Journal of Contemporary Issues in Business and Government Vol. 27, No. 05, 2021
https://cibg.org.au/

P-ISSN: 2204-1990; E-ISSN: 1323-6903
DOI: 10.47750/cibg.2021.27.05.091

The Effect of Risk Management on Financial Performance: the case of Commercial Banks of Ethiopia

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Abstract

Risk management has become an important topic for financial institutions, especially since the business sector of financial services is related to conditions of uncertainty. The turmoil of the financial industry emphasizes the importance of effective risk management procedures. The aim of this paper was therefore to identify the impact of risk management and its impact on bankperformance on the Ethiopian banks performance. Balanced fixed effect panelregression was used for the data of seven commercial banks in the sample covered theperiod from 2004 to 2015. Four risk management variables that affect banksperformance were selected and analysed. The results of panel data regressionanalysis showed that operational risk indicator (CIR) had negativeand statistically significant impact on banks performance. Capital adequacy ratiohad positive and statistically significant impact on banks performance. In addition this, the study analysed by descriptive statistical tools and on hypothesis testing using regression model. This leads the researcher to conclude in the last section that banks with good risk management policies have a lower risk and relatively higher return on asset. Finally, liquidity ratio and cost to income ratio are significant key drivers of performance of commercials banks in Ethiopia. Indeed focusing and reengineering the institutions alongside these indicators could enhance the profitability as well as the performance of commercial banks in Ethiopia.

Key Words: Bank Performance, Risk Management, Liquidity Risk, Operational Risk

Introduction:

There is no doubt all banks currently have been in a highly volatileenvironment and are facing risks such as credit risks, liquidity risks, foreignexchange risks, market risk and operating risk and also daily operations that are performed in banks are risky by nature,among other these risksmay encourage a bank to stay and reap success in the market. For these reasons,banks

P-ISSN: 2204-1990; E-ISSN: 1323-6903
DOI: 10.47750/cibg.2021.27.05.091

should implement efficient risk management. It is more important in the financial sectorthan in the other parts of the economy.

Financial risk management in banking sector isintended to help an organization meet its objectives such as the minimization offoreign exchange losses, reduction in the volatilities of cash flow, protection ofearnings against fluctuationsand to promote the survivalof the firm through growth and profitability. The objective of risk management is toreduce the effects of different kinds of risks related to a pre selected domain to thelevel accepted by society.

Financial performance of banks refers to the capacity in generating sustainable profitability. Traditional method of applying financial ratios to evaluate banks state of performance has been long practiced.Financial performance is the process of measuring the results of an organization policies and operations in terms of monetary value. These results are reflected in the firm's profitability, liquidity or leverage. Evaluating the financial performance of a business allows decision-makers to judge the results of business strategies and activities in objective monetary terms. Normally the ratios are used to determine the financial performance of an organization. A well designed and implemented financial management is expected to contribute positively to the creation of a firm’s value (Padachi, 2006).

Statement of the problem:Most Studies on the relationship between risk management practice andfinancialperformance of banks mostly have been conceptual innature, often drawing the theoretical link between good risk management practices and improved bank performance.There are limited studies providing empirical evidence to the relationship between riskmanagement practices and bank financial performance. Even if the issue of riskmanagement is equally important for all country, it is less focused and only few studies are conducted to see the effect of particular risk i.e. credit and liquidity risk on bank’sperformance. Hence, this study aims to fill the gap in the literature by focusing on the risk managementpractices of the commercial banks of Ethiopia and linking the practices with the financialperformance of the commercial banks.

Objective of the Study: The main objective of the study is to examine the effect of risk management on thebank’s performance in the Ethiopian commercial banking sector.The study specifically seeks to achieve,To understand the effects of risk faced in Ethiopian commercial banks, to determine the relationship between theoretical and empirical riskmanagement practiceof liquidity, efficiency, capital adequacy, operational risks as well as the size of banks in the banking sector of commercial banks in Ethiopia.

Research Hypothesis: The followinghypotheses of the study stands on the theory are related to a bank’srisk management practice and its impact on bank’s performance.

