DETERMINANTS OF BANK PROFITABILITY: EVIDENCE FROM THE EMERGING ECONOMY

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Abstract

This study examines the determinants of bank profitability in Zimbabwe, a country that has faced severe economic challenges in the past decade. To address this issue, we use a panel data analysis of 11 commercial banks over the period 2011–2020 and apply the system generalised method of moments (GMM) estimator to control heterogeneity and endogeneity issues. We find that bank-specific factors, such as non-interest income, liquidity, cost efficiency, capital adequacy, and bank stability, have a positive and significant impact on bank profitability, while the industry factor, bank concentration, has a negative and significant impact on bank profitability. We also find that macroeconomic factors, such as gross domestic product (GDP) and inflation, do not have a significant influence on bank profitability. This result is surprising given the high inflation and low growth rates experienced by Zimbabwe in recent years. Moreover, we find that regulatory capital weakens the positive effect of bank stability on bank profitability in Zimbabwe. This result suggests that higher capital requirements may reduce the risk-taking incentives or opportunities of banks, which may lower their profitability potential. Finally, we find no evidence of a moderating effect of fintech on bank performance. This result implies that fintech may not significantly impact the competitiveness and performance of banks in Zimbabwe in non-interest income activities. Our study concludes that bank profitability in Zimbabwe is mainly determined by internal factors that are under the control of bank managers and regulators, rather than external factors that are beyond their influence. Based on these findings, we provide several policy implications and recommendations for enhancing bank profitability and fostering a sound and resilient banking sector in Zimbabwe.

Keywords: Banks, Profitability, Panel Data, System GMM, Zimbabwe

1. INTRODUCTION

Banks are essential for the functioning of the financial system and the economy as a whole, as they perform the role of intermediaries between savers and investors and facilitate the allocation of funds to productive activities and economic growth. However, to carry out this crucial service, banks need to be profitable and stable. The main source of income for commercial banks is the interest they charge on loans (Dang & Nguyen, 2022; DeYoung & Rice, 2004). This implies that bank profits tend to vary with the business cycle, increasing in periods of expansion and decreasing in periods of contraction (Satria et al., 2016). There are two main reasons for this procyclicality. First, bank lending is influenced by economic output (gross domestic product, GDP). When the economy is in a downturn, banks reduce their credit supply due to low demand for loans from firms and households that face limited investment opportunities (Satria et al., 2016; Berlin, 2012). This relationship has been confirmed by several studies (Flamini et al., 2009; Athanasoglou et al., 2008). Second, loan losses tend to rise in times of recession due to higher default rates from borrowers who suffer from business losses and income shocks, which require banks to increase their provisions (Muriu, 2023; Albertazzi & Gambacorta, 2009). Moreover, the negative correlation between economic output and the probability of loan default is asymmetric, meaning that it is stronger during recessions than during expansions (Bolt et al., 2012).

However, the case of Zimbabwe presents a unique challenge to this conventional wisdom. Over the past few years, Zimbabwe has experienced a significant decline in its GDP, with the exception of a slight increase in 2017 attributed to favourable rainfall (International Monetary Fund [IMF], 2022). Surprisingly, amidst this overall economic decline, the profitability of commercial banks in the country has shown consistent improvement. This raises the question of what factors are contributing to the impressive performance of banks in Zimbabwe, despite the numerous challenges they face. One major obstacle facing banks in Zimbabwe is currency instability. The country has experienced significant fluctuations in its currency (Mahonye & Zengeni, 2019), which poses risks to the financial sector. Additionally, policy uncertainty further compounds the challenges faced by banks, as constantly changing regulations and economic policies can make it difficult for businesses, banks included, to operate effectively and plan for the future (Maumbe & Chikoko, 2022).

Furthermore, banks in Zimbabwe face intense competition from mobile money providers. These mobile banking platforms have gained significant popularity in the country due to their convenience and accessibility (Mutsonziwa & Maposa, 2016). This competition puts pressure on traditional banks to innovate and provide additional value to customers in order to maintain their market share and profitability. Moreover, political turmoil in Zimbabwe has added another layer of complexity to the banking industry. Political instability can create an uncertain business environment (Maune, 2015), affecting investor confidence and economic growth (Komal & Abbas, 2015). Banks must navigate this challenging political landscape and adapt their strategies accordingly to ensure their continued success.

Despite these obstacles, the banks in Zimbabwe have continued to post impressive results. This suggests that there may be other factors at play contributing to their success. Thus, Zimbabwe presents an interesting case study that challenges the conventional wisdom that economic decline directly translates to poor performance for banks. Despite facing currency instability, policy uncertainty, intense competition, and political turmoil, banks in Zimbabwe have managed to thrive. Understanding the factors behind their success requires further analysis of their risk management, operational strategies, and ability to innovate in response to the evolving market dynamics. Thus, this paper aims to contribute to the existing literature on bank profitability by examining the unique case of Zimbabwe, a developing economy with distinct characteristics.

In addition to examining the main factors that influence bank profitability in Zimbabwe, this paper also explores the moderating effects of bank stability and fintech on this relationship. The moderating analysis aims to test whether bank stability and fintech enhance or weaken the impact of the determinants of bank profitability on bank profitability. For example, it is possible that bank stability strengthens the positive effect of capital adequacy on profitability, as more stable banks may face lower funding costs and higher market confidence. On the other hand, it is possible that fintech weakens the positive effect of loan market share on profitability, as more digital financial services may reduce the demand for traditional bank loans. The moderating analysis provides insights into how banks can leverage their stability and innovation to improve their profitability and performance in a challenging environment. By examining these issues, this study aims to provide insights and evidence regarding the determinants of bank profitability in Zimbabwe, helping policymakers and regulators develop effective strategies to ensure bank stability and efficient regulation. Furthermore, as bank profitability has significant implications for the viability and sustainability of banks and their intermediation function, the findings of this study can contribute to the overall financial well-being and economic growth of Zimbabwe.

This paper is organized as follows. Section 2 reviews the relevant literature on the determinants of bank profitability. Section 3 describes the data, variables, and methodology used in the empirical analysis. Section 4 reports and discusses the main findings and results of the panel data regression. Section 5 summarizes the key conclusions, policy implications, and recommendations of the study.

2. LITERATURE REVIEW

This literature review section surveys the existing literature that has investigated the determinants of bank profitability in both developed and emerging economies. It focuses on discussing the key variables that affect bank profitability and providing consistent and conflicting evidence from previous studies.

