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DOES FINANCIAL TECHNOLOGY LENDING AND FINANCIAL LITERACY AFFECT CRIME? EVIDENCE FROM INDONESIA

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ABSTRACT

Purpose: *This research aims to investigate the relationship between FinTech Lending and Financial Literacy on Crime (fraud, embezzlement, and corruption). This research provides knowledge about the impact of FinTech Lending which can increase crime and financial literacy which can reduce crime.*

Methodology/approach: *This study employs panel data consisting of 34 provinces in Indonesia with observations in 2019 and 2022 due to data availability. The secondary data used was collected from official Indonesian government institutions (OJK and BPS). To achieve the purpose, a quantitative approach and panel data regression analysis methods are applied. Panel data provides more variability, less collinearity among variables, and more degrees of freedom. This can lead to more efficient estimators and more precise inference of model parameters. Based on the Hausman test, the estimated model is Random Effects (RE).*

Findings: *The results of this research show that FinTech Lending has a significant positive impact on the growth of crime, while Financial Literacy has a negative impact on the growth of crime. This indicates that as the use of FinTech Lending increases, crime rates also increase, and higher levels of Financial Literacy help reduce the growth of crime.*

Practical implications: *The results of this research can be used as material for consideration by the government in*

creating a comprehensive legal framework through the establishment of a Law on FinTech.

Originality/value: *To the best of the researcher's knowledge, this research is the first research to investigate the influence of FinTech Lending and Financial Literacy on Crime Rates in Indonesia using a quantitative approach, whereas previous research used a qualitative approach.*

Keywords: *Crime, FinTech Lending, Financial Literacy, Indonesia*

INTRODUCTIONS

The current period is known as the "digital age," and digital transformation has become a global consensus among enterprises (Zhang & Chen, 2024). Furthermore, the convergence of the so-called SMAC technologies – social, mobile, analytics, and cloud computing – has led to an unprecedented wave of digitalization that is currently fueling innovation in business and society (Legner et al., 2017). Digitalization is in every field of our lives: education and schools, social networking, in business, as almost each company has a website and in business processes: marketplaces, logistics, and more and more, in accounting (ILCUS, 2018). Besides that, there is also digitalization on access to finance (Bollaert et al., 2021). Moreover, according to the World Economic Forum, the COVID-19 pandemic gave a very strong impetus to the digitalization of the business world: more robots and Artificial Intelligence, and fewer manual tasks (Feghalhai et al., 2022). The rapid development of technology in Indonesia makes it a trending topic for citizens, one of which is financial technology (FinTech) (Anindyastri et al., 2022). One of the economic digitalization that is increasingly being used during the pandemic is FinTech (Fu & Mishra, 2022; Naz et al., 2022; Sugandi, 2021).

FinTech innovation has grown rapidly in recent years, facilitating the delivery of secure, efficient, simple, and high-quality web-based banking services (Alkhwaldi et al., 2022). The development of FinTech, especially peer-to-peer (P2P) lending, has shown significant progress in Indonesia (Hidajat, 2020). Online lending, or peer-to-peer (P2P) lending, is the practice of funding unrelated individuals ('partners') without going through a commercial bank (Suryono et al., 2021). Apart from that, according to Tritto & Junaedi (2022), peer-to-peer (P2P) lending is a relatively new form of FinTech lending that brings together potential borrowers with investors using digital and communication technology. There are many positive benefits from the presence of P2P lending, but the large number of borrowers who become victims because they do not pay their loans, as well as the weak regulations governing online loans indicate that there are problems (Hidajat, 2020).

According to Tritto & Junaedi (2022), P2P lending operating in a regulatory vacuum generates significant financial risks, such as fraud, the risk of platform failure and loan default for investors, and social dissatisfaction over unethical and illegal practices such as data privacy violations, inappropriate marketing deception, and harassment of delinquent borrowers. Apart from that, despite its great potential, the FinTech industry is full of high risks such as the emergence of illegal FinTech companies, system failures, misinformation, transaction errors, data security issues, implementation of Know Your Consumer (KYC) principles, astronomical interest rates, exemption clauses, and complaint handling. Consumers are some of the most common risks that threaten this industry (Kharisma, 2021).

