

# “Impact of determinants of the financial distress on financial sustainability of Ethiopian commercial banks”

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# IMPACT OF DETERMINANTS OF THE FINANCIAL DISTRESS ON FINANCIAL SUSTAINABILITY OF ETHIOPIAN COMMERCIAL BANKS

## Abstract

The study aims to investigate the impact of determinants of financial distress on financial sustainability of Ethiopian commercial banks. The balanced panel data of 12 commercial banks of Ethiopia have been taken for the study from 2011 to 2017. The research deploys Ordinary Least Square (OLS) Regression Model. The indicators of financial distress are bank's specific internals and macro-economic factors. The proxies of financial sustainability are Return on Assets, Return on Equity, Financial Stability Index and Bank Soundness. The findings reveal that the Absolute Liquidity Risk and Net Income Growth are found to be positive and significant and Solvency Risk negative and significant in relation to Return on Assets. Asset Quality is found to be positive and significant and Solvency Risk negative and significant with respect to Return on Equity. The Asset Quality and Net Income Risk are positive and significant and Solvency Risk is negative and significant with relation to the Financial Stability Index. Absolute Liquidity Risk and Liquidity Risk are positive and significant and Credit Risk negative and significant with Bank Soundness. Free Cash Flow and Net Income Growth are essential for enhancing Return on Assets and Bank Soundness, and managing equity within the prudential norms could bring forth short-term financial sustainability of commercial banks. By lowering provisioning of loan loss, Growth in Net Interest Income and managing Solvency Risk could ensure financial stability to the banks, which in turn leads to financial sustainability. The study reveals that financial sustainability of banks is insulated from the exposures of systematic risks originating from macroeconomic factors.

## Keywords

financial intermediation, financial stability, banking crisis, corporate distress, financial ratios, risk management, firm performance, bankruptcy

**JEL Classification** G21, G32, G33, L25, O16

## INTRODUCTION

The financial soundness of a country depends on a robust financial system that comprises a set of financial institutions, efficient financial markets, tradeable financial instruments and, after all, customer centric financial services. The nature and extent of financial crisis in the financial system depend on understanding the impact and likelihood of systemic risk (Allen et al., 2006). The evolution of stability of the world financial system emanates from the understanding of the systemic risk gravity. Bank distress poses as a reflection of systemic risk that acts as stumbling block on the economy or financial system as a whole (Bernanke, 2009). The financial institutions like banks and insurance companies act as mediation from savers to investors and channelize the cash flow from surplus to deficit economy and constantly thrive for balanced regional growth of a nation. The role of a banking sector is to utilize the resources judiciously that fuels economic growth and brings global competitiveness (Mwega, 2011). Efficient financial services in the banking sector could be achieved only through appropriate management of financial distress by the banks (Bariviera et al.,

2014). The prime cause of bankruptcy is due to bank distress when the bank is not able to meet the claims of the depositors that ultimately turn the ailing bank into bankruptcy due to lending to the low creditworthy borrowers having conflict of interest and macroeconomic instability (Brownbridge, 1998).

The history of banking has been evolved way back in 1905 in Ethiopia by forming Bank of Abyssinia as a result of the memorandum of understanding between the then king Menelik-II and the National Bank of Egypt. Later on, the National Bank of Ethiopia was formed as the Central Bank in 1963 by a proclamation No. 206/1963. There are at present three Government banks and sixteen private banks operating in Ethiopia (NBE, 2017). Ethiopia is reeling on restricted domestic banking with the cluster of nationalized commercial banks comprising of public and private banks under the aegis of the National Bank of Ethiopia at present, and the country has not yet opened the entry of foreign banks to operate in the economy. In view of sluggish manufacturing sector, the Ethiopian economy becomes an import dependent economy coupled with incessant shortage of foreign currencies due to heavy import. Thus, the domestic money supply in circulation of economy is inadequate to sustain acceptable economic growth, which might turn the domestic banks succumbed to failure while obliging financial commitment to the creditors and depositors leading to financial distress. Alentina et al. (2009) have taken 389 banks in 41 Sub-Saharan Africa countries and observed that higher returns of assets are the results of high bank size, macro-economic stability and infusion of private capital into banking system. The Central bank of Ethiopia proclamation No. 592/2008 envisages that a bank is said to be designated as a situation of “receivership” instead of “bankruptcy” when the bank’s liabilities are found to be more than its assets (NBE, 2008). The symptomatic condition of financial institutions is financial distress that aggravates into insolvency. Taddese Lencho (2008) has concluded that the financial distress of a bank could initially lead to insolvency, which would be declared later to bankruptcy by a court of law. When a company experiences financial distress, operating conditions may deteriorate, heavy financial burdens become commonplace and wages are renegotiated downwards. If the situation continues, bankruptcy may become a reality (Garlappi & Yan, 2011). However, if appropriate management steps are taken and financial distress factors are used effectively, it can recover and experience a resurgence (Wang & Shiu, 2014).

