The Effect of Fintech Loans on Commercial Bank Margin

Afnizal Zulfan Ariffandi[1], Irwan Trinugroho[2]

[1,2]*Faculty of Economics and Business, Sebelas Maret University, Jl. Ir. Sutami 36A, Surakarta, 57126, Indonesia*
*Corresponding Author: afnizalz@gmail.com

Abstract

This study aims to examine how far competition between commercial banks and fintech firms impacts the margins of commercial banks in Indonesia. Panel data regression analysis using the random-effects model was conducted on the financial data of 84 commercial banks from 2018 to 2021. This study found that the growth of fintech firms did not affect decreasing commercial banks' margins. However, fintech loans' growth was found to significantly and negatively effecting commercial banks' margins, Meaning that fintech loans' growth decreases the margins of commercial banks in Indonesia. Bank size, non-performing loan (NPL), and capital ratios do not significantly affect commercial banks' margins. This research ultimately provides input for making fintech interest rate policies and also input for commercial banks to adopt technology so that they do not seem old-fashioned and convoluted. This research only examines the influence of fintech firms on commercial banks, so future research could examine the effect on different types of banks, such as Islamic banks and rural banks.

1.   INTRODUCTION

A study found banking competition to be one of the main things that affect bank margins (Trinugroho, Risfandy, & Ariefianto, 2018). The "Competition Fragility" theory reveals that increased competition between banks will reduce their profits and make them riskier (Kabir & Worthington, 2017). It could be argued that fintech is emerging as a competitor to banks in current lending services (Navaretti, Calzolari, Mansilla-Fernandez, & Pozzolo, 2018). So can the emergence of fintech also be a sign of declining bank margins? We will find out in this research. Although many fintechs have been acquired by banks, there are still independent fintechs that provide services such as lending and investment. In the otherside there are still many banks that offer complicated and convoluted financial services (Brandl & Hornuf, 2020). Other theories such as consumer theory reveal that fintech can be a competitor to banks because new fintech services can fulfill consumer desires and replace traditional services provided by banks (Phan, Narayan, Rahman, &

Hutabarat, 2020). How big and how far existence of fintech can replaces services that were previously controlled by banks is an empirical matter (Phan et al., 2020).

As reported by https://finansial.bisnis.com, commercial banks can win the competition with fintech by reducing their transaction costs. Fintech and bank competition is inevitable. In Indonesia itself, the rapid development of financial technology (fintech) has started since 2010 (Lestari & Rahmanto, 2021). The development of fintech is still growing in Indonesia to this day. According to data from the Financial Services Authority (OJK), there was an increase in credit distribution of 74.41 trillion (26.47%) from December 2019 to December 2020. Fintech managed to reach sectors that were not covered by banks (Jagtiani, 2018). Fintech is considered to offer the lowest interest rates (Wu, Liu, & Huang, 2022). As a result, offering low-interest rates is fundamental for banks to survive in competition with fintech (Najaf, Mostafiz, & Najaf, 2021). This phenomenon has prompted this research to conduct research related to fintech, not only looking at the impact of the growth of fintech firms but also seeing the impact of the growth of fintech loans on commercial banks in Indonesia. So it is different from previous research where Phan *et al* (2020) only examined the impact of fintech firms growth on bank performance. From this research, it is hoped that results will be obtained that can be used as input for policymakers related to fintech and banks such as ojk, as well as for bank firms themselves.