At the end of 2019, the Financial Services Authority (OJK), noted that there were 164 registered and licensed FinTech (P2P lending) companies, but since the beginning of 2018, the Investment Alert Task Force (SWI) and the Ministry of Communication and Information have blocked 1,350 illegal FinTech platforms (Suryono et al., 2021). This shows that FinTech or P2P lending, apart from having many positive benefits, also has negative impacts.

There has been a lot of research related to the negative impacts of FinTech. One of the existing studies is related to fraud in FinTech (Anthony, 2023; Basrowi & Utami, 2019; Hasham et al., 2019; Pratiwi et al., 2022). However, most studies on fraud in FinTech are based on qualitative approaches. Meanwhile, research that provides empirical evidence is still rarely conducted. Therefore, research that discusses crime in FinTech empirically needs to be carried out. Apart from that, research results show that crime in FinTech is high, so mitigation is needed to overcome this impact so that it does not get bigger. According to Panos & Wilson (2020), increasing evidence shows that financial literacy plays an important role in financial well-being. In addition, according to Le (2022), financial literacy theoretically aims to promote formal loans and mitigate informal loans. This means that financial literacy can also help overcome the negative things that arise from using FinTech. Therefore, this research uses financial literacy to mitigate the impact of crime on FinTech. Based on the background above, this research will investigate the relationship between FinTech vulnerabilities, namely fraud, embezzlement, and corruption in FinTech in Indonesia, and financial literacy as mitigation.

The term "FinTech" is derived from "financial technology" and was most likely first mentioned in the early 1990s (Puschmann, 2017; Takeda & Ito, 2021). FinTech is a relatively modern concept (Suryono et al., 2020). According to Gomber et al. (2017), the term "FinTech" (sometimes: Fintech, Fin-tech, or Fintech) is a neologism derived from the words "finance" and "technology" and describes in general terms modern relationships and, especially, Internet-related technologies (e.g., cloud computing, mobile Internet) with established financial services industry business activities (e.g., money lending, transaction banking). In addition, according to Knewtson & Rosenbaum (2020), FinTech is a technology used to provide financial products or financial services to financial markets, which is characterized by advanced technology relative to existing technology in that market.

Generally, FinTech refers to innovators and disruptors in the financial sector who take advantage of the ubiquitous availability of communications, particularly through the Internet and automated information processing (Gomber et al., 2017). FinTech is recognized as one of the most important innovations in the financial industry and is growing very quickly, driven in part by the sharing economy, favorable regulations, and information technology (Lee & Shin, 2018). Today, the advancement of fintech or technology-based financial applications has been widely adopted in Indonesia (Putri et al., 2022). Indonesia is one of the countries whose FinTech market is growing rapidly in Southeast Asia (Abdillah, 2019). The Indonesian FinTech industry ranks 47th globally (Kharisma, 2021). According to Suryono et al. (2020), so far the presence of FinTech companies has been able to make startup companies develop more.

According to the Financial Stability Board (FSB), FinTech is divided into 4 (four) categories based on the type of innovation: 1) Payment, Settlement, and Clearing, 2) Market Aggregator, 3) Risk and Investment Management, and 4) Crowdfunding and Peer to Peer (p2p) Lending (Abdillah, 2019). Meanwhile, according to Suryono et al. (2020), Indonesian FinTech companies have many types such as lending, crowdfunding, payments, financial planning, remittances, and financial research. Apart from that, according to Ascarya & Sakti (2022),

the main types of services offered by FinTech are digital banking, crowdfunding, peer-to-peer (P2P) lending, P2P social crowdfunding, payments, money transfers, and trading platforms.

