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The Impact of Fintech on Bank Profitability and Bank Stability in Emerging Country

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ABSTRACT

This article investigate the impact of financial technology (Fintech) on the operations of Vietnamese commercial banks, specifically in terms of profitability and stability. The study uses panel data from 14 Vietnamese commercial banks listed on the stock exchange, covering the period from 2013 to 2022. The analysis employs a panel regression model using the generalized least squares (GLS) method to evaluate the relationship between Fintech and bank profitability and bank stability in Vietnam. The study indicates that Fintech, as reflected by the number of Fintech companies and the prevalence of Fintech, has a positive and statistically significant impact on the profitability and stability of Vietnamese commercial banks. Additionally, the study shows that bank equity is associated positively with bank stability and bank profitability. In contrast, the cost-to-income ratio shows an inverse relationship, and banks without state capital have higher profitability. Based on the empirical results, the study discusses several policy implications for regulators and Vietnamese commercial banks, suggesting that foster Fintech development could enhance the long-term stability and profitability of the banking sector. These insights are particularly relevant for emerging economies seeking to leverage technological advancement to strengthen their financial systems.

Keywords: Fintech, Bank stability, Bank profitability, Emerging country, Panel regression model.

Introduction

Fintech or financial technology can be defined as financial innovations supported by technology that create new business models, applications, processes, and products with significant impacts on financial markets, financial institutions, and the delivery of financial services (Thakor, 2020). Fintech appears in various aspects such as retail finance, wholesale payments, investment management, insurance, credit provision, and equity crowdfunding. It not only competes with traditional financial services but also drives innovation and transformation within them. The Financial Stability Board (FSB) categorizes Fintech activities into five types of financial services: payments and settlement, deposit taking, lending and capital raising, insurance, investment management, and market support services (Board, 2017). Financial technology provides lower-cost services with more options for consumers when using financial services, aiming to digitize their financial behaviors. The emergence and development of Fintech have a significant impact on financial institutions, particularly commercial banks.

The impact of Fintech on the banking industry has attracted significant attention from scholars. Various research teams have investigated financial technology's effect on commercial banks' operations using qualitative and quantitative methods. However, the results obtained have lacked consistency. Most studies support the view that the emergence of Fintech is inevitable and plays a vital role in the overall economy, particularly within the banking system. Drasch *et al*. (2018) examined the trend of collaboration between Fintech companies and banks as technology adoption becomes essential and mandatory. Using data from 136 banks in partnerships with Fintech firms and 12 in-depth interviews with leaders of major financial institutions, the study demonstrated that both parties benefit, enhancing their respective strengths and addressing weaknesses. This trend supports banks in developing their supply chains, improving product

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quality through technology integration, and elevating customer experience. The collaboration and use of technology by Fintech companies, particularly in the payment sector, have significantly improved the operations of 14 financial institutions listed on the Nigerian Stock Exchange from 2012 to 2017 (Mustapha, 2018). Wang *et al*. (2021) demonstrated that the development of Fintech in general and Fintech companies in particular has increased profitability, leading to innovations and improvements in the risk management processes of commercial banks. By applying Fintech technologies, commercial banks can enhance traditional business models, reduce operational costs, improve service efficiency, create more attractive business models for customers, and thus enhance their competitiveness in the market.

From another perspective, Fintech will pose a significant challenge to the operations of commercial banks. Specifically, these banks must respond by reducing loan interest rates and increasing deposit interest rates. This considerably affects the profitability of banks and the overall efficiency of banking operations (Hodula, 2023). With the advantage of technology and a large customer base, Fintech companies are expected to reshape the competitive landscape in the financial and banking services market. This could make traditional banks more willing to take on greater risks in their operations to stay competitive, thus increasing market risks (Boot *et al*., 2021). The entry of Fintech companies into the market leads to fragmentation in the banking services sector, increasing risks to the profitability of individual banks. Traditional financial institutions will lose a significant portion of their market share or experience reduced profit margins if Fintech companies effectively leverage technology and offer services at lower costs, better meeting customer expectations; banks face the risk of increased strategic, operational, and credit risks (Minh & Anh, 2022).

