



The Impact of Covid-19 on the Financial Stability Evidence from Private Commercial Banks in Ethiopia: Dynamic Panel Data Analysis

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ABSTRACT

This study used the Generalized Method of Moments (GMM), a dynamic two-step approach, to examine the effect of COVID-19 on the financial stability of private commercial banks in Ethiopia. The study offered a thorough evaluation of the ways in which different elements affected financial stability during the pandemic period by examining data from 16 private banks. The results showed that the financial stability of the banks was positively impacted by COVID-19, the financial stability of the prior year, liquidity, and GDP. In particular, the financial climate has become more stable as a result of the pandemic-induced changes to digital banking and regulatory adjustments, as well as economic expansion. On the other hand, less financial stability is linked to bigger banks, greater financing risk, higher credit risk, and greater bank concentration. Greater operational and risk management difficulties may be faced by larger banks, and financial stability may be undermined by excessive funding and credit risk. The findings highlight the intricate relationships at work, where internal variables and external shocks like the COVID-19 epidemic combine to influence banks' financial health. Policymakers and bank managers, who have to deal with the difficulties of controlling credit risk, interest rates, and bank size, need to know these insights. According to the study, resilience can be strengthened by prior financial stability and favorable economic indicators, but in order to maintain financial stability in the post-pandemic age, care must be taken to reduce the risks associated with larger banks and credit risk to ensure sustained financial stability in a post-pandemic era.

Keywords: Financial Stability, Dynamic Panel Data, Covid-19, Two-step System GMM

JEL Classifications: A10, G20, M40

1. INTRODUCTION

As the biggest worldwide issue since the conclusion of World War II, the COVID-19 pandemic represents an unparalleled calamity. It acts as a stark reminder of what happens when unbridled human activity collides with the finite resources of our world. This crisis is probably not the final one, according to the (United Nations Country Team in Ethiopia, 2020). The pandemic started on December 31, 2019, with the first confirmed case in Wuhan, Hubei Province, China. The virus spread quickly to nations all over the world, including Ethiopia and Africa, and by March 10, 2020, the World Health Organization (WHO) had proclaimed it

a global pandemic.

According to Rababah et al. (2020), the COVID-19 pandemic has caused business closures, global trade disruptions, and financial losses across industries. Supply chains, manufacturing, and healthcare face reduced demand, cash flow declines, lower sales, workforce shortages, and marketing challenges. Future success depends on overcoming these difficulties. The COVID-19 pandemic has significantly impacted economies, industries, and businesses globally, with Ethiopia's economy experiencing significant impacts. Agriculture, industry, and service sectors are expected to experience significant reductions, with agriculture,

industry, and service sector potentially losing 0.8%, 2.4%, and 25.5% respectively (Geda, 2020).

Beyene et al., (2020), found that COVID-19 has severely impacted Ethiopia's industrial manufacturing industries, particularly in machinery, basic iron and steel, and chemical products. These industries rely heavily on imported raw materials, with 75%-80% of their production being affected by strict immigration laws and Western countries.

Demisie (2020) study on Ethiopia's macroeconomic stability found that COVID-19's impact lasts at least 3 years, affecting the heavily reliant economy on imports. The uncertainty effect, which starts as a supply chain shock, rapidly destabilizes the economy through aggregate demand, food and non-food prices, investment, employment, and export shocks. Yayeh and Frede, (2020) reveal Ethiopia's rapidly increasing pandemic cases, particularly in manufacturing and service sectors like hospital, aviation, and tourism, due to international markets and global demand.

Commercial banks significantly contribute to a country's economic growth by facilitating the transfer of funds, providing credit to the production sector, and enhancing overall economic performance (Jahan et al., 2019). Banks are crucial to the economy, and failure to meet obligations could lead to severe economic consequences and disruptions within the banking system (Sifrain, 2021). Following the 2007-2009 Global Financial Crisis, policymakers have emphasized the importance of banks' financial stability, making it a key global agenda item (Beck, 2008).

Bank and financial stability are not universally agreed upon concepts, but are crucial for economic stability, ensuring smooth financial intermediation processes among sectors like households, businesses, and the government (Kasri and Azzahra, 2020) and (Khan, 2011). However, the onset of the COVID-19 pandemic introduced significant threats to this stability, leading to a series of economic disruptions and uncertainties.

The COVID-19 pandemic has impacted commercial banks' financial stability, with conflicting findings (Teresienè et al., 2021). While some profitability and solvency decreased, financial hardship decreased and liquidity improved. The pandemic underscored the need for banks to maintain adequate capital during crises, as more capital is needed to withstand shocks (Tran, 2024). The global financial system has been significantly impacted, emphasizing the importance of banks' ability to respond to disruptions (Alshamali and Alawadhi, 2022).