The relationship between bank liquidity and profitability has been extensively studied, but there are conflicting views in the literature. Pracoyo and Imani (2018) found that banks targeting low levels of liquid assets tend to be more profitable. This finding is supported by Bordeleau and Graham (2010), who found that higher levels of liquid assets lead to greater profitability by reducing financing costs. On the other hand, Abbas et al. (2019) argue that holding more liquid assets has an opportunity cost in terms of foregone interest income. Tran et al. (2016) and Goddard et al. (2013) also find a negative relationship between liquidity and bank profitability.

The relationship between bank capital and profitability has also been investigated extensively, but the results are mixed. Abbas et al. (2019) found a positive association between bank capital and profitability during the post-crisis era in Asia and the United States. Ozili (2017) also found a positive influence of bank capital on the profitability of commercial banks in Africa. However, Berger and Bouwman (2013) and Barth et al. (2008) concluded that the effect of capital on bank profitability is indeterminate. Tran et al. (2016) reported mixed results, finding an inverse relationship between bank capital and profitability for larger banks, and a positive relationship for smaller institutions. This lack of consensus on the relationship between bank capital and profitability indicates a need for further research.

The impact of credit risk on bank profitability remains inconclusive as well. On one hand, higher credit risk is associated with higher profit, as found by Tarus et al. (2012). On the contrary, bank profitability is negatively affected if scheduled loan payments are not collected. Studies such as Saleh and Afifa (2020), Abbas et al. (2019), Islam and Nishiyama (2016), and Ozili (2015) report an inverse relationship between credit risk and bank profitability, suggesting that suboptimal lending quality leads to high loan loss provisions and lower overall profitability. The impact of credit risk on bank profitability thus remains inconclusive.

Turning to operational efficiency, Karakaya and Er (2013) report that larger banks have higher overheads compared to smaller banks. Fungáčová et al. (2020) attribute this lower efficiency to structural problems and political incentives that prevent cost minimization, thereby adversely impacting bank profitability. However, Singh (2021) argues that the utilization of new financial technologies, such as automatic teller machines (ATMs) and the Internet, has led to a decrease in overhead expenses and an increase in profitability. A cross-country analysis by Le and Ngo (2020) supports this idea, demonstrating that the growth in bank cards issued, ATMs, and POS terminals enhances bank profitability.

Nonetheless, many studies emphasize the relationship between bank profitability and the macroeconomic environment. For instance, Yüksel et al. (2018) employ the generalised method of moments (GMM) method to examine bank profitability in 13 post-Soviet countries and find that higher GDP is associated with higher profitability. Similarly, Deng (2016) and Al-Jafari and Alchami (2014) corroborate the positive impact of GDP growth on bank profitability. However, Simiyu and Ngile (2015), and Tan and Floros (2012) offer different perspectives, finding insignificant, positive but insignificant, and negative effects of GDP on bank profitability, respectively.

The existing literature on the relationship between inflation and bank profitability also yields mixed results. Several studies, including those by Athanasoglou et al. (2008) and Demirgüç-Kunt and Huizinga (1999) have argued for a positive impact of inflation on bank profitability, based on their research conducted in Greece, the Eurozone, and Middle Eastern Islamic banks, respectively. However, alternative studies conducted by Scott and Ovuefeyen (2014) and Moyo and Tursoy (2020) found a significant negative relationship between banks' profitability and the inflation rate. In contrast, other studies by Combey and Togbenou (2017), and Ally (2014) have established that inflation has no impact on the profitability of commercial banks. This divergence of findings in the literature highlights the lack of consensus regarding the determinants of bank profitability. To contribute to this ongoing discourse, the current study seeks to provide empirical evidence from Zimbabwe, a developing Sub-Saharan African economy.

3. DATA AND METHODOLOGY

3.1. Data

This study examines the determinants of bank profitability in Zimbabwe over the period from 2011 to 2020. The data were collected from three sources: 1) Bureau van Dijk's Orbis database, which provides financial information on banks and other firms; 2) the World Bank's Global Financial Development Database, which provides indicators of financial sector development and performance; and 3) the World Bank's Economic Indicators for Zimbabwe, which provide data on key economic indicators such as GDP growth, inflation, and exchange rates. The population comprises of thirteen commercial banks, but the study omitted the banks that have had no data for three years or more. Thus, the sample is sorely based on data availability. This resulted in an unbalanced panel sample of eleven commercial banks[1].

3.2. Estimation approach

To estimate the determinants of bank profitability, the study adopts the following linear regression model:

$$\pi_{it} = \alpha + \beta X_{it} + \rho IND_{ct} + \vartheta MACECO_{ct} + v_{it} + \varepsilon_{it} \quad (1)$$

where, π_{it} denotes bank profitability measured by net interest margin (NIM); α represents the constant coefficient; X_{it} denotes a set of bank-specific characteristics; IND_{ct} denotes industry factors; $MACECO_{ct}$ denotes a set of macroeconomic factors; β, ρ, and ϑ are the coefficients for bank-specific characteristics, industry, and macroeconomic factors, respectively; v_{it} captures unobservable time-invariant bank fixed effects that control for

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[1] The list of banks used in the study includes: AFC, CABS, CBZ, Ecobank, FBC, First Capital, Nedbank, NMB, Stanbic, Standard Chartered, Steward.

heterogeneity across banks; and ε_{it} represents the error term.

Several studies have documented that bank profits tend to exhibit persistence due to market structure imperfections, such as entry barriers, market concentration, or regulatory restrictions (Gugler & Peev, 2018; Mashamba, 2018; Flamini et al., 2009). To account for this persistency, the study adopts a dynamic error component panel regression model that incorporates the lagged dependent variable as one of the explanatory variables. This model allows for both time-invariant and time-varying unobserved heterogeneity across banks as follows:

$$\pi_{it} = \alpha + \lambda \pi_{i,t-1} + \beta X_{it} + \rho IND_{ct} + \\ + \vartheta MACECO_{ct} + \nu_{it} + \varepsilon_{it} \qquad (2)$$

where, λ represents the speed of adjustment coefficient that measures the degree of mean reversion of bank profitability; and the other variables are as defined previously. The speed of adjustment coefficient (λ) reflects the market structure and competition in the banking sector. A lower value of λ indicates a higher speed of adjustment, which implies that bank profitability is more responsive to changes in market conditions and more competitive. Conversely, a higher value of λ indicates a lower speed of adjustment, which implies that bank profitability is more rigid and less competitive. Flamini et al. (2009) found that bank profitability in Africa exhibits a low degree of mean reversion, indicating low competition and high market power.