Figure 1 shows the growth of fintech firms in Indonesia which increased from 144 to 164 firms from 2018 to 2019. However, the number fell to 149 in 2020 and fell 127 in 2021. This trend is not in line with the growth of fintech in the UAE, KSA, and Bahrain which continued to increase from 2014 to 2019 and decreased bank profits (Almulla & Aljughaiman, 2021). Therefore, this study aims to examine whether there is a decline in bank profits due to the growth of fintech firms in Indonesia. This is also different from previous research because in this research period in Indonesia there has been a decline in the number of fintech firms. So this study wants to test whether the results of Phan et al (2020) research are still relevant today.
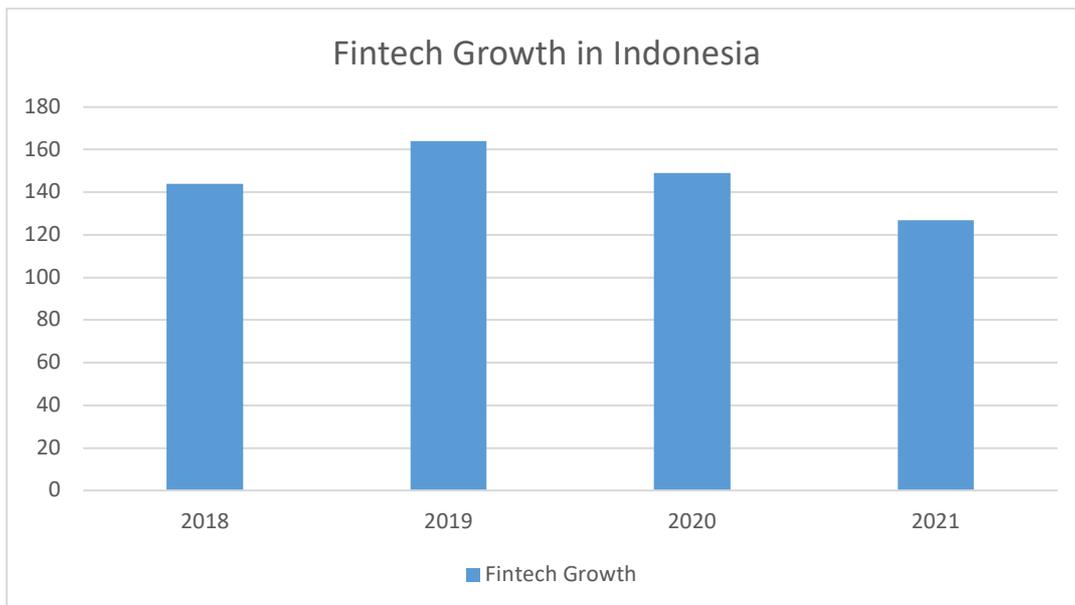

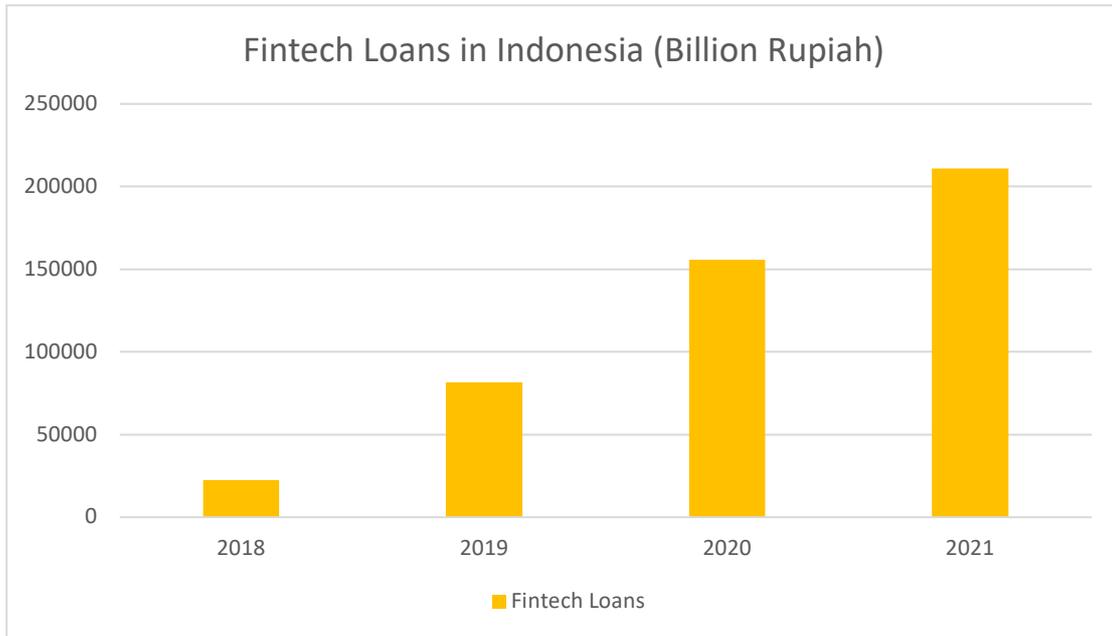*Figure 1.* Fintech firm growth in Indonesia from 2018 to 2021

