IMPACT OF FINTECH DEVELOPMENT ON BANKS' DEFAULT RISK - EMPIRICAL EVIDENCE FROM THE LISTED COMMERCIAL BANKS IN VIETNAM

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Abstract: ***FinTech development has become a key driver of financial innovation and stability in emerging banking systems. This study examines the impact of FinTech development on the default risk of Vietnamese commercial banks and differences across ownership structures. Using panel data from 33 banks during 2017-2022, the study employs Pooled OLS, Fixed Effects, Random Effects, GLS, and dynamic GMM to ensure robustness. The results show that FinTech development is positively associated with bank stability: higher FinTech activity significantly increases Z-scores (p < 0.05), indicating lower default risk. Descriptive evidence also shows that private and unlisted banks are more stable than state-owned and listed banks. These findings suggest that FinTech enhances operational efficiency and risk management, supporting policies that promote digital innovation while maintaining financial stability.***

• Keywords: *fintech, commercial banks, default risk, fintech start-ups, z-score.*

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1. Introduction

Financial Technology (FinTech) is defined as an interdisciplinary field encompassing finance, technology management, and innovation (Financial Stability Board, 2017). This disruptive combination provides both costs and benefits to commercial banks, affecting multiple aspects of the banks' operations and performance, especially the likelihood of default. Fintech can provide diversified, dimensional risk-management innovation for commercial banks (G. Li et al., 2022). Moreover, Fintech significantly improved commercial banks' profitability and risk-taking by addressing issues like information asymmetry, data quality, and data integration (G. Li et al., 2022). Since Fintech integrates advanced technologies into financial services, linking asset and liability sides, and managing transaction data using blockchain and distributed accounting, it addresses challenges in customer assessments through methods such as text mining, cluster analysis, iris recognition, and precision risk control.

However, Fintech can increase the probability of commercial bank bankruptcy by creating market risks and issues stemming from diversification and participants. Risks include micro-level processes, networks, and rules governing financial institutions, while macro-level risks encompass procyclicality, excessive volatility, and reputational issues (Chen et al., 2023). Commercial banks are finding it more difficult to foresee, assess, and quantify risks due to the ongoing generation and evolution of risks.

Moreover, the boom in Fintech start-ups affects the performance and default risk of commercial banks by competing with them in core activities. Fintech start-ups frequently violate financial regulations and engage in regulatory arbitrage, thereby jeopardizing the stability of the financial system (Hornuf et al., 2020).

The relationship and impact of FinTech on the banking sector have been examined in many previous studies. However, existing literature has emphasized the benefits of FinTech in improving profitability and operational efficiency; there is still little research on the potential risks and challenges it poses to commercial banks. This study aims to fill this gap by providing a comprehensive analysis of both the positive and negative impacts of FinTech on commercial bank default risk. In doing so, it makes a unique contribution to the field by providing a balanced perspective on the impacts of FinTech, thereby informing policymakers, regulators,

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and financial institutions on how to navigate the complexities of FinTech integration.

2. Literature and hypotheses development

FinTech encompasses a range of digital financial applications, including payments, digital banking, P2P lending, crowdfunding, and credit scoring (Suryono et al., 2020). These innovations improve efficiency, reduce transaction costs, and expand access to financial services, thereby affecting bank stability and default risk. FinTech development has also intensified competition in the banking sector by lowering entry barriers and enabling alternative financial service providers (Romanova & Kudinska, 2016; Zuo et al., 2021). Technologies such as big data and cloud computing enhance credit assessment, improve information sharing, and reduce transaction risks (G. Li et al., 2022). In addition, FinTech-driven lending platforms increase competition in the credit market and expand financing opportunities (Cornelli et al., 2022). These developments suggest that FinTech can improve operational efficiency while reshaping traditional banking models.

FinTech also enhances risk management by improving decision-making, reducing information asymmetry, and lowering fraud and credit risks (Allen & Gale, 2000; Fuster et al., 2019; Gomber et al., 2017). It expands financial services and strengthens risk-sharing mechanisms, contributing to financial stability (Allen & Gale, 2000; Demirguc-Kunt & Huizinga, 2010). Empirical evidence shows that banks adopting financial innovation achieve better risk management outcomes and lower default risk (Norden et al., 2011). However, FinTech may also increase risk-taking incentives due to higher profitability and expanded lending capacity (G. Li et al., 2022; Hu et al., 2022). Overall, its net effect is expected to reduce default risk.

Accordingly, FinTech is expected to reduce commercial banks' default risk through improved efficiency and risk management.

H1: *FinTech is negatively associated with the default risk of commercial banks.*

FinTech startups further influence bank stability by introducing innovative technologies that enhance efficiency, improve risk assessment, and diversify revenue streams (Haddad & Hornuf, 2021). These innovations reduce exposure to financial risks and are associated with lower volatility and systemic risk (G. Li et al., 2022). Collaboration between banks and FinTech firms also improves customer experience and stabilizes revenue, further mitigating default risk.