The COVID-19 pandemic has posed a major challenge to financial systems worldwide, affecting various economic sectors, including commercial banking (Nizar et al., 2023). It has had a notable impact on the financial performance and profitability of banks, with research examining effects on returns, volatility, and non-performing loans (Gazi et al., 2022; Ghouse et al., 2022; Silva et al., 2024). Additionally, the pandemic has influenced the operational efficiency of commercial banks, with some successfully adapting to the crisis and improving their operations (Sang, 2022).

The COVID-19 pandemic has worsened commercial banks' liquidity and financial health, leading to a drop in both areas (Karim et al., 2021). The government has implemented expansionary monetary policies to promote economic sectors and boost client loans, addressing the pandemic's impact on commercial banks' loan growth (Hoang et al., 2022). The impact of COVID-19 was significant on the banking industry (Lin et al., 2021). In times of financial turbulence brought on by the pandemic, commercial banks need more capital to withstand shocks. According to Tran (2024), this emphasizes how important capital adequacy is to maintaining banks' stability and resilience in the face of external disruption.

Using a comparison analysis, Nanang (2023) looked at how the COVID-19 epidemic affected Indonesian banks and found that the average bank soundness ratio, as determined by Return on Assets (ROA) and Loan to Deposit Ratio (LDR), had significantly decreased. The COVID-19 pandemic has had a complex range of repercussions, including challenges to the stability of the banking system, according to Riadi et al. (2022) (Riadi et al., 2022; Alshamali and Alawadhi, 2022). Highlight the pandemic's varied and substantial effects on the world financial system, with a particular emphasis on banks' responses to the crisis (Alshamali and Alawadhi, 2022).

Moudud-Ul-Huq et al. (2021) examined the impact of the COVID-19 pandemic on banks' capital regulation and risk-taking behavior, focusing on ownership structure. Their findings reveal how regulatory frameworks and risk management practices affect bank stability. Le Hoang et al., (2022) studied the COVID-19 pandemic's impact on Vietnamese commercial banks' loan growth, emphasizing the need for expansion and the crucial connection between lending practices and financial stability. Moreover, Nizar et al. (2023) and Riadi et al. (2022) highlighted the impact of the COVID-19 pandemic on financial stability, highlighting the importance of bank concentration, efficiency, and liquidity in maintaining commercial bank stability and profitability.

The pandemic has led to changes in banking practices, with digitalization and innovative development becoming essential for banks to adapt to the new normal (Olena et al., 2021). Commercial banks in various countries, such as south Africa and Indonesia, have demonstrated resilience during the pandemic, with strong capital reserves, fund inflows, and liquidity injection programs playing a crucial role in maintaining stability (Peerbhai, 2024; Viphindartin et al., 2022). The pandemic has impacted banking habits, necessitating digitalization and creative development for banks to adapt (Olena et al., 2021). Strong capital reserves, money inflows, and liquidity injection programs have been crucial in maintaining stability in countries like South Africa and Indonesia during the pandemic (Peerbhai, 2024; Viphindartin et al., 2022).

Mersha and Worku (2020) and Chali and Tyagi (2022) conducted qualitative content analysis on the impact of COVID-19 on Ethiopia's banking industry. They found that the pandemic significantly affected loan management, deposit mobilization, and economic stability. They suggested that banks should actively interact with customers and implement supportive policies to manage the crisis and maintain financial stability. Chali and

Tyagi (2022) also found a rise in risks and a negative impact on profitability. They advised banks to diversify revenue streams and implement digital solutions to increase resilience against future challenges.

The study reveals several research gaps regarding the impact of COVID-19 on the financial stability of commercial banks in Ethiopia. The lack of research on private commercial banks in Ethiopia highlights the complexity of factors influencing banking operations during crises. The study aims to address these gaps and provide new insights into how commercial banks can navigate financial challenges, enriching existing literature and offering valuable guidance for stakeholders in the banking sector. The research underscores the need for further investigation into the complex interplay of factors influencing banking operations during crises.

This study aims to contribute to the existing body of knowledge by providing a comprehensive analysis of the impact of the COVID-19 pandemic on the financial stability of commercial banks. By delving into factors such as COVID-19, previous year financial stability liquidity, credit risk, bank size, funding risk, gross domestic product and real interest rate this research seeks to offer insights into how banks can enhance their resilience in the face of unprecedented challenges. Furthermore, by examining the specific case of commercial banks in the context of the pandemic, this study aims to provide practical implications for policymakers, regulators, and industry professionals to bolster the financial sector's stability and sustainability in a post-pandemic landscape.