Figure 2. Fintech loan growth in Indonesia from 2018 to 2021

Figure 2 shows the growth of fintech loan in Indonesia from 2018 to 2021, showing a continuous annual increase. Existing studies argue that increasing fintech loan will reduce bank profits (Nguyen, Tran, & Ho, 2021). The study found tthat banks withmany competitors will be a factor that causes bank margins to decline, and the other way arround (Jackowicz, Kozłowski, Kuchciak, & Marcinkowska, 2020). Therefore, based on Figure 2, this study wants to see the impact of the increasing growth of fintech loans, and whether it will reduce bank margins.

2. HYPOTHESIS DEVELOPMENT

Bank Indonesia (BI) Circular Letter No. 6/23/DPNP dated May 31, 2004, defines the Net Interest Margin (NIM) as an indicator of a bank's ability to manage its assets. Thus, an increase in bank margins indicates a better ability of banks to manage their assets. Several things affect commercial bank margins such as efficiency, operating costs, level of risk aversion, credit risk, operating size, market share, interest payments, and funding costs. (Lee & Isa, 2017). Bank margins are mainly influenced by competition and diversification (Trinugroho et al., 2018),), bank size, capitalization, liquidity, and opportunity costs (Shawtari, Ariff, & Abdul Razak, 2019). It is found that the fact that banks have many competitors will be a factor that causes bank margins to decline, and the other way arround (Jackowicz et al., 2020). Fintech has becoming a new competitor for banks because fintech provides the same services as banks such as in the loan sector, fintech also expands its operations into transaction services, the clearing sector, the fund management sector (loans, investment management, deposits), and the insurance sector (Navaretti et al., 2018). Therefore, fintech has the potential to have a disruptive effect on banks (Almulla & Aljughaiman, 2021; Carlson & Wheelock, 2018; Le, Mai, & Phan, 2021).

Fintech currently offers the lowest interest rates (Wu et al., 2022). This will force banks to offer lower interest rates (Najaf et al., 2021). It is suspected that fintech will have a negative impact on bank performance regardless of the age and size of the bank (Phan et al., 2020). Based on the literature review, this study hypothesizes that :

H1: The growth of Fintech firms will decrease bank margins

It can be argued that fintech is emerging as a competitor to banks in today's lending services (Navaretti et al., 2018). We find that competition from technology-based lending affects domestic and private banks negatively (Kowalewski & Pisany, 2022). Previous studies have found an adverse effect of fintech on bank lending (Zhang, Hu, & Chang, 2019). When banks are in a tight competitive environment, it will encourage banks to lower their margins (Jackowicz et al., 2020). Fintech is a competitor to banks in the lending sector by providing loan services similar to banks. In addition, competition also makes banks take riskier decisions because to win the competition banks need to adopt a more flexible credit selection policy (Nassar, Martinez, & Pineda, 2017). This relaxation will certainly increase bank credit risk as a factor that affects bank margins. Thus, the current research hypothesizes that :

H2: The growth of Fintech Loans will decrease bank margin

3. METHOD

Data and Sample
The current study analyzes data from commercial banks in Indonesia registered with the Financial Services Authority (OJK) from 2018 to 2021. According to records, there are 84 commercial banks in Indonesia the population in this study. The purposive sampling method was applied to select a sample of banks that continued to issue financial reports or annual reports during the study period. In total, 336 data observations were obtained from the data collection process. Meanwhile, data on the number of fintech firms and fintech loans are taken from the statistics on fintech lending on the ojk. site. The fintech data itself is taken from the same year, from 2018 to 2021. The number of fintech firms is 144 in 2018, 164 in 2019, 149 in 2020, and 127 in 2021. This is to ensure the balance of this research sample. So that the dependent and independent variables constitute the entire data from 2018 to 2021.

Independent Variable
The first independent variable in this study is the number of fintech firms (FG) that have been used by Phan *et al* (2020). Phan *et al* (2020), this variable is the number of fintech firms each year in Indonesia recorded in the ojk data. The second independent variable in this study is the number of fintech loans measured using the natural logarithm of fintech loans each year (FL). Fintech loan amount has been used as an independent variable of bank margin research in studies (Zhang et al., 2019).