HP1: There is a significant positive relationship between the size of capital of a bank and thebank’s financialperformance.

HP2: There is a significant negative relationship between the efficiency of a bank and the bank’s financial performance.

P-ISSN: 2204-1990; E-ISSN: 1323-6903
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HP3: There is a significant negative relationship between the liquidity risk of a bank and the bank's performance.
HP4: There is a significant negative relationship between the operational risk of a bank and the bank's performance.

1. Literature review

Risk is a technical matter of unpredictability inexpected outcomes, both negative and positive. Risk is closely associated with the spirit of enterprise and value creation (Santosh 2001). Firms are exposedto different sources of risk, which can be divided into operational risks and financialrisks.As opposed to operational risks, which influence a specificfirm or industry, financial risks are market-wide risks that can affect the financialperformance of companies in the whole economy. Both kinds of risk exposure canhave substantial impact on the value of a firm.
Risk management as asystematic process for the identification, evaluation of pure loss exposure faced by anorganization or an individual, and for the selection and implementation of the mostappropriate techniques for treating such exposures. The process involves:identification, measurement, and management of the risks Stickles (1984). Risk management also involves a set of tools andmodels for measuring and controlling risk(Bessis 2010).
Under the risk management evaluation process, plenty of researchers were used different type of theoretical and non theoretical techniques. The theoretical foundations of efficiency study were laid by Debrue (2001) and were extended in particular, by Fare (1994). The theoretical literature on productive efficiency measurement is broadlydivided into the non parametric mathematical programming technique and the parametric(which is subdivided into deterministic and stochastic models) based on econometricregression theory and uses a stochastic production cost or profit function to estimate efficiency. The most commonly used non parametric techniques are Data Envelopment Analysis (DEA)and Free Disposable Hull (FDH). While the commonly used parametric efficiency estimationtechniques are the stochastic frontier analysis (SFA), the thick frontiers approach (TFA) andthe distribution free approach (DFA).
The conceptual frame work on efficiency described by different authors, efficiency is a statement abouttheperformance of processes transforming a set of inputs into a set of outputs (H.jalmarsson-1974).The concept means differentthings to different people in different circumstances (ferrel 1957). However the economistbreakdown the economic efficiency of a firm or industry into two separate components: priceefficiency and technical efficiency (Amey 1970). Technical efficiency refers to the use of productiveresources in the most technologically efficient manner (Kosmidou (2006)). Price efficiency reflectsthe ability of a firm to use inputs in optimal proportion given their respective prices (Farrel 1972).According toAdongo (2005)the concepts for measuring price (allocative)efficiency fall into three categories- revenue, cost and profit efficiency.These conceptsaccording to them established an economic foundation for analyzing bank efficiency.
X-efficiency refers to the degree of efficiency maintained by firms under conditions of imperfect competition. Efficiency in this context means a company getting the maximum outputs from its

P-ISSN: 2204-1990; E-ISSN: 1323-6903
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inputs, including employee productivity. The alternative profit efficiency function employs the same dependent variables as thestandard profit function and the same exogenous variables as the cost function.Alternativeprofit X-efficiency is important where some particular conditions exist, Adongo (2005). the alternative profit X-efficiency function is a better measure than thestandard profit X-efficiency function (Pulley (1997).

According to Koulenti (2006),there are many reasons why a particular firm may possesscertain returns to scale properties. The most commonly used example relates to a small firmexhibiting increasing returns in particular tasks. One possible reason for decreasing returns toscale is the case where a firm has become so large that the management is not able to exerciseclose control over all the aspects of the production process.

Themore difficult issue of summing over these risks and adding still other more amorphous ones such as legal, regulatory or reputational risk will be left to the end Santomero (1997).According to Greuning and Bratanovic(2003), a bank faces liquidity risk when it does not have the ability to efficiently accommodate the redemption of deposits and other liabilities and to cover funding increases in the loan and investment portfolio. The Basel Accord (2007) defines operational risk as the risk of direct or indirect loss resulting from inadequate or failed internal processes, people and systems or from external events. Basel Committee addressed operational risk in its CorePrinciples for Effective Banking Supervision (1997) by requiring supervisors toensure that banks have risk management policies and processes to identify, assess,monitor, and control or mitigate operational risk.

