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FINANCIAL TECHNOLOGY, NON PERFORMING LOAN RATIO, BANK SIZE ON BANK STABILITY: EVIDENCE FROM MALAYSIAN LISTED BANKS

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Abstract:

This study investigates the effects of FinTech, non performing loan ratio and bank size on the case of stability in banks. This research work utilizes secondary data derived from listed Malaysian banks for a period extending from 2010 to 2024. The Z-score is used as a measure of banking stability, while non-interest operating costs are taken as a proxy for FinTech adoption. Non performing loan ratio (NPL) and bank size, are also employed as the independent variables. The analysis of the relationships among the variables is performed using STATA. The results implicate that FinTech adoption and non performing loan ratio have a negative yet insignificant correlation with bank stability, while Bank Size has a negative and significant correlation with stability. This finding indicates that larger banks may reduce its stability due to operations cost and risk exposure. Thus, the banks manager should might tightening is liquidity and risk control to ensure the bank's stability in the long run and it may give signal to investors on the firm value and impact their financial decision.

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Bank Size, Bank Stability, Financial Technology, Non
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Introduction

The Malaysian banking sector has been undergoing transformation since 2011, and it has increased rapidly with the introduction of Interoperable Credit Transfer Framework (ICTF) by Bank Negara Malaysia in 2018. The regulatory reform as a result of the emergence of financial technology (FinTech). FinTech by means is the technology used in the banking industry such as mobile banking, digital payments, artificial intelligence, data analytics, blockchain-based applications and digital lending platforms. The rapid growth of FinTech in Malaysia has created a significant issue for the banking industry. Digital financial services are expanding rapidly, changing how banks compete, operate and manage risk. Bank Negara Malaysia said e-payment transactions increased 25% to 18.4 billion transactions in 2025 from 14.7 billion transactions in 2024. By 2025, Malaysians made an average of 538 e-payment transactions, up from 432 transactions in 2024 (Bank Negara Malaysia, 2026). The data indicates that digital financial services have become an essential component of Malaysia's banking and payment ecosystem. The adoption of Financial Technology (FinTech) have influenced the whole banking sector, which have increasingly transferred their operations online in order to be more efficient and competitive (Mohamed et al., 2023; Kurniawati et al., 2024; Omar & Ibrahim, 2025) and strengthen the stability of banking industry. This development is a positive sign of progress in digital finance but also raises questions about the implications of FinTech adoption for the stability of banks or whether it introduces new risks to the banking system.

However, financial indicators by mean financial ratios are still being considered as the most important measures to assess the financial well-being and durability of banks (Iqbal et al., 2024; Zahra & Miranti, 2023). Among the main ratios, return on assets (ROA), capital sufficiency, liquidity, and bank size, there are certain banks' characteristics that indicate a bank's performance, efficiency in risk management, and its capability of surviving financial crises. In addition, conventional tools for gauging stability and resilience continue to be financial ratio like capital adequacy, ROA, and liquidity (Iqbal et al., 2024; Zahra & Miranti, 2023). The banking system in Malaysia remained resilient in 2025 with a total capital ratio of 18.1% of total risk-weighted assets and excess capital buffers of RM139.3 billion as at December 2025. The system-wide liquidity coverage ratio was also above the regulatory requirement which showed that Malaysian banks generally had strong liquidity positions (Bank Negara Malaysia, 2026).

The existence of strong aggregate banking indicators does not imply that the analysis of the impact of FinTech and financial indicators on bank stability at the institutional level is unnecessary. This is important because the reaction of individual banks to technological transformation may differ depending on the financial strength, business model, risk exposure and level of digital readiness of each bank.

If this issue is not studied properly, it will be difficult for bank managers, regulators, investors and policymakers to understand whether FinTech strengthens or weakens the stability of Malaysian banks. FinTech can increase efficiency and competitiveness but may also raise banks' risk exposure to cybersecurity threats, operational disruptions, technology investment costs, regulatory challenges, and heightened competition from non-bank financial service providers. Weak financial indicators can reduce a bank's capacity to absorb losses, maintain liquidity, manage credit risk and retain public confidence. If banks aggressively pursue digital expansion without maintaining sound financial fundamentals, the long-term stability of the banking industry may be affected. This could undermine financial intermediation, dampen investor confidence, increase systemic risk and endanger the resilience of the Malaysian financial system. Through financial innovation, it increases the performance of the bank (Zhang et al., 2024) and the study may contribute to Sustainable Development Goal 9 (SDG9) by showing how financial innovation through FinTech may support resilient of financial structure in the banking industry in Malaysia.

