Stability, Profitability, and Liquidity: How Fintech Lending Effects the Banking Trifecta

Bekir ZENGİN* Mehmet Sinan ÇELİK **

ABSTRACT

Currently, the effects of developments in financial technology are among the topics of intense interest to researchers. Whether fintech will be supportive or disruptive for the banking system is still widely debated. The impact of technologically advanced credit systems on the traditional banking system, especially on the stability and performance of the banking system, remains a controversial issue in the literature. Accordingly, the impact of fintech lending on various indicators in the banking sector is investigated. For this purpose, various results are obtained using the 22 MSCI Emerging Markets data between 2015 and 2020. Accordingly, fintech loans positively affect not only Z-Score, a measure of financial stability, but also return on assets, a measure of financial performance. On the other hand, fintech loans also positively affect bank liquidity. These results reveal the positive effects of fintech lending on the banking sector in emerging economies. Therefore, policymakers and bank managers can contribute to the continued stability of the banking system by creating favorable conditions to encourage and develop fintech lending.

Key Words: *Fintech lending, Banking System Stability, Banking System Performance, Liquidity*

JEL Classification: *F65, G21.*

İstikrar, Kârlılık ve Likidite: Fintech Kredileri Bankacılık Üçlüsünü Nasıl Etkiliyor?

ÖZ

Günümüzde finansal teknolojideki gelişmelerin etkileri araştırmacıların yoğun ilgi gösterdiği konular arasında yer almaktadır. Fintekin bankacılık sistemi için destekleyici mi yoksa yıkıcı mı olacağı sorusu halen geniş alanda tartışılmaktadır. Teknolojik olarak gelişmiş kredi sistemlerinin geleneksel bankacılık sistemi üzerindeki etkisi, özellikle de bankacılık sisteminin istikrarı ve performansı üzerindeki etkisi literatürde tartışmalı bir konu olmaya devam etmektedir. Bu doğrultuda, fintek kredilerinin bankacılık sektöründeki çeşitli göstergeler üzerindeki etkisi araştırılmıştır. Bu amaçla, 22 MSCI Gelişmekte Olan Piyasa'nın 2015-2020 yılları arasındaki verileri kullanılarak çeşitli sonuçlar elde edilmiştir. Buna göre, fintek kredileri sadece finansal istikrarın bir ölçüsü olan Z-Score'u olumlu etkilemekle kalmıyor, aynı zamanda finansal performansın bir ölçüsü olan aktif karlılığı da olumlu etkilediği tespit edilmiştir. Öte yandan, fintek kredileri banka likiditesini de olumlu yönde etkilemektedir. Bu sonuçlar, fintek kredilerinin gelişmekte olan ekonomilerdeki bankacılık sektörü üzerindeki olumlu etkilerini ortaya koymaktadır. Bu nedenle, politika yapıcılar ve banka yöneticileri, fintek kredilerini teşvik etmek ve geliştirmek için uygun koşullar yaratarak bankacılık sisteminin istikrarının devam etmesine katkıda bulunabilirler.

* Ph.D, Tarsus University, Faculty of Applied Sciences, Finance and Banking, bekirzengin@tarsus.edu.tr, ORCİD Bilgisi: 0000-0001-7572-5290

** Asst. Prof., Nigde Omer Halisdemir University, Faculty of Economics and Administrative Sciences, Finance and Banking, mehmetsinancelik@ohu.edu.tr, ORCİD Bilgisi:0000-0002-3102-406X

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INTRODUCTION

The way businesses create value and provide products and services is changing due to digital breakthroughs and technology-driven business models. This might present new business possibilities for existing firms. Another option is that they might promote purposeful disintermediation and obfuscate the distinctions between the current financial industry systems. Fintech may make financial services more accessible by creating new opportunities for entrepreneurship, which might spur competition from start-up businesses. Established institutions must adapt successfully, find a way to handle growing competition, and use novel strategies if they are to endure (European Economy, 2018: 3). The name "Fintech" is typically used in the literature. However, it is also occasionally used as "Fin-Tech". The terms "financial" and "technology" are combined to form the term fintech. This term refers to contemporary technology, particularly cloud computing and mobile internet, to long-standing financial services industry operations like lending and transaction banking (Gomber et al., 2017: 540). However, fintech is defined by the Financial Stability Board as technologically enabled innovation in financial services that may lead to new business models, procedures, or products that significantly affect financial markets, institutions, and financial service delivery. This concept implies that fintech innovations have affected and will continue to affect a wide range of financial services sectors (FSB, 2017). In its most basic definition, Fintech lending refers to lending services that connect investors, or borrowers, with lenders. The terms "credit-based crowdfunders," "peer-to-peer (P2P) lenders," and "marketplace lenders" refer to these lending systems. Their own balance sheets are also available. One thing that sets fintech companies apart from traditional lenders is that they interact with customers entirely online and leverage digital innovations to process customer data. Fintech lending platforms use digital technology to engage with clients online and carry out transactions through electronic (online) channels (Claessens et al., 2018: 30–31).

