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Financial Inclusion Based on Fintech Lending (Peer to Peer Lending) in Indonesia

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Abstract

This study aims to analyze the influence of *fintech lending* on the level of financial inclusion in Indonesia, by considering the moderating role of the level of financial literacy and the Information and Technology Development Index (IPTI). The method used is *mixed methods* with a *convergent parallel design* . Quantitative analysis was conducted using panel data regression from 34 provinces in Indonesia during 2019-2022, while a qualitative approach was conducted through in-depth interviews with *fintech lending service users* in two cities. The results of the study indicate that *fintech lending* has a significant effect on increasing financial inclusion. However, financial literacy was found to have a negative moderating effect on the relationship. This indicates that although *fintech lending* increases financial inclusion, increasing financial literacy can actually reduce the strength of *fintech's influence* , possibly because more literate people become more selective in using digital financial services. These results demonstrate the importance of a policy approach that considers the context of literacy and technological infrastructure in developing *fintech* for financial inclusion purposes.

Keywords: *financial inclusion; fintech lending ; financial literacy; IPTI; panel data regression .*

Abstract

This study aims to analyze the effect of *fintech lending* on the level of financial inclusion in Indonesia, considering the moderating role of financial literacy and the Information and Communication Technology Development Index (IPTI). The research applies a mixed methods approach using a convergent parallel design. Quantitative analysis was conducted using panel regression data from 34 provinces in Indonesia for the period 2019-2022, while qualitative data was obtained through in-depth interviews with *fintech lending* users in two cities. The findings reveal that *fintech lending* significantly improves financial inclusion. However, financial literacy has a negative moderating effect on the relationship, suggesting that increased literacy may lead to more selective behavior in adopting *fintech* services. These findings highlight the importance of incorporating financial literacy and ICT infrastructure considerations into *fintech* policies to optimize its role in expanding financial inclusion.

Keywords: *financial inclusion; fintech lending ; financial literacy; ICT development index; panel regression.*

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INTRODUCTION

Financial inclusion is one of the important discussions that is often discussed when discussing economic development (Arner et al., 2018; Barajas et al., 2020; Demirguc-Kunt et al., 2017; Demirgüç-Kunt et al., 2022; Moore et al., 2019; Morgan, 2022; Oliver Wyman, 2017; World Bank, 2014; Yang & Zhang, 2022) . Financial inclusion has entered the global reform agenda and has become the focus of attention of policymakers, regulators, researchers, market practitioners, and other stakeholders (World Bank, 2014) . Financial inclusion can help reduce poverty and inequality by helping individuals invest in the future, level consumption patterns, and manage financial risks (Demirguc-Kunt et al., 2017) .

Account ownership, as a basic measure of the level of financial inclusion, is a gateway that empowers men and women to use financial services optimally to facilitate development. (Demirgüç-Kunt et al., 2022) . Globally, in 2021, account ownership increased by 50% in a 10-year period, now reaching 76% of the adult population worldwide or around 515 million people (Arner et al., 2018; Demirgüç-Kunt et al., 2022) . The main contributor to this increase in account ownership is the use of *financial technology* (*fintech)* products . According to the *Global Findex Database report 2021* released by the World Bank Group (Demirgüç-Kunt et al., 2022) , the use of *fintech*- based money (*mobile money*) contributed 8% to the growth of account ownership in developing countries. Meanwhile, account ownership from conventional banking stagnated (Demirgüç-Kunt et al., 2022) .

One form of *fintech* that is growing rapidly in Indonesia is *peer-to-peer* (P2P) *lending* or *fintech lending services* . This model offers an alternative to non-bank financing with a relatively fast, easy, and digital-based process, and has the potential to reach groups of people who previously did not have access to conventional banking services. Data from the Financial Services Authority (OJK) shows that the fintech lending industry *in Indonesia* has experienced significant growth in recent years. As of August 2023, there were 101 *fintech lending providers* registered and supervised by OJK. All *fintech lending providers* have total assets of IDR 7.4 trillion. The total distribution of funds from lenders to borrowers reached IDR *20.5* trillion. This phenomenon shows that *fintech lending* has become an important actor in the national financial ecosystem, with the potential to expand financial inclusion throughout Indonesia.