Dependent Variable
The dependent variable in this study is bank margin as measured by Net Interest Margin (NIM) as implemented in previous research by Phan *et al* (2020), Anto, Pangestusti, & Purwandari (2021) Oppusunggu & Dwipasari (2021). They say that bank margins can be measured using Net Interest Margin (NIM). Following Phan *et al* (2020) the following is the formula for calculating NIM :

$$NIM = (Interest\ Income - Interest\ Expense)/Total\ Assets$$

Control Variable

The first control variable in this study is the size of the bank which is measured using the logarithm of the bank's total assets (SIZE). In previous studies, bank size was found to be a determining factor for intermediation margins due to differences in market share, such as when small banks have a lower class market share which makes them less efficient and have higher margins (Birchwood, Brei, & Noel, 2017). SIZE measurement using the logarithm of total assets follows previous research (Fadli, Sakti, & Jumono, 2021). The second control variable is Non-Performing Loan (NPL), which in previous studies was considered to be the main factor determining bank margins (Akter & Roy, 2017). The third control variable is Capital Ratio (CAP) following previous research. Research finds that banks with higher capital ratios can increase their profits by lowering the interest rate on loans (Phan et al., 2020).

Empirical Model

Data processing is done by panel data regression method because the data is a combination of cross-section and time series. The following is the formulation of the panel data regression equation being tested :

$$NIM_{i,t} = \beta_0 + \beta_1 FG_{i,t} + \beta_2 FL_{i,t} + \beta_3 SIZE_{i,t} + \beta_4 NPL_{i,t} + \beta_5 CAP_{i,t} + \alpha_i + \mu_{i,t}$$

NIM : (Interest Income - Interest Expense) / Total Assets
FG : Number of Fintech Firms Every Year
FL : Natural Logarithm of Fintech Loan Amount Every Year
SIZE : Logarithm of the Bank's Total Assets
NPL : Total Non-current Credit / Total Credit
CAP : Total Equity / Total Assetst
Ai : Constanta
$\mu_{i,t}$: Vary Over Time
i,t : Cross Sectional and Time Series

4. RESULT

Table 1. Descriptive Statistics

Variable	Obs	Mean	Std. Dev	Min	Max
NIM	336	4.783632	2.30934	-2.58	19.3
FG	336	146	13.22955	127	164
FL	336	32.11136	0.85797	30.75189	32.98172
SIZE	336	7.399299	0.6593511	5.822608	9.196663
NPL	336	1.432864	1.330144	0	9.92
CAP	336	0.1954385	0.1520725	0.055336	1.075036

Source : Stata Data Result

Table 1. Shows the descriptive statistical results of each variable used in this study. The total data observed were 336 observations. The average value of NIM is 4.783632 with the highest value of 19.3. The average value of FG itself is 146 with the highest value of 164. The average value of FL is 32.11136 with the highest value of 32.98172. The average value of SIZE is 7.399299 with the highest value of 9.196663. The average value of NPL is 1.432864 with the highest value of 9.92. The average value of CAP is 0.1954385 with the highest value of 1.075036.

Table 2. Correlation Matrix

	NIM	FG	FL	SIZE	NPL	CAP
NIM	1.0000					
FG	0.0448	1.0000				
FL	-0.1494	-0.2993	1.0000			
SIZE	-0.0958	-0.0448	0.0741	1.0000		
NPL	-0.2159	0.1150	-0.1038	-0.1498	1.0000	
CAP	0.1020	-0.0126	0.0080	-0.1861	0.0343	1.0000

Source : Stata Data Result

Table 2. Is a correlation matrix of each variable tested in this study. The correlation between NIM and FG is 0.0448. Then the correlation between NIM and FL is -0.1494 . while the correlation between NIM and SIZE is -0.0958. Furthermore, the correlation value of NIM and NPL is -0.2159. The last correlation between NIM and CAP is 0.1020. From the table, it can be concluded that no data indicates a very strong correlation that exceeds 0.08.

