



RESEARCH ARTICLE

The effect of risk management on the bank's financial stability in the emerging economy

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Abstract

In light of the fact that sustainable development and financial stability are now essential to global social and economic progress. Thus, the current study looks into how risk management affects Ethiopian banks' financial stability between 2017 and 2024 using the generalized moment (GMM) model. The study used financial stability as the dependent variable and liquidity risk, credit risk and operational risk as the independent variables. Moreover, the study used inflation GDP and exchange rate as the control variable. In light of this, the study found that the financial stability of Ethiopia's commercial banks is significantly impacted negatively by credit risk, inflation, and exchange rates. Whereas GDP and liquidity risk have a significant and positive impact on the financial stability of Ethiopia's banking industry, apart from them, operational risk doesn't affect the financial stability of banks in Ethiopia. Thus, the study concluded that macroeconomic features (GDP, inflation, and exchange rate) and risk management factors (credit risk and liquidity risk) significantly affected the financial stability of banks in Ethiopia. Therefore, bank management should establish effective risk management mechanisms like ensuring secure loan granting and, improving the quality of credit appraisal and analysis and, collecting and updating information about customers in a timely and accurate manner, analyzing the risks of the loan plan to provide the expected risks and the bank's controllability.

Keywords: Financial stability, Inflation, Credit risk, Liquidity risk, Banks

Introduction

The expansion of the financial industry has witnessed significant changes in the banking sector in emerging countries. The global financial crisis that struck in 2007–2008 brought about a number of fundamental changes in the economy. The banking sector and other financial institutions have struggled to keep up with losses and meet liquidity requirements while maintaining operating activity. Global social and economic growth now depends critically on sustainable development and financial stability (Adusei & Elliott, 2015; Ali & Puah, 2018; Dao *et al.*, 2020; Shair *et al.*, 2021; Yin, 2019).

Financial stability refers to the ability of the financial system to function effectively and efficiently in the face of shocks and disruptions while maintaining the provision of critical financial services to the economy. Financial stability is defined by Gupta and Kashiramka (2020) as the adaptable operation of the essential components that comprise the financial system. A financial institution's capacity to accelerate economic processes, manage risks, and absorb shocks is a personal indicator of its financial stability (Gupta & Kashiramka, 2020). According to Dsouza (2021), expansion, danger of misstatements, and profitability position all affect financial stability. Apostolik, Donohue, and Went (2009) define financial stability as the capacity of markets and financial institutions to mobilize savings in order to supply liquidity. In a similar vein, Nguyen (2021) characterizes the absence of economic instability in the system as the financial stability of commercial banks.

The various factors that contribute to the banking sector's financial stability have been the subject of numerous studies. These factors include funding risk (Adusei, 2015), credit, liquidity, and operational risk (Diallo *et al.*, 2015; Zaghdoudi, 2019), corporate governance (Subhani and Zeb, 2021), the quality of governance and financial inclusion (Malik *et al.*, 2021), bank size (Ali *et al.*, 2019), and accounting (Bischof *et al.*, 2020). In addition to these, a number of studies have employed macroeconomic factors, political stability, bank

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market structure, monetary policy, corruption, e-policy uncertainty, and monetary policy (Djebali and Zaghdoudi, 2020; Feghali *et al.*, 2021; Nair and Anand 2020; Ali *et al.*, 2019).

Understanding the significance of these aspects for the financial stability of banks is crucial for bank management, which may be gained from these studies. Because they play a significant role in bank stability, bank-specific issues are the ones that policymakers are most concerned about (Lassoued *et al.*, 2016). According to Djebali and Zaghdoudi (2020), the majority of research looks at credit, liquidity, and operational risks as the main threats to financial stability. The conflicting findings of these investigations prevented a definitive conclusion on the link between risk variables and financial stability. The purpose of this study is to shed light on the connection between risk variables and financial stability from Ethiopia's point of view.