2. Methodology

The survey would be carried out by means of structured documents review. The survey would be panel which comprises of both time series and cross-sectional elements.The main sources of data for the study wouldbe found from the audited balance sheet ofseven purposively selected banks. From those banks, twelve consecutive years of balancesheet report would be used for the study. The population of the study is all commercial banks of Ethiopia operating across the country that means it includes both public and private banks. Currently, there are eighteen commercial banks operating in Ethiopia including Construction and Business Bank that has recently been acquired by commercial bank of Ethiopia.The researcher would select**seven** major commercial banks in Ethiopia and collected thenecessary data from national bank of Ethiopia, too, for the sake ofcomparison.Those data that were collected have been gathered from **2004 to 2015**to use balanced method, and used for regression purpose. Therefore, there would be**84 (12 years x 7 banks)** observations in the regression analysis.

Researcher analyzed data by using descriptiveresearch design, and multiple regressions, correlation matrix analysis. Mean values and standard deviations wouldalso be used to analyze the general trends of the data. The multiple regression models would also be run, and thus OLS has been conducted to test the casual relationshipbetween the risk management and its impact on the banks performance. There is likely to be little difference in the values of the parameters estimatedbyfixed effect model and random effect model.

P-ISSN: 2204-1990; E-ISSN: 1323-6903
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In this study, researcher attempted ROA (return on asset) as Dependent variable and preferred four independent variables and one controlvariable namely CAR(Capital Adequacy ratio), LQIQ(Liquidity ratio), EFR(Efficiency ratio) and CIR (cost to income ratio) as well as FIRM SIZE as a control variable would be usedbecause these four variables are the major indicators of risk management which affect the performance (profitability) of commercial banks in Ethiopia Amdemikael (2012).

ROAwouldbe used as the indicatorof the banks'financial performance. Thus, the multivariate regression model that would be employed was presented hereunder.

$Y=a+B1X1+B2X2+B3X3+B4X4 + B5X5 \ldots\ldots BNXN + u$

Where:

Y = the value of the dependent variable

a= the constant term

β= the coefficient of the function

μ=the disturbance term or error term

Applying Terms (Variables) can be summarized as below:

Table 3.1 Term variables

Variable(s)	Variable(s) Description
Y-ROA	Profitability Indicator
X1-LIQR	Liquidity Management indicator
X2-EFR	Efficiency Ratio Indicator
X3-CAR	Capital Adequacy Management Indicator
X4- CIR	Operational Management Indicator
X5-FIRM SIZE	Control Variable (Bank size)

3. Data analysis

4.1 Regression Model: The below data summarizes the descriptive statistics of the variables included in theregression models as presented. The descriptive statistics for the dependent and independent variables arepresented bellow. The dependent variables are return on asset measured by netincome to total asset which is used to measure financial performance of the bank. The remaining are the independent variables such as: capital adequacy ratio, liquidity risk ratio and cost to income ratio as well as firm size of commercial banks of Ethiopia as a control variable.

Table 4.1 Summary of Descriptive Statistics

VARIABLE |	OBS	MEAN	STD. DEV.	MIN	MAX
ROA |	84	.1081393	.0422135	.009	.147
LIQR |	84	.53475	.0977251	.172	.672
EFR |	84	1.146912	.5740542	.098	3.891

P-ISSN: 2204-1990; E-ISSN: 1323-6903
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CAR |	84	.3242381	.0790009	.184	.484
CIR |	84	.8461034	1.131655	.190722	10.5947
FSIZE |	84	22.30664	1.755302	19.02	26.25

Source: Financial Statements of commercial banks and regression analysis from STATA

According to the table above all variables comprised of 84 observations and the banks performance measure used in this study namely; ROA indicates that the Ethiopian banks attained, on average, a good performance over the last twelve years. For the total sample, the mean of ROA was 10.81% with a minimum of 0.9% and a maximum of 14.7%. That means, the most profitable bank among the sampled banks earned 0.147 cents of profit after tax for a single birr invested in the asset of the firm. On the other hand, the least profitable bank of the sampled banks earned 0.009 cents of profit before tax for each birr invested in the asset of the firm. The standard deviation statistics for ROA was 0**.**0422135 which indicates that the profitability variation between the selected banks was very small one. The result implies that these banks need to optimize the use of their asset to increase the return on of the bank.