Therefore, the following hypothesis is proposed:

H2: *FinTech start-ups are negatively correlated with the default risk of commercial banks.*

Vietnam provides a relevant context due to its rapid digital transformation and expanding FinTech ecosystem (National Financial Supervisory Commission, 2018; Pham et al., 2023). The coexistence of traditional banking structures and emerging digital innovations creates both opportunities and challenges for risk management. This study contributes to the literature by providing empirical evidence on the relationship between FinTech and bank default risk in emerging economies.

3. Data and Methodology

3.1. Data

The research sample, collected over the 7-year period from 2017 to 2022, comprises 33 listed commercial banks in Vietnam. The selection of the 2017 to 2022 time period for the research stems from the fact that this is the period during which Vietnam's Fintech market has experienced remarkable growth, and commercial banks are participating in the race to digital transformation. The period 2017-2022 witnessed rapid and significant development of the Fintech market in Vietnam, during which Fintech companies collaborated with banks to bring digital financial services to customers (Dinh, 2022).

3.2. Variable measure

Table 1. Variable description

Sign	Meaning	Formula	Sources
Z-score	Proxy for bank default risk; reflects distance to insolvency. A higher Z-score indicates a lower probability of default. It combines profitability, leverage, and earnings volatility (Sullivan, 2008; Nguyen & Dang 2022)	$Z - score_{i,t} = \frac{ROA + EA}{SD(ROA)}$	FS
FINT	FinTech development measured by total digital transaction value. Log transformation is applied to reduce skewness. This indicator was choosen because payment sector dominates FinTech landscape in Vietnam (Quang et al., 2022; Dinh 2022)	$\ln(Digi \quad payment\ value)$	Statista
FINC	Number of FinTech firms operating in a given year; reflects FinTech ecosystem development and technological advancement.	$Number\ of\ FinTech\ firms$	Statista
BSIZE	Size of bank measured by total assets; larger banks may benefit from "too-big-to-fail" effect (Nguyen & Dang, 2022).	$\ln(Total\ asset)$	FS
AGROW	Annual growth rate of total assets; rapid growth may increase risk due to aggressive lending (Foos et al., 2009).	$\frac{Total\ asset_t - Total\ asset_{t-1}}{Total\ asset_{t-1}}$	FS
DTA	Measures funding stability; higher deposits indicate stronger funding base (Ahrend & Goujard, 2012).	$\frac{Deposit}{Total\ assets}$	FS
LEV	Reflects leverage and risk exposure; higher leverage may increase default risk (Fahlenbrach et al., 2012).	$\frac{Total\ debt}{Total\ assets}$	FS
OBTD	Indicates liquidity and credit risk exposure; a higher ratio may imply higher risk (Albanesi et al., 2022).	$\frac{Customer\ deposit}{Outstanding\ loan}$	FS
DIVI	Measures income diversification; higher diversification may reduce risk (Williams, 2016).	$Interest\ income - Non - interest\ income$	FS
NIIC	Reflects income structure; reliance on noninterest income may affect stability (Williams, 2016).	$\frac{Non - interest\ income}{Total\ income}$	FS
NIM	Profitability indicator; higher NIM may be associated with higher risk-taking (Claanen & Claanen, 2020).	$\frac{Net\ interest\ income}{Earing\ assets}$	FS

3.3. Model specifications

We use a panel regression as follows:

$$Z - score_{it} = \beta_0 + \beta_1 \times FINT_{it} + \beta_2 \times FINC_{it} + \beta_3 \times BSIZE_{it} + \beta_4 \times AGROW_{it} + \beta_5 \times DTA_{it} + \beta_6 \times LEV_{it} + \beta_7 \times OBTD_{it} + \beta_8 \times DIVI_{it} + \beta_9 \times NIIC_{it} + \beta_{10} \times NIM_{it} + e_{it}$$

4. Results

4.1. Descriptive statistics

Table 2. Summary statistics

Variable	Mean	Standard Deviation	Minimum	Maximum
Dependent variable				
ZSCORE	3.63332	0.7367242	2.263423	5.952973
Independent variables				
FINT	10.04081	0.2010623	9.740363	10.31429
FINC	27.83333	20.54109	11	71
Control variables				
BSIZE	14.23053	0.5076598	13.20665	15.32646
AGROW	0.162247	0.2349924	-0.72489	2.978701
DTA	0.785963	0.0844553	0.509033	0.920637
LEV	0.904854	0.0752168	0.031824	0.959382
OBTD	0.910477	0.2004858	0.214643	1.469094
DIVI	-0.50023	0.7787573	-5.08401	1.29349
NIIC	0.503784	0.3399463	-0.36155	2.595376
NIM	0.029509	0.0136186	0.000552	0.0941

The average natural logarithm of the Z-score is 3.6333, indicating moderate bank stability. The highest value is observed for PBVN Bank in 2019 (log(Z) = 5.953; Z = 384.90), while the lowest is recorded for SeABank in 2017 (log(Z) = 2.263; Z = 9.62). FinTech development shows an upward trend, with an average of 27.83 new firms annually during 2017-2022, peaking at 71 firms in 2021. The average log value of electronic transactions is 10.04, reaching a maximum of USD 18.06 billion in 2022.