Liem et al. (2022) find that fintech lending is an essential factor in improving bank stability and that as fintech lending increases, competition with banks increases, but this competition strengthens bank stability. Similarly, Daud et al. (2022) and Yudaruddin et al. (2023) find that fintech supports financial stability through various technological infrastructures and fintech is positively related to financial stability. On the other hand, Nguyen et al. (2021) find that as the volume of fintech increases, it receives a share of profits due to the competition with banks, and on the other hand, it is also beneficial for banks in terms of stability. Yu et al. (2023) investigate the impact of fintech on commercial banks and find that fintech implementation can increase the banks' income. In another study, Lv et al. (2022) state that fintech has a 'U' shaped effect on bank profitability that is, in the initial stages, fintechs reduce the profitability of banks, and then bank profitability gradually increases as the advantages of fintech are revealed. Li et al. (2023) put

forward a similar result obtained from a study by Lv et al. (2022). Accordingly, it was found that there was initially a weak and then a strong relationship between fintech and bank profitability.

Cornelli et al. (2023) find that the growth in fintech lending is not negative for bank stability and fintech and other technological lending play a complementary role to lending in the traditional system. Again, Hodula (2022) finds that there is evidence that fintech platforms in the banking sector can be a substitute for the banking sector. In another study, Wang et al. (2023) find that fintech lending plays a complementary role to traditional bank lending. On the other hand, Naceur et al. (2023) find that fintech firms support the banking system in countries with stronger regulatory systems, while Claessens et al. (2018) find that stricter banking regulations discourage fintech lending activities.

The following variables, which we refer to as the 'banking trifecta' in our study: 'stability, liquidity and profitability', are among the basic indicators used to evaluate a bank's overall stability and performance. These indicators are closely interrelated and need to be well managed and balanced for the sustainability of banks. For example, excessive liquidity may increase stability but may also decrease profitability. On the other hand, excessively risky investments for high profitability may threaten the stability of the bank. Moreover, measures to be taken to maintain financial stability may affect liquidity or profitability. We investigate the effect of fintech lending on bank stability and performance. For this purpose, various results are obtained by using the data of 22 countries in MSCI Emerging Markets between the years 2015 and 2020. The methodology section includes the hypotheses of our study. However, in general, our research question is 'Which factors shape the relationship between fintech investments and banks' stability, liquidity and profitability performance in 22 emerging markets and what is the direction of this relationship?'. In the literature, there are many studies on both fintech lending and the types of lending used for banking services within the scope of financial technology. It is noticed that most of these studies have been about China when first analyzed on a country basis. Another concentration includes studies on various countries rather than country groups. This gap in the literature is attempted to be filled in this study by first using the list of countries included in the developing countries index. The study analyzes countries in a similar category. Another contribution is that studies in the literature have generally focused on bank stability. In this study, in addition to bank stability, performance and liquidity factors are also considered.

The rest of the study is as follows. Following introduction, Section 1 presents literature, Section 2 presents data, Section 3 presents methodology, Section 4 presents findings, and Section 5 presents conclusion.