3.3. Variables description

3.3.1. Dependent variable (NIM)

There are three main profitability metrics mainly used in literature, i.e., *return on assets* (*ROA*), *return on equity* (*ROE*), and *net interest margin* (*NIM*). Similar to Dietrich and Wanzenried (2011), Flamini et al. (2009), and Athanasoglou et al. (2008), this study uses *NIM* to assess bank profitability instead of ROA, which is commonly used in literature, because *NIM* is more sensitive to the interest rate environment, i.e., it reflects the ability of banks to adjust their interest income and expenses to changes in market conditions. The interest rate component can significantly affect *NIM*; hence, *NIM* is considered to be a more focused metric. *NIM* shows the profits generated from interest-bearing assets and liabilities by management.

3.3.2. Explanatory variables: Bank specific factors

Lagged dependent variable (nim_{t-1}). As mentioned earlier, bank profits are presumed to be persistent. To capture persistence in bank profits, the variable *lagged return on assets* ($nim_{i,t-1}$) is included among the explanatory variables.

Income diversification (*non-interest income*, *nii*). In a tight competitive environment, banks can improve their profitability by increasing income from non-core activities such as service fees, commissions, and transaction costs. Studies such as Yüksel et al. (2018) established that there is positive association between bank profits and non-interest income. Besides, the profitability of banks in Zimbabwe seems to be spurred by non-interest income given the significant contribution of non-interest income to total bank profits over the past years. Therefore, this study anticipates a positive and significant impact of non-interest income on bank profitability in Zimbabwe.

Liquidity (*liq*). According to the risk-return trade-off theory, there is a negative relationship between bank profitability and liquidity. This theory assumes that liquid assets have lower returns than illiquid assets, as they entail lower risks (Bordeleau & Graham, 2010). Therefore, the study hypothesizes that banks with higher liquidity (low loan-to-deposit ratio) are less profitable than banks with lower liquidity. However, some studies have challenged this hypothesis and found a positive relationship between liquidity and profitability (Tran et al., 2016; Goddard et al., 2013). They argued that liquid assets can help banks cope with unexpected shocks and reduce the cost of external funding (Dietrich & Wanzenried, 2011; Berger & Bouwman, 2009). Following Satria et al. (2016) and Bordeleau and Graham (2010), the study measures bank liquidity by the loan-to-deposit ratio, which indicates how much of a bank's deposits are used to make loans. A higher loan-to-deposit ratio means that the bank has more loans than deposits, implying lower liquidity, and vice versa.

Operational efficiency (*cost-to-income ratio*, *cost_eff*). Operational efficiency measured by the cost-to-income ratio is another variable the study predicts to have a significant impact on the profitability of banks. The cost-to-income ratio indicates management's efficiency in controlling costs. A high ratio demonstrates that management is inefficient in controlling costs which adversely affects profitability (Rao & Lakew, 2012). Accordingly, the study expects an inverse association between operational efficiency and bank profit. Previous studies have also confirmed the negative effect of operational efficiency on bank profitability in different contexts (Flamini et al., 2009; Sufian & Habibullah, 2009; Athanasoglou et al., 2008).

Bank capital (*cap*). Capital is a vital source of funding for banks, as it enables them to absorb losses, maintain solvency, and comply with regulatory requirements (Li & Feng, 2016; Ahlswede & Schildbach, 2012). Moreover, high capital is associated with greater stability and confidence, which can attract more deposits and reduce the cost of funding (Dietrich & Wanzenried, 2011; Berger et al., 2013). Therefore, one would expect banks with high levels of equity capital to have more funds to lend out, which should result in increased profitability. Accordingly, the study hypothesizes that capital positively affects bank profitability. Bank capital is measured by the tier 1 ratio, which indicates the ratio of a bank's core equity capital to its total risk-weighted assets.

Credit risk (*loan loss reserves, llr*). Credit risk is the risk of loss arising from the failure of borrowers to repay their loans or meet their contractual obligations. Credit risk is one of the major sources of income and risk for banks, as lending is their core business activity (Dang & Nguyen, 2022; DeYoung & Rice, 2004). However, if a bank fails to properly

manage its credit risk, loan defaults erode its profits and capital (Dang & Nguyen, 2022; Subhanij, 2010). Thus, the study claims that credit risk negatively affects the performance of banks in Zimbabwe. Credit risk is proxied by the loan loss reserve ratio, which measures the ratio of loan loss provisions to total loans. Recent studies have also examined the impact of credit risk on bank profitability in different regions and contexts, such as Africa (Opoku-Mensah et al., 2019), Asia (Farooq et al., 2021), Europe (Kosmidou, 2008), and Islamic banking (Al-Harbi et al., 2019).

Economic activity (*GDP*). Economic activity, measured by real GDP, reflects the level of output and income in an economy. Economic activity has a cyclical relationship with bank profitability, as it affects both the demand and supply of credit, as well as the quality of borrowers (Satria et al., 2016; Albertazzi & Gambacorta, 2009). During economic downturns, credit quality wanes leading to higher loan defaults (Yarovaya et al., 2020), thereby reducing bank profitability. In times of economic booms, demand for loans generally rises coupled with improving credit quality, leading to improved bank profitability (Albertazzi & Gambacorta, 2009). As such, a positive relationship between GDP and bank profit is anticipated. This study uses the GDP growth rate to proxy economic activity. Some recent studies have also explored the role of economic activity in determining bank profitability in various countries and regions, such as China (Zhang et al., 2022), India (Almaqtari et al., 2019), Latin America (Jara-Bertin et al., 2014), and Sub-Saharan Africa (Flamini et al., 2009).

Inflation (*inf*). Inflation is the general increase in the prices of goods and services over time. The relationship between inflation and bank profit is ambiguous, as it depends on the banks' ability to forecast inflation developments and adjust their interest rates accordingly (Yüksel et al., 2018). If banks can accurately predict inflation trends, they can increase their revenues faster than their costs and reap higher profits. However, if banks fail to anticipate inflation changes or face regulatory constraints on interest rate settings, they may suffer from lower margins and reduced profitability. Hence, this study expects either a positive or negative relationship between inflation and bank profitability. The annual inflation rate is used in this study. Some recent studies have also investigated the effect of inflation on bank profitability in different settings, such as Turkey (Yüksel et al., 2018), Pakistan (Farooq et al., 2021), and Nigeria (Ogunmuyiwa & Ekone, 2010).