2. LITERATURE REVIEW

2.1. COVID-19 and Financial Stability

The global financial crisis led to the failure of many commercial banks, highlighting the importance of a sound financial system to withstand crises. Central banks have historically prioritized maintaining financial and banking stability, as it directly impacts the long-term viability of the banking sector. Assessing financial stability was initially recognized during the late 1990s and 2007 financial and economic crises, making it a highly discussed topic in economic literature (Karim et al., 2019).

The COVID-19 pandemic has had a greater negative impact on the global financial system and economic sector than the 2008-2009 Global Financial Crisis. It has led to significant growth downgrades and economic instability in every region. The role of COVID-19 in the banking industry has been extensively studied, but there is a lack of studies on how it affected banking stability, particularly in commercial banks.

Al-Kharusi and Murthy (2020) study analyzed the financial stability and sustainability of 30 large banks in the Gulf Cooperation Council countries using Monte Carlo simulations. They identified several banks at risk of becoming financially unsustainable due to potential negative profitability, low capital ratios, and heavy credit losses during economic turbulence. The COVID-19 pandemic has severely impacted developing markets, causing declining commodity prices and weakening currencies. Despite stimulus packages, financial instability remains a major

risk in Africa due to capital outflows, trade disruptions, decreased foreign direct investment, and funding shortages (Shipalana and O'riordan (2022).

Hassan et al. (2022) found that the COVID-19 pandemic significantly impacted international banks, leading to decreased loan growth and increased non-performing assets. Low interest rates and non-performing loans increased banking risks and stability. A 1% increase in COVID-19 instances decreased banks' z-scores and increased return volatility, highlighting the importance of government actions in reducing financial risks. Mathenge and Muniu (2024) assessed how the COVID-19 epidemic affected Kenyan commercial banks' financial stability. The study used a panel vector auto regression model to analyze data and develop impulse response functions using data from 19 commercial banks between 2015 and 2022. The results showed that the pandemic negatively impacted capital adequacy and Z-score, indicating heightened financial instability.

Elnahass et al. (2021) studied the impact of COVID-19 on global banking stability using panel data from 1090 banks. The study found that the pandemic significantly negatively affected the financial stability of these banks, using the Z-score as a stand-in.

Utami & Makhrus, (2022) compared the financial performance of Islamic commercial banks in Indonesia before and during the COVID-19 pandemic, focusing on key financial ratios like Return on Assets, Financing to Deposit Ratio, Non-Performing Financing, and Operating Costs to Operating Income. The research found that despite challenges, Islamic banks demonstrated resilience in profitability, liquidity, asset quality, and efficiency. The study recommends Islamic banks to enhance risk management strategies, focus on innovation and digital transformation, and continuously monitor financial performance to better withstand future economic shocks. This will contribute to a deeper understanding of the Islamic banking industry's dynamics during crises and lay a foundation for future research.

Kodasheva et al., (2020) studied the impact of COVID-19 on Kazakhstan's banking industry, highlighting increased financial distress, a drop in loans, and regulatory actions. The report concluded that recovery depends on strong regulation, financial stability, and a resurgence of economic expansion, despite significant challenges faced by the industry.

Maria et al.'s 2022 study found that COVID-19 significantly and negatively impacted Indonesian bank stability, using data from 108 commercial banks from 2020 to 2021, using fixed effects regression analysis. Riadi et al. (2022) studied the impact of COVID-19 and bank concentration on Indonesian stability. They found that robust capitalization reduced the negative effects of bank concentration and the pandemic on stability. The study concluded that increasing bank capitalization and concentration is crucial for maintaining stability during economic downturns, emphasizing the need for supportive governmental initiatives.

DeYoung & Torna, (2013) study investigated whether income from nontraditional banking activities contributed to the failures

of U.S. commercial banks during the financial crisis. Using a multi-period logit model, the results indicated that pure fee-based nontraditional activities, such as securities brokerage and insurance sales, decreased the probability of bank failure, whereas asset-based activities, including venture capital, investment banking, and asset securitization, increased the likelihood of failure.

Le et al. (2024) examined the impact of COVID-19 on Vietnam's bank-based financial system and stability. Using VECM and NARDL models, they found that the pandemic initially negatively impacted financial stability, but this effect decreased over time. The analysis also revealed an unbalanced relationship between the epidemic and the financial market. Alfayan et al., (2023) analyzed the financial stability of 13 Islamic banks from Q1 2019 to Q4 2020. They found no significant differences in variables like Z-Score, BOPO, NPF, HHI, GDP, and inflation. However, there were noticeable shifts in BI rate, bank size, and FDR. The study concluded that Islamic banks demonstrated remarkable resilience during the pandemic.