1. RELATED LITERATURE

Using a comprehensive literature analysis, Kamal et al. (2022) examine the link between fintech and bank stability between 1995 and 2022 and discover that the global banking industry based on financial technology boosted financial stability. On the other hand, Yeo & Jun (2020) find that fintech loan growth is not

negative for bank stability. The literature suggests that fintech lending has a multidimensional impact on bank stability and performance. This effect differs depending on factors such as the level of development of the country, the state of financial markets, and the strictness of regulations. The studies in the literature and the results obtained are as follows:

Stankevičienė (2022) investigates the impact of fintech development on the stability of financial institutions in a sample of 37 countries for the period 2015-2019. The findings reveal that fintech development can have an impact on the stability of financial institutions when market indicators are taken into account. It shows that the development of fintech innovations in developed financial markets reduces stability. Liem et al. (2022) investigate the relationship between fintech lending, credit information sharing, and bank stability in a sample of 73 countries for the period 2013-2018. The first finding is that fintech lending is an important factor in improving bank stability and as fintech lending increases, competition with banks increases, but this competition strengthens bank stability. Second, banks' credit information sharing has a positive effect on bank stability and the effect of fintech lending on bank stability may depend on credit information sharing. Cuadros-Solas et al. (2024), who investigate the impact of fintech lending on banks' market power and stability for 70 countries between 2013 and 2019, find that fintech lending negatively affects bank market power and that the entry of fintech firms into the loan market leads to an increase in competition. Moreover, fintech lending negatively affects bank stability and changes in bank competition are seen as one of the factors that undermine bank stability.

Yoon et al. (2023) investigate the impact of fintech on bank performance for 91 countries for the years 2014, 2017, and 2021. The findings reveal that fintech improves bank performance in less developed countries. In another study, Nguyen et al. (2021) investigate whether fintech loans affect bank performance for 73 countries for the years 2013-2018. The results show that fintech lending tends to increase bank risk-related performance while decreasing bank profitability. This suggests that as fintech volume increases, it takes some share of profits as a result of competition with banks, but on the other hand, it also benefits banks in terms of stability. They also find that the impact of fintech lending on bank performance may depend on banking regulations and that fintech lending may have a more positive impact on bank stability because of stricter banking regulations.

Considering the studies on whether fintech lending is an alternative or complement, Cornelli et al. (2023) investigate the volumes of fintech and big tech lending worldwide, their size relative to credit markets and their economic-institutional impacts. They analyze data of 79 countries between the years 2013 and 2018. According to the findings, the growth in P2P lending is not negative for bank stability. In general, fintech and other technological loans play a complementary role to the loans in the traditional system. Hodula (2022) also searches for 78 countries using data from the period 2013-2019 to determine whether fintech lending platforms are substitutes or complements for traditional banks. The findings reveal that in the case of a less concentrated, more liquid and more stable

banking sector, banks and fintech lending platforms do not compete for a similar customer segment and play a complementary role. However, in the less stable and highly concentrated banking sector, there is evidence that fintech platforms may be a substitute for the banking sector. H. Tang (2019) conducts research on 62 countries between the years 2015 and 2017 to determine whether P2P platforms and banks are substitutes or complements in the consumer credit market. The findings reveal that the positive relationship between financial institution efficiency and P2P lending volumes signals that P2P lending platforms may expand in economies with high bank competition.

Studies on the impact of fintech on the development of the financial sector and the banking system, Daud et al. (2022) investigate the impact of fintech on the financial sector for 63 countries for the period 2006-2017. The findings reveal that fintech supports financial stability through various technological infrastructures and fintech is positively related to financial stability. Moreover, it is found that the relationship between fintech and financial stability improves as bank concentration increases. Le et al. (2021) investigate the relationship between fintech lending and banking system development for 80 countries for the period 2013-2017. The findings reveal that there is a negative relationship between fintech lending and bank efficiency. This suggests that fintech lending is more developed in countries with less efficient banking systems. Naceur et al. (2023) investigated the impact of fintech lending institutions on the traditional financial system. They found that fintech lending negatively affects profitability due to a decrease in interest income and an increase in operational costs. Despite the efforts of incumbent financial institutions to diversify their income streams, it has been determined that the losses incurred due to the inclusion of fintech firms in the competition are more pronounced in countries with more profitable, more competitive, and more developed financial systems, compared to those with less profitable, less competitive, and less developed systems. However, countries with stronger regulatory systems have benefited from the presence of fintech firms.

On the other hand, Claessens et al. (2018) conduct a study on 63 countries for the year 2016 in order to reveal the possible effects of fintech lending. It shows that stricter banking regulations discourage fintech lending activities. This is because it is argued that in regions where banking regulations are more liberal, fintech regulations may also be more liberal. Wang et al. (2023) examine a study on a sample of 41 countries for the period 2013-2020 in order to reveal the main determinants of fintech lending. They find a negative relationship between fintech lending and financial risk, and bank competition in countries with lower levels of bank lending. Fintech lending is found to play a complementary role to traditional bank lending.

