as the research model satisfies the OLS assumptions for linear regression, we can rest easy knowing that we're getting the best possible estimates. When running a multiple regression, there common assumptions that you need to check research data meet and the analysis to be reliable and valid. In this study, the most common assumptions such as multicollinearity, normality, autocorrelation, and heteroscedasticity have been tested before running final regression result and fully satisfied.

Table 4: Random Effect Model Regression Result: Dependent Variable (ROA)

Dependent Variable: ROA				
Method: Panel EGLS (Cross-section random effects)				
Date: 05/26/23 Time: 07:33				
Sample: 2013 - 2022				
Periods included: 11				
Cross-sections included: 9				
Total panel (balanced) observations: 99				
Swamy and Arora estimator of component variances				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
Capital Adequacy	0.003323	0.001047	3.173332	0.0021***
Non-performing loan	-0.005567	0.001177	-4.729814	0.0000***
Loan to deposit ratio	0.013055	0.001675	7.795106	0.0000***
Loan to total asset	-0.002251	0.001004	-2.242253	0.0274**
Loan loss provision	0.009693	0.002514	3.855129	0.0002***
Cost per loan	-0.506349	0.211556	-2.393447	0.0187**
Constant	-0.085518	0.032251	-2.651620	0.0094***
	Effects Specification			
			S.D.	Rho
Cross-section random			0.000000	0.0000
Idiosyncratic random			0.017188	1.0000
	Weighted Statistics			
R-squared	0.640641	Mean dependent variable		0.035658
Adjusted R-squared	0.612998	S.D. dependent variable		0.027387
S.E. of regression	0.017037	Sum squared reside		0.026415
F-statistic	23.17555	Durbin-Watson stat		1.515565
Prob(F-statistic)	0.000000			

Source: computed from E-views 9 result (2023)

The estimation result of the operational panel regression model used in this study was presented in table 5 above. R-squared was measured the goodness of fit of the explanatory variables in explaining the variations in profitability measured by ROA. As shown in the table above, R-squared statistics of the model were 64.06

percent. The result indicates that 64.06 percent variation in the dependent variable was explained by the explanatory variables in the model. That means the explanatory variables (capital adequacy, non-performing loan, loan to deposit ratio, loan to total asset, loan loss provision, and cost per loan are jointly explain about 64.06 percent of the variation in the return on asset. The remaining 35.94 percent of the variation in the profitability (as measured by return on asset) explained by other variables which are not included in the model. For panel data R^2 greater than 20 percent is still large enough for reliable conclusion. Since the R^2 of the model was more than 20 percent, these variables jointly have more explanatory power of the variation in the profitability of commercial banks in the study period. From table 5 above, the researcher found the following estimated regression equation;

$$ROA = -0.085518 + 0.003323*CA_{it} - 0.005567*NPL_{it} + 0.013055*LDR_{it} -$$
$$0.002251*CTA_{it} + 0.009693*LMLP_{it} + 0.020344*GR_{it} - 0.506349*CLA_{it} + \varepsilon_{it} \ldots\ldots\ldots (2)$$

Beside this, F- statistics (23.17555) which is used to test the overall significance of the model was presented, and null hypothesis can be clearly rejected at 1 percent level of significant, since the p-value was (0.0000) which was sufficiently low, indicates the reliability and validity of the model at 1 percent level of significance. The coefficients of capital adequacy, loan to deposit ratio, Loan loss provision, and gearing ratio 0.003323, 0.013055, and 0.009693 respectively shows that one unit changes in capital adequacy, loan to deposit ratio, and loan loss provision will have 0.003323, 0.013055, and 0.009693 change on financial performance of DBE with the same direction respectively. On the other hand, non-performing loan, loan to total asset and cost per loan -0.005567, -0.002251 and -0.506349 respectively affects profitability negatively which means the one unit of non-performing loan, loan to total asset and cost per loan have a 0.005567, -0.002251 and -0.506349 unit change on commercial banks financial performance to the opposite direction. Based on the results shown in table 5 above, all explanatory variables had statistically significant impact on profitability measured by return on asset. Among the significant variables loan to total asset and cost per loan was statistically significant at 5 percent significance level since the p-value of the variables were (0.0274) and (0.0187). Whereas variables like capital adequacy, non-performing loan, loan to deposit ratio, and loan loss provision were statistically significant at 1 percent significance level with p-value of (0.0021), (0.0000), (0.000) and (0.0002) respectively. Finally, gearing ratio is not statistically significant even at 10 percent significance level with p-value of (0.4373).

Hypotheses testing (Discussion of Results)
The main objective of this study is to analyze the effect of credit risk on financial performance of development bank of Ethiopia. Based on previous studies and the finding of this study, this section discussed the general result obtained via Random Effect Regression Model as shown in the above table 5. Referring the literature, the result of each explanatory variable including their impact on the level of ROA was discussed. To test these hypotheses, the study employed random- effect generalized least squares (GLS). By considering the research hypotheses in chapter three, the researcher discussed the findings of this study as follow:

Concerning capital adequacy, the regression results as shown in the table 5 confirmed that the variable has positive and statistically significant effect on ROA with regression coefficient of (β=0.003323) and the p-value is 0.0021 at 1% significance level. So, the researcher accepted H1. This finding is consistent with findings of studies by Tenriola (2019); Ozili (2017; Miranda (2018); Sangmi and Nazir (2010); Datta & Mahmud (2018); Naceur (2003); Ajayi et al.(2019); and Nguyen (2020) were found out that there is positive relationship between capital adequacy and profitability. This indicates that well capitalized financial institutions face lower costs of going to bankrupt, which reduces their cost of funding or that they have lower needs for external funding which results in higher profitability.