## 1. LITERATURE REVIEW

Empirical evidence of the researchers on the effect of external variables as well as firm specific variables acting as the determinants of financial distress on financial sustainability of commercial banks are discussed below.

### 1.1. Financial distress

When an institution is plagued by financial, managerial and operational malfunctions, it is said to be in financial distress. The financial institutions are engulfed in financial distress when these are involved in unethical business practices, facing shortage of adequate capital and meager deposit base. Thus low financial distress is an indication of better financial performance of the banks. The symptom of financial distress is manifesting in decreasing financial performance of a bank followed by inability to meet payment obligation to the creditors and depos-

itors that ultimately results in bankruptcy (Tan, 2012). The various proxies of financial distress are important determinants of bank failure of any institution (Bergman et al., 2012). Hill et al. (2012) noted that the financial performance of a bank is influenced by variables of financial distress such as liquidity, size and leverage, etc. Khalid (2017) has divided the variables of financial distress into firm’s specific and external factors of a country. Aspachs et al. (2007) propose to assess the capacity of banks to assume risks based on a combination of the probability of default of banks and their profitability. The financial distress arises out of bank’s specific factors and macro-economic factors. The following literatures are discussed on the indicators of financial distress of commercial banks.

#### 1.1.1. Bank’s specific internal factors

The internal determinants of financial distress are bank’s specific internal factors, viz: Absolute

Cash Ratio, Cash Ratio, Net Income Growth, Asset Quality, Net Interest Risk, Credit Risk, and Solvency Risk taken for the study.

- *Absolute Liquidity Risk (CaR1)*

Absolute Liquidity Risk is called Absolute Cash Ratio that can be measured by the total cash and bank balance after deposit at the National Bank of Ethiopia divided by the demand deposits of the bank customer. This ratio reveals the ability of the bank to meet immediate financial obligation arising out of the customers who will withdraw on demand.

- *Liquidity Risk (CaR2)*

Liquidity risk of a bank is called Cash Ratio that can be measured by the quantum of total cash and bank balance divided by the total deposits by the customers. This ratio shows overall liquidity of a bank to fulfil the financial obligation of the depositors. Ariffin (2012) noted that the relationship between liquidity risk and financial performance is not always predicted by the conventional financial theory of “high risk-high return” and concluded that liquidity risk always lowers ROA and ROE. Ongore and Kusa (2013) have given an opposite view that financial performance of Kenyan banks is less affected by liquidity.

- *Net Income Growth (NIG)*

Net income growth indicates a situation of constant growth of income of a bank that brings financial sustainability of banks in the long run. Sultana and Akter (2015(2018) have noted that the loan growth ratio is the significant predictor of net income growth of the banking sector of Bangladesh. This study has calculated Net Income Growth as excess of profit after tax between the current years over the previous year to the profit after tax of the previous year.

- *Asset Quality (AQ)*

The quality of loan and advances to the borrowers by the banks depends on the extent of how much lowest loan loss provision done against the loan and advances to smooth earning. Thus, asset quality is measured by the provision of loan

loss to the total loan and advances disbursed by the bank. The financial distress could be reduced by better management of Asset Quality of loan portfolio due to lowest provision of loss that brings financial stability to financial institutions. Carapeto et al. (2011) used non-performing loan to total loan as a single accounting variable that can be used to measure bank financial distress. Reinhardt (1999) noted that the weak banking sector in an economy is due to excessive default risk taking leading to an increase in the non-performing loans and chances of insolvency.

- *Net Interest Risk (NIR)*

Net Interest Risk is a default risk that acts as an indicator of financial distress and depends on the paying capacity and regular paying habit of the borrowers. Net Interest Risk is measured by net interest margin to the total loan and advances by the bank.

- *Credit Risk (CR)*

The loan given to the borrowers out of the money of the depositors becomes a default risk and an indicator of financial distress. The credit risk is measured by total loan and advances of the bank to the total deposits by the depositors. Adeolu (2014) asserted that management of asset quality entails the evaluation of a firm’s assets to facilitate the measurement of credit risk associated with its operation to ensure profitability resulting in improved financial performance. Abdullah et al. (2014) observed that default credit risk is inversely affecting the financial performance of banks.

- *Solvency Risk (SR) or Capital Adequacy Ratio (CAR)*

Capital Adequacy Ratio or Solvency Risk acts as cushion to prevent financial distress in case of non-repayment by the borrowers. The Capital Adequacy Ratio is measured by the total equity to total loan and advances of the bank. Olalekan and Adeyinka (2013) posited that adequacy of capital acts as primary capital to the assets given as loan and advances. They asserted that capital would be used to absorb an unanticipated abnormal loss

in cases where such losses cannot be absorbed by earnings in financial institutions. Foggitt et al. (2017) proposed that the commercial banks should have enough capital reserve in order to mitigate the effect of financial crisis emanating from systemic risk.

### 1.1.2. Macroeconomic factors

The external determinants of the study are macroeconomic factors such as General Inflation, GDP per Capita, Trade Deficit, Ending Exchange Rate and Lending Interest Rate.