Market structure (*c3*). The study also examines the effect of market structure on bank profitability in Zimbabwe. Based on the structure-conduct-performance (SCP) hypothesis, market structure influences the competitive behaviour of banks, which in turn affects their profitability. According to this hypothesis, a more concentrated banking market (i.e., a market with fewer and larger banks) leads to higher profitability, as banks can collude with each other to charge higher interest rates and fees, and reduce their operating costs (Kosmidou, 2008). Therefore, the study predicts a positive nexus between market share and bank profitability and measures market structure using the *c3* ratio, which is the market share of the three largest banks by asset size.

Bank stability (*zscore*). The study explores the relationship between bank stability, measured by the *zscore*, and bank profitability in Zimbabwe. Bank stability can impact bank profitability through two channels: the cost of funding and risk-taking activities. A more stable bank can attract greater deposits and reduce its funding costs, as depositors perceive it as less likely to default or encounter liquidity problems. This lower cost of funding can in turn increase the net interest margin and overall profitability of the bank. For instance, Nguyen and Le (2022) and Nisar et al. (2018) found that bank stability *zscore* has a positive and significant effect on bank profitability in Asian economies. Thus, the study hypothesizes that financial stability has a positive effect on bank profitability.

3.4. Empirical specification

The empirical model (Eq. (2)) incorporates several key elements to enhance its accuracy and robustness. Firstly, it accounts for unobserved bank-specific fixed effects, which capture factors such as management quality and board effectiveness that can significantly influence banks' performance. By including these fixed effects, the model ensures that the estimated coefficients are not biased. Additionally, the model addresses the issue of persistence in bank performance, which can arise from market structure imperfections like cartels and monopolies. These imperfections can lead to sustained differences in bank performance over time. Acknowledging and incorporating this persistence into the model, it provides a more comprehensive understanding of the determinants of bank performance.

Moreover, the model recognizes the possible presence of endogeneity, wherein the explanatory variables may be correlated with the idiosyncratic error term. To address this concern, the study employs the GMM estimator. This estimator effectively controls for endogeneity and provides consistent estimates. Within the GMM framework, two prominent estimators are employed: the difference GMM (Arellano & Bond, 1991) and the system GMM (Arellano & Bover, 1995; Blundell & Bond, 1998). While both estimators have their merits, the system GMM is preferred in this study due to its ability to eliminate fixed effects using forward orthogonal deviation transformations. This transformation ensures consistent estimates and enhances the model's performance compared to the difference GMM (Blundell & Bond, 1998). The study uses the xtabond2 command in Stata to implement the system GMM estimator. One of the main advantages of xtabond2 is that it can control for instrument proliferation, which is a common problem in dynamic panel data models (Roodman, 2006). Instrument proliferation occurs when the GMM estimation uses too many instruments compared to the number of observations or groups. This can cause problems such as overfitting, weak identification, and biased inference. xtabond2 has several options to reduce the number of instruments, such as collapsing the instrument matrix, limiting the lag depth, or using principal components (Roodman, 2006).

4. RESEARCH FINDINGS

4.1. Descriptive statistics

Table 1 presents the descriptive statistics of the data used in the study. The table shows both the raw and the log-transformed values of the variables to compare their distributions before and after the log transformation. However, the analysis is based on the raw data, as it reflects the original scale and variation of the variables.

Table 1. Descriptive statistics

Variable	Obs.	Mean	Std. dev	Minimum	Maximum
Non-transformed data					
nim	113	11.25	5.10	3.61	31.25
llr	102	4.76	3.28	0.44	20.07
cap	83	20.71	10.75	5	60
nii	113	12.33	9.52	2.65	47.29
cost_eff	113	70.45	27.95	19.34	253.33
liq	113	38.63	18.62	5.85	81.02
c3	102	59.54	5.49	52.71	81.83
inf	73	3.75	5.63	-6.25	16.67
GDP	79	0.51	4.27	-6.25	4.82
zscore	104	5.91	1.07	5.01	8.08
Log-transformed data					
nim	113	2.33	0.44	1.28	3.44
lnllr	102	1.37	0.63	-0.82	3.00
lncap	83	2.91	0.51	1.61	4.09
lnnii	113	2.25	0.73	0.98	3.86
lncost_eff	113	4.20	0.34	2.96	5.53
lnliq	113	3.51	0.60	1.77	4.39
lnc3	102	4.08	0.09	3.96	4.40
lninf	73	1.07	0.91	-0.28	2.81
lnGDP	79	1.16	0.94	-0.28	2.98
lnzscore	104	1.76	0.17	1.61	2.09

Source: Authors' elaboration.

The results in Table 1 above show the descriptive statistics of the net interest margin (*nim*) for the sampled banks over the period 2011 to 2020. The *nim* is a measure of bank profitability that indicates the difference between the interest income and the interest expense as a percentage of total assets. The mean value of *nim* for the sampled banks is 11.25%, which suggests that the banks have a high-interest margin on average. However, the standard deviation of *nim* is 5.10%, which implies that there is a large variation in profitability across banks. The minimum value of *nim* is 3.61%, while the maximum value is 31.25%, indicating that some banks have very low or very high profitability compared to others. The range of *nim* values is 27.64%, which reflects the wide dispersion of profitability in the sample.

The loan loss reserves (*llr*) to total loans ratio, which averaged 4.76% among the banks included in the study, indicates that banks in Zimbabwe set aside reserves of approximately 5% to account for potential loan defaults. The small standard deviation of 3.28% suggests that there is little variation in the amount of loan reserves held by the sampled banks.

Based on an average tier 1 capital (*cap*) ratio of 20.71%, it can be concluded that banks in Zimbabwe are adequately capitalized according to the minimum tier 1 ratio of 8% recommended by the Basel II[2] framework. However, the presence of minimum and maximum values of 5% and 60% respectively is concerning, as it reveals that some banks in the sample have low capital while others are highly capitalized.

On average, banks in the study generated about 12% of their total revenue from non-interest income (*nii*) activities. This implies that 12% of a bank's income is derived from sources other than interest, while the majority, 88%, comes from interest sources. This heavy reliance on interest income indicates a low diversification of revenue sources for the banks, which could expose them to interest rate risk. Such risk arises from changes in interest rates that can impact the bank's profitability and overall value.

Examining Table 1, the loan-to-deposit ratio (*liq*) averaged 39% for the sampled banks during the study period. This ratio is concerning, suggesting constrained credit extension by banks possibly due to the volatile macroeconomic environment in Zimbabwe. Additionally, the minimum ratio of 6% implies liquidity hoarding by banks in the country.

With an average cost-to-income ratio (*cost_eff*) of 70%, it is evident that operational costs for banks in Zimbabwe are very high. This can be attributed to the predominantly high-cost structure of the country's economy, influenced by factors such as high energy costs, inflation, and high taxes.