However, the effectiveness of *fintech lending* in driving financial inclusion has not been fully understood empirically. There are still fundamental questions about the extent to which the existence of *fintech lending* is truly able to increase the level of financial inclusion evenly, and whether its impact is consistent across regions. In addition, factors such as the level of financial literacy and information technology infrastructure are also thought to moderate the relationship between the use of *fintech lending* and increased financial inclusion. Low financial literacy, for example, can lead to misuse of *fintech services* or vulnerability to financial risks. Conversely, the

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availability of adequate digital infrastructure is believed to strengthen the effectiveness of *fintech lending* in reaching the wider community.

Considering these conditions, this study aims to empirically test the influence of *fintech lending* on the level of financial inclusion in Indonesia, as well as to analyze the role of financial literacy and the Information and Technology Development Index (IPTI) as moderating variables. This study is important to provide scientific evidence that can be used as a basis for policy makers, regulators, and *fintech industry players* in formulating strategies for developing an inclusive, equitable, and sustainable digital financial ecosystem.

Theoretically, this study expands the literature on determinants of financial inclusion in the context of the digital economy in developing countries. While practically, the results of the study are expected to provide real contributions in increasing the effectiveness of financial inclusion policies through the use of digital technology, especially *fintech lending* . Thus, this study occupies a strategic position in bridging the gap between the potential for digital financial innovation and the achievement of inclusive development goals in Indonesia.

METHODOLOGY

This study uses a *mix methods approach* with a *convergent parallel design* , which is a research strategy that integrates quantitative and qualitative methods in parallel in the same research stage (Creswell, 2014) . This design allows researchers to gain a more complete understanding of the phenomenon of the influence of *fintech lending* on financial inclusion in Indonesia. Quantitative and qualitative data are collected and analyzed separately, then the results of both are compared to see if there is confirmation, enrichment, or inconsistency between the findings (Creswell, 2014) .

The quantitative approach was conducted using panel data covering 34 provinces in Indonesia during the period 2019–2022. The dependent variable in this study is the financial inclusion index obtained from the OJK National Survey of Financial Literacy and Inclusion. The independent variable is the accumulation of *fintech lending loan distribution* in each province, obtained from OJK *Fintech Lending Statistics* . This study also includes two moderating variables, namely the financial literacy index and the Information and Technology Development Index (IPTI), which are obtained from OJK and BPS, respectively.

To test the effect of *fintech lending* on financial inclusion and the moderating role of financial literacy and IPTI, this study uses a panel data regression model. Determination of the appropriate panel data regression model (*Common Effect Model* (CEM) / *Fixed Effect Model* (FEM) / *Random Effect Model* (REM)) is carried out based on the results of *the Chow* , *Hausman* , and *Lagrange Multiplier tests.* (Baltagi, 2005; Ekananda, 2016; Hsiao, 2014) . The regression model used in this study is formulated as follows:

Model 1 (direct effect without moderation):

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$$Y_{it} = \beta_0 + \beta_1 X_{it} + \varepsilon_{it} \quad (1)$$

Model 2 (with financial literacy moderation):

$$Y_{it} = \beta_0 + \beta_1 X_{it} + \beta_2 Z1_{it} + \beta_3 XZ1_{it} + \varepsilon_{it} \quad (2)$$

Model 3 (with IPTI moderation):

$$Y_{it} = \beta_0 + \beta_1 X_{it} + \beta_2 Z2_{it} + \beta_3 XZ2_{it} + \varepsilon_{it} \quad (3)$$

In the panel regression model used in this study, the variables Y_{it}represent the financial inclusion index in the region $i$and time t. The variables show the accumulation of X_{it}*fintech lending* loan distribution in the region $i$and time t. Furthermore, $Z1_{it}$is the financial literacy index which acts as a moderating variable in the same region and period, while $Z2_{it}$is the Information and Technology Development Index (IPTI) which is also used as a moderating variable. The interaction between the *fintech lending variables* and each moderator is stated in $XZ1_{it}$for the interaction between *fintech lending* and financial literacy, and $XZ2_{it}$for the interaction between *fintech lending* and IPTI. Parameters $\beta_0, \beta_1, \beta_2, \beta_3$are the regression coefficients to be estimated in the model, while $\varepsilon_{it}$is the error *term* which includes all variables that are not included in the model but have an effect on Y_{it}.