External factors are found to have a mixed relationship with bank's sustainability. Some studies found a significant positive relationship, while some revealed the opposite and there are also studies that proved no relationship at all. Bennaceur and Goaid (2008) argued that macroeconomic factors do not have association with financial performance of banks. Owoputi et al. (2014) observed that endogenous factors like capital adequacy, bank size, productivity growth and deposits have a positive and significant effect on profitability. The performance of banks is not affected by credit risk and liquidity risk. The exogenous factors like inflation rate and interest rate have no influence on profitability of Nigerian banks. Other factors, such as the GDP or the economic growth, rate of interest and the nature of the financial system, are key parameters that are used to define the macro-economic environments (Berger et al., 2010).

- *General Inflation (INF)*

When a country is experiencing high inflation, the purchasing power of the consumers has been diminished. Such situation brings sluggish economic growth, which has a negative effect on the performance of a bank. General inflation of the country has been considered for the study. According to Vong and Chan (2006), inflation is shown to be positive and significant with banks' performance, because when the inflation is high, the banks charge high interest rate. However, Kosmidou et al. (2007) revealed that when inflation rate begins to increase, the loan transactions will start decrease. Hence, there is an inverse association between inflation and performance of a bank during high in-

flation. Abdullah et al. (2014) noted that GDP and inflation rate are negatively associated with return on assets.

- *GDP per Capita (GDPC)*

GDP per Capita is the economic well-being of a nation. The real GDP per capita has been considered as one of variables for the study. Kosmidou et al. (2007) argued economic growth influences performance of banks positively, while Khwarish (2011) has found a negative relationship. Boubakri et al. (2005) observed that performance of banks significantly influences economic growth in 16 European countries, which is consistent with Althanasoglou et al. (2006) who studied on banks of Egypt. Increase in GDP growth has a linear effect on the profitability level of banks.

- *Trade Deficit (TD)*

Since Ethiopia imports most of goods for internal consumption for which there is always a deficit, the balance of trade account is observed in the balance of payment account. This study has taken Trade Deficit as an indicator of financial distress although no evidence is found in the literature.

- *Lending Interest Rate (LIR)*

Generally, the interest rate of a country affects the deposit and credit function of the bank and particularly the lending interest rate influences the profitability of banks. So lending interest rate has been taken for the study. Gull and Zaman (2013) evaluated the impact of interest rate fluctuations and financial outcomes of banking sector of Pakistan. Interest rate and other variables show significant association on profitability of banks of Pakistan.

- *Ending Exchange Rate (EER)*

The exchange rate of a country depends on the demand and supply of foreign currencies that depend on export, import and foreign direct investment bringing inflow of foreign currencies to the country. Since Ethiopia consumes more foreign currencies through import leading to trade deficit, ending exchange rate has been taken for the study.

## 1.2. Financial sustainability

The financial sustainability of banks has been taken as a dependent variable. The proxies of financial sustainability are Return on Assets, Return on Equity, Financial Stability Index and Bank Soundness. The financial sustainability can be measured from the short-term and long-term points of view.

While Return of Assets and Bank Failure are the indicators of short-term financial position, the Financial Stability Index and Solvency Risk are meant to assess the long-term financial position.

Financial sustainability of banks has a critical implication for economic well-being of any nation and it is generally considered to be the reflector of financial and economic conditions of a country other than its intermediation role in an economy (Ongore & Kusa, 2013). Financial sustainability factors are important drivers, which withstand risks facing the business. Strategic management and information management are thus required to take into account and evaluate information necessary in pursuing financial sustainability of an organization (Schaltegger, 2011). The classification proposed by Bardsen et al. (2006) has two large groups of definitions of financial stability. The first group includes definitions based on information characteristics where financial stability is applied to financial markets (Mishkin, 1999). As Ethiopia has no regulated financial market in the form of stock exchange as of now, the interpretation of the first group is not relevant for the study. The second group includes the works of Crockett (1996), Tsomocos (2003), where “financial stability” is used as an analogy to “financial sustainability”. Padoa-Schioppa (2003) has observed that financial sustainability in a financial system could tolerate and absorb the risks during the transition from savings and investments in the economy. This view is supported by Shinasi (2004), Kadomtsev and Israelyan (2015). Al-Shawabkeh and Kanungo (2017) posited that sustainability of a banking system could be improved by reassessing credit risks and improved decision making by the managers.

- *Return on Assets (ROA)*

The operating efficiency of a bank can be judged from the income arising out of utilization of total

assets of a bank and acts as an indicator of sustainability of banks in the short run. Said and Tumin (2011) studied the financial performance of banks in Malaysia and China and observed that liquidity risk and size of banks have no significant influence on return on assets of banks.

- *Return on Equity (ROE)*

The Ethiopian commercial banks have deployed only equity capital that boosts the shareholders to expect adequate returns on their investment.