From an economic perspective, Zimbabwe has experienced modest growth during the sampling window, with an average growth rate of 0.51%. This subdued growth can be attributed to various factors, including political instability, currency volatility, and high inflation.

4.2. Correlation matrix

Table 2 shows the pairwise correlation coefficients between the variables used in the study. The correlation matrix is widely used to detect multicollinearity, which is a problem that occurs when two or more variables are highly correlated with each other, causing instability and bias in the regression estimates. Besides this, it can help to identify the potential relationships between the variables.

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[2] Banks in Zimbabwe have not yet fully adopted the Basel III standards, which are a set of international regulations for banking supervision and risk management. They are still operating under the Basel II framework, which is the previous version of the standards. However, they are in the process of transitioning to Basel III compliance, which is expected to enhance their resilience and stability.

Table 2. Correlation matrix

	lnnim	*lnllr*	*lncap*	*lnnii*	*lncost_eff*	*lnliq*	*lnc3*	*lninf*	*lnGDP*	*lnzscore*
lnnim	1.00									
lnllr	-0.15	1.00								
lncap	0.07	0.03	1.00							
lnnii	0.51*	-0.16	0.13	1.00						
lncost_eff	0.02	0.09	0.10	0.24*	1.00					
lnliq	-0.13	-0.09	-0.63*	-0.52*	-0.20*	1.00				
lnc3	0.17	-0.07	-0.35*	0.04	-0.14	0.39*	1.00			
lninf	0.13	-0.18	-0.01	0.24*	-0.08	-0.28*	-0.03	1.00		
lnGDP	0.02	-0.08	-0.34*	0.26*	0.002	0.03	0.27*	0.36*	1.00	
lnzscore	0.58*	-0.22*	0.17	0.76*	0.19	-0.51*	0.03	0.39*	0.10	1.00

*Note: * indicate statistical significance at the 5% level.*
Source: Authors' elaboration.

The results in Table 2 show that there are no variables with a correlation above 0.70, which is a common threshold for detecting multicollinearity. Therefore, it can be concluded that the research data is free from multicollinearity and that the explanatory variables are sufficiently independent from each other. Besides detecting multicollinearity, the correlation matrix also provides some insights into the possible relationships among the variables. Some of the interesting and significant correlations are as follows:

The variable *lnnim* has a positive and significant correlation with *lnnii* and *lnzscore*, which means that banks with higher net interest margins tend to have higher non-interest income and higher *zscore*. This is consistent with the literature that suggests that *lnnim* is a proxy for bank profitability and stability.

The variable *lncap* has a negative and significant correlation with *lnliq*, which means that banks with higher capital adequacy ratios tend to have lower loan-to-deposit ratios. This may indicate that banks with higher capital have lower liquidity needs or preferences, or that they face lower demand for loans or a higher supply of deposits.

Interestingly, the variable *lnnii* has a positive and significant correlation with *lncost_eff*, meaning that banks with higher non-interest income tend to have a higher cost-efficiency ratio. This may suggest that banks with higher non-interest income have higher operating costs or lower operating income, or that they invest more in technology and innovation to generate non-interest income.

Bank concentration, proxied by *lnc3*, has a positive and significant correlation with *lnGDP*, which means that banks in more concentrated markets are characterized with higher gross domestic product growth rate. This may imply that banks in more concentrated markets face lower competition or higher regulation, which may affect their liquidity management or intermediation function. The variable *lnzscore* has a positive and significant correlation with *nim*, *lnnii*, and *lninf*, which means that banks with higher *zscore* tend to have higher net interest margin, higher non-interest income, higher cost efficiency ratio, and higher inflation. This may suggest that *lnzscore* is a proxy for bank stability and performance, as higher *zscore* may reflect higher profitability, solvency, diversification, resilience, and competitiveness of banks.

Turning to the macroeconomic fundamentals, *lninf* has a positive and significant correlation with *lnGDP*, and *lnzscore*, which means that banks in countries with higher inflation rates tend to have higher gross domestic product growth rate, and higher *zscore*. On the other hand, the variable *lnGDP* has a positive and significant correlation with *lnnii*, *lnc3*, and *lninf*, which means that banks in countries with higher gross domestic product growth rate tend to have higher non-interest income, higher concentration ratio, and higher inflation rate. This may suggest that *lnGDP* is a proxy for economic growth and financial performance, as higher GDP growth may indicate higher income and consumption levels, as well as higher financial inclusion and stability.

The correlation matrix provided some preliminary evidence of the relationships between the dependent variable (bank profitability) and the explanatory variables (bank-specific, industry, and macroeconomic factors). However, it does not establish any causal effects or control for other confounding factors. To address these issues, the study uses a panel data regression analysis to estimate the effects of the explanatory variables on bank profitability in Zimbabwe. The results and discussion of the regression analysis are presented in the next section.

4.3. Empirical findings

4.3.1. Main results

This section presents the results of estimating Eq. (2) with system GMM, which examines the determinants and dynamics of bank profitability. The study uses the Sargan test to check for instrument validity. The Sargan test statistic has a p-value of 0.13, which does not reject the null hypothesis of no overidentification at the 5% significance level. This indicates that the instruments used in the model are valid and exogenous. The study tests for the absence of second-order autocorrelation in first-differenced errors using the Arellano and Bond (1991) test (AR (2) test). The AR (2) test statistic has a p-value of 0.13, which does not reject the null hypothesis of no second-order autocorrelation at the 5% significance level. This indicates that the model satisfies the assumptions for using system GMM. The results are shown in Table 3 below.

Table 3. Empirical findings

Variable	Coefficient	Std. error
lnnim(1)	0.6212***	0.1953
lnllr	-0.1153*	0.0607
lncap	0.1435**	0.0655
lnnii	0.1512***	0.0459
lncost_eff	0.1248***	0.0459
lnliq	0.3503***	0.1046
lnc3	-0.7032**	0.2810
lninf	0.0469	0.0369
lnGDP	0.0279	0.0294
lnzscore	0.8000*	0.4379
Diagnostics		
AR(2)	0.13	
Sargan	0.13	

*Note: ***; **; * indicate statistical significance at the 10%, 5%, and 1% levels.*
Source: Authors' elaboration.