Prior to the COVID-19 epidemic, Ethiopia's banking industry was flourishing, but the crisis has caused operational disruptions for financial institutions, according to Mersha and Worku (2020). According to the report, there would be detrimental effects on important areas like foreign banking, loans, deposit mobilization, and profitability. With their position as financial intermediaries and economic stabilizers receiving more attention, banks must make sure they continue to assist their clients through the difficulties posed by the pandemic.

3. METHODS

3.1. Data and Sample Size

The study investigates the impact of COVID-19 on the financial stability of private commercial banks in Ethiopia. It uses an explanatory research design and quantitative research approach, focusing on all 25 active banks as of 2022/2023. 16 banks were chosen based on their 2017-2022 annual reports, and the National Bank of Ethiopia provided macroeconomic statistics and financial data.

3.2. Model Specification

The study examines the impact of covid-19 on financial stability of private commercial banks in Ethiopia using the generalized method of moments (GMM). The dynamic panel GMM is superior to conventional estimators due to its ability to correct for potential endogeneity, heteroscedasticity, and autocorrelation in panel data. The two-step system GMM dynamic panel estimators of Arellano and Bover (1995), and Blundell and Bond (1998) were used for estimation. A Z-Score was used to quantify financial stability, Following prior studies such as Koskei (2020), Ali and Puah (2018a), Zaidi et al. (2018), (Adusei, 2015) and Köhler (2015) we measured financial stability using a Z-Score: The Z-score is calculated as follow:

$$Zscore_{it} = \alpha + \beta_1 Zscore_{it-1} + B_2 X_{2it} + B_3 X_{3it} + B_4 X_{4it} + B_5 X_{5it} + B_6 X_{6it} + B_7 X_{7it} + B_8 X_{8it} + B_9 X_{9it} + \varepsilon_{it}$$

Where $Zscore_{it}$ = Financial Stability (the dependent variable which is measured by Z-score); $Zscore_{it-1}$ = the lagged dependent variable, previous year Z-score; X_2 =Pandemic (Covid-19); X_3 =Bank size (BS); X_4 =Funding risk (FR); X_5 =Credit risk (CR); X_6 =Liquidity (LIQ); X_7 =Bank concentration (BC); X_8 =Gross domestic product growth rate(GDP); X_9 =Annual average real interest rate(RITR); α =Constant; β_1 - β_9 coefficients of the independent variables; ε_{it} =Error terms.

3.3. Estimation Procedure

OLS and fixed/random effects are unsatisfactory for consistent and effective parameter estimation because they inject endogeneity into the lagged dependent variable. To estimate the models, I first eliminated bank heterogeneity effects by taking the initial difference. Following Arellano and Bond (1991), I employed the generalized method of moments (GMM) technique to address this, which involves instrumenting endogenous regressors using their lagged values. The Arellano-Bond tests for AR (1) and AR (2) in first differences, as well as the Sargan and Hansen tests for over-identifying limitations, were used to evaluate the instruments' validity and strength.

3.4. Variables Definition and Measurements

The Z-score is used to measure stability in this study, which investigates the effect of COVID-19 on the financial stability of private commercial banks in Ethiopia. Three categories of variables—bank-specific, industry-specific, and macroeconomic factors are examined to determine their impact on bank stability, and the findings offer valuable information for forming regulatory policies and management strategies in Ethiopia's banking sector (Table 1).

3.5. Measuring Bank Financial Stability (Z-Score), the Dependent Variable

The Z-score was used to evaluate the financial stability of banks; a higher Z-score denotes more stability because it suggests a lesser chance of failure. On the other hand, a lower Z-score indicates a greater chance of becoming bankrupt. One important indicator of a bank's financial stability in empirical banking research is the Z-score. The researcher used a Z-score as a measure of bank solvency risk or bank stability in this study, which is in line with previous research (Ali and Puah, 2018b); (Adusei, 2015) and Li, Tripe, & Malone, (2017). The computation of bank financial stability by Z-score is as follows:

$$Z - Score = \frac{\text{Return on Assets}(Ro_a) + (Ea)}{\text{Total Equity} / \text{Total Assets}} \div \text{Standard Deviation}(\delta) \text{ of Return on Assets}(\delta Ro_a)$$

3.6. Independent Variables (Bank Specific Variables)

3.6.1. COVID-19 pandemic

COVID-19 is the independent variable in our research. It stands for the dummy variable, which, in accordance with Mathenge