- *Financial Stability Index (FSI)*

Financial Stability Index (FSI) symbolizes the long-term sustainability of commercial banks. FSI is measured by a profit/risk (PR) indicator of a commercial bank with respect to total banking system.

- *Bank Soundness (BF)*

Free cash balance is calculated after deducting deposited case reserve at the National Bank of Ethiopia from total cash and bank balance held by banks. A bank is in the way to financial soundness when the free cash balance is sufficient to meet the demand deposits of the customers. If the free cash balance is less than demand deposits, then the bank is on the verge of financial distress leading to bank failure. The bank having financial soundness has been taken as zero, while the bank having bank failure has been taken as one in this study. Zhen (2015) has studied banks of OECD, NAFTA, Southeast Asian nations, G8, G20 countries and European Union and observed that asset quality, loan ratios and fixed assets were positive and significant with bank failure. Capital adequacy ratio and net interest income were negative and significant with bank failure.

## 1.3. Problem statement

Although enough evidence of bank failure is available across the globe, there is scanty evidence of bank failure in Ethiopian banks in the past, although many banks suffer financial distress due to liquidity crunch. Most of the researchers in sub-Saharan Africa including Ethiopia and in the global context have studied the impact of var-

ious indigenous and exogenous factors on profitability of banks and very few study have been observed in terms of financial stability as well as financial sustainability of banks. The present study thrusts upon the firm specific factors leading to financial distress and some systematic risk factors from Ethiopian economy reflected as macroeconomic factors leading to financial distress and their ultimate influence on the financial sustainability of Ethiopian banks. Therefore, the study aims to identify and evaluate the effect of firm specific indicators of financial distress and macroeconomic variables on the financial sustainability of banks.

The aim of the study is to identify the various proxies of financial distress and evaluate their association with financial sustainability of Ethiopian commercial banks.

The following hypotheses are framed to carry out the analysis.

### 1.4. Hypotheses

*H0: There is no association between internal determinants of financial distress and financial sustainability of commercial banks.*

*H1: There is an association between internal determinants of financial distress and financial sustainability of commercial banks.*

*H0: There is no association between external determinants of financial distress and financial sustainability of commercial banks.*

*H1: There is an association between external determinants of financial distress and financial sustainability of commercial banks.*

- Internal determinants: Liquidity Risk, Absolute Liquidity Risk, Net Income Growth, Asset Quality, Net Interest Risk, Credit Risk, Solvency Risk.
- External determinants: Trade Deficit, GDP per Capita, General Inflation, Ending Exchange Rate, Lending Interest Rate.
- Financial Sustainability: Return on Assets, Return on Equity, Financial Stability Index, Bank Soundness.

The proxies of financial distress and financial sustainability are described with formulae and symbols shown in Table 1.

**Table 1.** List of variables and their proxies and symbols

Name	Symbol	
<b>Dependent variables</b>		<b>Proxies of financial sustainability</b>
Return on Assets	ROA	Profit before Tax to Total Assets
Return on Equity	ROE	Profit after Tax to Total Equity
Bank Soundness	BS	If free cash flow > demand deposits = 0 (bank soundness) If free cash flow < demand deposits = 1 (bank failure) Free cash flow = total cash & bank balance – reserve with central bank (NBE)
Financial Stability Index	FSI	Profit before Tax X Total Loan & Advances X Total Assets of the individual bank divided by Total Assets of the banking system; R = EQ/CAR, where R = Risk Weighted Assets, CAR = Capital Adequacy Ratio PR = PBT/R, where PR = Profit/Risk Indicator of Individual bank, PBT = Profit before Tax; FSI = PR·A/TA, where A = Assets of banks in particular year, TA = Total assets of the banking system
<b>Independent variables</b>		<b>Proxies of firm's specific factors of financial distress</b>
Absolute Liquidity Risk	CaR1	Free cash flow to demand deposits Free cash flow = total cash and bank balance – reserve with the National Bank of Ethiopia
Net Income Growth	NIG	(Profit after tax of the current year – profit after tax of the previous year) to profit after tax of previous year
Liquidity Risk	CaR2	Total Cash & Bank Balance to Total Deposits of the bank
Asset Quality	AQ	Provision for Loan Loss to Total Loan & Advances
Net Interest Risk	NIR	Net Interest Income to Total Loan & Advances
Credit Risk	CR	Total Loan & Advances to Total Deposits
Solvency Risk/Capital Adequacy Ratio	SR/CAR	It denotes Capital Adequacy ratio measured by Total Equity to Total Loan & Advances.