The analysis shows that the net interest margin (*lnnim*), which is a measure of bank profitability, has a significant positive relationship with its lagged value (*lnnim(1)*). This means that banks in Zimbabwe tend to maintain their profitability levels over time and adjust slowly to changes in market conditions or bank-specific factors. The coefficient of the lagged *nim* is 0.6212, indicating that a 1% increase in the previous year's *nim* leads to a 0.6212% increase in the current year's *nim*. The speed of adjustment, which measures how fast banks converge to their desired or optimal profitability levels, is 0.38. This implies that banks in Zimbabwe are relatively slow in adjusting their profitability and eliminate only 38% of the gap between their actual and desired *nim* in a year. This could be due to various reasons, such as high adjustment costs, market frictions, regulatory constraints, or managerial inertia. This finding is important because it reveals how banks in Zimbabwe manage their profitability and respond to changes in the banking sector.

The results show that the logarithm of non-interest income (*lnnii*) has a positive and statistically significant impact on bank profitability in Zimbabwe. In particular, the coefficient of *lnnii* is estimated to be 0.1512, with a p-value of 0.0000, indicating that this relationship is highly significant. These results indicate that for every 1% increase in the ratio of non-interest income to total income, there is a corresponding increase in net interest margin (*nim*) of 15% points. This evidence supports the notion that diversifying income sources and reducing reliance on interest income can be beneficial for banks in Zimbabwe. By expanding their revenue streams beyond traditional interest-based activities, banks can not only enhance profitability but also improve their overall stability. This rationale is intuitive since non-interest income is known to be less responsive to business cycles. The findings of this study align with the perspective put forth by Albertazzi and Gambacorta (2009), which emphasizes the importance of non-interest income in fostering bank stability. Their argument is grounded on the premise that incorporating diverse income streams can help buffer banks from the volatilities associated with interest-based activities.

The impact of liquidity on bank profitability in Zimbabwe can be seen through the natural logarithm of this ratio (*lnliq*). The coefficient of *lnliq* is noted as 0.3503, which holds a significant and positive influence as indicated by a p-value of 0.0000.

Consequently, a 1% increase in loan-to-deposit ratio equates to a 35% point rise in *nim*. This observation suggests that banks in Zimbabwe experience advantages from having a higher proportion of loans compared to deposits, resulting in increased interest income and decreased interest expense. This suggests that banks in Zimbabwe are able to charge higher interest rates on their loans than they pay on their deposits, reflecting their market power and pricing strategy. A similar finding by Isayas (2022) in Ethiopia supports these results, further affirming the positive and significant relationship between liquidity and bank profitability.

Contrary to popular belief, the variable cost-to-income ratio (*lncost_eff*) has a notable positive impact on bank profitability in Zimbabwe. This is supported by a statistically significant point estimate of 0.1248. These findings challenge existing literature, such as the studies conducted by Al-Tarawneh et al. (2017) and Athanasoglou et al. (2008), which suggest that a higher cost-to-income ratio hampers bank performance. One possible explanation for this unexpected result is the presence of market power among Zimbabwean banks. This enables them to impose high interest rates on loans while offering low-interest rates on deposits. This aligns with Abel et al. (2018), who demonstrate that banks in Zimbabwe possess considerable market power, as measured by the Lerner index, and how it affects their profitability over time.

The coefficient of the capital adequacy ratio (*lncap*), measured by the tier 1 ratio, is found to be statistically significant at 0.1435. This means that a 1% change in the capital ratio results in a 14% point increase in bank profits. These results suggest a positive relationship between capital and bank profitability, which is consistent with the findings of García-Herrero et al. (2009). García-Herrero et al. (2009) argue that banks with higher capital ratios are able to reduce their funding costs as they face a lower risk of bankruptcy. Thanh et al. (2022) also support this notion, stating that higher equity gives banks an advantage in raising capital, improves their risk tolerance, and enhances customer confidence, ultimately boosting profitability. Jadah et al. (2020) provide similar evidence for Iraqi banks.

The empirical results presented in Table 3 provide support for the hypothesis that credit risk has a significant negative impact on bank performance. The coefficient of -0.12 on the loan loss reserves ratio (*lnllr*) indicates that a 1% increase in *llr* leads to a decline of approximately 12% in net interest margin (*lnnim*), a measure of bank profitability. This finding aligns with previous research, including studies by Siddique et al. (2021) and Garcia-Herrero (2009), which have identified a negative relationship between credit risk and bank performance. The negative effect of credit risk on bank performance can be attributed to the fact that higher *llr* reflects a greater number of non-performing loans (NPLs), reducing income from loans and increasing provision expenses. Consequently, it is essential for banks to implement effective credit risk management practices to minimize NPLs and enhance their overall performance.

The study shows that the *c3* ratio coefficient demonstrates a negative association with *nim* that is

statistically significant. The coefficient value is found to be -0.7032, with a p-value less than 0.05. This implies that market structure plays a significant role in negatively impacting bank profitability in the country. These findings align with those of Bolarinwa et al. (2019), who also found that elevated levels of market concentration, as measured by the Herfindahl-Hirschman index (HHI), have a detrimental effect on bank profitability. Considering these results, it can be inferred that Zimbabwean banks encounter substantial challenges in the form of high operational costs, credit risks, and regulatory burdens. These challenges seem to outweigh the potential benefits that could arise from market concentration. Consequently, the banking sector in Zimbabwe must focus on enhancing its efficiency, fostering innovation, and strengthening its risk management practices. These areas of improvement are crucial for enhancing profitability and fortifying the sector's resilience in the face of such demanding market conditions.

The statistically significant coefficient of 0.80 on the variable *zscore* strongly supports the hypothesis that financial stability promotes bank stability. This finding is intuitive and aligns with the belief that greater stability leads to increased bank profitability. Consequently, it is evident that enhancing the resilience and efficiency of the financial system can contribute to the stability and performance of banks. This conclusion is consistent with the findings of Nguyen and Le (2022) and Nisar et al. (2018), who also observed a positive and significant impact of bank stability (measured by the *zscore*) on bank profitability in Asian economies. As a result, our results suggest that policymakers and regulators should implement measures to foster financial stability, such as strengthening macroprudential supervision, improving crisis management and resolution frameworks, and promoting international cooperation.

Turning to macroeconomic fundamentals, the empirical analysis conducted for this study yielded findings that are inconsistent with initial expectations. The first variable examined is economic activity, as measured by gross domestic product (*GDP*) growth. It was expected that an increase in GDP growth would be associated with higher bank profitability. However, the coefficient for this variable was found to be statistically insignificant at conventional levels, indicating that there is no strong evidence to support the notion that bank profits in Zimbabwe are cyclical in nature. Previous studies conducted by Ozili (2015), Boitan (2015), and Albertazzi and Gambacorta (2009) have demonstrated a positive relationship between business cycles and bank profitability. However, the current analysis did not find similar evidence, suggesting that business cycles may not have a significant effect on bank profitability in Zimbabwe. This finding is particularly noteworthy given the challenging economic environment in the country, highlighting the ability of Zimbabwean banks to implement effective strategies that enable them to withstand tough business conditions.