Financial crime consists of many unlawful activities including fraud, bribery, corruption, cybercrime, and terrorism which will lead to money laundering activities (Jamil et al., 2022). According to Jamil et al. (2022), financial crimes, which include money laundering and terrorism financing, are becoming increasingly important in this time of economic uncertainty and political instability, especially for private financial institutions and public authorities. One form of financial crime currently related to FinTech is fraud. According to Nikkel (2020), criminals use and abuse FinTech for fraud, extortion, money laundering, and criminal underground financing activities. More clearly, Nikkel (2020) states that typical cyber criminal activity involves financial transactions between the following groups: (1) victims to criminals (theft or extortion of funds); (2) criminal to criminal (purchases and payments in the criminal underground); and (3) criminals to financial institutions (money laundering). Besides that according to Merlonghi (2010) advancements in information technologies enhance market efficiency, they also pose challenges to the system's stability and security, increasing its potential vulnerability to criminal activities, such as money laundering and the financing of terrorism. Moreever the characteristics of digital payment transactions, which are real-time, not face-to-face, and without borders, introduce potential risks for financial crimes like money laundering and terrorism financing (Wiwoho et al., 2021). Meaning, that the more FinTech there are, the more opportunities for crime there will be. Based on the literature previously explained, the hypothesis related to Financial Technology on Crime is as follows:

H1: Financial Technology Can Increase Crime in Indonesia.

Fraud is a broad legal concept that involves the use of deception to gain unfair and unlawful advantage (Miskam et al., 2019). Fraud causes direct and indirect harm to victims. According to Miskam et al. (2019), identity theft and phishing scheme fraud are examples of various ways to defraud individuals using technology. Fraud against companies can be committed by employees, directors, company owners, customers, or even vendors (Miskam et al., 2019). Several studies show that individuals who have financial knowledge or high financial literacy have a higher tendency to detect fraud (Panos & Wilson, 2020). This means that financial literacy can mitigate the occurrence of financial crimes such as fraud.

Financial literacy is a person's ability to manage their finances related to the ability to use financial concepts (Irawan & Matoati, 2021). According to Setiawan et al. (2021), financial literacy is the level of personal knowledge in understanding basic financial management information. In addition, financial literacy is knowledge, skills, and beliefs that influence attitudes and behavior to improve the quality of decision-making and financial management to achieve prosperity (OJK, 2021). According to Kakinuma (2022), financial literacy has economic significance in today's world, namely that a person needs good financial literacy to make the right decisions in financial planning, wealth accumulation, investment, loans, and retirement savings. In addition, according to Sari et al. (2020), financial literacy is the life skill necessary to manage financial behavior intelligently in everyday life.

According to the Indonesian Financial Services Authority, the financial literacy level of the Indonesian population is divided into four parts, namely well-literate; sufficiently literate; less literate, and not literate. More clearly, firstly, well literate, namely having knowledge and confidence about financial service institutions and financial service products, including

features, benefits and risks, rights and obligations related to financial products and services, and having skills in using financial products and services. Second, sufficient literacy, namely having knowledge and confidence about financial service institutions and financial products and services, including features, benefits and risks, rights and obligations related to financial products and services. Third, less literate, namely only knowing financial service institutions, financial products, and services. Lastly, not literate, namely not having knowledge and confidence in financial service institutions and financial products and services, and not having the skills to use financial products and services.

According to Martha et al. (2023), financial literacy is a fundamental need for everyone to avoid financial problems. Financial literacy theoretically aims to promote formal loans and mitigate informal loans (le, 2022). According to the literature, it also shows that financial literacy plays an important role in household credit and corporate credit growth (le, 2022). According to Le (2022), financial literacy can be divided into external financial literacy and internal financial literacy. External financial literacy refers to the ability of owner-managers to use their basic financial skills and knowledge combined with their networking, communication, and cognitive skills to achieve desired goals (Lusardi & Mitchell, 2011). Internal financial literacy also helps owner-managers promote efficient use of scarce resources by implementing better financial management systems (Hussain et al., 2018).