Regarding bank characteristics, the average bank size (log) is 14.255, with BIDV being the largest and PBVN the smallest. Asset growth averages 16.22%, ranging from 46.33% (KLB, 2021) to -33.38% (ANZB, 2022). Deposits account for 78.60% of total assets on average, while loans represent 90.49%. The loan-to-deposit ratio averages 91.05%, with extremes of 146.91% (VPB, 2021) and 21.46% (ANZB, 2020). The income diversification index averages -0.500, ranging from 1.293 (BaoVietBank, 2020) to -5.084 (KLB, 2019). Non-interest income averages 0.504, while net interest margin ranges from 0.06% (BaoVietBank, 2020) to 9.41% (VPB, 2019).

4.2. Regression results

Table 3. Result of defect tests

Defect tests	Wald test	Wooldridge test	Multicollinearity test
Result	P-Value > Chi2(33) =0,0000	Prob > F = 0,0000	Mean VIF = 2.31

Testing for endogeneity (two-stage least squares regression - 2SLS)

For a robustness check, a two-stage regression is performed to test the endogeneity of each independent variable and control variable in the model. From the results of the Durbin Wu-Hausman test, reject or accept the hypothesis H0: The variable is not endogenous (H1: The variable is endogenous). Accordingly, there are three endogenous control variables, including DTA, LEV, and NIIC.

Table 4. Result of the Wu-Hausman test

Variable	FINT	FINC	BSIZE	AGROW	DTA	LEV	OBTD	DIVI	NIIC	NIM
P-Value	0.9863	0.9932	0.4672	0.9326	0.0341	0.0109	0.7823	0.3528	0.0406	0.3802

The GMM method is used to address endogeneity in the model. The GMM method allows the use of instrumental variables to control the correlation between explanatory variables and errors, thereby improving the accuracy and reliability of the estimates (Hansen, 2018).

Table 5. Result of the GMM method

	Variables	Regression coefficient	P-value
Independent variables	$Z\text{-}SCORE_{it-1}$	0.7986984*	0.000
	FINT	0.0635441**	0.019
	FINC	0.0004205*	0.000
Control variables	BSIZE	0.0270971	0.641
	AGROW	-0.0612078*	0.000
	DTA	-0.5139723*	0.000
	LEV	-2.579308*	0.000
	OBTD	-0.1453956*	0.009
	DIVI	-0.0580609*	0.000
	NIIC	-0.2977282*	0.000
	NIM	-4.208502	0.324
Constant		2.859631	0.000
Observations	198		

Source: Supported by software

*Note: *, **, and *** represent for the statistical significance of 1%, 5%, and 10% respectively*

FinTech significantly improves bank performance and reduces default risk. The coefficient of FinTech transaction value (FINT) is 0.7986 ($p < 0.05$), indicating a positive relationship with the Z-score. This suggests that FinTech enhances operational efficiency, supports revenue diversification, and improves customer experience, thereby reducing insolvency risk (Mahdi et al., 2023; Chhaidar et al., 2022). In Vietnam, mobile banking adoption has been shown to increase fee-based income and overall financial performance, further lowering default risk (Le et al., 2021).

Similarly, FinTech start-ups (FINC) positively affect bank stability, with a coefficient of 0.0004 ($p < 0.01$). Their integration improves efficiency,

expands services, and enhances risk management through technologies such as data analytics and digital platforms (Ha & Nguyen, 2022; Hang et al., 2021; Le et al., 2021).

Regarding bank characteristics, asset growth (AGROW) negatively affects the Z-score (-0.0612), suggesting higher risk due to aggressive lending (Nagel & Purnanandam, 2019). The deposit-to-asset ratio (-0.514) indicates potential liquidity risk (Ruozi & Ferrari, 2012), while leverage (LEV: -2.5793) increases default risk due to higher financial obligations (Fahlenbrach et al., 2012). Similarly, a higher loan-to-deposit ratio (OBTD: -0.1454) increases credit and liquidity risks (Nagel & Purnanandam, 2019).

Finally, income diversification (DIVI: -0.00581) and non-interest income (NIIC: -0.2978) are associated with higher default risk, reflecting the volatility of non-traditional banking activities (Zouaoui & Zoghlami, 2022; Oanh et al., 2024).

5. Conclusion

This study examines the impact of FinTech development on the default risk of Vietnamese commercial banks using data from 33 banks over the period 2017-2022. The results indicate that FinTech development proxied by transaction value and the number of FinTech start-ups significantly reduces bank default risk, as reflected in higher Z-scores. In addition, differences are observed across bank groups: private banks exhibit lower default risk than state-owned banks, and unlisted banks are more stable than listed banks.

This study contributes to the literature by providing empirical evidence on the role of FinTech in enhancing bank stability in a developing economy context. The findings highlight the importance of FinTech in improving bank performance and risk management, offering implications for policymakers in strengthening regulatory frameworks and for banks in developing appropriate digital strategies.

However, the study has several limitations. It does not incorporate ownership structure and macroeconomic factors, such as inflation and exchange rates, which may influence default risk. Future research should extend the analysis by including these variables and expanding the dataset across countries to provide more comprehensive and generalizable insights.

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