Moving on to the analysis of inflation (*lninf*), it was hypothesized that inflation would have a negative impact on bank profitability in Zimbabwe. However, the coefficient for inflation in the regression model was found to be 0.0469, which

is statistically insignificant at conventional levels. This suggests that there is no compelling evidence to support the claim that inflation negatively affects the profitability of banks in Zimbabwe. The findings align with Bolarinwa et al. (2019), who also reported a positive but insignificant effect of inflation on bank profitability in Nigeria. One possible explanation for these findings is that banks in Zimbabwe have been adept at predicting and incorporating inflation forecasts into their interest rate structures. It is plausible that policy inconsistencies in the country have enabled banks to successfully adapt and build inflation forecasts into their operations. This ability to navigate inflationary pressures may contribute to the resilience of Zimbabwean banks and their ability to maintain profitability even in the face of economic challenges. In summary, the empirical analysis conducted in this study did not find strong evidence to support the hypotheses that bank profits in Zimbabwe are cyclical or that inflation negatively affects bank profitability. These findings suggest that Zimbabwean banks have been successful in implementing sound strategies that enable them to withstand tough business conditions and effectively manage inflationary pressures.

4.3.2. Moderation analysis

This study extends the previous literature on this topic by examining the moderating effect of bank stability and fintech on the determinants of bank profitability in Zimbabwe. The results are presented in Table 4 below. Column 2 shows the results of the regression model that includes the interaction terms between bank stability and regulatory capital, while column 3 shows the results of the regression model that includes the interaction terms between fintech and non-interest income.

Table 4. Moderation analysis results

Variable	Model 1	Model 2
	(2)	(3)
nim(1)	0.7249***	0.6645***
lnllr	-0.0773	0.00004
lncap	0.4480***	0.2379*
lnnii	0.1900***	0.1461*
lncost_eff	0.0291	0.0483
lnliq	0.2705**	0.2131*
lnc3	-0.9249***	-0.2759*
lninf	0.0441	0.0416
lnGDP	0.0433	0.0403*
zscore	1.0821**	-
reg_zscore	-0.0020**	-
fintech	-	-0.0443
fintech_nii	-	-0.0001
Diagnostics		
AR(2)	0.213	0.082
Sargan	0.142	0.136

*Note: ***; **; * indicate statistical significance at the 10%, 5%, and 1% levels.*
Source: Authors' elaboration.

The variable *reg_zscore* is the interaction term between the regulatory capital and the *zscore* variables. The coefficient of *reg_zscore* is -0.002, which is negative and significant at the 5% level. This means that there is a weak negative and significant moderating effect of regulatory capital on the relationship between bank stability and bank

profitability. In other words, higher regulatory capital weakens the positive effect of bank stability on bank profitability. This result may suggest that higher regulatory capital reduces the risk-taking incentives or opportunities of banks, which may lower their profitability potential. This analysis is consistent with the literature. For example, Agénor and da Silva (2021) developed a model of endogenous growth with banking, limited liability, and government guarantees. They showed that higher capital requirements increase the skin-in-the-game effect, which reduces the default risk and the incentive for banks to extend risky loans. They also found that the optimal capital adequacy ratio may be too high in practice and may require other regulatory measures to prevent distortions in financial markets.

The variable *fintech_nii* is the interaction term between the fintech and the non-interest income. The coefficient of *fintech_nii* is -0.0001, but it is statistically insignificant at the conventional levels. This means that the study could not find evidence for the moderating effect of fintech on the relationship between non-interest income and bank profitability. This result may imply that fintech does not have a significant impact on the market

share or pricing power of banks in non-interest income activities, or that it has offsetting effects on their costs and revenues (Philippon, 2016).

4.3.3. Robustness analysis

To ensure the validity and reliability of our empirical findings, we conducted a number of robustness tests that are presented in Table 5 below. For easy comparison, the baseline results are displayed in column 2. First, we added money supply (*ms*) as an additional variable in column 3. Money supply has been a key driver of inflation in Zimbabwe over the past decades (Maune et al., 2020), so we wanted to control its effect on bank performance. Second, we replaced the loan loss reserve ratio with impaired loans (*il*) as a measure of asset quality in column 4. Impaired loans reflect the actual quality of the loan portfolio better than the loan loss reserve ratio, which may be subject to managerial discretion. Third, we used *c5* instead of *c3* as a measure of bank concentration in column 5. The variable *c5* captures the market share of the top five banks more accurately than *c3*, which only considers the top three banks.

Table 5. Robustness test results

Variable	Model 1	Model 2	Model 3	Model 4
	(2)	(3)	(4)	(5)
nim(1)	0.6212***	0.6675***	0.7162***	0.6277***
lnllr	-0.1153*	-0.1113*	-	-0.1156*
lncap	0.1435**	0.1258*	0.1568**	0.1392**
lnnii	0.1512***	0.1535***	0.1597***	0.1494**
lncost_eff	0.1248***	0.1233**	0.1050***	0.1260***
lnliq	0.3503***	0.3351***	0.3820***	0.3433***
lnc3	-0.7032**	-0.7066***	-0.7392***	-
lnc5	-	-	-	-0.6595**
lninf	0.0469	0.0496	0.0401	0.0473
lnGDP	0.0279	0.0302	0.0460*	0.0267
lnzscore	0.8000*	0.7852*	0.6617	0.8029*
ms	-	0.0189	-	-
il	-	-	-0.0677*	-
Diagnostics				
AR(2)	0.13	0.117	0.129	0.132
Sargan	0.13	0.131	0.167	0.119

*Note: ***; **; * indicate statistical significance at the 10%, 5%, and 1% levels.*
Source: Authors' elaboration.