Table 3. Regression Model Selection

Step No	Test	Indicators	Decision
1	Chow Test	Prob > F = 0.0000, it means less than 0.05	H0 : PLS (rejected) H1 : FE (accepted)
2	Breusch and Pagan Lagrangian Multiplier Test	Prob > chibar2 = 0.0000, it means less than 0.05	H0 : PLS (rejected) H1 : RE (accepted)
3	Hausman Test	Prob>chi2 = 0.0004, it means less than 0.05	H0 : RE (rejected) H1 : FE (accepted)

Source : Stata Data Result

Table 3. It is a table for selecting the best panel data regression model for this study. The test is carried out using the Stata application with three stages of testing. The first test stage is using the Chow Test and the results obtained are Prob > F = 0.0000 fixed effect model less than 0.05 then the PLS model is rejected and the FE model is accepted. Next is to do the LM test and the result is Prob > chibar2 = 0.0000 less than 0.05 then the PLS model is rejected and RE is accepted. Because the FE model and RE model are accepted, it is necessary to carry out further testing, namely using the Hausman Test to compare the Random Effect Model with the Fixed Effect Model which gets the best results. The result is Prob>chi2 = 0.0004 which is less than 0.05 then the FE model is selected based on these three testing stages.

Table 4. Is a Classical Assumption Test on this research variable. Using the Stata application, it was found that none of the four tests passed. Neumayer & Plümper (2017) provide a solution to the uncertainty faced by researchers and threaten the validity of the research results, namely by conducting a robustness test. Previous research also used robustness tests (Phan et al., 2020).

Table 4. Classical Assumption Test

No	Test	Indicators	Test Result
1	Multikolinearity Test	VIF test	There is multikolinearity in variabel FG, FL and SIZE
2	Heteroskedasticity Test	Modified Wald test	Prob>chi2 = 0.0000, it means there is a heteroskedasticity
3	Autocorrelation Test	Wooldridge test	Prob > F = 0.0007, it means there is a autocorrelation
4	Normallity Test	Swilk Test	all variables do not pass the normality test, because Prob>z less than 0.05

Source : Stata Data Result

Table 5. Regression Fixed Effect Result

Dependent Variable : Net Interest Margin (NIM)	Fixed Effect NIM	Fixed Effect Robust NIM
FG	0.000657	0.000657
	(0.14)	(0.14)
FL	-0.432***	-0.432***
	(-5.66)	(-4.19)
SIZE	0.631	0.631
	(0.96)	(0.44)
NPL	0.0246	0.0246
	(0.38)	(0.21)
CAP	0.691	0.691
	(1.19)	(0.95)
_cons	13.72**	13.72
	(2.96)	(1.56)
N	336	336

t statistics in parentheses
* p<0.05, ** p<0.01, *** p<0.001
Source : Stata Data Result

5. DISCUSSION

Table 4. Shows the results of the regression analysis of the Fixed Effect regression test and Fixed Effect Regressions Robustness Test. It can be seen that the number of fintech firms (FG) is positive but not significantly related to bank margins (NIM) with a coefficient of 0.000657. This result is different from previous research. The growth in the number of fintech firms will reduce bank margins (Almulla & Aljughaiman, 2021; Phan et al., 2020). This happens because the period of this study is not the same as the previous research period. This research was conducted when fintech firms did not continue to increase but experienced a decline after 2019 (figure 1). Next is the relationship between the number of fintech loans (FL) on bank margins (NIM), which is significantly negative at 0.1% with a coefficient of -0.432. These results support that fintech is emerging as a competitor to banks in current lending service (Navaretti et al., 2018). This finding also supports that fintech

lending affects domestic and private banks negatively (Kowalewski & Pisany, 2022; Zhang et al., 2019) and also reduces bank profits (Nguyen et al., 2021).

6. CONCLUSION, LIMITATIONS, AND SUGGESTIONS

This study analyzes the impact of the number of fintech firms and the number of fintech loans on the net interest margin of commercial banks in Indonesia from 2018 to 2021. This study examines 84 commercial banks in Indonesia, including state-owned, private, foreign, and non-foreign banks listed on the website. ojk. This study wants to test whether the research of Phan et al (2020) is still relevant today. Moreover, different research years have different impacts. In contrast to previous research, this research was conducted when fintech firms in Indonesia were no longer continuously increasing. This research was conducted when fintech firms started to disappear. One of the reasons is that it does not have a permit / illegal (Machrusyah, Budyatomo, & Aulia, 2020). So that in Indonesia the number of existing fintech firms is no longer a factor that affects commercial bank margins. With this conclusion, hypothesis 1 of this study is rejected.