The regression result of this study showed that non-performing loan has negative and statistically significant effect on ROA of banks with (β=-0.005567) and significant at 1% level of significance because the p-value of 0.0000<0.01. Therefore, the researcher accepted H2.

This finding is similar with findings of studies by Million et al. (2015); Miranda, M. (2018); Sheeba, J. (2017); Tesfaye (2018) and Bhattarai (2020); Tadesse (2014),) and Mekasha (2011) who investigated that there is significant negative association between non-performing loan and financial performance of the banks, which is supported the researcher expectation and in line with the studies.

Also the regression result bout loan to deposit has positive and statistically significant effects on profitability of the commercial banks with regression coefficient (β =0.013055) at 1% significance level since p-value of (0.000) <0.01. So the researcher accepted H3. This finding is consistent with findings of Aminul (2014); Aprianti (2018); Miranda, M. (2018); Roslan & Rauf (2019); Aminul (2014); Sari & Septiano (2020); Sukmadewi (2020); Sianturi & Rahadian (2020); Lee & Liu (2017); Sulistiyaningrum & Lisiantara (2018) who found out that loan to deposit ratio has positive effect on banks profitability. This implies that one unit increase in loan to deposit ratio increases the profitability of the banks.

When it comes loan to total asset, the regression result of this study showed that it hasnegative and statistically significant effect on ROA of DBE with (β= -0.002251) and significant at 5% level of significance

because the p-value of 0.0274<0.05. Therefore, the researcher accepted H4. This finding is consistent with regression result of Altunbas (2005) and Tadesse (2014); Doyran (2012); and Miranda, M. (2018) supports the researcher expectation (H4) which is there is negative relationship between credit risk indicator loan to total asset and profitability of bank (ROA). This implies that one unit increase in loan to deposit ratio decreases the profitability of the banks.

Additionally this study confirmed that loan loss provision to total loan with regression coefficient of (β= 0.009693) has positive and statistically significant effect on financial performance of banks at 1% level of significance because p-value of 0.0002<0.01. Hence, the researcher accepted H5. This finding is supported by Altunbas (2005); Million et al. (2015); Miranda, M. (2018); Li and Zou (2017) and Lucky & Nwosi (2015) who found loan loss provision has positive effect on financial performance of banks by protecting the banks of Ethiopia before become insolvency due to credit risk. The researcher founds that, it has a positive relationship with financial performance when the banks have estimated the future loan losses carefully.

Finally, the regression result concerning cost per loan assets ratio with regression coefficient of (β= -0.506349) showed that cost per loan assets ratio has negative effect on financial performance of DBE. So the researcher accepted H6.The researcher findings supported by Paudel (2012); Tadesse (2014), Nwanyanwu (2014); Rex (2016); Sheeba, J. (2017); Akula (2020); Kurawa & Garba (2014); Bhattarai (2017) who were found negative and statistically significant association between cost per loan assets and bank profitability (ROA)and the hypotheses is supported.

Table 6 Summary of expected and actual impact of explanatory variables on the dependent variable

Relation with ROA	Expected	Actual impact	Decision
Capital Adequacy	H1: Positive & significant	Positive & significant	Accepted
Non-performing loan	H2: Negative & significant	Negative & significant	Accepted
Loan to deposit ratio	H3: Positive & significant	Positive & significant	Accepted
Loan to total asset	H4: Negative& significant	Negative & significant	Accepted
Loan loss provision	H5: Positive & significant	Positive & significant	Accepted
Cost per loan	H6: Negative& significant	Negative& significant	Accepted

Source: Computed from E-views 9 result (2023)

Conclusions

Based on the findings from the descriptive analysis, the researcher can conclude that selected commercial banks were averagely generating positive ROA. Based on the findings from the regression analysis of the model, the researcher concludes that profitability of commercial banks was best explained by the explanatory variables included in the model. The conclusion that can be drawn from the findings in the first hypothesis under the summary of the findings was, it can be conclude that capital adequacy has positive and statistically significant effect on ROA; which means an increase on the value of this variable leads to an increase on profitability of commercial banks in Ethiopia Based on the findings related to the second hypothesis, non-performing loan has negative and statistically significant effect on ROA; which shows that a decrease on the value of this variable leads to increase on financial performance of banks measured by ROA. The conclusion that can be drawn from the findings of the third hypothesis it can be conclude that loan to deposit has positive and statistically significant impact on ROA; which means an increase on the value of this variable leads to an increase on earning of banks measured by ROA. Based on the findings related to the fourth hypothesis, it can be conclude that loan to asset ratio has negative and statistically significant effect on ROA. Which mean that decrease on the value of this variable leads to an increase by ROA. Based on the findings related to the fifth hypothesis, it can be concluded that loan provision has positive and statistically significant impact on ROA. Which mean that increase on the value of this variable leads to an increase by ROA. Finally, based on the findings related to sixth hypotheses, it can be concluded that cost per loan has negative and statistically significant effect on ROA; which indicates that decrease on the value of this variable leads to an increase on financial performance of selected commercial banks measured by ROA.

Research limitations and prospects

This study was not an end to itself. There are many issues that arise from the findings and may require further research in order to address them. For instance a study can be carried out to establish the other factors that can explain 35.94 percent variation in the ROA regression model. And this study identifies only limited organization specific variables of credit risk management for only 9 selected commercial banks of Ethiopia based on published financial statements from 2008. Researchers can conduct further study by including more organization specific, industry specific and macroeconomic variables that affect the financial performance of all commercial bank of Ethiopia. And they can be carried out by increasing the sample size by incorporating more study period. This same study may be replicated later in order to find out if the situation remain the same or there will be substantial changes. The future researchers can conduct the comparative study commercial banks and

government banks in to account.

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