In this section, we present the results of our robustness tests and discuss their implications for our main findings. First, we included money supply (*ms*) as an additional variable in Model 2 (column 3) because it has been a key driver of inflation in Zimbabwe over the past decades, which may affect bank performance. However, these results suggest that money supply has no significant effect on bank profitability in Zimbabwe. One possible explanation of this evidence is that money supply is endogenous to bank profitability (Sieroń, 2019), meaning that it is determined by the demand and supply of money in the economy, which is influenced by bank behaviour. Second, we used impaired loans (*il*) instead of loan loss reserves (*llr*) as a measure of asset quality in Model 3 (column 4). We used impaired loans as an alternative measure of asset quality because it reflects the actual quality of the loan portfolio better than the loan loss reserves, which may be subject to managerial discretion. The results show impaired loans have a negative and significant effect on bank profitability, reaffirming that poor credit risk

management is detrimental to bank profitability. Third, we used *c5* instead of *c3* as a measure of bank concentration in Model 4 (column 5). We used *c5* as a different measure of bank concentration because it captures the market share of the top five banks more accurately than *c3*, which only considers the top three banks. The results show a significant negative effect of bank concentration on bank profitability in Zimbabwe. This supports earlier findings that high concentration dampens bank profitability in Zimbabwe.

5. CONCLUSION

This study examines the factors that affect the profitability of banks in Zimbabwe, which have shown remarkable performance despite the challenging economic conditions. The study uses a panel data analysis of 11 banks over the period 2011–2020 and employs the net interest margin as a measure of bank profitability. The study considers various bank-specific, industry, and macroeconomic

variables as potential determinants of bank profitability. The bank-specific variables that are considered in this study are non-interest income, liquidity, cost-to-income ratio, tier 1 capital, bank stability, and asset quality. To measure the degree of competition in the banking sector, the study uses bank concentration as a proxy for market structure. The macroeconomic variables include GDP and inflation. The study finds that non-interest income, liquidity, cost-to-income ratio, tier 1 capital, and bank stability have a positive and significant impact on bank profitability, while asset quality and bank concentration have a negative and significant impact on bank profitability. The study also reports that GDP and inflation do not have a significant effect on bank profitability. The study concludes that bank profitability in Zimbabwe is mainly driven by internal factors that are under the control of bank managers and regulators, rather than external factors that are beyond their influence. The study provides several policy implications and recommendations based on the findings.

The evidence that non-interest income positively affects bank profitability, suggests that banks can boost their revenues by diversifying their income sources beyond interest-based activities. Policymakers can support this strategy by facilitating the development and promotion of innovative banking products and services that cater to the needs of customers. Another positive determinant of bank profitability is liquidity, which reflects the ability of banks to meet their short-term obligations and fund their lending activities. To enhance their profitability, banks need to maintain a healthy level of liquidity that balances the demand for loans and the availability of deposits. Policymakers and regulators can assist this process by providing guidelines and mechanisms that ensure adequate liquidity management and prevent liquidity crises.

The study also finds a positive relationship between the cost-to-income ratio and bank profitability, implying that efficiency is a key factor in improving bank performance. Banks can achieve higher efficiency by reducing their operating costs and increasing their productivity. This can be done by streamlining operations, improving processes, and leveraging technology to optimize their cost structure and enhance their profitability. Another factor that positively influences bank profitability is tier 1 capital, which measures the core capital of banks that is used to absorb losses and protect depositors. The study suggests that banks with higher capital adequacy are more profitable than those with lower capital adequacy. Therefore, policymakers should recommend and enforce regulations that ensure banks comply with the minimum capital requirements and maintain sufficient capital buffers to mitigate risks and absorb losses.

The positive effect of bank stability on bank profitability underscores the importance of maintaining a stable and resilient banking system. Policymakers should implement measures to strengthen regulatory oversight, monitor banks' risk management practices, and promote financial stability to support bank profitability.

On the other hand, the study identifies two negative determinants of bank profitability: asset quality and bank concentration. The negative effect of loan loss reserves on bank profitability highlights the need for a robust credit risk management framework. Banks should adopt prudent lending practices, conduct thorough credit assessments, and establish adequate loan loss reserves to mitigate potential losses. Policymakers should reinforce regulations and supervision to ensure banks adhere to sound credit risk management practices. The study reveals that banks operating in a more concentrated market are less profitable than those operating in a more competitive market. To increase their profitability, banks need to expand their market share and customer base by offering better products and services at competitive prices. Policymakers can foster this outcome by encouraging market competition, promoting fintech, and discouraging excessive market concentration that may harm overall bank profitability.

The study also reports that macroeconomic fundamentals, such as GDP and inflation, do not have a significant impact on bank profitability in Zimbabwe. This implies that macroeconomic factors have a limited direct influence on banks' financial performance in the country. However, policymakers should still monitor macroeconomic conditions as they indirectly affect the overall business environment and determine the demand for banking services.

Finally, the analysis reveals that the impact of regulatory quality on the relationship between bank stability and profitability is weakly negative and significant. This implies that enhancing the regulatory environment may not necessarily improve the performance and resilience of banks in Zimbabwe. Policymakers and regulators need to carefully consider the trade-offs and costs associated with imposing stricter regulations and supervision on the banking sector. It is essential to strike a balance between prudential norms, transparency requirements, and consumer protection measures, while also considering the impact on profitability incentives, risk-taking opportunities, and innovation capabilities of banks. Furthermore, the analysis indicates that fintech has an insignificant moderating effect on the relationship between non-interest income and bank profitability. This suggests that fintech may not significantly impact the competitiveness and performance of banks in Zimbabwe in non-interest income activities. Bank managers and practitioners should closely monitor trends and developments in fintech within the country and the region. They need to assess the potential opportunities and challenges that fintech presents for their business models, products, and services. Additionally, exploring the possibilities of collaborating or partnering with fintech providers can help enhance customer experience, loyalty, and satisfaction.

One of the main limitations of this study is the data availability and quality. Due to the economic and political instability in Zimbabwe, reliable and consistent data on the banking sector and the macroeconomic environment are scarce and difficult to obtain. This limits the sample size and the time span of the analysis, as well as the choice of variables and methods. For example, we could not include some important factors that may affect bank profitability, such as competition, efficiency, and

innovation. We also could not perform some desired robustness tests or sensitivity analyses that would enhance the validity and reliability of our results. Therefore, our findings should be interpreted with caution and subject to further verification with more comprehensive and updated data.

In recent years, the Sub-Saharan African region has experienced tremendous growth in fintech activities, particularly in the realm of mobile money. As of now, the region is considered the global leader in mobile money initiatives. The emergence and evolution of fintech in this region has disrupted traditional banking systems, leading to several innovative financial services. However, despite this significant progress, the impact of fintech developments on the profitability of banks in Sub-Saharan Africa remains uncertain. The rapid evolution of fintech, combined with its dynamic nature, presents opportunities, challenges, and, inevitably, risks for traditional banking institutions. Therefore, a comprehensive investigation is warranted to understand the potential effects of fintech on the financial landscape and profitability specifically within Sub-Saharan African banking sectors.

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