Thus, the goal of this study is to look into how FinTech and financial ratios affect Malaysian banks' stability. From a theoretical standpoint, it strengthens the application of the Signalling Theory in banking research by combining FinTech adoption with non performing loan ratio and bank size, which serve as signals of bank strength and resilience. In practical terms, the results help policymakers, regulators, and bank managers strike a balance between financial resilience and digital innovation, ensuring that banks maintain stability while remaining competitive. This gives a signal to investors on the firm's value, and it may boost confidence for investors to invest in the company.

Literature Review

Stability within the banking sector always emerged as a core component within financial realms. Here, financial ratios were the initial factors applied for measuring financial stability within the financial sector. More contemporary research emphasizes FinTech within the sector that is changing the efficiency of services within banks (Mohd et al., 2023; Nguyen et al., 2021). In this research, the banking stability as a dependent variable is understood as the ability of a bank to function effectively, control risks, and endure shocks. The Z-score is the most common measure of stability in banks, being the sum of profit, capital-to-asset ratio, and the variability of risk (Islamic Financial Services Board [IFSB], 2024). Financial resilience has been recognized as the most accepted substitute for this measure. In the current research, FinTech, non performing loan ratio and bank size serve as independent variables. The FinTech phenomenon signifies the use of advanced digital technologies in banking practices. Earlier research portrays FinTech as enabling and actively taking part in the banking sectors but at the same time, it poses risks that, if not well handled, might turn to be burdensome (Baharin & Fazli, 2024; Omar & Ibrahim, 2025). The bank's profitability and stability are usually measured through various financial indicators such as ROA and bank size, and non performing loan (NPL), and these methods are very common. Numerous studies have indicated that these ratios are closely related to stability. This connection is especially pronounced in banks where

financial fundamentals are critical (Iqbal et al., 2024; Zahra & Miranti, 2023; Sivarajan et al., 2023). This study also supported by Signalling Theory (Spence, 1973) which explain how information asymmetry may convey investors on making decision and suggested that financial decisions can be shown through financial indicators and it may affect the firm value (Ross, 1977). This framework combined offer a thorough viewpoint on the reciprocal impact of Non Performing Loan (NPL) ratio and Bank size and FinTech adoption on banking stability. Based on the literature, the following hypotheses were developed:

H1: FinTech adoption has a significant impact on Banks stability.

H2: Non Performing Loan (NPL) ratio has a significant impact on Banks stability.

H3: Bank Size has a significant impact on Banks stability.

Methodology

This research utilizes secondary data gathered from the yearly reports of Malaysian banks, publications of Bank Negara Malaysia, and financial databases covering the period from 2010 to 2024 from seven banks listed in the Bursa Malaysia. Z-score is the measure for banking stability while the natural logarithm of non-interest operating costs is the proxy for FinTech adoption. Financial indicators are measured with Non Performing Loan ratio and bank size. The longitudinal research design takes variables changes over a fifteen-year period. Multiple linear regression analysis applied to assess the impact and direction of the effect that FinTech, non performing loan (NPL) and bank size had on the stability of banks. Stata software was used for data analysis that included descriptive statistics, correlation analysis, and regression analysis which formed the basis of the findings. Table 1 shows the measurement of variables.

Table 1: Variables Description

Variable (Notation)	Measurement
Bank Stability	$Z\text{-score} = (ROA + E/A) / \sigma(ROA)$
Financial Technology	Ln (non-interest operating cost)
Non Performing Loan (NPL) Ratio	Impaired loans, advance and financing/total loans, advance and financing
Bank Size	Natural Logarithm of Total Assets

Descriptive Analysis

The descriptive statistic results are summarizing in the table 2. The average score for banking stability is 4.53, there is considerable variation with different banks having scores ranging from 2.44 to 9.67. On the other hand, FinTech implementation has an average score of 16.11, which is fairly high and stable, while Non Performing Loan (NPL) ratio and bank size have an average value of 1.57 and 25.32 respectively, suggesting there is uniformity across the banks.

Table 2: Descriptive Statistics

Variable	N	Mean	Min	Max	Standard Deviation	Skewness	Kurtosis
Bank Stability	105	4.527848	-1.1833	9.6667	2.448055	-0.4426	2.4747
FinTech	105	16.11302	10.6454	18.764	1.330656	-1.0823	6.6272
NPL	105	1.567048	0.15	5.37	1.06347	1.6351	6.2003
Bank Size	105	25.31774	21.9385	27.70364	1.467447	-0.5624	2.8466

Finding and Discussion

The correlation analysis in Table 3 indicates that there is a moderate positive correlation between banking stability and bank size ($r = 0.748$), which means that strong financial fundamentals are a backup to resilience. The relationship between banking stability and FinTech adoption is weaker ($r = 0.145$), and there is negative correlation between bank stability and NPL ($r = -0.1746$).