**Table 1 (cont.).** List of variables and their proxies and symbols

Name	Symbol	
<b>Independent variables</b>		<b>Macroeconomic factors</b>
Trade Deficit	TD	Natural log of Trade Deficit has been taken Trade Deficit = Import – Export
GDP per Capita	GDPC	GDP per Capita of the people of the country has been taken
General Inflation	INF	Consumer Price Index of the country has been taken
Ending Exchange Rate	EER	Closing Exchange Rate of the year has been taken
Lending Interest Rate	LIR	Average Lending Interest Rate of banks has been taken

## 2. RESEARCH METHODS

The research has been designed to implement quantitative and inferential approach. The population of commercial banks consists of 19 banks, which includes three Government and 16 private commercial banks. Convenience sampling is adopted to select sample based on availability of financial data since inception. Balanced panel data of a sample of 12 banks have been taken for the study from the annual reports of individual banks for the period from 2011 to 2017. Hutcheson and Sofroniou (1999) stated that when the regression model comprises both continuous and dummy variables, Ordinary Least Square (OLS) is a suitable statistical technique. This study has deployed the OLS regression Model comprising pooled regression and fixed effect regression analysis done by R Studio. The model specification of the regression model balanced panel data is described below:

$$Y_{it} = \beta_0 + \beta_1 X_{it} + \epsilon_{it}, \quad (1)$$

$$i = 1 \dots N, \quad t = 1 \dots T,$$

where  $i$  stands for the  $i^{\text{th}}$  cross-sectional unit and  $t$  for the  $t^{\text{th}}$  time period,  $\beta_0$  is the intercept for each entity,  $Y_{it}$  is the dependent variable, where,  $i$  = entity and  $t$  = time,  $X_{it}$  represents one independent variable,  $\beta_1$  is the coefficient for that independent variable,  $\epsilon_{it}$  is the error term.

The regression model is specified as follows with financial sustainability as the dependent variable whose proxies are Return on Assets (ROA), Return on Equity (ROE), Bank Soundness (BS) and Financial Stability Index (FSI). The proxies of financial distress as independent variables are Absolute Liquidity Risk (CaRI), Liquidity Risk (CaR2), Asset Quality (AQ), Net Interest Risk (NIR), Credit Risk (CR), Solvency Risk (SR), Net

Income Growth (NIG), Inflation (INF), Real GDP per Capita (GDPC), Trade deficit (TD), Ending Exchange Rate (EER), Lending Interest Rate (LIR).

$$ROA_{it} = \beta_0 + \beta_1 CaR1_{it} + \beta_2 NIG_{it} + \beta_3 CaR2_{it} + \beta_4 AQ_{it} + \beta_5 NIR_{it} + \beta_6 CR_{it} + \beta_7 SR_{it} + \beta_8 TD_{it} + \beta_9 GDPC_{it} + \beta_{10} INF_{it} + \beta_{11} EER_{it} + \beta_{12} LIR_{it} + \epsilon_{it}, \quad (2)$$

$$ROE_{it} = \beta_0 + \beta_1 CaR1_{it} + \beta_2 NIG_{it} + \beta_3 CaR2_{it} + \beta_4 AQ_{it} + \beta_5 NIR_{it} + \beta_6 CR_{it} + \beta_7 SR_{it} + \beta_8 TD_{it} + \beta_9 GDPC_{it} + \beta_{10} INF_{it} + \beta_{11} EER_{it} + \beta_{12} LIR_{it} + \epsilon_{it}, \quad (3)$$

$$FSI_{it} = \beta_0 + \beta_1 CaR1_{it} + \beta_2 NIG_{it} + \beta_3 CaR2_{it} + \beta_4 AQ_{it} + \beta_5 NIR_{it} + \beta_6 CR_{it} + \beta_7 SR_{it} + \beta_8 TD_{it} + \beta_9 GDPC_{it} + \beta_{10} INF_{it} + \beta_{11} EER_{it} + \beta_{12} LIR_{it} + \epsilon_{it}, \quad (4)$$

$$BS_{it} = \beta_0 + \beta_1 CaR1_{it} + \beta_2 NIG_{it} + \beta_3 CaR2_{it} + \beta_4 AQ_{it} + \beta_5 NIR_{it} + \beta_6 CR_{it} + \beta_7 SR_{it} + \beta_8 TD_{it} + \beta_9 GDPC_{it} + \beta_{10} INF_{it} + \beta_{11} EER_{it} + \beta_{12} LIR_{it} + \epsilon_{it}. \quad (5)$$

## 3. RESULTS AND DISCUSSION

At first, the study has used serial correlation test to find serial correlation between dependent and independent variables and then the OLS Regression Model has been applied, which includes Pooled Regression and Fixed Effect Regression Model.

Then PF test has been conducted to find the superiority of one model over another.

### 3.1. Serial correlation test

In order to test the relationship amongst the variables, a serial correlation test has been deployed using the Durbin-Watson test for serial correlation in panel data. The test is applied for each dependent variable with all the independent variables and the result of the test has been shown in Table 2.

**Table 2.** Serial correlation test amongst the variables

Source: Developed by authors based on the R Studio analysis.

Variables	Durbin-Watson test	P-value
Return on Assets (ROA)	2.1956	0.8932
Return on Equity (ROE)	2.7396	0.9998
Financial Stability Index (FSI)	2.4582	0.9837
Bank Soundness (BS)	2.4659	0.9852

The hypotheses for each dependent variable with all independent variables are framed below.