Table 1: Description of the variables and their expected relationships

Variables	Proxies/Measurement	Notation	Expected Sign
Dependent Variable Z-Score (Bank financial stability)	ROA+Equity/TA Δroa	Z-Score	
Independent Variables (Bank-Specific factors)			
Covid-19	Dummy variable that took the value of 1 in 2020,2021 and 2022 and or zero in 2017,2018 and 2019	Covid-19	-
Previous year Stability	Previous Year Z-score	Previous year Z-score	+
Bank Size	Natural Logarithm of Total Asset	SIZE	+
Funding Risk	$\text{Funding Risk} = \frac{\frac{DEP}{TA} + E / TA}{\delta DEP / TA}$	FR	-
Credit Risk	Total Loan/Total Assets	CR	-
Liquidity	Liquid Asset/Total Asset	LIQ	+
Independent Variable (Industry-Specific)			
Bank Concentration	Hirschman-Herfindahl Index (HHI)	BC	+
Independent Variables (Macro-Economic)			
Gross Domestic Product rate	The annual real Growth rate of gross domestic product	GDP	+
Real Interest Rate	Annual Real Average interest rate	RITR	-

Source: Own Compilation, 2024

and Muniu (2024); Ben Abdallah and Bahloul (2024) and Maria et al. (2022), takes the value of 1 if the bank is observed during the COVID-19 period (2020, 2021, and 2022) and zero (2017, 2018 and 2019).

3.6.2. Previous year's bank stability financial (Previous year Z-score)

Bank stability is a continual process rather than a one-time accomplishment, and a bank's performance throughout time affects its continued stability. In other words, a bank's financial stability in one year can affect its stability in the next. In this study, the Z-score from the previous year will be used to gauge the financial stability of the previous year (Pham et al., 2021; Pascual et al., 2015; Carretta et al., 2015).

3.6.3. Bank size (Size)

A bank's size is determined by taking the natural logarithm of its total assets. Due to their increased market power, larger banks are typically less susceptible to liquidity or macroeconomic shocks, enabling them to boost earnings and accumulate larger capital buffers. Because of economies of scale, banks may increase their revenue and offer more competitive interest rates when they have more assets, like loans, which can improve their business (Ali and Puah, 2018a). A greater range of financial services is also available to larger banks, which enables them to raise more capital, provide better customer service, and turn a profit all of which enhance financial stability.

3.6.4. Funding risk

Given that banks rely significantly on consumer deposits, the idea of bank funding risk (FR), first proposed by Adusei (2015) is essential to bank stability. Higher funding risk has a detrimental impact on financial stability, according to the study, because banks increase their efforts to draw deposits, which raises operating costs like marketing and interest rates. According to earlier research, this so lowers profitability by decreasing income from loans and investments (Ali and Puah, 2018b).

$$\text{Funding Risk}(FR) = \frac{\frac{DEP}{TA} + E / TA}{\delta DEP / TA}$$

3.6.5. Credit risk

The loan asset ratio is a measure of a bank's liquidity and credit risk. It indicates the proportion of loans to total assets in a year. A bank with more loans or whose loans account for a significant portion of its assets has a greater loans-to-assets ratio. A higher ratio indicates a bank with more assets in loans. The loan-to-asset ratio has been used by researchers like as (Adusei, 2015), and, Ali and Puah (2018a) to measure credit risk.

3.6.6. Liquidity

Another element that affects a bank's financial health is liquidity, which is measured as the ratio of liquid assets to total assets. The greater this figure, the more liquidity the bank possesses, and thus, the more stable the banking system will be. The ability of the bank to meet its responsibilities, primarily to depositors, is referred to as liquidity. High cash holdings can reduce liquidity risk and assist banks reduce the chance of failure, according to Berger and Bouwman (2013) According to Torna and Young (2012) banks that have more liquid assets have a lower failure rate. Liquid assets divided by total assets serves as a stand-in for it.

3.6.7. Bank concentration/herfindahl index

The Hirschman-Herfindahl Index (HHI), which gauges market rivalry in the banking industry, is used in this study to quantify banking concentration. The market shares of each bank are squared and added up to determine the HHI. Less competition is indicated by higher concentration, which may lower banking operations' efficiency. According to the study, by encouraging efficiency and strategic pricing, less market concentration which raises competition—may improve bank financial stability. Each bank's market share, which is determined by dividing its total

assets by the total assets of the industry, is squared to determine the HHI.

$$Herfindahl\ Hirschman\ index\ (HHI) = \sum_{i=1}^n (MS_{it}^2) = \sum_{i=1}^n \left(\frac{T_{ait}}{Ta} \right)^2$$

The Herfindahl Hirschman Index (HHI) is normally used to compute market concentration. The HHI ranges from 0 to 1 with higher values indicating high concentrated and less competitive banking industry (Boyd and De Nicoló, 2005).