According to Irawan & Matoati (2021), the financial literacy index in Indonesia is quite low and needs to be improved. Higher financial literacy helps family investors achieve the best match between risk and return, thereby increasing income at the average risk level and reducing idle resources (Li et al., 2020). In addition, according to Yoshino et al. (2020), people with better financial literacy are more skeptical about holding crypto assets, perhaps reflecting their price volatility. According to research by Morgan & Trinh (2019), a higher level of financial literacy has a strong and positive effect on individuals' awareness of using FinTech products. This means that Financial Literacy can help overcome crime. Based on the theory and literature previously explained, the hypothesis related to Financial Literacy on Crime is as follows:

H2: Financial Literacy Can Reduce Crime in Indonesia

METHOD

This research uses secondary data obtained from official Indonesian government institutions using archival data collection methods. In more detail, data on FinTech Lending and Financial Literacy were obtained from the official website of the Financial Services Authority with the link www.ojk.go.id, while Crime and Gross Regional Domestic Product (GRDP) data were obtained from the official website of the Badan Pusat Statistik (BPS) with the link www.bps.go.id. This research takes the form of panel data consisting of 34 provinces in Indonesia with observations in 2019 and 2022 (due to data availability).

This research uses several variables as follows: (1) Crime (CRIME); (2) Financial Technology (FinTech); and (3) Financial Literacy (LITERACY). According to Jamil et al. (2022), financial crime consists of many unlawful activities, including fraud, bribery, corruption, cybercrime, and terrorism which will lead to money laundering activities. This study measures CRIME based on crime incidents related to fraud, embezzlement, and corruption recorded by the Indonesian National Police. This data can be obtained from Criminal Statistics published by the Badan Pusat Statistik (BPS).

FinTech is a form of technological advancement in the financial industry that eliminates the need for physical cash by digitizing currency for increased efficiency (Abdillah, 2020; Hiyanti et al., 2020). This study focuses on FinTech Lending data. The Otoritas Jasa Keuangan (OJK) defines FinTech Lending as a service that connects lenders with borrowers to establish loan agreements in various currencies via an electronic system that operates over the Internet. Lastly, according to The Otoritas Jasa Keuangan (OJK), Financial Literacy is knowledge, skills, and beliefs that influence attitudes and behavior to improve the quality of decision-making and financial management to achieve prosperity. This research uses financial literacy index data obtained from the Financial Services Authority (OJK), where the index is measured using direct survey methods or interviews assisted by the Computer Assisted Personal Interviewing (CAPI) system. This financial literacy survey was first carried out in 2019 and is then carried out periodically every three years. So until now the data available is 2019 and 2022.

This study employs a quantitative approach with panel data regression analysis. Several tests were conducted to analyze the panel data, including the Chow Test, Hausman Test, and Lagrange Multiplier Test to identify the most suitable model. Additionally, the F-test and the Coefficient of Determination Test (R^2) were utilized to evaluate the model's fit. The partial significance test (t-test) was also employed to assess the impact of the independent variables on the dependent variable. Lastly, Multicollinearity and Heteroscedasticity Tests were performed to ensure compliance with classical assumptions.

This study uses the following analytical model:

$$LogCRIME_{it} = \beta_0 + \beta_1 logFINTECH_{it} + \beta_2 LITERACY_{it} + \beta_3 logGDRB_{it} + \varepsilon_{it}$$

Where:

LogCRIME	: Crime Rate
logFINTECH	: Distribution of Financial Technology Lending Funds (Billion Rupiah)
LITERACY	: Financial Literacy (%)
β_0	: Intercept or Constant
$\beta_1\beta_2\beta_3$	: Independent Variable Regression Coefficient
ε	: Error term
t	: Time Series Annual (2019 and 2022)
i	: Cross Section Province (34 Provinces)

RESULTS AND DISCUSSION

This research has carried out a normality test on all variables used, namely the dependent variable (CRIME) and independent variables (fintech and financial literacy, and GRDP). All these variables have passed the normality test. Information about descriptive statistic analysis and correlation can be seen in Table 1. Based on the sample selection criteria, this research consisted of a final sample of 68 observations (comes from 34 provinces multiplied by 2 years of observation). Table 1 shows that the mean value of CRIME is 1262.60 and the standard deviation is 1737.70. The mean value of FINTECH is 5996.42 and the standard deviation is 37682.20. The mean value of LITERACY (financial literacy) is 44.00 and the standard deviation is 9.83. The mean value of GRDP is 336791.94 and the standard deviation is 479051.62. The fourth column in Table 1 shows the correlation matrix coefficients and it

can be seen that all variables have correlation values lower than 0.90. Based on the Pearson Test criteria, it means that there is no strong relationship between variables or there are no multicollinearity problems.