Vietnam's Fintech sector has made significant progress in recent years, driven by the widespread adoption of digital protocols in business, the boom in e-commerce, and the government's strong commitment to promoting digital payments. These factors have contributed to the rapid development of innovative financial solutions, making Fintech an increasingly integral part of the country's financial ecosystem. In Vietnam, the number of Fintech companies has grown significantly, from 10 companies at the end of 2010 to over 187 in 2023. These Fintech companies operate across various sectors, including payment intermediaries and e-wallets, peer-to-peer lending, blockchain technology, digital currencies, and remittances. This expansion reflects the Fintech industry's dynamic development in Vietnam, driven by technological innovation and increasing demand for digital financial services (Dao & Le, 2024). Fintech is rapidly transforming the financial and banking landscape in the banking industry, blurring the lines between financial companies and traditional banks. Most Fintech companies have collaborated with banks to develop new products and services that cater to a wide range of customer needs, such as electronic payment services, fundraising and lending, insurance, asset management, and market support services. This collaboration drives innovation in the financial sector, offering more convenient and accessible solutions for customers while enhancing the overall efficiency and competitiveness of both Fintech firms and traditional banks (Nhung & Phương, 2021). However, the rapid rise of Fintech poses a significant challenge to Vietnamese commercial banks, leading to changes in their traditional operations. With Fintech companies developing rapidly and potentially becoming formidable competitors, particularly in payment services, traditional banks must adapt to stay competitive. This shift forces banks to rethink their business models, integrate new technologies, and innovate their service offerings to meet the evolving demands of customers while maintaining their market position (Minh & Anh, 2022).

The paper is organized as follows: Section 2 provides a brief review of Fintech's impact on bank stability and profitability. Section 3 presents the data and research methodology, while Sections 4 and 5 show the empirical results and discussion.

Literature Review

The research relates to the literature on the impact of Fintech on bank profitability and stability. Most literature supports that Fintech development would help increase bank profitability and stability. Fintech can improve commercial banks' operations by applying new technologies in service delivery and risk assessment and leveraging advantages from the information and big data collected from customers (Fuster *et al*., 2019). Fintech enhances the efficiency of commercial banks in risk management and cost control (Wang *et al*., 2021). It enables the creation of more diverse and customized financial products and services that had better meet customer needs (Gomber *et al*.,

2017). Mirza *et al*. (2023) state that lower costs, an expanded product base, and reduced economic capital requirements of banks drive the direct impact of Fintech investment on the risk-adjusted return on capital. In the stability aspect, Fung *et al*. (2020) shows that Fintech can mitigate financial instability by enhancing transparency, decentralization, service convenience, and operational efficiency, thereby fostering diversification. Daud *et al*. (2022), through a study of data from 63 countries worldwide, demonstrated that Fintech is positively associated with overall financial stability, facilitated by new technologies such as cloud computing, AI, and data technology. Advancements in financial technology enhance the monitoring and oversight of traditional activities, supporting traditional banking by enabling customers to access credit through Fintech lending providers more easily. This innovation also creates new investment opportunities and supports banks' stability (Yin *et al*., 2022).

Additionally, some studies indicate that the development of Fintech hurts the profitability and stability of commercial banks. Thakor (2020) argues that the growth of Fintech leads to increased competition and causes the operations of commercial banks to become more unstable as the level of risk acceptance rises. Due to their technological advantages, Fintech companies can offer traditional banking products and services at lower costs and with higher efficiency. They also provide innovative and effective products for customers while requiring lower management and capital safety standards compared to traditional banks (Paulet & Mavoori, 2019; Li *et al*., 2020). Fintech has the potential to exacerbate the stability of the financial system, accompanied by risks and adverse side effects, including system failures, exploitation of personal data, hacking, identity theft, aggressive digital credit offerings, cybersecurity issues, data privacy concerns, overpricing, excessive lending, and fraud (Khan *et al*., 2023). Zhao *et al*. (2022) point out that the development of Fintech leads to a deterioration in the asset quality of commercial banks, increasing credit risk as banks accept higher levels of risk to compete with Fintech companies, reducing the profitability of commercial banks. The impact of Fintech on the performance of commercial banks is still debatable. In this study, the author assesses the impact of Fintech on commercial banks in Vietnam, as reflected in their profitability and stability. The number of Fintech companies and the prevalence of Fintech in Vietnam will be used as a proxy to influence the stability and profitability of Vietnamese commercial banks.