3.6.8. Gross domestic product

The stability of the financial system is greatly influenced by GDP growth, which generally promotes bank stability by increasing deposits and loans. By decreasing these financial inflows, a drop in GDP growth can jeopardize banking stability by raising the number of non-performing loans and possible banks (Ali and Puah, 2018b). One of the most important markers of banking distress is frequently an economic slowdown. Stability in banking is greatly

aided by robust GDP growth (Pham et al., 2021) The yearly real GDP growth rate was employed in this study to measure economic performance.

3.6.9. Real interest rate

Sincere interest is used to describe the interest rate adjusted for inflation. According to Pascual et al. (2015) real interest rate increases are predicted to boost bank profits while negatively affecting borrowers by raising loan interest rates. In other words, a high real interest rate will deter borrowers and reduce loan applications. Furthermore, there is a risk of higher credit risk associated with an increase in market interest rates, even while this directly results in higher bank returns for newly created or variable interest loans Koskei (2020).The average real interest rate was employed in this study’s analysis.

4. RESULTS AND DISCUSSION

4.1. Descriptive Statistics of Variables

To give an overall description of data employed in the model, descriptive statistics are used to determine the minimum, maximum, mean, and standard deviation as follows in Table 2.

Table 2: Summary of descriptive statistics

Variable	Obs	Descriptive Statistics			
		Mean	Standard deviation	Min.	Max.
Z-Score	80	2.951	0.362	2.382	4.294
COVID-19	80	0.5	0.502	0	1
CR	80	17.541	2.663	5.879	23.233
SIZE	80	2.26e+10	1.78e+10	1.29e+09	8.93e+10
FR	80	2.874	0.453	2.345	4.425
LIQ	80	19.389	5.21	10.717	33.111
BC	80	42.945	4.628	14.157	48.067
GDP	80	8.047	1.409	6.057	9.564
RITR	80	-0.216	4.519	-7.3	5.25

Source: NBE, Banks Annual Report and Computed through Stata 14, 2024

The Z-score, a measure of financial stability, shows a mean value of 2.951 between 2017 and 2022. The study found a small but not statistically significant difference in the financial soundness of Ethiopia’s private commercial banks. The banks had sufficient equity to cover losses, as indicated by the mean Z-score value (2.951). This is due to positive returns on equity and assets, as well as consistent returns. No significant losses would have destroyed their equity, and growing profitability served as the catalyst. The study reveals that banks’ financial stability is measured by their Z-scores, which indicate their

Table 3: Two-Step System GMM Model Result

Group variable: id	Number of obs= 80					
Time variable: year	Number of groups= 16					
Number instruments: 19	Obs per group: min= 5					
Wald chi2(9)= 82135.10	avg= 5.00					
Prob >chi2= 0.000	max= 5					
Zscore	Coef.	Std. Err.	Z	P> z	[95% Conf.	Interval]
L. Zscore	.950171	.1687076	5.63	0.000	.6195102	1.280832
Covid-19	.5311536	.1185048	4.48	0.000	.2988885	.7634187
Cr	-38.74754	11.54666	-3.36	0.001	-61.37858	-16.11651
Size	-.7940501	.2306281	-3.44	0.001	-1.246073	-.3420273
Fr	-.0120141	.0052405	-2.29	0.022	-.0222852	-.001743
Liqq	.042862	.0143048	3.00	0.003	.0148251	.070899
Bc	-9.454225	3.723068	-2.54	0.011	-16.7513	-2.157147
Gdp	21.48175	5.766348	3.73	0.000	10.17992	32.78359
Ritr	.0461851	.6320816	0.07	0.942	-1.192672	1.285042
_Cons	11.03645	3.474911	3.18	0.001	4.225754	17.84716

Arellano-Bond test for AR (1) in first differences: z = -2.44 Pr > z = 0.005

Arellano-Bond test for AR (2) in first differences: z = 1.63 Pr > z = 0.172

Sargan test of overid. restrictions: chi2(6) = 17.23 Prob > chi2 = 0.525 (Not robust, but not weakened by many instruments.)

Hansen test of overid. restrictions: chi2(6) = 4.38 Prob > chi2 = 0.956 (Robust, but weakened by many instruments.)

Number of Instruments =19

Number of Groups=16

Source: Own Computation via Stata 14, 2024

ability to withstand changes in returns. Strong financial health is indicated by a Z-score above 2.99, while mild troubles are indicated by scores between 1.88 and 2.99. The study found that the banks in the sample are in the “grey zone,” indicating low but not imminent financial instability.