*H0: There is no serial correlation amongst the variables in error terms.*

*H1: There is a serial correlation amongst the variables in error terms.*

Table 2 reveals that *p*-value is more than 5% (0.05) in all cases. Null hypothesis is rejected, which implies that there is no serial correlation between the dependent and independent variables.

### 3.2. OLS regression analysis

OLS Regression Model is applied to regress each dependent variable with all the independent variables in which pooled and fixed effect model are deployed. Then PF test has been resorted to evaluate appropriateness between pooled and fixed effect models (see Table 3). The hypothesis for the PF test for each dependent variable with all the independent variables are framed below.

*H0: Pooled Model is appropriate.*

*H1: Fixed Effect Model is appropriate.*

**Table 3.** PF test between pooled and fixed effect regression models

Source: Developed by authors based on the R Studio analysis.

Variables	F-value	DF1	DF2	P-value
Return on Assets (ROA)	0.28247	-1	71	NA
Return on Equity (ROE)	0.008106	-1	71	NA
Financial Stability Index (FSI)	0.073365	-1	71	NA
Bank Soundness (BS)	2.1927e-05	-1	71	NA

In all these cases, null hypothesis is rejected as *p*-value is not applicable. Hence, fixed effect model is appropriate in all the cases; fixed effect Regression Model is applied for all the dependent variables.

#### 3.2.1. Return on Assets (ROA)

The Fixed Effect Model is applied by regressing Return on Assets with all the bank's specific factors and macroeconomic factors and the result is shown in Table 4.

Table 4 reveals the fixed effect regression results where *F*-statistics shows that *p*-value is fully significant. That shows robustness of a model of good fit. Absolute Cash Ratio being a proxy of Absolute Liquidity Risk is found positive and significant with Return on Assets at 5% as *p*-value is less than 0.05. The Net Income Growth is significant and has positive association with Return on Assets at 1% as *p*-value is less than 0.01. The Capital Adequacy Ratio being the proxy of Solvency Risk is fully significant but establishes negative association with Return on Assets as *p*-value is less than 0.001. The Return on Assets is not influenced by macroeconomic factors. Further, *R*-square reveals that Return on Assets is explained by 34.5% of bank's specific factors that include Absolute Liquidity Risk, Net Income Growth and Solvency Risk.

The findings of the Fixed Effect Regression Model reveal that the increase in operating efficiency of banks reflecting through Return on Assets depends on adequate free cash flow accessible for the business to meet immediate financial obligation from the demand depositors. The Return on Assets increases when there is growth in net profit after tax year after year. Further, Solvency Risk can be

**Table 4.** Fixed effect regression model on Return on Assets

Source: Developed by authors based on the R Studio analysis.

Balanced panel	$n = 7$	$T = 12$	$N = 84$	
Min	1st Qu	Median	3rd Qu	Max
-0.02458439	-0.00414773	-0.00048076	0.00317376	0.02917991
Variables	Estimate	Std. error	t-value	Pr (>  t )
<i>CaR1</i>	0.0037131	0.0017447	2.1282	0.036843*
<i>NIG</i>	0.0053213	0.0016705	3.1856	0.002158**
<i>CaR2</i>	-0.0028126	0.0027874	-1.0090	0.316435
<i>AQ</i>	0.0123656	0.0429208	0.2881	0.774119
<i>NIR</i>	-0.0327358	0.0502013	-0.6521	0.516478
<i>CR</i>	0.0036924	0.0043124	0.8562	0.394801
<i>SR</i>	-0.0299591	0.0064397	-4.6522	1.508e-05***
Sig. code	0.001***	0.01**	0.05*	?

Total sum of squares: 0.0079619

Residual sum of squares: 0.0052121

*R*-squared: 0.34536Adj. *R*-squared: 0.22379*F*-statistic: 5.27568 on 7 and 70 DF, *p*-value: 7.157e-05

Note: \*, \*\*, \*\*\* denote levels of significance at 5%, 1% and 0.01%, respectively.

minimized by deploying equity capital in securing more loan portfolio that would accelerate more Return on Assets. The Return on Assets is not found to be affected by the macroeconomic factors.

### 3.2.2. Return on Equity (ROE)

Return on Equity is regressed with bank's specific factors and macroeconomic factors. The result is shown in Table 5.

Table 5 shows the model of good fit as *F*-statistics shows that *p*-value is fully significant.

Asset Quality being a proxy of non-performing loan is showing significant and positive association with Return on Equity at 1% as *p*-value is less than 0.01. Capital Adequacy Ratio being a proxy of Solvency Risk is fully significant but shows negative association with Return on Equity as *p*-value is less than 0.001. The Return on Equity is ex-

**Table 5.** Fixed effect regression model on Return on Equity

Source: Developed by authors based on the R Studio analysis.