Panel data regression has three models, namely Pooled Least Squares (PLS) or Common Effects Model (CEM), Fixed Effects Model (FEM) and Random Effects Model (REM). This research uses the Chow Test, Hausman Test, and Lagrange Multiplier Test to determine the best model from the three models. Table 2 shows the results of the Chow Test, Hausman Test, and Lagrange Multiplier Test. Based on the Chow Test probability value is 0.0000 < 0.05, this means that the best model is the Fixed Effect Model (FEM). The Hausman Test probability value is 0.3088 > 0.05, meaning the best model is the Random Effect Model (REM). The Lagrange Multiplier Test probability value is 0.0000 < 0.05, this means that the best model is the Random Effect Model (REM). This means that the best panel data regression modeling test results are the Random Effects Model (REM).

Table 3 is the result of the Random Effects Model (REM) panel data regression analysis used for hypothesis testing. Before testing the hypothesis and its interpretation, it is necessary to carry out a Model Goodness Test and a Classical Assumption Test. The model goodness test consists of the Simultaneous Significance Test (F) and the Determination Coefficient (R^2). Meanwhile, the Classical Assumption Test consists of the Multicollinearity Test and the Heteroscedasticity Test. Table 3 shows that the Prob(F-statistics) value is smaller than the 5 percent significance level (0.0000<0.01). This means that the independent variables (FinTech, Financial Literacy, and GRDP) in this study simultaneously have a significant influence on the dependent variable (Crime). Table 3 also shows the Adjusted R-squared value of 0.5044. This means that the variation in the dependent variable (Crime) can be explained by the independent variables (FinTech, Financial Literacy, and GRDP) amounting to 50.44 percent, while the remaining 49.56 percent is influenced by other factors outside the model. The Classic Multicollinearity Assumption Test can be seen in Table 1 which was explained previously. The second Classical Assumption Test is Heteroscedasticity. To identify heteroscedasticity problems in this research, the Glejser Test was used. Based on Table 4, the Glejser Test results show that the probability values for all independent variables are greater than the 5 percent significance level (0.05), meaning that no symptoms of heteroscedasticity were found.

After completing the Model Goodness Test and the Classical Assumption Test, then the Hypothesis Test is carried out. Table 3 shows the results of the Hypothesis Test. In more detail, Table 3 shows that the FINTECH variable has a probability value smaller than the 10 percent significance level (0.0867<0.1) and has a coefficient value of 0.0898. This means that the FINTECH variable has a significant influence on the CRIME variable and every 1 percent increase in FINTECH growth will have an impact on increasing CRIME by 0.000898 percent. In addition, Table 3 also shows that the LITERACY variable has a probability value smaller than the 1 percent significance level (0.0067 < 0.01) and has a coefficient value of -0.0160. This means that the LITERACY variable has a significant influence on the CRIME variable and every 1 percent increase in LITERACY (Financial Literacy) growth will result in a decrease in CRIME of 0.00016 percent. Lastly, Table 3 also shows that the control variable, namely GRDP, has a significant influence on the CRIME variable. In more detail, increasing GRDP will further increase CRIME.