Regarding the explanatory variables of the model there are some interesting statistics that have to be mentioned. From this fact, the outputs of the descriptive statistics indicate that the ratio of liquid assets to total asset was 53.475%, on average, with a minimum of 17.2 % and a maximum of 67.2%. This means despite the inverse relationship that exists between liquidity and profitability, the liquidity measure indicates that the Ethiopiancommercialbanks have, on average, a higher liquidity position which was somewhat higher than the statutory requirement of 20% for the last Twelve years.(NBE Directive No, SBB/15/96).

Furthermore, another observation is that there was somewhat a higher variation in the cost-to-income ratio indicated by the range between 21.5% and 389%. The mean of the cost-to-income ratio equals 84.61%. The relatively higher range between the minimum (0.1907) and maximum value (10.5947) implies that the most efficient bank has a quite substantial cost advantage compared to the least efficient bank.

Despite the small dispersion in the minimum and maximum observation of ROA, there could be seen relatively high variation in the equity to asset ratio. On average, the equity-to-asset ratio equals 32.42% with a maximum of 48.4%, which was considerably above the statutory requirement of 8% set by NBE based on Basel II recommendation; even its minimum value was 18.4%. The standard deviation statistics for capital strength was 0.07558 which shows the existence of relatively higher variation of equity to asset ratio between the selected banks compared to the variation in Return on Asset. In a similar manner, the efficiency of commercial banks of Ethiopia has been stated as per the above descriptive statistics table. As it is shown the most or the highest efficient bank earns 0.3891cent for each birr invested in the bank whereas the least efficient bank reaps 0.098 revenueonly in its business operation.

P-ISSN: 2204-1990; E-ISSN: 1323-6903
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4.2 Correlation matrix model: in this study correlation matrix for **four** of the independent variables shown below in the table had been estimated. The results in the following correlation matrix show that the highest correlation of 0.494701 which is between liquidity risk ratio and firm size of the commercial banks. Since there is no correlation above 0.7, 0.75 and 0.9 according to Kennedy (2008), Malhotra (2007) and Hair et al (2006), respectively, we can conclude in this study that there is no problem of multicollinearity.

Table 4.2 Correlation matrixes of independent variables:

	LIQR	EFR	CAR	CIR	FSIZE
LIQR	1.0000				
EFR	0.0572	1.0000			
CAR	-0.0605	0.1503	1.0000		
CIR	-0.2268	-0.2008	0.0036	1.0000	
FSIZE	0.4947	0.0906	-0.1095	-0.2081	1.0000

Source: Financial Statements of commercial banks and regression analysis from STATA

As it is shown from the above correlation matrix, there is no an independent variable with a correlation coefficient of greater than 0.5 that means more than 50% in its value. As such there is no such a serious multicollinearity observed amongst the explanatory variables that are the predictors of the dependent variable in the regression model analysis.

Table 4.3 Correlation matrixes between dependent and independent variables

	ROA	LIQR	EFR	CAR	CIR	FSIZE
ROA	1.0000					
LIQR	0.6225	1.0000				
EFR	0.1719	0.0572	1.0000			
CAR	0.2019	-0.0605	0.1503	1.0000		
CIR	-0.3207	-0.2268	-0.2008	0.0036	1.0000	
FSIZE	0.6366	0.4947	0.0906	-0.1095	-0.2081	1.0000

Source: Financial Statements of commercial banks and regression analysis from STATA

4.3 Results of the regression analysis: Under the following regression outputs the beta coefficient may be negative orpositive; beta indicates that each variable's level of influence on the dependent variable. P-value indicates at what percentage or precision level of each variable is significant. R2 values indicate the explanatory power of the model and in this study adjusted R2 value which takes into account the loss of degrees of freedom associated with adding extra variables were inferred to see the explanatory powers of the models.