Balanced panel:	$n = 7$	$T = 12$	$N = 84$	
Min	1st Qu	Median	3rd Qu	Max
-0.216519	-0.043777	-0.016162	0.017400	0.349480
Variables	Estimate	Std. error	t-value	Pr (>  t )
<i>CaR1</i>	-0.018642	0.019885	-0.9375	0.351734
<i>NIG</i>	0.025273	0.019039	1.3274	0.188680
<i>CaR2</i>	-0.028750	0.031769	-0.9050	0.368584
<i>AQ</i>	1.389643	0.489193	2.8407	0.005891**
<i>NIR</i>	0.382747	0.572173	0.6689	0.505737
<i>CR</i>	0.015247	0.049151	0.3102	0.757324
<i>SR</i>	-0.416984	0.073397	-5.6812	2.834e-07***
Sig. code	0.001***	0.01**	0.05*	

Total sum of squares: 1.4208

Residual sum of squares: 0.67708

*R*-squared: 0.52345Adj. *R*-squared: 0.43494*F*-statistic: 10.984 on 7 and 70 DF, *p*-value: 2.8187e-09

Note: \*, \*\*, \*\*\* denote levels of significance at 5%, 1% and 0.01%, respectively.

**Table 6.** Fixed effect regression model on Financial Stability Index

Source: Developed by authors based on the R Studio analysis.

Balanced Panel:	$n = 7$	$T = 12$	$N = 84$	
Min	1st Qu	Median	3rd Qu	Max
-0.0251336	-0.0093082	-0.0032716	0.0057468	0.0558687
Variables	Estimate	Std. Error	t-value	Pr (>  t )
<i>CaR1</i>	-0.00099335	0.00334032	-0.2974	0.76706
<i>NIG</i>	-0.00218459	0.00319817	-0.6831	0.49681
<i>CaR2</i>	-0.00445787	0.00533657	-0.8353	0.40637
<i>AQ</i>	0.45653150	0.08217394	5.5557	4.674e-07***
<i>NIR</i>	0.19785509	0.09611275	2.0586	0.04326*
<i>CR</i>	-0.00053485	0.00825633	-0.0648	0.94853
<i>SR</i>	-0.02561388	0.01232914	-2.0775	0.04142*
Sig. code	0.001***	0.01**	0.05*	

Total sum of squares: 0.037916

Residual sum of squares: 0.019105

*R*-squared: 0.49613Adj. *R*-squared: 0.40255*F*-statistic: 9.84631 on 7 and 70 DF, *p*-value: 1.7473e-08

Note: \*, \*\*, \*\*\* denote levels of significance at 5%, 1% and 0.01%, respectively.

plained by 52.3% of bank's specific factors, which include Asset Quality and Capital Adequacy Ratio.

The results demonstrate that the shareholders expect more returns on investment in equity due to better Asset Quality resulting from creating lowest provision of loan loss against loan and advances. Further, in order to stay with long-term sustainability of banking business while maximizing the profit for the shareholders, the banks should have lowest solvency risk by way of minimum equity buffer as per the norm against the loan and advances. The Return on Equity is not found to be affected by the macroeconomic factors.

### 3.2.3. Financial Stability Index (FSI)

The Financial Stability Index is regressed with bank's specific factors and macroeconomic factors and the result is shown in Table 6.

Table 6 demonstrates the robustness of a model of good fit as *F*-statistics show that *p*-value is fully significant. The Asset Quality is positive and fully significant with the Financial Stability Index as *p*-value is less than 0.001. The Net Interest Risk is positive and significant with the Financial Stability Index at 1% as *p*-value is less than 0.01.

The Solvency Risk is significant but shows a negative association with the Financial Stability Index at 1% as *p*-value is less than 0.01.

The Financial Stability Index is explained by 49.6% with the firm's specific factors that include Asset Quality, Net Interest Risk and Capital Adequacy Ratio.

The Financial Stability Index being a proxy of financial sustainability of banks is dependent on low financial distress resulting from better management of loan portfolio by way of lowest provisioning of loss resulting from non-performing assets. Although Net Interest Risk is inviting default risk by increasing the loan portfolio, such increased risk is coupled with the increase in net interest margin that paves that way to strengthen the financial stability index. Although financial stability of banks depends on Capital Adequacy Ratio of banks that minimizes the Solvency Risk by way of keeping prescribed minimum equity so that the balance equity could be deployed into investment in loan portfolio, which in turn leads to financial sustainability of commercial banks. The Financial Stability Index is not found to be affected by macroeconomic factors.

**Table 7.** Fixed effect regression model on Bank Soundness

Source: Developed by authors based on the R Studio analysis.