Each of the above models aims to measure the direct influence *of fintech lending* on financial inclusion and the interaction between *fintech lending* and moderating variables. The analysis was carried out using statistical *software* for econometrics and parameter significance testing was carried out through the t-test and F-test, with a significance level of 5%. The classical assumption test used includes a normality test on the residual model using the *Jarque-Bera test* . Multicollinearity testing was not carried out because there was no more than one independent variable in the main model.

Meanwhile, a qualitative approach was conducted through *in-depth interviews* with eight informants who are active users of *fintech lending services* in two cities, namely Jakarta and Surabaya. The selection of informants was carried out purposively based on the diversity of demographic backgrounds and experience using fintech. The aspects explored include: financial knowledge/literacy especially related to *fintech lending* , behavioral intention , *social influence, decision making, trust, usability, and the role of fintech lending* inclusivity .

Qualitative data analysis uses an interactive model from Miles et al. (2014) , which includes the process of data reduction, presentation of data in narrative form, and drawing conclusions based on the patterns found. The results of the interviews are expected to enrich and provide context to the results of the quantitative analysis that have been obtained, as well as identify social and psychological dynamics in the use of *fintech lending* .

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The validity and reliability of the study were maintained by triangulating data and methods. Data sources came from official and credible institutions (OJK and BPS), while for qualitative data, verification was carried out between researchers against the interview results. The *convergent parallel approach* used allows this study to produce statistically strong findings as well as contextually relevant in understanding the role of *fintech lending* in driving financial inclusion in Indonesia.

RESULTS AND DISCUSSION

Quantitative Analysis

This section outlines the main findings of a study conducted to evaluate the impact of *fintech lending* on financial inclusion in Indonesia, and explore how financial literacy and the quality of digital infrastructure act as moderating variables in the relationship. The analysis was conducted using a panel data approach from 34 provinces over the period 2019 to 2022, resulting in 136 observations.

Descriptive statistics are presented to describe the distribution of data from each variable used in the study, namely the financial inclusion index (Y), accumulated *fintech lending loan distribution* (X), financial literacy index (Z1), and technology and information development index (Z2). The following table presents the average (mean), median, maximum, minimum, and standard deviation values of the four variables.

Table 1. Descriptive Statistics

Variables	*Obs.*	*Mean*	*Median*	*Maximum*	*Minimum*	*Std. Dev.*
Y	136	0.807	0.818	0.966	0.598	0.094
X	136	7,214	7,049	11,900	3,584	1,806
Z1	136	0.440	0.434	0.673	0.278	0.084
Z2	136	5,630	5,625	7,660	3,220	0.745

The dependent variable, namely the financial inclusion index (Y), has an average of 0.807 with a minimum value of 0.598 and a maximum of 0.966, indicating that the level of financial inclusion in most regions is relatively high, although there are disparities between provinces. The main independent variable, namely the accumulation of *fintech lending loan distribution* (X), has an average value of 7.214 and a standard deviation of 1.806, indicating quite large variations in the intensity of *fintech lending utilization* between regions. Meanwhile, the first moderating variable, the financial literacy index (Z1), has an average value of 0.440 with a standard deviation of 0.084, indicating the diversity of levels of financial understanding of the community in various provinces. Meanwhile, the technology and information development index (Z2) as the second moderating variable, has an average value of 5.630 with a standard deviation of 0.745, reflecting quite striking differences in infrastructure and utilization of information technology in Indonesia. Overall, the descriptive statistical results

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indicate the existence of inter-provincial heterogeneity that is relevant for further analysis in a panel data model.

After obtaining an overview of the characteristics of the data through descriptive statistical analysis, the next step in this study is to determine the most appropriate panel regression model to be used in the estimation analysis. Determining the appropriate panel regression model is done through three types of tests, namely the Chow test, the Hausman test, and the Lagrange Multiplier (LM) test. The Chow test is used to choose between the Common Effect Model (CEM) and the Fixed Effect Model (FEM), the Hausman test to choose between the Fixed Effect Model (FEM) and the Random Effect Model (REM), and the LM test to compare REM with CEM. These three tests are carried out on three different regression models, each with a different configuration of moderating variables. The test results are presented in the following table:

Table 2. Results of Panel Regression Model Selection Test

Model	*Chow* Test (*p-value*)	*Hausman* test (*p-value*)	LM Test (*p-value*)	Selected Models
Model 1	0.0000	0.2390	0.0000	BRAKE
Model 2	0.0000	0.7648	0.0000	BRAKE
Model 3	0.0000	0.1510	0.0000	BRAKE