Materials and Methods

Methodology

The author uses a quantitative analysis approach to evaluate the effects of Fintech on bank stability and profitability in Vietnam. This includes regression modeling using the Generalized Least Squares (GLS) method for four equations as shown below and correlation analysis to prevent problems with autocorrelation and multicollinearity.

$$ROA_{i,t} = \beta_0 + \beta_1 FIN_{i,t} + \alpha' Bank'_{i,t} + \gamma' Macro'_t + \tau_i + \varepsilon_{i,t} \quad (1)$$

$$ROA_{i,t} = \beta_0 + \beta_1 TRE_{i,t} + \alpha' Bank'_{i,t} + \gamma' Macro'_t + \tau_i + \varepsilon_{i,t} \quad (2)$$

$$ZSC_{i,t} = \beta_0 + \beta_1 FIN_{i,t} + \alpha' Bank'_{i,t} + \gamma' Macro'_t + \tau_i + \varepsilon_{i,t} \quad (3)$$

$$ZSC_{i,t} = \beta_0 + \beta_1 TRE_{i,t} + \alpha' Bank'_{i,t} + \gamma' Macro'_t + \tau_i + \varepsilon_{i,t} \quad (4)$$

Where $ROA_{i,t}$ and $ZSC_{i,t}$ refer to the dependent variables. The research uses the return on asset (ROA) ratio for profitability. To measure the profitability of commercial banks, commonly used ratios include Return on Assets (ROA), Return on Equity (ROE), and Net Interest Margin (NIM). However, in developing countries where banks often have lower equity ratios, ROA, measured by the ratio of net income over total assets, is typically used to measure bank profitability (Flamini *et al*., 2009; Saona, 2016; Fang *et al*., 2019). For the bank stability, the research uses the bank's Z-score (ZSC), similar to De Jonghe *et al*. (2020) and Daud *et al*. (2022). The bank's Z-score is calculated as the sum of the return on asset ratio and equity to asset ratio divided by the standard deviation of the ROA over three years.

To proxy fintech, the author uses two indicators: the number of fintech companies (FIN) and the Google trend index (TRE). FIN measures the number of fintech companies, similar to the research of Safiullah and Paramati (2024) and Hồng and Văn (2024). The Google Trend Index (TRE), using the keyword "fintech," measures the actual volume search returns normalization closest to the search value, the largest search, and results recorded values from zero to

100. Increasing values indicate the popularity of that particular query keyword is growing over time. This method is used in the research of Le Hai (2024) and Wang *et al*. (2021).

$Bank'_{i,t}$ is a vector of control variables representing the characteristics of commercial banks that impact the profitability of Vietnamese commercial banks, including bank size (SIZE), equity ratio (EQR), cost-to-income ratio (COS), and the dummy variable (STA), which takes the value of 1 if the bank is state-owned and 0 otherwise. Variable SIZE using the natural logarithm of total assets, indicating a larger bank size, increases competitive advantage, enabling banks to leverage their financial potential, thereby improving the operational efficiency and stability of banks (Kilic, 2015). The bank equity ratio (EQR) is the ratio of equity to total assets. A higher equity ratio indicates greater resilience, enabling the bank to diversify its activities and generate more profits and stability (Pham, 2022). The cost-to-income ratio (COR) reflects operational efficiency, so there is an inverse relationship between the cost-to-income ratio and the profitability of commercial banks (Mathuva, 2009). The government control may be prioritized as part of the government's strategic agenda, giving them an advantage that can increase their potential to become market leaders (Ng *et al*., 2009).

$Macro'_t$ is a vector of macroeconomic variables that may affect commercial banks' profitability. The study includes variables such as the annual GDP growth rate and the inflation rate (INF), measured using the annual consumer price index. A country with economic growth and stable inflation rates can help the banking system improve profitability and maintain operational stability (Iqbal *et al*., 2024).

To address the issue of autocorrelation, which can lead to statistically insignificant regression coefficients and inaccurate results, the author employed the Generalized Least Squares (GLS) method to optimize the outcomes.