With a range of 0-1, the primary independent variable, COVID-19, has a mean value of 0.5 and a standard deviation of 0.502. Bank liquidity ratios (LIQs) ranged from a low of 10.72% to a maximum of 33.11%, with an average of 19.39%. This implies that Ethiopian commercial banks generally keep a moderate amount of liquidity. The liquidity ratio's 5.21% standard deviation, on the other hand, shows the most variability among the institutions and reflects notable variations in liquidity across the sample period.

The study found that bank size (SIZE) has a significant impact on client satisfaction, with a mean value of 22,600,000,000 and a standard deviation of 17,800,000,000. Big banks, with a wide range of financial services, can raise more money and effectively serve clients by utilizing economies of scale, as demonstrated by the highest value of 89,300,000,000. The study found that Ethiopian private commercial banks' average credit risk (CR) percentage was 17.541% of total assets, with a standard deviation of 2.663%. The ratio varied between 5.879% and 23.233%, with some banks having relative stability, making the percentage of loan facilities incomparable across banks.

The study reveals a moderate level of market concentration among banks, as indicated by the bank concentration (BC) and funding risk (FR) factors. The BC, measured by the Herfindahl-Hirschman Index, has an average value of 42.945%, while the FR, determined by the ratio of equity to total assets and deposits to total assets adjusted for deposit volatility, indicates variation in deposit mobilization across banks. Ethiopia's GDP growth rate, which has averaged 8.047% over the past 5 years with a standard deviation of 1.409%, is examined in this study and shows signs of economic instability. The GDP varied from 9.564% to 6.057%, which had an impact on the stability and profitability of banks. With a standard deviation of 4.519%, the average real interest rate for banks was -0.216%, ranging from -7.3% to 5.25%. This indicates a substantial degree of variability.

4.2. Two-Step System GMM Model Regression Result

The final model used in this study for testing the formulated hypothesis was a two-step system GMM due to the fact it is an efficient estimator in the presence of Autocorrelation and Heteroscedasticity (Table 3).

Covid-19, measured by a dummy variable, is positively and statistically significantly associated with the Z-score of Ethiopia's private commercial banks ($\beta = 0.5311536$, $z = 4.48$, $P = 0.000 < 0.01$), according to the study. Despite its difficulties, the COVID-19 program brought about improvements that improved Ethiopia's private commercial banks' financial viability. The transition to digital banking has accelerated due to improved online systems, allowing clients to manage accounts and transactions remotely. This has led to increased deposits, client base, and operational effectiveness. Additionally, banks can invest in

innovation and customer service, promoting financial inclusion, especially in rural areas. The Ethiopian government implemented policies like loan deferrals and liquidity support programs to maintain economic stability during the epidemic. These measures helped private commercial banks manage non-performing loans and strengthen capital buffers. The partnership also boosted resilience and prepared the banking industry for future expansion.

The two-step system GMM estimate results show that the current year's bank financial health and the previous year's Z-score (PYFS), a measure of financial stability, have a substantial positive association ($\beta = 0.950171$, $z = 5.63$, $P = 0.000 < 0.01$). This suggests that, in contrast to less stable banks, those that retain stability in one year typically show better financial health the next year. The fact that banks have remained financially stable over time emphasizes how previous stability levels have an impact on present financial health. This result is consistent with earlier research by (Pham et al., 2021; Pascual et al., 2015; Edimealem, 2014).

Financial stability is negatively and significantly impacted by bank size (SIZE), according to the study in Table 3 ($\beta = -0.7940501$, $z = -3.44$, $P = 0.001$). The Z-score drops by 0.794 with a 1% rise in bank size, suggesting less stability. As suggested by previous studies like Adusei (2015), Pham et al. (2021), Kiemo et al. (2019), Ozili (2018) and Edimealem (2014), Belete (2013) and Ali, (2015), this finding supports theories that larger banks experience diseconomies of scale and higher instability. These studies also highlighted the higher costs that larger banks incur, which can further exacerbate instability.

With the goal of determining its effect on financial stability, the study calculated funding risk (FR) in Ethiopian private commercial banks using a ratio involving deposits, total assets, equity, and their standard deviation. According to the analysis, funding risk has a statistically significant detrimental effect on financial stability ($\beta = -0.0120141$, $z = -2.29$, $P = 0.022 < 0.05$). This finding is consistent with the original hypothesis that expected a negative relationship: funding risk has a major impact on bank stability. According to the results of this study, funding risk is a major factor influencing the financial stability of Ethiopian private commercial banks, which is consistent with Köhler (2015) and Ali and Puah (2018a).