Different results are shown in hypothesis 2 which is accepted in this study. It can be concluded that this study supports several previous studies which state that an increase in the number of fintech loans will reduce bank margins (Kowalewski & Pisany, 2022; Nguyen et al., 2021; Zhang et al., 2019). In Indonesia, when this research was conducted, the number of fintech loans continued to increase. It can be seen in figure 2 that from 2018 to 2021 fintech loans continue to grow.

This research is expected to be an input for OJK as a policymaker regarding financial accelerators in Indonesia. OJK can make policies by setting rules as a separator between fintech and banks. The hope is that fintech and banks can run side by side without harming each other. OJK can make fintech interest rate policy regulations so that they don't get too low. In addition, this research is also expected to be input for commercial banks in Indonesia to accelerate the adoption of technology. Because there are still many old fashioned and convoluted traditional banks (Brandl & Hornuf, 2020). With the adoption of technology they can make it easier for consumers to access banks an so they can reach a wider range of consumers. Technology can make banks equal to fintech and even better.

The limitation of this research is only to see the impact of the existence of fintech firms on commercial banks. In Indonesia, there are other banking sectors such as Islamic banks and rural banks. Rural banks may be an interesting sample for further research because the main function of rural banks according to the OJK is to collect public funds, which are only savings and loan banks. This rural bank lending sector is likely to intersect with lending from fintech.

REFERENCE

Akter, R., & Roy, J. K. (2017). The Impacts of Non-Performing Loan on Profitability: An Empirical Study on Banking Sector of Dhaka Stock Exchange. *International Journal of Economics and Finance*, *9*(3). https://doi.org/10.5539/ijef.v9n3p126

Almulla, D., & Aljughaiman, A. A. (2021). Does financial technology matter? Evidence from an alternative banking system. *Cogent Economics and Finance*, *9*(1). https://doi.org/10.1080/23322039.2021.1934978

Anto, R., Pangestusti, I. R. D., & Purwandari, E. N. (2021). Determinants of bank efficiency in asean5: Size as a control variable. *Universal Journal of Accounting and Finance*, *9*(4). https://doi.org/10.13189/ujaf.2021.090402

Birchwood, A., Brei, M., & Noel, D. M. (2017). Interest margins and bank regulation in Central America and the Caribbean. *Journal of Banking and Finance*, *85*. https://doi.org/10.1016/j.jbankfin.2017.08.003

Brandl, B., & Hornuf, L. (2020). Where Did FinTechs Come From, and Where Do They Go? The Transformation of the Financial Industry in Germany After Digitalization . *Frontiers in Artificial Intelligence* . Retrieved from https://www.frontiersin.org/article/10.3389/frai.2020.00008

Carlson, M., & Wheelock, D. C. (2018). Near-money premiums, monetary policy, and the integration of money markets: Lessons from deregulationCarlson, M. and Wheelock, D. C. (2018) 'Near-money premiums, monetary policy, and the integration of money markets: Lessons from deregulation', Journal of. *Journal of Financial Intermediation*, *33*. https://doi.org/10.1016/j.jfi.2016.09.001

Fadli, J. A., Sakti, I. M., & Jumono, S. (2021). Market Power and Bank Liquidity Risk: Implementations of Basel III using Net Stable Funding Ratio Approach. *Jurnal Keuangan Dan Perbankan; Vol 25, No 2 (2021): April 2021DO - 10.26905/Jkdp.V25i2.5525* . Retrieved from https://jurnal.unmer.ac.id/index.php/jkdp/article/view/5525

Jackowicz, K., Kozłowski, Ł., Kuchciak, I., & Marcinkowska, M. (2020). Local banks in social media: determinants and consequences. *Economic Research-Ekonomska Istrazivanja* , *33*(1). https://doi.org/10.1080/1331677X.2020.1773892

Jagtiani, J. (2018). Do fintech lenders penetrate areas that are underserved by traditional banks? *Journal of Economics and Business*, *100*, 43–54. https://doi.org/10.1016/j.jeconbus.2018.03.001