Balanced Panel	$n = 7$	$T = 12$	$N = 84$	
Min	1st Qu	Median	3rd Qu	Max.
-0.640830	-0.191690	0.034878	0.201533	0.649184
Variables	Estimate	Std. Error	t-value	Pr(> t )
<i>CaR1</i>	-0.557649	0.058434	-9.5432	2.69e-14***
<i>NIG</i>	0.080270	0.055948	1.4347	0.15581
<i>CaR2</i>	0.185540	0.093356	1.9874	0.05079*
<i>AQ</i>	-0.935003	1.437522	-0.6504	0.51755
<i>NIR</i>	2.171431	1.681362	1.2915	0.20079
<i>CR</i>	-0.280976	0.144433	-1.9454	0.05575*
<i>SR</i>	-0.303890	0.215682	-1.4090	0.16327
Sig. code	0.001***	0.01**	0.05*	

Total sum of squares: 16.583  
Residual sum of squares: 5.8467  
R-squared: 0.64744  
Adj. R-squared: 0.58196  
F-statistic: 18.3638 on 7 and 70 DF, p-value: 1.2277e-13

Note: \*, \*\*, \*\*\* denote levels of significance at 5%, 1% and 0.01%, respectively.

### 3.2.4. Bank Soundness (BS)

The Bank Failure is regressed with bank's specific factors and macroeconomic factors and the result is shown in Table 7.

Table 7 reveals the model of good fit as F statistics show significant  $p$ -value. The Cash Ratio (CaR1) being a proxy of Absolute Liquidity Risk is negative and fully significant with Bank Soundness as  $p$ -value is less than 0.001. Further, the Cash Ratio (CaR2) being a proxy of liquidity risk is significant but positively associated with Bank Soundness at 5% as  $p$ -value is less than 0.05. The Credit Risk being a proxy of default risk is positive and significant with Bank Failure at 5% as  $p$ -value is less than 0.05. The Bank Soundness is explained by 64.7% of the bank's specific factors of financial distress, which include absolute Liquidity Risk, Liquidity Risk and Credit Risk of the loan portfolio of commercial banks.

The results have shown that more bank failure could be imminent if the absolute liquidity risk would be kept at high resulting in inability of banks to pay off the immediate demand obligations of the customers. In other words, when more

free cash flow is being maintained as a safeguard against demand deposits, bank failure would be reduced. On the other hand, availability of surplus cash by way of enough liquidity more than total deposits brings more bank failure, because the banks would be unable to earn income from idle surplus cash just because they want to pay the financial obligation to the depositors. In other words, bank soundness can be achieved by deploying surplus cash in securing more loan portfolio.

More investment in loan portfolio brings more default risk, which in turn lead to bank failure. In other words, the bank should keep the default risk arising from loan and advances kept to minimum, which would result in low financial distress and minimize the probability of consequent bank failure and maximize the chance of bank soundness. Bank soundness is not found to be affected by the macroeconomic factors.

The findings reveal that the proxies of financial sustainability of commercial banks in Ethiopia are insulated from the systematic risk emanating from macroeconomic factors. This result is found consistent with Bennaceur and Goaid (2008), Owoputi et al. (2014).

## CONCLUSION

At the outset, Durbin-Watson test does not find serial correlation amongst the variables. PF test reveals that fixed effect model is appropriate for the study. The Return on Assets and Bank Soundness representing short-term financial sustainability of banks reveal that the contribution of consistent income growth year after year, management of absolute free cash to meet the demand of depositors and maintaining minimum equity capital as per the prudential norms of the Central Bank have a tremendous effect on the Return on Assets growth. While absolute free cash could be adequately kept to reduce probability of financial distress vis-a-vis bank failure, total cash and bank balance should be kept minimum by deploying the surplus cash in securing loan portfolio having low default risk that maximizes the chance of bank soundness, which in turn accelerates the financial sustainability of commercial banks.

The Return on Equity and Financial Stability Index representing long-term financial sustainability of commercial banks demonstrate that lowest provision of loan loss ensures better Asset Quality of loan leading to low financial distress. So better Asset Quality ensures quick and timely payment of interest by the borrowers bringing more Return on Equity, which has continuing effect on financial sustainability of banks. Secondly, although low Capital Adequacy Ratio invites more financial distress by way of Solvency Risk, it triggers the equity capital to be invested in the business for greater return on equity and its ripple effect on sustainability of banks in the long run. So more equity capital deployed in the banking business by keeping minimum equity as per the norms (at present 8%) would bring more returns to the shareholders. The contribution of Net Interest Income and Asset Quality ensuring timely payment of interest by the borrowers will strengthen the Financial Stability Index. Further, keeping aside equity to ensure solvency position of banks and deploying balance fund in loan and advances will improve the Financial Stability Index, which in turn accelerates the financial sustainability of commercial banks. The study is not free from the following limitations. Since the banks have relied on equity capital and no debt finance is involved in the business, the financial leverage being an important indicator of financial distress affecting financial sustainability argued by Meher and Ajibie (2018) has been excluded from the study. Another important macroeconomic indicator called economic cycle has been excluded due to unavailability of relevant data.

Since the financial sustainability of banks is insulated from the perils of systematic risk arising from macroeconomic variables, the managers continuously strive to create strategy to lower the financial distress through professional management practice in selecting the right borrowers having adequate creditworthiness that would maximize the profit as well as the wealth of the shareholders. The research findings have thrown challenges to the policy makers and regulators to tight rope the banking regulations from the shock of financial distress by enforcing prudential norms on adequate funding and deposit base.

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