Data

The paper comprises 14 commercial banks listed on the Ho Chi Minh City Stock Exchange (HOSE) and the Hanoi Stock Exchange (HNX) from 2013 to 2022. The microeconomic variables were collected from the annual reports of commercial banks, while the macroeconomic variables were gathered from World Bank data. The number of fintech companies in Vietnam, FIN, is collected from Statista. The Google Trend Index (TRE) is collected from Google Trends with the keyword "fintech" and the scope in Vietnam.

Table 1. Descriptive statistics

Variables	Means	Std. dev	Min	Max
ROA	0.0119	0.0077	0.0003	0.0358
ZSC	0.1806	0.0901	0.0664	0.5146
SIZE	19.4602	1.0013	16.8776	21.4750
EQR	0.0838	0.0291	0.0406	0.1697
COR	0.4691	0.1414	0.0737	0.8745
STA	0.2143	0.4118	0	1
INF	0.0321	0.0147	0.0063	0.0659
GDP	0.0587	0.0171	0.0256	0.0802
FIN	106.7	44.7292	42	176
TRE	38.1	29.8843	0	85

Sources: author's calculation

Descriptive statistics for the research's variables are shown in **Table 1**. The average ROA and ZSC of Vietnamese commercial banks are 1.19% and 0.18, respectively, with comparatively significant standard deviations of 0.77 and 0.09. Vietnam's commercial banks have a high cost-to-income ratio, significant leverage, and a comparatively small size.

Results and Discussion

Correlation Analysis

To ensure the research model's robustness, the author assessed the correlation among the variables used in the model to avoid issues of autocorrelation and multicollinearity **(Table 2)**. The correlation coefficients are mild, with the highest correlation between ZSC and STA at 0,6870, ensuring that the model is not affected by issues of autocorrelation and multicollinearity (except the correlation between FIN and TRE is 0,9178, but these two explanatory variables are different models).

Table 2. correlation matrix

	ROA	ZSC	SIZE	EQR	COR	STA	INF	GDP	FIN	TRE
ROA	1.0000									
ZSC	-0.1607	1.0000								
SIZE	0.2217	0.3492	1.0000							
EQR	0.5553	-0.0467	-0.3117	1.0000						
COR	-0.6189	-0.2023	-0.5510	-0.1705	1.0000					
STA	-0.1814	0.6870	0.6852	-0.3942	-0.3010	1.0000				
INF	-0.0620	0.0990	-0.1530	0.0375	0.1600	0.0219	1.0000			
GDP	-0.1065	-0.0235	-0.0759	-0.0311	0.0130	0.0010	0.0515	1.0000		
FIN	0.5089	-0.0600	0.4372	0.0757	-0.4414	-0.0149	-0.3189	-0.1261	1.0000	
TRE	0.4523	-0.0790	0.3918	0.0317	-0.3610	-0.0139	-0.1856	-0.0832	0.9178	1.0000

Sources: author's calculation

Regression Results

Table 3 provides a regression analysis of the impact of fintech on the profitability and stability of commercial banks in Viet Nam using four models and the Generalized Least Squares (GLS) method.

Table 3. Research Model Results

	dependence variable: ROA		dependence variable: ZSC	
	model 1	**model 2**	**model 3**	**model 4**
ROAt-1	0.672*** (0.056)	0.669*** (0.056)		
ZS t-1			0.817*** (0.000)	0.823*** (0.000)
SIZE	0.000 (0.815)	0.000 (0.001)	0.005 (0.003)	0.07 (0.03)
EQR	0.030* (0.014)	0.034** (0.014)	0.276*** (0.071)	0.267*** (0.071)
COR	-0.013*** (0.003)	-0.014*** (0.003)	-0.002 (0.013)	-0.010 (0.001)
STA	-0.003** (0.001)	-0.003*** (0.001)	0.014* (0.009)	0.010 (0.008)
INF	0.031** (0.017)	0.024 (0.017)	-0.239** (0.111)	-0.281** (0.118)
GDP	0.017 (0.010)	0.015 (0.010)	0.052 (0.067)	0.050 (0.070)
FIN	0.000** (0.013)		0.000** (0.000)	

TRE		0.000** (0.012)		0.000* (0.071)
Const	0.002 (0.013)	-0.000 (0.012)	-0.111* (0.057)	-0.126** (0.057)
Observations	140	140	140	140
F-test	0.000***	0.000***	0.000***	0.000***

*p < 0.10, **p < 0.05 and ***p < 0.01
Sources: author's calculation

The coefficients of FIN and TRE are positive and significant in all four models. The number of Fintech companies (FIN) positively impacts banks' return on assets (ROA) and Z-score (ZSC). Increasing the number of Fintech companies in Vietnam improves banks' profitability and stability.