The study identifies macroeconomic variables as the second critical problem that has a stronger impact on bank stability. According to Castro (2013), macroeconomic variables have a detrimental impact on banks through a number of unfavorable circumstances, including high rates of inflation and bank interest, as well as negative growth and high unemployment. Research has revealed that macroeconomic factors impact several factors related to banking and finance. Athanasoglou (2008), Ameer and Mhiri (2013), Masood and Ashraf (2012), bank profitability; liquidity and capital adequacy ratio; credit risk; Castro (2013), Nor and Ahmad (2015); bank efficiency; Sufian (2009), Sufian Habibulloh (2010); and financial crises (Bicaba *et al.*, 2014).

The research also notes that numerous macroeconomic conditions have an impact on banks' financial stability (Altaee *et al.*, 2013; Rajhi and Hassairi, 2013). Additionally, significant macroeconomic variables like GDP, inflation rate, and currency rate were chosen for this work and regressed to assess their impact on Ethiopian banks' financial stability. The current study, in general, attempted to fill the gap by figuring out the combined impact of the two most significant particular determinants on bank stability in Ethiopian circumstances. The study also closes a gap in the limited body of research on rising economies. Examining the effect of risk management on bank financial stability is the primary goal of this research, which also has the following particular goals:

1. To assess the effect of liquidity risk on the financial stability of Ethiopian banks'
2. To ascertain how Ethiopian banks' financial stability is impacted by credit risk.
3. To investigate the connection between Ethiopian banks' financial stability and operational risk.
4. To investigate how GDP impacts Ethiopian banks financial stability.
5. To evaluate how the rate of inflation affects the financial stability of banks in Ethiopia

6. To evaluate how the exchange rate affects the financial stability of banks in Ethiopia

In this regard, the current study makes the following particular contributions to the body of existing literature. The current analysis aids Ethiopia's government in its ongoing efforts to raise the standard of services provided in the bank industry, forge connections with the foreign exchange market globally, and boost economic efficiency. Furthermore, the study focuses on investigating the relationship between risk management and macroeconomic features and effects on financial stability of banks in Ethiopia that could contribute some evidence from the emerging economy.

Empirical literature review and hypothesis development

Liquidity risk and financial stability

The ability of businesses to pay for their short-term needs is liquidity. It is required of commercial banks to maintain a certain level of liquid assets that can be easily converted to cash. The company's incapacity created liquidity risk to fulfill its short-term obligations. Banks that encountered liquidity risk during the 2008 financial crisis experienced financial instability, which had an impact on other banks and the whole economy (Mishra *et al.*, 2012; Shukla, 2014). Liquidity risk has a substantial detrimental impact on banks' financial stability, according to a number of prior studies that looked at this link (Imbierowicz and Rauch, 2014; Mensi and Labidi, 2015; Khemais, 2019). The study examined some inconsistent findings from Gupta and Kashiramka (2020) and Zaghdoudi (2019), which discovered a significant beneficial impact of liquidity risk on the stability of Indian and Tunisian banks, respectively. In addition to these outcomes, a few more studies have discovered comparable outcomes (Ali and Puah, 2018). Nonetheless, certain research indicates that liquidity risk has less impact on financial stability (Amara and Mabrouki, 2019). In light of the debate above, the following hypotheses are put forth:

• H1

Liquidity risk has a significant and negative effect on the financial stability of banks in Ethiopia.

Credit risk and financial stability

Ineffective credit risk management will cause a bank to have more non-performing loans than allowed by the central bank, which will swiftly lower profitability. A high percentage of non-performing loans is frequently linked to a poor credit score. According to agency theory, there is always a credit risk associated with bank operations, and managers may have conflicts of interest with shareholders. The agency problem can manifest itself in a variety of ways, such as a decline in loan quality. Credit risk is the likelihood that one of the bank's counterparties won't fulfill its responsibilities in

line with the terms and circumstances set out, which might result in a loss of money.