The hypothesis of the research is supported by results, which shows a negative association between credit risk (CR) and Ethiopian commercial banks' financial stability ($\beta = -38.75$, $z = -3.36$, $P = 0.001$). The results demonstrate that bank stability significantly decreases for every unit rise in credit risk. Higher credit risk is the cause of this, as it raises non-performing loans, lowers revenue, and erodes overall financial stability. These findings are in line with earlier studies that found a negative correlation between credit risk and bank stability, including those by Ghenimi et al. (2017), by Adusei (2015), and Ali and Puah (2018b).

The study demonstrates a significant positive relationship between the liquidity ratio (LIQ) and financial stability in Ethiopian private commercial banks as measured by the Z-score ($\beta = 0.042862$, $z = 3.00$, $P = 0.033$). As a result, banks have greater capacity

to manage unexpected withdrawals and credit applications. This suggests that higher liquidity levels are linked to increased stability. Strong liquidity positions improve banks' capacity to handle financial shocks and maintain stability, according to earlier studies by Ghenimi et al. (2017) and Kiemo et al. (2019).

The study reveals a significant negative correlation between Ethiopian banks' financial soundness and their bank concentration, ($\beta = -9.454225$, $z = -2.54$, $P = 0.011 < 0.05$) as determined by the Herfindahl–Hirschman Index. This suggests that financial stability declines as bank market strength increases, even if one commercial bank controls a significant share of the industry. This supports previous studies highlighting the detrimental effect of banking market concentration on stability due to increased loan interest rates, moral hazard problems, and potential “too-big-to-fail” hazards in line with Čihák & Hesse, (2010).

According to the study, the financial stability of Ethiopia's private commercial banks and the GDP growth rate are significantly positively correlated, with higher GDP growth being associated with better bank stability. In other words, economic growth raises the demand for banking services, which improves the stability and performance of the financial system. The findings support the Demand Following Hypothesis and earlier research, including Adusei (2015) Real interest rates (RITR) had a negligible impact on bank stability, according to the study ($\beta = 0.0461851$, $z = 0.07$, $P = 0.942$).

5. CONCLUSION

The study examines the impact of COVID-19 on the financial stability of commercial banks in Ethiopia. It highlights the positive effects of digital banking, remote financial services, regulatory reforms, and improved risk management practices. These adaptations have enabled Ethiopian banks to navigate future economic uncertainties and leverage technology effectively. The study emphasizes the need for banks to continue building on these advancements to sustain and improve their financial stability in a dynamic global environment. The enhanced stability reflects the sector's capacity to innovate under crisis conditions.

The study highlights the importance of continuity in financial stability, stating that stability from previous periods positively affects current stability. It also highlights the challenge of credit risk and funding risk, which can lead to increased non-performing loans and undermining a bank's income and profitability. Managing and mitigating these risks is crucial for maintaining stability. The study also highlights the negative effects of bank size on financial stability, as larger banks tend to charge higher interest rates on loans, causing borrowers to undertake riskier projects and increasing default risks.

Liquidity management is also a critical factor, as adequate liquidity allows banks to meet their obligations and seize profitable investment opportunities, while insufficient liquidity can lead to vulnerabilities during financial stress, potentially affecting overall stability. The study reveals that economic growth positively impacts bank stability by encouraging savings and investment,

which are supported by the financial sector. However, it also shows insignificant relationship between inflation-adjusted real interest rates and bank stability.

To sustain and build on the positive effects of COVID-19 on the financial stability of Ethiopian commercial banks, it is essential to continue investing in and expanding digital banking infrastructure while addressing cyber security challenges. Banks should focus on promoting financial inclusion by reaching underserved populations through tailored digital solutions and financial literacy programs. To enhance resilience, businesses should enhance risk management frameworks, maintain robust liquidity and capital buffers, collaborate with regulators, foster innovation, invest in employee training, and regularly evaluate and adjust business models to reflect evolving customer behaviors and market conditions for long-term stability and competitiveness.

6. FUTURE RESEARCH DIRECTIONS

This study was not an end by itself. There are many issues that arise from the findings and may require further research to address them. This study investigated the impact of covid-19 on financial stability evidence from private commercial banks. However, these variables are not complete, there may be other variables that are not included in this study but, that can influence the financial stability of the banks in addition to the covid-19 pandemic. Thus, it is recommended for future researchers to further assess factors affecting financial stability of commercial banks in Ethiopia by including additional bank-specific, industry-specific and macro-economic variables.

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