Chow test on the three models, *a p-value* smaller than 0.05 indicates that *the Fixed Effect Model* (FEM) is more appropriate than *the Common Effect Model* (CEM), so H_0 is rejected. However, the *Hausman test* shows *a p-value* above 0.05 for all models, indicating that *the Random Effect Model* (REM) is more efficient and has no significant correlation between individual effects and independent variables, so H_0 is accepted. The results of *the Lagrange Multiplier (LM)* test also strengthen the selection of REM by showing *a p-value* <0.05, which means that REM better than CEM. Thus, based on the three tests, it can be concluded that *the Random Effect Model* (REM) is the most appropriate estimation approach to use in the three regression models analyzed in this study.

After the model selection is done and *the Random Effect Model* (REM) is determined as the most appropriate estimation approach, the next step is to conduct regression estimation to test the effect of *fintech lending* on financial inclusion. Estimation is done in three different models to describe the scenario of direct relationships and relationships moderated by financial literacy and digital infrastructure. Model 1 is a basic model that only involves *fintech lending variables* as predictors of financial inclusion. Model 2 adds financial literacy as a moderating variable, while Model 3 uses the information and technology development index (IPTI) as a moderator.

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The estimation results of the three models are shown in the following table:

Table 3. Results of Panel Data Regression Estimation with *Random Effect Model*

Variables	Model 1	Model 2	Model 3
Constant (C)	0.5353***	0.1014	0.0648
***Fintech lending* (X)**	0.0377***	0.0823***	0.0838***
Financial Literacy (Z1)	–	1,2678***	–
IIT (Z2)	–	–	0.0956***
X × Z1	–	-0.1370***	–
X × Z2	–	–	-0.0097***
R-squared	0.4767	0.6244	0.5982
***Prob* (*F-stat*)**	0.0000	0.0000	0.0000
Number of Observations	136	136	136

Note: *** significant at α = 1% level

Model 1 shows that *fintech lending* has a positive and significant influence on financial inclusion with a coefficient of 0.0377 and *a p-value* < 0.01. This indicates that the increase in loan distribution through *the platform fintech lending* can increase the financial inclusion index between provinces. With an *R-squared value* of 0.4767, around 47.67% of the variation in financial inclusion can be explained by *fintech lending* , indicating a significant contribution from this variable.

Model 2 tests the role of financial literacy as a moderating variable. The results show that financial literacy (Z1) has a direct positive and significant effect on financial inclusion, with a coefficient of 1.2678. However, the interaction between *fintech lending* and financial literacy (X × Z1) actually produces a negative coefficient of -0.1370 which is also significant, indicating that in areas with higher levels of financial literacy, the positive effect *of fintech lending* on financial inclusion is reduced. This can be explained by the possibility that people with high financial literacy are more careful in accessing digital-based lending services that are not yet fully regulated or strictly protected.

Model 3 involves IPTI as a moderator. IPTI has a direct positive and significant effect on financial inclusion with a coefficient of 0.0956, indicating that good digital infrastructure encourages increased access to formal financial services. However, the results of the interaction between *fintech lending* and IPTI (X × Z2) show a negative and significant value of -0.0097, which implies that even though digital infrastructure is adequate, the effect of *fintech lending* on financial inclusion actually decreases in areas with high IPTI. This can be interpreted that good infrastructure is not necessarily in line with the level of utilization or adoption *of fintech lending* inclusively, especially if it is not followed by adequate digital literacy and consumer protection policies.

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Overall, the three models show that *fintech lending* has a positive impact on financial inclusion. However, the negative moderating effects of financial literacy and digital infrastructure provide insight that the effectiveness of *fintech lending* is highly dependent on the social context, consumer behavior, and inclusive technological readiness. These findings provide an empirical basis for formulating policies that not only encourage the expansion of *fintech lending* , but also strengthen digital literacy and governance as a whole.

Qualitative Analysis

A qualitative approach was conducted to enrich the quantitative findings through in-depth interviews with 10 *fintech lending users* domiciled in Jakarta and Surabaya. The respondents consisted of business actors who had used *peer-to-peer services. lending* to support their business financing. The analysis was conducted by reducing the answers into the main themes that had been determined, namely: financial literacy, behavioral intention , social influence, decision-making process, trust, *platform usability* , and inclusiveness of *fintech lending services* .