	N	Mean	SD	CRIME	FINTECH	LITERACY	GRDP
CRIME	68	1262.60	1737.70	1.00	0.64	0.20	0.81
FINTECH	68	5996.42	37682.20	0.64	1.00	0.14	0.48
LITERACY	68	44.00	9.83	0.20	0.14	1.00	0.31
GRDP	68	336791.94	479051.62	0.81	0.48	0.31	1.00

Table 1. Descriptive Statistics and Correlation Matrix

	Test Summary	Prob.	Conclusion
Chow Test	Cross-section F	0.0000	Models follow fixed effects
Hausman Test	Cross-section random	0.3088	Models follow random effects
Lagrange Multiplier Test	Breusch-Pagan	0.0000	Models follow random effects

Table 2. Chow Test, Hausman Test, and Lagrange Multiplier Test

Dependent Variable: LogCRIME			
Variable	**Coefficient**	**t-Statistic**	**Prob.**
(Constanta)	-1.4561	-1.0583	0.2939
logFINTECH	0.0898	1.7400	0.0867*
LITERACY	-0.0160	-2.8046	0.0067***
logGRDP	0.6786	5.5079	0.0000***
Adjusted R-squared		0.5044	
F-statistic		23.7302	
Prob(F-statistic)		0.0000	
N		68	

Note(s): *Significant at the 10% level; **Significant at the 5% level; ***Significant at the 1% level

Table 3. Random Effect Model Regression Analysis Panel

Dependent Variable: ABS(RESID01)	
Variable	**Prob.**
C	0.0008
logFINTECH	0.6167
LITERACY	0.7592
logGRDP	0.4113

Table 4. Glejser Test

Based on the results of the data analysis, it can be concluded that the results of this research show that all the hypotheses proposed in this research are supported. In more detail, it shows that the results of this research respectively indicate that FINTECH has a significant positive effect on CRIME growth, LITERACY or Financial Literacy has a negative effect on CRIME

growth, and the control variable, namely GRDP, has a positive effect on CRIME. This means that the higher the growth of FINTECH, the higher the growth of CRIME, and the higher the growth of Financial Literacy, the higher it can help reduce the growth of CRIME. Besides that, the higher the GRDP, the higher the growth of CRIME.

The results of this research are in line with several previous studies. First, the results of the study by Wiwoho et al. (2021), show that several cases of terrorism financing have been proven to use FinTech digital payments as a means of online funding. In addition, according to Nikkel (2020), criminals use and abuse FinTech for fraud, extortion, money laundering, and criminal underground financing activities. This means that FinTech can be an opportunity to commit financial crimes or in other words, FinTech supports the growth of crime. Second, research conducted by Jin et al. (2022) who examined the relationship between financial literacy and crime incidents using financial literacy data and crime data in the US from 2009 to 2018 showed the results that public financial literacy was negatively related to crime rates. This means that the higher the public's financial literacy, the lower the crime rate.

The results of this study prove that fintech lending can increase crime through acts of identity misuse to access capital in fintech lending. Therefore, financial regulators are expected to further increase the level of security as a requirement for individuals to access fintech lending capital. So that in the future, acts of identity misuse will be increasingly difficult to do and ultimately can prevent crime. In addition, this study also proves that financial literacy through increasing knowledge, skills, beliefs that influence a person's financial attitudes and behavior to improve the quality of financial management can reduce criminal acts in the form of fraud, embezzlement, and corruption. Therefore, people should increase their awareness of financial literacy to avoid crime in the financial sector.

CONCLUSION

This research wants to find out whether FinTech can influence the growth of crime and whether Financial Literacy can reduce the growth of crime. This research takes the form of panel data consisting of 34 provinces in Indonesia with observations in 2019 and 2022 according to data availability. The research findings confirm all the proposed hypotheses. Specifically, the results reveal that FINTECH has a significant positive impact on the growth of CRIME, while LITERACY or Financial Literacy has a negative impact on CRIME growth. Additionally, the control variable, GRDP, also shows a positive influence on CRIME. This implies that as FINTECH growth increases, so does CRIME growth, but higher Financial Literacy helps reduce CRIME growth. Moreover, an increase in GRDP correlates with higher CRIME growth. This research has contributed in several ways, first, theoretically, this research provides the knowledge that FinTech Lending can increase Crime growth and Financial Literacy can reduce Crime growth in Indonesia. Second, the results of this research can be a consideration for the government to create a comprehensive legal framework through the establishment of a Law on FinTech. This study has a limitation of only analyzing observations for 2019 and 2022 due to data availability constraints beyond the control of the researcher. Therefore, further research can develop a longer observation period. Future research can add gender variables.

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