Credit risk is the inherent danger that a consumer won't get their money back from the bank. The bank must use all of its qualitative and quantitative judgment abilities to assess credit risk as precisely as possible (Choudhry, 2018). The main risk that has to be controlled is the control risk (Hopkin, 2018). Credit risk, according to Kamis (2018), is the possibility that one of the parties to a financial transaction will default. Several investigations have been conducted to examine the impact of credit risk on bank stability, yielding varying conclusions. Credit risk, among other things, has been shown in several studies to decrease the stability of banks (Acharya and Mora, 2013; Rajhi and Hassairi, 2013; Khemais, 2019; Djebali and Zaghdoudi, 2020). According to certain research, banks with higher credit risk should be more stable (Phan *et al.*, 2019; Adusei, 2015; Ali & Puah, 2018). Aside from this, other research (Amara and Mabrouki, 2019; Zaghdoudi, 2019) finds no discernible impact of credit risk on the stability of banks. In light of the above argument, we postulated the hypothesis as:

- *H2*

Credit risk has a significant and negative impact on the financial stability of banks in Ethiopia.

Operational risk and financial stability

Operational risk affects bank's financial stability because of subpar, antiquated, or inappropriate internal banking procedures; it can also result from outside events (Jahan *et al.*, 2022). Operational risk occurs in the course of running any firm, not only banks. Banks expect incidents involving operational risk. Furthermore, a bank's complexity of operations raises the possibility of significant operational risk events that might have a negative effect on the bank's profitability; as a result, operating losses are usually factored into the bank financial strategy (Apostillik *et al.*, 2009). Many academics contend that if operational risk results in a financial institution failing or a decline in public trust in the financial system, it may have a major effect on financial stability. Consequently, operational risk management is taken into account by regulators and financial institutions when evaluating and reducing threats to financial stability. The research conducted by Mazankova and Nemec (2008) and De Jongh, De Jongh, De Jongh, and Van Vuuren (2013) revealed that operational risk elements played a significant role in exacerbating the duration and severity of financial crises, thereby impacting financial stability. Drawing upon empirical reviews, the present study posits the following hypothesis:

- *H3*

There is a significant and positive relationship between operational risk and the financial stability of banks in Ethiopia.

Inflation rate and financial stability

A nation's banking system becomes more susceptible to risk as its inflation rate rises, which is predicted to have an effect on the financial stability of banks. Nurmakhanova (2013). The majority of financial stability research (Ali & Puah, 2018; Trad, N. *et al.*, 2016; Shahid and Abbas, 2012; Labidi, W., 2015; Amidu and Wolfe, 2013) has found a significant and negative relationship between inflation and bank financial stability. Despite this, Mirzaei, A. (2011), and Abuzayed *et al.* (2018) discovered that the influence of inflation varies between Islamic and conventional banks, with the former having a negative correlation with stability and the latter having a positive correlation.

However, for banks in Southeast Asia, it was discovered by Rajhi and Hassairi (2013) that inflation had a positive and substantial influence on the stability of small banks and a negative and significant impact on the stability of large banks. However, although the link between inflation and bank profits appears to be negatively associated with all metrics of bank profitability, Cihak and Hesse (2010) and Al-Khouri and Arouri (2016) found no influence of inflation on bank financial stability. According to Viphindartin (2021), the rate of inflation has a long-term, positive, and significant effect on the amount of non-performing loans. As a result, rising inflation rates raise credit risk or non-performing loan levels, which negatively affect a bank's capacity to remain stable. Therefore, the study developed the hypothesis as;

- *H4*

There is a significant and negative relationship between inflation and the financial stability of banks in Ethiopia.