In addition to the studies on the banking systems of various countries and fintech lending, Yu et al. (2023) investigate the impact of fintech on commercial banks and find that fintech implementation can increase the banks' income. Geng et al. (2023), who investigate the impact of fintech on bank stability for 2008-2018, find that fintech decreased bank stability. On the other hand, they show that fintech

increases bank stability by supporting risk control and increasing net interest margin. Yin et al. (2022), who also investigate the impact of fintech on the stability of the banking sector for the period 1995-2018, state that fintech has a positive impact on non-performing loans and banking stability, credits provided by fintech lenders contribute to the traditional banking system, and fintech innovation enables the creation of new investment opportunities. Lv et al. (2022), who investigate how fintechs affect banks' profitability as well as bank stability for the period between the years 2011 and 2020, state that fintech has a 'U' shaped effect on bank profitability, that is, in the initial stages, fintechs reduce the profitability of banks, and then bank profitability gradually increases as the advantages of fintechs emerge. Li et al. (2023) investigate the relationship between fintech, bank concentration and bank profitability for the period 2010-2021. The findings reveal that there is initially a weak and then a strong relationship between fintech and bank profitability. It confirms that bank concentration has a negative regulatory effect of fintech on bank profitability. On the other hand, Wang (2024), who investigates the liquidity impact of fintech development on commercial banks for the period 2013-2022, finds that the liquidity risk of banks decreases significantly as fintech companies strengthen their relationships with commercial banks. Tang et al. (2024) investigate the impact of fintech development on bank diversification and liquidity for the period 2011-2021. The results reveal that fintech development reduces liquidity creation but supports bank diversification. In addition, the study, which examines the impact of Covid-19, finds that fintech further hindered bank liquidity creation and, on the other hand, does not contribute to bank diversification. In another study, Yang et al. (2023), who investigate the impact of fintech on net interest margin and non-performing loans for the period between 2010 and 2021, show that fintech development positively affects bank net interest margin and that banks are able to earn more profit from interest-bearing assets.

In addition to studies examining China and various other countries, Phan et al. (2020) investigate the impact of fintech growth on bank performance in Indonesia between 1997 and 2017. The findings reveal that fintech growth has a negative impact on bank performance. Yudaruddin et al. (2023), who also investigate the impact of financial technology on bank stability in Indonesia for the period 2004-2018, find that developments in P2P lending transactions increase bank stability. These findings are more pronounced for small banks and unlisted banks. Another study has been conducted by De Roure et al. (2016) for the period 2009-2012 in the United States to answer the question of whether P2P lending is an alternative or a complement to bank lending. The findings show that P2P lending expands in markets that benefit from a negative shock to bank credit supply. They also find evidence of substitution between banks and P2P platforms, given that the quality of the P2P borrower market deteriorates when low-quality bank borrowers switch to P2P platforms. This result suggests that credit expansion opportunities introduced by P2P lenders only benefit non-marginal bank borrowers. But it also suggests that P2P platforms complement banks by providing small loans. In addition to Indonesia, Safiullah & Paramati (2024) find that fintech firms have a

significant impact on the financial stability of banks in Malaysia for the period 2003-2018. Khai Nguyen & Cuong Dang (2022) investigate the impact of fintech development on financial stability in Vietnam for the period 2010-2020. The findings reveal that fintech development has a negative impact on financial stability, but market discipline can mitigate this effect. Moreover, the negative impact of fintech development on financial stability and the role of market discipline can be further strengthened if banks increase state ownership and weakened if foreign ownership increases.

Considering the results obtained from the literature using various data and countries; Cornelli et al. (2023), Stankevičienė (2022), Daud et al. (2022), Yoon et al. (2023), and Yin et al. (2022) find that fintech has a significant positive effect on the stability of financial institutions, while Phan et al. (2020) and Khai Nguyen & Cuong Dang (2022) state that it has a negative effect. Cuadros-Solas et al. (2024) find that fintech lending negatively affects bank market power and fintech firms' entry into the loan market increases competition; Nguyen et al. (2021) find that fintech lending tends to increase bank risk-related performance while reducing bank profitability; Claessens et al. (2018) and Tang et al. (2024) find that banking regulations discourage fintech lending activities. Liem et al. (2022) investigate the relationship between fintech lending, credit information sharing and bank stability and find that fintech lending is an important factor in improving bank stability and that competition with banks increases as fintech lending increases, but this competition strengthens bank stability. Considering the literature, the greatest contribution of our study to the literature will be the examination of this relationship in terms of stability, profitability, and liquidity using data from countries included in the MSCI (Morgan Stanley Capital International) Emerging Markets.