Return on Asset (ROA):

$ROA = a + \beta 1LIQRi1 + \beta 2EFRi2 + \beta 3CARi3 + \beta 4CIRi4 + \beta 5FSIZE5 + \mu i$

Table of regression result in the independent variables seems like the following.

Total panel (strongly balanced) Observations: 84

P-ISSN: 2204-1990; E-ISSN: 1323-6903
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Source	SS	df	MS	Number of obs = 84
				F (5, 78)= 26.22
Model	.092728405	5	.018545681	Prob> F = 0.0000
Residual	.055176175	78	.000707387	R-squared = 0.6269
				Adj R-squared = 0.6030
Total	.14790458	83	.001781983	Root MSE = .0266

Table 4.4 Regression analysis results:

ROA	COEF.	STD. err.	t	p>t	[95% CONF.	INTERVAL]
LIQR	.1671129	.0347487	4.81	0.000	.0979336	.2362922
EFR	.0031335	.0052671	0.59	0.554	-.0073525	.0136196
CAR	.1431357	.0376774	3.80	0.000	.0681257	.2181457
CIR	-.0049678	.0027138	-1.83	0.071	-.0103706	.0004349
FSIZE	.0106539	.001939	5.49	0.000	.0067937	.0145141
_CONS	-.2646781	.041942	-6.31	0.000	-.3481782	-.1811779

Source: Stata12 results from f/statements of banks and own computation

ROA = α + 0.1671129 LIQR + .0031335EFRi + .1431357CAR +-.0049678CIR + .0106539FSIZE + μ

The Estimation result of the operational panel regression model used in this study is presented in the above table. From the table the R-squared statistics and the adjusted-R squared statistics of the model was0.6269 % and 0.6030%, respectively. The result indicates that the changes in the independent variables explain0.6030 % of the changes in the dependent variable. The remaining 39.7% of the changes was explained by other factors which are not included in the model. Thus these variables collectively, good representative explanatory variables of risk management on bank performance of commercial banks in Ethiopia. F value of 0.000 indicates strong statistical significance, which enhanced the reliability and validity of the model.

Based on the results shown in the above table, three independent variables have significant impact on commercial banks performance. Namely, Liquidity risk ratio, Capital adequacy ratio and Firm size were significant at 5% significance level even at 1% since the p-value for these variables were 0.000 for each of them. Even if cost-to-income ratio is insignificant at 5%, it is significant at the significance level of 10% because it is possible to take this one as an alternative. On the other hand, Efficiency ratio has insignificant impact on banks performance since the p-value for the variables was greater than 5% significance level which is 0.554.Besides, table 4.4 also shows that the coefficient of Cost-to-Income against ROA were negative as far as the coefficient for this variable is-0.0049678 indicating negative sign. This indicates that there was an inverse relationship between the aforementioned independent variable and ROA. Thus the increase of this variable will lead to a decrease in ROA.

P-ISSN: 2204-1990; E-ISSN: 1323-6903
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On the other hand, variables like capital adequacy ratio, efficiency ratio, liquidity ratio, and firm size had a positive relationship with return on asset as far as their coefficients were positive. This revealed that there was a direct relationship between the above independent variables and return on asset .In general as per the regression results provided in table 4.4 among the four repressors used in this study three of them were significant. In general, so far, the results of the documentary analysis which includes tests for the descriptive statistics, correlation matrix & regression analysis have been presented.