GDP growth and financial stability

The majority of studies on financial stability have shown that real GDP growth and bank financial stability are significantly positively correlated (Adusei, 2015; Olokoyo *et al.*, 2021; Iqbal and Molyneux, 2016; Roman, A.; Danuletiu, 2013; Trad, N. *et al.*, 2016; Rajhi and Hassairi, 2013). According to some research, bank stability and the GDP effect are positively correlated but not significantly so (Nyabakora and Ngomaitara, 2020; Srairi, 2013). According to other research, bank financial stability and GDP growth are inversely correlated (Ali & Puah, 2018; Fu *et al.*, 2014; and Ghassan & Fachin, 2016). Conversely, Ghenimi and Omri (2015) discovered that there is a strong and negative correlation between the real GDP growth variable and the financial stability of conventional banks but not a significant and negative correlation with the stability of Islamic banks. On the other hand, Cihak and Hesse (2010) and Al-Khouri and Arouri (2016) found no evidence of a relationship between GDP growth and bank financial soundness. According to Abuzayed *et al.* (2018), GDP growth in GCC nations is not significantly correlated with conventional bank stability but has a significant positive association with Islamic bank

stability. In general, the GDP growth variable’s hypothesis is expressed as follows:

• *H5*

There is a significant and positive relationship between GDP and the financial stability of banks in Ethiopia.

Exchange rate and financial stability

Exchange rate crises, which arise from local currency depreciation and therefore create significant losses in a nation’s international reserves, can be the primary cause of financial crises. Banks are particularly vulnerable to the effects of these crises due to fluctuations in foreign exchange rates, Taher and Ghassan (2013). As a result, it is anticipated that bank stability and exchange rate stability will be favorably and strongly correlated. The research on bank stability supports the idea that changes in the exchange rate have a significant and favorable influence on the financial stability of banks (Cihák and Hesse, 2010; Shahid and Abbas, 2012; Trad *et al.*, 2016). Conversely, it was discovered by Rajhi and Hassairi (2013) and Ally (2022) that there is a noteworthy and adverse correlation between the exchange rate and the financial stability of big banks in Southeast Asian nations, as well as bank performance in Tanzania.

According to Trad *et al.* (2016), the foreign exchange rate has a significant positive influence on predictability as evaluated by return on equity but a significant negative impact on predictability as measured by return on asset. In addition, bank activity is more risky due to exchange rate volatility, and foreign exchange rate transactions may result in losses. Mendes and Abreu (2001). Based on the given empirical reviews, the hypothesis of the exchange rate variable is stated as follows:

• *H6*

There is a significant and positive relationship between the exchange rate and the financial stability of banks in Ethiopia.

Conceptual frame work

The relationship between the independent and dependent factors of the study is depicted in Figure 1. Financial stability is the dependent variable. Meanwhile, liquidity risk, credit risk and operational risk are employed as independent variables and GDP, inflation and exchange rate are used as the control variables.