2. DATA

The study measures the impact of fintech lending on bank stability and performance. For this purpose, banking data of the countries in MSCI (Morgan Stanley Capital International) Emerging Markets for the period covering 2015-2020 are included in the analysis of the study. There are 27 countries in MSCI Emerging Markets in total, but 22 countries are included in the study. Some countries were not included in the analysis due to the lack of data. These countries are Kuwait, Qatar, South Africa, South Korea, and Taiwan. The limitation of our study is that we include emerging markets and data for some countries are not available. The list of countries is as follows in Table 1:

Table 1. MSCI Emerging Market List

1.	Argentina	2.	Brazil	3.	Chile
4.	China	5.	Colombia	6.	Czechia
7.	Egypt	8.	Greece	9.	Hungary
10.	India	11.	Indonesia	12.	Kuwait
13.	Malaysia	14.	Mexico	15.	Pakistan
16.	Peru	17.	Philippines	18.	Poland
19.	Qatar	20.	Russia	21.	Saudi Arabia
22.	South Africa	23.	South Korea	24.	Taiwan
25.	Thailand	26.	Türkiye	27.	United Arab Emirates

Source: The Global Economy

The study employs eight variables. These variables are bank stability, bank return on assets, bank liquid assets to deposits and short-term funding, cost-to-income ratio, bank concentration, bank credit to government and public enterprises, credit information sharing index, and fintech volume. Among these variables, bank stability, bank return on assets, and bank liquid assets to deposits and short-term funding are used as dependent variables, while the cost-to-income ratio, bank concentration, bank credit to government and public enterprises, credit information sharing index, and fintech volume are used as independent variables. The notation of the variables, where they are found in the related literature, and the data sources are presented in Table 2.

Table 2. Definitions, In literature, and Source of Variables in the Dataset

Variables	Definitions	In Literature	Source
Z-Score	Bank stability	(Liem et al., 2022)	The Global Economy
ROA	Bank return on assets, in percent	(Yoon et al., 2023)	The Global Economy
LIQ	Bank liquid assets to deposits and short-term funding	(Liem et al., 2022)	The Global Economy
CIR	The cost-to-income ratio	(Y. Wang, 2024) and (Yudaruddin et al., 2023)	The Global Economy
CON	Bank concentration: percent of bank assets held by top three banks	(Safiullah & Paramati, 2024)	The Global Economy
BSD	Bank credit to government and public enterprises, percent of GDP	(Nguyen et al., 2021)	The Global Economy
CIS	Credit information sharing index, 0 (low) - 8 (high)	(Liem et al., 2022)	The Global Economy
Fintech	Fintech Volume, dollar	(Claessens et al., 2018) and (Liem et al., 2022)	The Cambridge Centre for Alternative Finance

3. METHODOLOGY

The use of panel data in econometric research provides additional advantages beyond using cross-sectional and time series data. Since panel data analysis requires observations from both cross-sectional and time series dimensions to be present simultaneously, it offers researchers the opportunity to work with a larger dataset. Consequently, the number of observations increases, leading to higher degrees of freedom, and consequently, reducing the degree of multicollinearity among explanatory variables. This situation enhances the efficiency and reliability of econometric predictions.

Our study utilizes panel data analysis due to its inclusion of multiple countries and multiple years. In panel data analysis, it is common to encounter a situation where the number of cross-sectional units (N) exceeds the number of time periods (T), denoted as (N>T).

The general panel data model;

$$\gamma_{i,t} = \alpha_{i,t} + \beta_{i,t} X_{i,t} + u_{i,t} \quad i = 1, \dots\dots, N ; t = 1, \dots\dots, T \qquad \textbf{(1)}$$

The general expression for the panel data model is as follows:

The subscript i denotes individual units (such as individuals, firms, cities, countries), and the subscript t denotes time periods (such as days, months, years).