4.5 Summary for the Hypotheses testing: The following table summarizes the results of hypothesis.

Table 4.5: Summary of Hypotheses Testing Results:

Source: financial statements of banks

Alternative Hypothesis	Return on Asset (ROA)	
	The detected coefficient sign	Decision
HP1: There is a significant positive relationship between the size of capital of a bank and the bank's financial performance.	(+)	Accepted
HP2: There is a significant positive relationship between the efficiency of a bank and the bank's financial performance.	(+)	Rejected
HP3: There is a significant negative relationship between the liquidity risk of a bank and the bank's performance.	(+)	Accepted
HP4: There is a significant negative relationship between the operational risk of a bank and the bank's performance.	(-)	Accepted

Analysis of Hypothesis results

The data are analyzed in light of the specific hypotheses stated. The analysis focuses mainly on the results of the regression analysis for the selected risk management factors that have an impact on bank performance. These selected factors are capital strength, operational risk (cost to income ratio), liquidity risk (liquidity ratio), and efficiency ratio as well as size of the banks as a control variable.

A) Capital Strength: One could expect that the impact of capital on bank performance is positive andsignificant. Therefore, since the coefficient of capital adequacy of the bank was positive as expected, it was statistically significant even at 5% significance level even it is strongly significant at 1% significance level (p-value= 0.000), indicating that its influence is substantial one . As a result, the hypothesis that states there is a significant relationship between capital

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Strength and bank performance has been accepted means that there is a strong evidence to accept the stated hypothesis.

B) Operational efficiency: The coefficient of the ratio of cost to income, which provides information on theefficiency of the management regarding expenses relative to income, was negativeand statistically significant at 10% significance level (p-value=0.071) which is in line with a prior expectation and makes the variable an important determinant of Ethiopian banks performance. This showed that minimizing commercial banks operating costs in Ethiopia would certainly improve the banks performance in general and profitability in particular.

C) Liquidity risk: The impact of liquidity on bank performance is negative and statically significantimpact on banks performance. The coefficient of liquidity ratio was negative as expected, it was statistically significant at 1% significance level (p-value= 0.000), indicating that its influence is significant on the performance of commercial banks in Ethiopia. Moreover, the significant parameter indicates that the liquidity structure does affect Ethiopian banks performance. Thus the hypothesis that states there is a negative significant relationship between liquidity risk and profitability should be accepted.

D) Efficiency Ratio:From the results of the regression model of this study, the coefficient parameter of the efficiency ratio was positive and insignificant at the same time. Moreover, the insignificant parameter indicates that the efficiency ratio does not affect Ethiopian banks financial performance. As a result, the hypothesis that states there is a significant relationship between efficiency ratio and bank performance has been rejected means that there is no strong evidence to accept the stated hypothesis.

E) Bank Size:The natural logarithm of total asset (SIZE) was used as proxy for size in the regression modelaccording to the studies of (Boyd et al.,1993). The result indicates that size is positive and stronglystatistically significant to bank profitability. This implies that bank size induces economies of scale thereby making larger banks more profitable. Economies of scale will reduce the cost of gathering and processing information. The larger the bank size, the more profitable the bank. It could also mean that bank size is associated with diversification which may impact favorably on risk and product portfolio. The data of this study shows the size of all Ethiopian commercialbanks which is measured by log of total asset is increased for the last 12 years means that starting from 2004 through 2015. Consequently,this improvement leads to the profitability of banks in Ethiopia. The result implies that larger banks enjoy the higher profit than smaller banks in Ethiopian banking sector because they are exploiting the benefit of economies of scale. The finding of this study was in consistent with the findings of Akhavein et al. (1997) and Smirlock (1985) and Damena (2011).

4. Conclusions

As indicated in table 4.4 of regression results, bank risk variables are able to explain a substantial part of banks performance in Ethiopia (R- square and adjusted R-square of 62.69%

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and 60.30% respectively).For that matter, the study specified an empirical framework to investigate the effectof bank risk management on Ethiopian commercial banks performance for the period 12 years. A panel data was collected from the sample of seven commercial banks in Ethiopia from 2004 to 2015. The collected Data was analyzed by using descriptive statistics, balanced correlation and regression analysis. The study also used an appropriate econometric methodology for the estimation of variables coefficientunder fixed regression models.Fixed effect model/FEMwas used based on convenience. Four risk factors affecting banks performance were chosen and analyzed. Four ratios of the risk factors were run in the regression model to know their effects in the Ethiopian commercial banks. And also the size of selected commercial banks was used as a control variable and run in the regression model analysis.

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