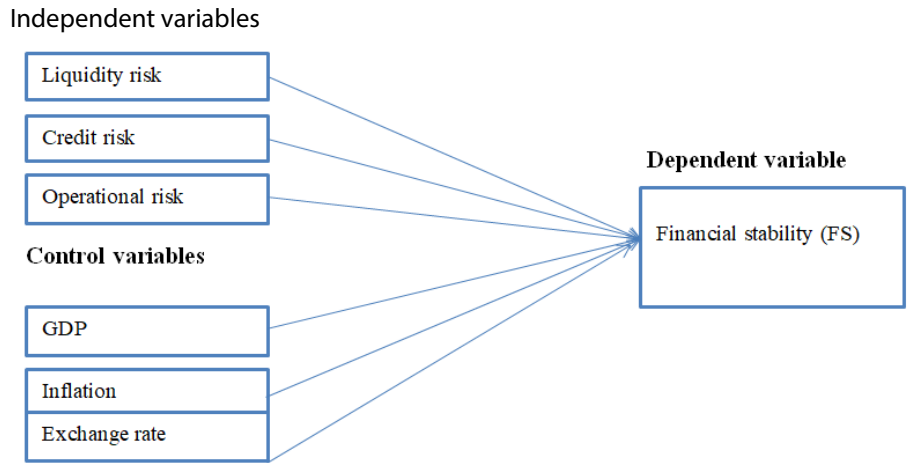
Research method

Sample selection

The purpose of this study was to look at how risk management and macroeconomic features affected Ethiopian bank’s financial stability. To determine the impact of risk management and macro-economic features on the financial stability of banks, this study used a quantitative technique, in line with the research purpose and the quantitative character of the data. In order to investigate the causal linkages between risk management and macroeconomic features on the bank’s financial stability, this study used an explanatory research approach. All banks that are active in Ethiopia and have a full set of annual reports for the sample period of 2017–2024 are included in the sample. There are presently 31 banks functioning in Ethiopia; threats of these banks were not included in the sample data since the full report was not available. Consequently, the study’s final sample consists of 18 banks, which account for 58% of Ethiopia’s banking industry. An overview of the selection process is given in Table 1.

Table 1: Study sample

Total number of bank companies	31
Number of bank companies with missing data	13
Final study sample	18



Own design, 2025

Figure 1: missing caption

Model specifications

The Generalized Method of Moments model was utilized to examine the relationship between risk management and macroeconomic features on the financial stability of banks in Ethiopia. We can account for the endogeneity bias that may arise from the dynamic character of our panel data throughout the sample period of 2017–2024 by using the generalized method of moments (GMM) methodology (Akbar *et al.*, 2017; Chen *et al.*, 2017). The two-step system estimator is more reliable and asymptotically efficient in managing autocorrelation and heteroscedasticity (Arellano & Bover, 1995). In order to evaluate how risk management and macroeconomic features impacted the financial stability of Ethiopian banks, this study used the two-step GMM methodology. The following diagnostic procedures are available for use in confirming the results of GMM estimation: The requirements of the moments are true, which is the null hypothesis for the Arellano and Bond tests of no second-order serial correlation and the Hansen test of over-identifying limitations. A differentiation in Hansen statistics is used to quantify the exogeneity of the subgroups of GMM instruments. Thus, the inability to reject these null hypotheses indicates the reliability of the GMM estimates. As a result, this work modified Ozkan's (2001) partial adaptation model to reflect the main findings of the study. The model is given as:

$$Y_{it} = (\lambda - 1)Y_{it-1} + \beta_1 X_{it} + \mu_i + \mu_t + \varepsilon_{it} \quad \text{-----1}$$

$$FS_{i,t} = (\lambda - 1)FS_{i,t-1} + \beta_1 LR_{i,t} + \beta_2 CR_{i,t} + \beta_3 OR_{i,t} + \beta_4 IFR_{i,t} + \beta_5 GDP_{i,t} + \beta_6 EXR_{i,t} + \varepsilon_{it} \quad \text{-----2}$$

Where:

$FS_{i,t}$ is the financial stability of bank i at time t , LR is the liquidity risk of bank i at time t , CR credit risk of bank i at time t , OR is the operational risk of bank i at time t , IFR is inflation rate of bank company i at time t , GDP is gross domestic product of Ethiopia at time t , EXR is the exchange rate of Ethiopia at time t , and ε is the error term.

Variable contraction

The dependent variable in the study was financial stability, whereas the independent variables were risk management (liquidity risk, credit risk, operational risk) and macroeconomic features (inflation rate, GDP and exchange rate). Table 2 below provides a summary of the research variables.

Dependent variable

Al-Khouri and Arouri (2016) state that the literature uses a variety of methods to compute accounting ratios, including bank profitability, leverage ratio, and liquidity, in order to assess the financial stability of banks. Nevertheless, there is an endogeneity issue with applying these methods, which represent bank risk and accounting ratios. Consequently, the literature uses the common metric Z-score index to lessen

this issue. Several studies on banks' financial stability have employed this indicator in a variety of ways to get accurate results (Abdelbadie and Salama 2019; Tran *et al.*, 2020; Marie *et al.*, 2021). As per Barth (2013), the Z-score index is a solitary metric that takes into account predictability, return volatility, and leverage as proxies for the financial health of banks. The following is the formula for the Z-score index: ROA plus the capital ratio, which is calculated by dividing the total equity (TE) by the total asset (TA) and dividing the result by the ROA standard deviation (σ).