The presence of subscripts i and t for variables, parameters, and the error term indicates that they are associated with the individual units and time periods, respectively, indicating the presence of a panel data set. In this model, both the constant and slope parameters vary across both units and time.

The determination of which approach to use is typically done by first testing whether the model can be used in a pooled form using the Breusch-Pagan (B-P) test. If the pooled approach is not suitable, then the decision between fixed effects and random effects approaches is made based on the results of the Hausman test (Hausman, 1978; Hausman & Taylor, 1981)

Due to the heteroskedasticity issue in the Z-Score model, standard errors need to be corrected, and robust results will be presented. However, both the ROA and LIQ models suffer from both heteroskedasticity and autocorrelation problems. Therefore, given the presence of autocorrelation and heteroskedasticity issues in our models, we employ the robust estimator proposed by Driscoll and Kraay (1998), which is widely used in the literature. Apart from Driscoll and Kraay, other robust estimators such as Huber, Eicker and White, Arellano, Froot and Rogers, Wooldridge, Newey-West, Anselin Maximum Likelihood Estimator, Parks-Kmenta, and Beck-Katz are also utilized.

In a panel data model

$$\gamma_{i,t} = \beta X_{i,t} + u_{i,t} \quad \textbf{(2)}$$

Under the assumptions that the error term is heteroskedastic, autocorrelated, and correlated across units, the parameters can be consistently estimated using the Pooled Ordinary Least Squares (POLS) method.

$$\gamma_{i,t} = \beta X_{i,t} + u_{i,t} \quad \textbf{(3)}$$

Driscoll and Kraay estimator provides us with information about the impact of the independent variable on the dependent variable. Control variables are also added to the analysis to reduce error terms in regression analysis and enhance the explanatory power of the regression. The regression models to be estimated are as followed;

Model 1**:** $Z\text{-}Score_{i,t}=\alpha_0 + \alpha_1 Fintech_{i,t} + \alpha_2 LIQ_{i,t} + \alpha_3 CIR_{i,t} + \alpha_4 CON_t + \alpha_5 BSDi_{,t} + \alpha_6 CIS_{i,t} + \varepsilon i_{,t}$ **(4)**

Model 2**:** $ROA_{i,t}=\alpha_0 + \alpha_1 Fintech_{i,t} + \alpha_2 LIQ_{i,t} + \alpha_3 CIR_{i,t} + \alpha_4 CON_t + \alpha_5 BSDi_{,t} + \alpha_6 CIS_{i,t} + \varepsilon i_{,t}$ **(5)**

Model 3: $LIQ_{i,t}=\alpha_0 + \alpha_1 Fintech_{i,t} + \alpha_2 CIR_{i,t} + \alpha_3 CON_t + \alpha_4 BSDi_{,t} + \alpha_5 CIS_{i,t} + \varepsilon i_{,t}$ **(6)**

The hypotheses of the study are as follows;

Hypothesis 1: Does the impact of Fintech lending in MSCI Emerging Markets affect financial stability in the banking sector?

Hypothesis 2: Does the impact of Fintech lending in MSCI Emerging Markets affect financial performance in the banking sector?

Hypothesis 3: Does the impact of Fintech lending in MSCI Emerging Markets affect liquidity in the banking sector?

4. ANALYSIS AND FINDINGS

Descriptive statistics of the analysis data are presented in Table 3.

Table 3. Descriptive Statistics

Variables	Obs.	Mean	Std. Dev.	Min.	Max.
Z-Score	132	13.822	6.897	4.74	45.45
ROA	132	1.555	1.039	-3.94	5.21
LIQ	126	26.092	13.429	6.34	63.32
CIR	132	49.709	9.439	28.69	75.15
CON	132	56.110	15.289	29.62	98.23
BSD	129	19.228	13.956	2.87	70.66
CIS	111	7.234	0.785	3	8
Fintech	110	17.648	3.133	9.124	26.597

Table 3 presents summary statistics of the variables. The mean Z-Score of 13.82 indicates a general financial stability in the banking sector, while the high standard deviation indicates that this stability is variable across institutions. Although ROA (1.555) indicates positive profitability, the minimum value of -3.94 indicates that some banks have losses. Although the LIQ variable indicates that liquidity is generally adequate with an average of 26.09, the range of values between 6.34 and 63.32 reflects significant differences between banks. The average of CIR is 49.71, indicating that banks exhibit a moderate performance in efficiency levels. While the CIS variable, with its high mean and low deviation, reveals that countries are at similar levels of digitalization or structural development, the Fintech mean of 17.65 and its limited variance indicate that the interaction with fintech across the sector is at a certain level and balanced.