The prevalence of Fintech (TRE) positively affects the return on assets of the banks (ROA) and the Z-score of banks (ZSC). An increase in the prevalence of Fintech in Vietnam also leads to improved bank profitability and stability. The finding of a positive relationship between Fintech and bank profitability is similar to that of Li *et al*. (2023) and Mirza *et al*. (2023). Moreover, the finding of a positive relationship between Fintech and bank stability is similar to the research results. However, these conclusions contradict the findings of Li *et al*. (2020), Paulet and Mavoori (2019), Thakor (2020), and Zhao *et al*. (2022), which suggest that fintech has an inverse impact on bank profitability and stability.

The findings regarding the characteristics of commercial banks that influence profitability are generally consistent with the existing literature. An increase in bank equity (EQR) significantly leads to an improvement in the bank's stability and the bank's profitability. This finding is similar to that of Yakubu and Bunyaminu (2023). The cost-to-income ratio (COR) is inverse to banks' profitability. An increase in the COR indicates that the bank will incur higher expenses, which complicates operational efficiency, optimizes business processes, and ultimately hinders profit generation. This finding is consistent with the previous research conducted by Sahyouni and Wang (2019). Furthermore, banks without state capital, as indicated by the STA variable, exhibit higher profitability than those with state capital. This conclusion aligns with the research (Nguyen *et al*., 2014). Commercial banks can make independent decisions and implement their business strategies flexibly and in a timely manner when there is no interference from the government or state management organizations. Besides, inflation positively affects a bank's profitability, supporting the similar findings of Maria and Hussain (2023). Finally, there is no significant relationship between economic growth and bank profitability and stability, which aligns with the study of Mashamba and Chikutuma (2023).

The study results show that Fintech positively affects commercial banks' operations, specifically improving the profitability and stability of Vietnamese commercial banks. These findings are in line with previous studies such as Wang *et al*. (2021), Mirza *et al*. (2023), Fung *et al*. (2020), and Yin *et al*. (2022). With the support of Fintech applications, customers can reduce borrowing costs and increase the frequency of using banking services in the digital environment. By adopting digital services, banks can benefit from reduced operational costs and improved service quality (Gomber *et al*., 2017). In Vietnam, most Fintech companies have collaborated with banks to develop new products and services that meet the diverse needs of customers (Minh & Anh, 2022). Big Data, Block chain, and Cloud Computing are core technologies widely applied in the digital transformation and the development of payment services and digital banking products by Vietnamese commercial banks, all of which contribute to improving their profitability (Le Hai, 2024).

Conclusion

Vietnam is one of the most attractive markets in the region for investors interested in the Fintech sector, and the potential that Fintech can generate is substantial. The author proposes several solutions to promote the development of Fintech in Vietnam to enhance profitability and ensure stability for Vietnamese commercial banks. First, due to the incomplete legal framework (Minh & Anh, 2022), a management framework and a mechanism for reviewing Fintech

activities are needed promptly to promote innovation, limit unhealthy competition, prevent illegal activities, and protect the interests of service users. Second, commercial banks need to balance profit objectives with cost optimization. They should invest in information technology to modernize banking products and services and better meet customer needs. However, it is also essential to ensure the mitigation of cybersecurity risks and the protection of customer information. Third, banks must adopt appropriate risk management practices and address all activities outsourced or supported by third parties, including Fintech companies. Moreover, control measures for outsourced services should be maintained to the same standards as those for activities conducted internally by the banks (Le Hai, 2024).

Limitations and Dimensions for Future Research

Some limitations of this study provide for future research. First, the scope of this study is 14 listed commercial banks in Vietnam. Future research can also enhance the scope of the research. Second, future research can explore more deeply the impact of Fintech on different types of banks based on factors such as size, ownership structure, and business model.

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