$$Z\text{-score}_{i,t} = \frac{ROA_{it} + \frac{TE}{TA}_{it}}{\sigma(ROA)_{it}}$$

Independent variables

• Liquidity risk

is the possibility that the bank won't have enough cash on hand to pay its maturing debts when they're due, at a fair price, and on schedule. Due to discrepancies in the timing of the cash flows in both normal and stressful conditions, the bank may not be able to fulfill its payment commitments when they become due, which gives rise to liquidity risk. "Liquid assets/total assets" is a measure of liquidity risk. It was a reference to businesses' ability to pay short-term debt. This ratio's higher value indicates a larger degree of liquidity risk.

• Credit risk

Credit risk is the likelihood that one of the bank's counterparties won't fulfill its responsibilities in line with the terms and circumstances set out, which might result in loss of money. Credit risk, according to Kamis (2018), is the possibility that one of the parties to a financial transaction would default. The ratio of non-performing loans to total advances is used to calculate credit risk (Goetz 2018, Serwadda 2018). It symbolizes the potential for a bank borrower to default on their debt by the agreed-upon terms. According to Natsir *et al.*, (2019), a higher ratio value indicates a higher level of credit risk. Non-performing loan to total advance is how it was measured.

• Operational risk

Operational risk is the possibility of suffering a loss as a result of improper or inadequate systems, improper personnel, improper or inadequate internal procedures, and external events inside the bank. By implementing the operational risk management policy and process that the bank's board of directors had authorized, the bank established its framework for managing operational risk. Operational risk is calculated as 15% times the total income over the previous three years (Roman, 2021).

• Inflation rate

Therefore, a nation's banking system becomes more susceptible to risk as its inflation rate rises, which is

Table 2: Variable and their measurement

Variables	Symbol	Measurement
Dependent variable		
Financial stability	FS	$Z\text{-score} = \frac{ROA_{it} + \frac{E}{A_{it}}}{\partial(ROA)_{it}}$
Independent variable		
Liquidity risk	LR	$LR = \frac{\text{current asset}}{\text{current liability}}$
Credit risk	CR	$CR = \frac{\text{Non Performing loan}}{\text{Total advance}}$
Operational risk	OR	The total income for the last three years * 15%
GDP	BM	GDP growth rate of the year
Inflation	INF	Inflation rate of the year
Exchange rate	EXR	Bank exchange rate of the year

Source: own design 2025

Table 3: Descriptive statistics

Variables	Obs	Mean	Std. Dev	Min	Max
FS	136	0.039699	0.015558	0.019000	0.067000
LR	136	4.351468	33.92306	0.506000	0.086000
CR	136	0.033329	0.079983	0.001240	0.912000
OR	136	0.388735	1.526278	0.090000	18.00000
INF	136	0.160288	0.100008	0.016000	0.338000
GDP	136	0.136125	0.150295	0.056000	0.530000
EXR	136	0.967000	0.010174	0.981000	0.950000

Source: STATA 14 result

predicted to have an effect on the financial stability of banks, Nurmakhanova (2013). It is expressed as the annual rate of inflation.

- *GDP*

The most often used metric to describe the total economic activity of a country is its gross domestic product. It shows the total amount of finished products and services produced in a nation over a given amount of time, like a year. The majority of research on financial stability has shown that real GDP growth and bank financial stability have a significantly positive association (Adusei 2015; Olokoyo *et al.*, 2021). It is expressed as the annual GDP.