In terms of financial literacy, respondents have relatively adequate knowledge about *fintech lending services* . Some of them obtained information through professional networks, acquaintances in the financial sector, and personal searches related to capital sources. Although *fintech lending* is considered an alternative financing solution, respondents are generally cautious, such as only utilizing around 30% of capital needs through this service. They also understand the inherent risks, including high interest rates and potential data privacy violations, but still appreciate the speed of the process and ease of access without collateral.

In terms of behavioral intention, most respondents use *fintech lending* because of urgent capital needs, especially to maintain business cash flow. This decision is driven by factors of convenience, speed of process, and flexibility of fund usage. Some respondents are also influenced by exposure to social media and digital advertising, while others choose based on community references or personal experiences.

Social influence has been shown to play a role in *platform usage decisions* . Recommendations from business peers, professional forums, and user communities contribute to trust and *platform selection decisions* . However, some respondents stated that their decisions were still predominantly based on rational considerations and business calculations, rather than simply social pressure.

In decision making, the main considerations include interest rates, loan ceilings, speed of fund disbursement, and security and privacy aspects. Respondents are very concerned about the legality of *the platform* , such as registered status and supervision by the OJK. Risk mitigation strategies implemented include limiting loan exposure, diversifying between *platforms* , and adjusting funding to the cash flow of the ongoing project.

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Level of trust in *the platform fintech lending* is quite high, although there are still notes on aspects of complaint handling and customer service efficiency. Most respondents feel safe using *the platform* , but remain selective and emphasize the importance of transparency and service reliability.

In terms of usability, the majority of respondents felt that the *platform interface* was easy to use and intuitive. The available features were considered to support the user experience, although some respondents suggested improvements such as a more detailed loan history and faster processing time for digital documents.

Finally, in terms of inclusivity, respondents agreed that *fintech lending* provides financing opportunities for business actors who are not covered by formal banking services. However, this inclusivity is still limited because the majority of providers only fund business activities with *invoice guarantees* (*invoice financing*). Businesses without active contract bills often do not meet funding requirements, so open access is still selective. In addition, limited digital infrastructure and operational dominance in urban areas mean that this service has not yet reached people living in remote areas.

Overall, these qualitative results reinforce the quantitative findings that the success of *fintech lending* in driving financial inclusion is largely determined by literacy factors, user trust, and digital infrastructure readiness. To achieve more equitable and sustainable financial inclusion, a holistic approach is needed that includes user education, expanding service coverage to non-urban areas, and improving aspects of consumer protection and information transparency.

CONCLUSION

This study aims to evaluate the influence of *fintech lending* on the level of financial inclusion in Indonesia, as well as to analyze the role of financial literacy and the Information and Technology Development Index (IPTI) as moderating variables. Using a *mix methods approach* and *convergent parallel design* , this study found that *fintech lending* has a positive and significant influence on increasing financial inclusion. *Fintech lending services* are able to reach groups of people who were previously underserved by conventional banking, especially micro-entrepreneurs and individuals without formal collateral.

However, the results of the analysis also show that the effect of *fintech lending* on financial inclusion is influenced by the presence of moderating factors. Financial literacy was found to negatively moderate the relationship, meaning that at higher levels of financial literacy, the effect of *fintech lending* on financial inclusion tends to decrease. This is due to the increasing caution of consumers who are more aware of financial risks and obligations. Meanwhile, IPTI also shows a negative moderating effect, although in a weaker intensity, indicating that the available digital infrastructure has not automatically increased the effectiveness of utilizing *fintech lending services* .

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The findings from the qualitative approach support the quantitative results by showing that ease of access and speed of process are the main attractions of using *fintech lending* . However, low financial literacy and limited understanding of the risks of digital financial services are challenges in themselves. Several respondents stated that they did not understand the interest structure and experienced pressure in the collection process, which shows the importance of consumer education in the digital financial ecosystem.

Overall, this study concludes that *fintech lending* plays a role in increasing financial inclusion in Indonesia, but its effectiveness is influenced by the readiness of financial literacy and digital infrastructure. Therefore, synergy is needed between strengthening regulations, increasing financial education, and developing technological infrastructure to ensure that the growth of *fintech lending* contributes to more inclusive and sustainable economic development.

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