Table 4. Correlation Matrix of Variables

	Z-Score	ROA	LIQ	CIR	CON	BSD	CIS	Fintech	VIF
Z-Score	1.0000								
ROA	-.0472	1.0000							1.19
LIQ	0.1140	0.2258	1.0000						2.42
CIR	-.3685	-.1480	0.0132	1.0000					1.28
CON	-.0832	-.2050	0.3655	0.2993	1.0000				1.89
BSD	0.4581	0.0097	0.5832	-.1882	0.0599	1.0000			1.70
CIS	0.2798	0.1700	0.1354	-.3185	-.0476	0.1419	1.0000		1.18
Fintech	0.2169	-.1326	-.0908	-.1278	-.2362	0.0485	0.2572	1.0000	1.21

Table 4 indicates that the correlations between the variables are not at a level that would significantly affect the validity of the model. Additionally, the Variance Inflation Factor (VIF) values are below the commonly accepted threshold of 10.

Table 5 shows the test results for deviations from the basic assumptions.

Table 5. Test Results for Deviations from Basic Assumptions

	Test Heteroscedasticity (Modified Wald Test)	**Autocorrelation Test (Baltagi-Wu** (1999) **Local Best Invariance Test (BW-LBIT))**
Model1 (Z-Score)	8.231 (0.00)	2.031 (0.17)
Model 2 (ROA)	4.431 (0.00)	25.531 (0.00)
Model 3 (LIQ)	59881.27 (0.00)	36.661 (0.00)

Due to the heteroskedasticity issue in the Z-Score model, standard errors need to be corrected, and robust results will be presented. However, both the ROA

and LIQ models suffer from both heteroskedasticity and autocorrelation problems. Therefore, in our models, given the presence of autocorrelation and heteroskedasticity issues, we employ the robust estimator proposed by Driscoll and Kraay (1998), which is widely used in the literature.

Table 6 shows the estimation results for model selection.

Table 6. Estimation Results for Model Selection

	Random Effects - Pooled OLS	Fixed Effects - Pooled OLS	Fixed Effects-Random Effects
Model 1 (Z-Score)	37.79 (0,00) **Result:** Random Effects	95.03 (0,00) **Result:** Fixed Effects	4.86 (0.56) **Result:** Random Effects
Model 2 (ROA)	51.08 (0,00) **Result:** Random Effects	35.42 (0,00) **Result:** Fixed Effects	21.34 (0,00) **Result:** Fixed Effects
Model 3 (LIQ)	59.50 (0,00) **Result:** Random Effects	95.05 (0,00) **Result:** Fixed Effects	35.53 (0,00) **Result:** Fixed Effects

Table 6 indicates that random effects will be used in Model 1, while fixed effects will be used in Models 2 and 3.

The analysis results for the models are shown in Table 7.

Table 7. Panel Data Analysis Results for Z-Score, ROA, and LIQ

	Z-Score	ROA	LIQ
Fintech	0.2702 (0.009)***	0.0529 (0.012)**	0.1991 (0.076)*
LIQ	-0.0725 (0,041) **	-0.0091 (0,001)***	
CIR	-0.1131 (0.161)	-0,0812 (0.000)***	0.0960 (0.2225)
CON	0.0302 (0.619)	-0,0089 (0.101)	0.5812 (0.000)***
BSD	0.2344 (0,000)***	-0.0041 (0,521)	0.4301 (0.090)*
CIS	-0.2257 (0.509)	-0.1095 (0.008)***	0.1142 (0.709)
Constant	12.8505 (0.000)***	6.2245 (0.000)***	-23.0356 (0.041)**
F-Statistic	109.11 (0.000)	257.23 (0.000)	8880.77 (0.000)
Number of Observation	85	85	85
Adj. R^2	0.401	0.386	0.173

Notes: Z-Score, Bank stability; ROA, Bank return on assets; LIQ, Bank liquid assets to deposits and short-term funding; CIR, the cost-to-income ratio; CON, Bank concentration; BSD, Bank credit to government and public enterprises; CIS, Credit information sharing index; Fintech, Fintech Volume. *, **, and *** show 10%, 5%, and 1% level of significance.