Exchange rate

Empirical results and discussion

Descriptive statistics

The descriptive statistics of variables are displayed in Table 3 below. Z score has an average value of 0.039; with a standard

deviation of 0.0155, with a minimum value of 0.019 and a maximum value of 0.067. The average value of liquidity risk is 4.35, with a minimum of 0.506 and a maximum of 0.086. Credit risk has a mean value of 0.033 and a moderate range between 0.0012 and 0.912. The average operational risk value is 0.388, with a minimum of 0.09% and a high of 18%. With a minimum of 0.016 and a maximum of 0.338, inflation has an average value of 0.16. Furthermore, the GDP has a mean value of 0.136 and a wide range between 0.056 and 0.53. Additionally, the average exchange rate is 0.967, with a small spread between the minimum value of 0.09% and the maximum value of 0.95.

Correlation matrix

As shown in Table 4 below, there is a negative correlation between credit risk, operation risk, inflation and exchange rate with a coefficient of -0.1039, -0.043, 0.1675 and -0.246, respectively. Moreover, liquidity risk and GDP have all positively correlated with the financial stability of banks in Ethiopia, with values of 0.1561 and 0.099, respectively.

Regression analysis

Table 5 shows that, with a level of 0.446 and a *p-value* of 0.004, liquidity risk positively affects the bank's financial stability. According to this finding, the bank's financial stability decreases by 2.04% for every 1% increase in the liquidity risk. The outcome is consistent with the hypothesis put forward and is comparable to the research of Gupta and Kashiramka (2020) and Zaghdoudi (2019). Consequently, the study accepts the alternative hypothesis and rejects the null hypothesis. The bank's financial stability is negatively impacted by credit risk, with a level of 0.154 and a *p-value* of 0.063. This finding indicates that a 1% rise in credit risk causes a 6.3% increase in the bank's financial instability. The outcome aligns with the hypothesis put forward and is comparable to the research conducted by (Khemais, 2019 Djebali and Zaghdoudi, 2020).

The bank's financial stability is negatively impacted by the inflation rate, with a coefficient of 0.023 and a *p-value* of 0.004 at the 1% significant level. This finding indicates that a 1% increase in the inflation rate causes a 2.3% increase in the bank's financial instability in Ethiopia. This might be the case because a nation's banking system becomes more susceptible to risk as its inflation rate rises, which is predicted to have an effect on the stability of bank finances, Nurmakhanova (2013). The outcome is consistent with the majority of financial stability research, which has found a significant and negative relationship between inflation rate and bank financial stability (Ali & Puah, 2018; Trad, N. *et al.*, 2016; Abuzayed *et al.*, 2018). The outcome is likewise consistent with the theory put forward. Consequently, the study accepts the alternative hypothesis and rejects the null hypothesis.

Additionally, table 3 of the statistical analysis result shows that the exchange rate had a negative and statistically

Table 4: Correlation matrix

	FS	LR	CR	OR	INF	GDP	EXR
FS	1.0000						
LR	0.1039634	1.0000					
CR	-0.0438654	-0.0236	1.0000				
OR	-0.1561658	-0.0137	-0.0142	1.0000			
INF	-0.1675914	0.1072	0.1389	0.0930	1.0000		
GDP	0.0992666	0.1386	0.2037	-0.0478	0.6016	1.0000	
EXR	-0.2464271	0.0961	0.1141	0.11994	0.6342	0.4397	1.0000

Source: STATA 14 result

significant impact on the financial stability of banks at the 1% significance level and 0.166 coefficients with *p-value* 0.0032. This could be interpreted as a 1% raise in exchange rates leading to a 16.62% enhancement in the instability of banks. The fundamental cause of the negative link between bank stability and exchange rates may be exchange rate crises, which are triggered by devaluations of local currencies and are susceptible to changes in the values of foreign exchange

(Ghassan and Taher, 2013). The result is consistent with the theory and comparable to the studies carried out by Ally (2022) and Rajhi and Hassairi (2013). As a result, the study rejects the null hypothesis and accepts the alternative. In the end, the operational risk study had no appreciable effect on Ethiopian banks' financial soundness.