Kabir, M. N., & Worthington, A. C. (2017). The 'competition–stability/fragility' nexus: A comparative analysis of Islamic and conventional banks. *International Review of Financial Analysis*, *50*. https://doi.org/10.1016/j.irfa.2017.02.006

Kowalewski, O., & Pisany, P. (2022). Banks' consumer lending reaction to fintech and bigtech credit emergence in the context of soft versus hard credit information processing. *International Review of Financial Analysis*, *81*. https://doi.org/10.1016/j.irfa.2022.102116

Le, T. T., Mai, H. N., & Phan, D. T. (2021). Fintech Innovations: The Impact of Mobile Banking Apps on Bank Performance in Vietnam. *International Journal of Research and Review*, *8*(4). https://doi.org/10.52403/ijrr.20210446

Lee, S. P., & Isa, M. (2017). Determinants of bank margins in a dual banking system. *Managerial Finance*, *43*(6). https://doi.org/10.1108/MF-07-2016-0189

Lestari, D., & Rahmanto, B. T. (2021). Fintech and its challenge for banking sector. *The Management Journal of Binaniaga*, *6*(1). https://doi.org/10.33062/mjb.v6i1.428

Machrusyah, S., Budyatomo, H. I., & Aulia, R. D. (2020). Optimalisasi Penanggulangan Fintech Peer To Peer Lending Ilegal Melalui Intersectoral Coordinating Protocol Guna Menghadapi Revolusi Industri 4.0. *Gema Keadilan*, *7*(1). https://doi.org/10.14710/gk.2020.8266

Najaf, K., Mostafiz, M. I., & Najaf, R. (2021). Fintech firms and banks sustainability: Why cybersecurity risk matters? *International Journal of Financial Engineering*, *08*(02). https://doi.org/10.1142/s2424786321500195

Nassar, K., Martinez, E., & Pineda, A. (2017). Determinants of Banks' Net Interest Margins

in Honduras. *Journal of Banking and Financial Economics*, *2017*, 5–27. https://doi.org/10.7172/2353-6845.jbfe.2017.1.1

Navaretti, G. B. mname, Calzolari, G. mname, Mansilla-Fernandez, J. M. mname, & Pozzolo, A. F. mname. (2018). Fintech and Banking. Friends or Foes? *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.3099337

Neumayer, E., & Plümper, T. (2017). *Robustness Tests for Quantitative Research. Robustness Tests for Quantitative Research*. https://doi.org/10.1017/9781108233590

Nguyen, L., Tran, S., & Ho, T. (2021). Fintech credit, bank regulations and bank performance: a cross-country analysis. *Asia-Pacific Journal of Business Administration*. https://doi.org/10.1108/APJBA-05-2021-0196

Oppusunggu, L. S., & Dwipasari, L. (2021). Factors Affecting Bank Profitability of BUKU 1 and BUKU 2. *Jurnal Keuangan Dan Perbankan; Vol 25, No 4 (2021): October 2021DO - 10.26905/Jkdp.V25i4.6445* . Retrieved from https://jurnal.unmer.ac.id/index.php/jkdp/article/view/6445

Phan, D. H. B., Narayan, P. K., Rahman, R. E., & Hutabarat, A. R. (2020). Do financial technology firms influence bank performance? *Pacific Basin Finance Journal*, *62*. https://doi.org/10.1016/j.pacfin.2019.101210

Shawtari, F. A., Ariff, M., & Abdul Razak, S. H. (2019). Efficiency and bank margins: a comparative analysis of Islamic and conventional banks in Yemen. *Journal of Islamic Accounting and Business Research*, *10*(1). https://doi.org/10.1108/JIABR-07-2015-0033

Trinugroho, I., Risfandy, T., & Ariefianto, M. D. (2018). Competition, diversification, and bank margins: Evidence from Indonesian Islamic rural banks. *Borsa Istanbul Review*, *18*(4). https://doi.org/10.1016/j.bir.2018.07.006

Wu, P. C., Liu, S. Y., & Huang, C. W. (2022). The Impact of FinTech Index on P2P Lending Rate. *Review of Integrative Business and Economics Research*.

Zhang, Z., Hu, W., & Chang, T. (2019). Nonlinear effects of P2P lending on bank loans in a Panel Smooth Transition Regression model. *International Review of Economics and Finance*, *59*. https://doi.org/10.1016/j.iref.2018.10.010