Table 3: Correlation Table

Variable	Bank Stability	FinTech	NPL	Bank size
Bank Stability	1			
FinTech	0.1452	1		
NPL	-0.1746	-0.1621	1	
Bank size	0.748	0.0567	-0.2011	1

The results for the regression analysis are displayed in Table 4. The regression analysis shows that FinTech and bank stability is negatively associated and insignificant with a p-value of 0.125. Similarly to the Non Performing Loan (NPL) has a negative coefficient with -0.0556 and p value of 0.568 with shows that even though higher Non Performing Loan (NPL) ratio could reduce bank stability but the effects is insignificant. Meanwhile, for Bank size, with the coefficient of -0.0703 and p value of 0.013, it implies that bank size and bank stability is negatively coefficient and significantly related. Therefore, Hypothesis 3 is supported, whereas Hypotheses 1 and 2 were not.

Table 4: Regression Test

Variable	Coefficient	P (value)
FinTech	-0.1342379	0.125
NPL	-0.0555828	0.568
Bank size	-0.070347	0.013
C	33.8767	0.003

The findings provided strong support to the hypotheses that were made regarding the factors that influence the stability of banking systems in Malaysia. The first hypothesis (H1) claimed that the FinTech would impact banking stability. The results of the regression analysis, however, reveal that with the adoption of FinTech, there is no strong impact on the bank

stability yet. While FinTech can enhance banking efficiency, customer access and transaction speed, it may also introduce new risks such as cybersecurity risks and operational disruption. This may explain the negative but not significant coefficient. The findings is aligned with Yudaruddin (2022), where the study found that FinTech has an impact on bank performance. The second hypothesis (H2) and third hypothesis (H3) were related to financial indicators, which asserted that financial indicators represent by financial ratio would have a considerable effect on banking stability. However, the findings show otherwise. The finding shows that there is negative relationship between NPL ratio and bank stability is consistent with banking theory where higher non-performing loans are indicative of weaker asset quality and higher credit risk. The increased level of unpaid or defaulted loans can lead to lower income, higher loan-loss provisions, lower profitability and pressure on capital adequacy for banks. Such conditions can destabilize a bank. This is supported by Anh and Phuong (2021) who found that non-performing loans have a negative effect on the financial stability of commercial banks, where higher NPLs decrease the bank stability measured using the Z-score. It may indicate that NPL has a negative direction but is not strong enough to explain the changes in bank stability in the sample period. One reason might be that banks are well-capitalised, have a good grip on credit risk management or have sufficient loan-loss provisions to absorb the impact of problem loans. The finding implies that NPL is an important risk indicator but its effect on stability is not significant in this model. Concerning bank size, the negative and significant result means that bigger banks are linked to lower bank stability. This result can be explained by the fact that larger banks tend to be more complex in their activities, more exposed to financial risk, more engaged in market-based activities, and have more complex structures of risk management. Larger banks may be subject to greater operational risk and be harder to monitor effectively. Ali and Puah (2018) support this argument, finding that bank size has a negative effect on bank stability when stability is measured using the Z-score model. The strongly negative effect of bank size indicates that bank does not necessarily result in higher stability. Bigger banks can leverage economies of scale and have a more dominant market presence, but they also may be subject to higher risk and more complex management. This means that big banks have to strengthen governance, improve internal control, ensure effective risk monitoring and have sufficient capital protection to make sure that the expansion does not come at the expense of stability (Salim et al.,2026).

The research outcomes emphasized the role of capital, profitability, and efficient management in stability maintenance (Iqbal et al., 2024; Zahra & Miranti) are, in fact, contribute to the variation in banking stability explained independently (Rahman et al., 2023).

Conclusion

The results of the study point out that financial ratios are still the main factors for the stability of banking industry. The positive side of FinTech adoption is that it has the potential but still needs well-defined measurement indicators that can tap its actual impact. This indicates that banking industry ought to fortify their financial foundations while slowly and carefully bringing in FinTech innovations. The research is faced with certain limitations. First, a small sample size is used, and it is restricted to seven listed banks in Malaysia. Second, the indicator for the adoption of FinTech technology was non-interest operating costs, which might not represent the whole quality of the digital transformation. Moreover, the use of secondary quantitative data is another limitation that affects the breadth of analysis. In order to produce more reliable and comprehensive results, future studies ought to use a larger sample size that includes banks from different countries, apply a wider range of FinTech indicators such as

mobile banking adoption or digital transaction volumes and also employ qualitative methods like interviews or surveys. Besides that, longitudinal case studies might also allow researchers to gradually unveil the paths of banks' digital transformation and how they cope with it. To summarize, bank size has a huge impact on the stability of banks, whereas the adoption of technology in finance remained insignificant in the current research. The empirical results reiterate the role of sound financial fundamentals in maintaining stability and resilience and also reveal the need for more sophisticated measurement in the case of FinTech for stability impact determination.

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