Test of statistical assumptions

Multicollinearity

The strongest correlation (0.63) between EXR and INF is seen in Table 4. According to Nguyen and Do (2020), if the correlation coefficient is less than 0.8, multicollinearity may not exist. Therefore, it is verified that the regression analyses of the current study do not exhibit multicollinearity.

Heteroscedasticity and autocorrelation

The two-step GMM estimator approach is more asymptotically effective and consistent in handling heteroscedasticity and autocorrelation (Arellano & Bover, 1995).

Normality test

As indicated by the probability values of 0.125 in the Shapiro-Wilk W test statistics, Table 6 provides evidence that the data are consistent with the standard distribution assumption. Additionally, it implies that inferences about population parameters drawn from sample data appear to be accurate (Table 6).

Conclusions and implications

The aim of the study is to investigate the main determinants of a bank's stability with yearly data (2015–2022) from the banking sector in the emerging economy of Ethiopia. Financial stability (FS) was used as the dependent variable in the analysis, along with independent factors such as liquidity risk (LR), credit risk (CR), operational risk (OR) as bank-specific factors, inflation (INF), GDP, exchange rate (EXR) as macroeconomics factor. The study found that credit risk, inflation and exchange rate have a significant negative influence on the financial stability of commercial banks in Ethiopia. Where liquidity risk and GDP have a significant positive influence on the stability of the bank sector of Ethiopia, besides these, operational risk has no significant

Table 5: The two-step system GMM estimation results

FS	coef.	Std. errs.	Z	<i>p> z </i>	[95% conf. interval]
FSit-1	0.513877	0.116657	4.40	0.004**	-0.000135 1.85005
LR	-0.020408	0.000508	0.488	0.063***	-0.030527 0.035296
CR	-0.154189	0.430207	-0.468	0.0488**	-0.000374 0.003047
OR	-0.001436	0.003067	-3.315	0.11698	-0.078358 0.027704
INF	-0.023751	0.016214	-0.42	0.0044*	-0.015410 0.028927
GDP	0.018803	0.019627	-3.315	0.0352**	-0.3928029 0.421256
EXC	-0.166285	0.191549	0.958	0.0032*	0.068898 0.999732
cons	2.537693	12.82142	0.197926	0.8435	-0.915585 -0.030470
Wald stat	16.235				
AdjR ²	48.236				
AR2(<i>p-value</i>)	0.0314				

Source: STATA 14 result

Table 6: Normality test

Variables	Obs	W	V	Z	Prob>z
Residual hat	136	0.76756	1.312	2.101	0.125

Source: STATA 14 result

impact on bank stability.

The findings of our study have several implications for policymakers and bank management in Ethiopia. Bank management should establish policies that ensure secure loan granting and timely reimbursement from customers to minimize credit risk. Besides this, the management should keenly observe the liquidity position. According to our study, liquidity risk reduces the financial stability of the banks. Furthermore, banks should also improve the quality of credit appraisal and analysis. Focus on collecting and updating information about customers in a timely and accurate manner, analyzing the risks of the loan plan to provide the expected risks and the bank's controllability. Develop appropriate appraisal procedures and standards for each different type of project. Higher inflation rates negatively impact on financial stability of banks. For these reasons, commercial banks of Ethiopia should take measures to mitigate the inflation rate effect by strengthening the ability of banks to provide insurance against liquidity risk and enhancing saving potential. Ethiopian commercial banks play a vital role in the economic development of a country. Ethiopian banks should enhance the accumulation of idle savings of the people and make them available for investment. They also create new demand deposits in the process of granting loans and purchasing investment securities in order to promote GDP growth.

This study has limitations. Firstly, this work concentrated on banking institutions and disregarded non-banking institutions, so its findings will not be relevant to non-banking institutions. Second, although there are many internal and external determining factors, the current study only used a small number of macroeconomic and bank-specific elements. Thus, future studies should incorporate more macroeconomic variables relevant to Ethiopian economies that influence banks' financial stability. Moreover, future research may take into consideration specific bank variables such as all financial risks, liquidity risk, credit risk, and interest rate risk.

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