Table 7 shows evidence on how Fintech loans affect the banking sector's financial stability, financial performance, and liquidity in developing countries. Fintech loans positively influence the Z-Score, a measure of financial stability, with a coefficient of 0.2702 at a significance level of 1%. Similarly, Fintech loans positively affect the Return on Assets (ROA), a measure of financial performance, with a coefficient of 0.0529 at a significance level of 5%. Fintech loans also positively impact liquidity with a coefficient of 0.1991 at a significance level of 10%.

The control variable LIQ negatively affects Z-Score with a coefficient of -0.0725 at a significance level of 5% and negatively affects ROA with a coefficient of -0.0091 at a significance level of 1%. The CIR variable only negatively affects ROA with a coefficient of -0.0812 at a significance level of 1% among the dependent variables. The CON variable positively affects only the LIQ dependent variable with a coefficient of 0.5812 at a significance level of 1%. BSD positively affects Z-Score with a coefficient of 0.234 at a significance level of 1%, LIQ with a coefficient of 0.4301 at a significance level of 10%, but it does not have a significant effect on ROA. The CIS variable has a significant negative effect only on ROA with a coefficient of -0.1095 at a significance level of 1%.

5. CONCLUSION

Understanding how fintech credit applications have impacted key aspects of banking operations alongside the evolving landscape of financial technology is crucial. Fintech credits have emerged as a disruptive force in the financial sector, challenging traditional banking models and offering new opportunities for accessing financial services, characterized by innovative use of technology and data-driven algorithms. In emerging markets, the importance of fintech lending on bank stability, ROA and liquidity suggests that payment systems and digital wallets of fintech platforms may affect banks' deposit base, making liquidity management more difficult, while increasing financial inclusion may increase liquidity across the system. While fintech regulations are generally more flexible in emerging markets, making competitive conditions more difficult, increasing cooperation models between banks and fintechs may allow banks to improve stability, ROA and liquidity indicators by taking advantage of technological innovations.

This study investigates the impact of fintech credits on bank stability and performance. MSCI Emerging Markets data across 22 countries from 2015 to 2020 is utilized. The study provides evidence on how fintech credits affect the financial stability, performance, and liquidity of the banking sector in developing countries. Fintech credits positively influence Z-Score, a measure of financial stability. This finding aligns with prior studies by Liem et al. (2022), Daud et al. (2022), and Yudaruddin et al. (2023). Fintech investments can increase bank stability by enabling more effective credit risk management through advanced data analytics and artificial intelligence in credit assessment processes. Similarly, fintech credits positively affect Return on Assets (ROA), a measure of financial performance, consistent with findings from Yu et al. (2023), Li et al., and Lv et al. (2022). It can be argued that the positive effect on profitability is due to the fact that banks reduce operational costs through digital transformation, reduce personnel expenses through automation and acquire customers at lower costs through digital channels. Furthermore, fintech credits also positively impact bank liquidity. The fact that fintech investments improve bank liquidity ratios can be explained by low-cost deposit collection through digital channels and reduced dependence on the traditional branch network.

The finding that fintech lending is positively related to bank stability, profitability and ROA suggests that fintech innovations have constructive effects

on the banking system in emerging markets. In line with these findings, encouraging collaborations between banks and fintech startups, strengthening digital credit infrastructures, and easing regulations to support innovation should be among the main policy recommendations. Moreover, increasing financial literacy and clarifying data security standards will be complementary steps to support this transformation process. Hence, policymakers and bank executives should create conducive environments to encourage and develop fintech credits. However, it is recommended that the scope of this study to be expanded and further research to be conducted for more insights. Particularly, comparative studies on the effects of fintech credits across different countries, research examining the effectiveness of various policy approaches, and studies evaluating the long-term impacts of fintech credits could be beneficial.

Araştırma ve Yayın Etiği Beyanı

Makalenin tüm süreçlerinde Yönetim ve Ekonomi Dergisi'nin araştırma ve yayın etiği ilkelerine uygun olarak hareket edilmiştir.

Yazarların Makaleye Katkı Oranları

Yazarlar çalışmaya eşit oranda katkı sağlamıştır

Çıkar Beyanı

Yazarın herhangi bir kişi ya da kuruluş ile çıkar çatışması yoktur.

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