Financial Technology (Peer-to-Peer Lending): Efficiency and Effect on Economic Growth in Indonesia

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ABSTRACT

The transformation of the digitalization era has experienced rapid growth, especially in the financial services industry, since the emergence of the Covid-19 pandemic in Indonesia. The advances have created Financial Technology (FinTech) through a digital system known as Peer-to-Peer (P2P) Lending, which is in great demand by the public. However, the magnitude of risk management has an efficiency level that needs to be analyzed, and the multiplier effect of promoting economic growth should also be investigated. This study aims to analyze the efficiency level of FinTech P2P lending and the effect on regional economic growth from 2019 to 2022. The results show that P2P lending will be relatively efficient in 2021-2022. The panel data regression indicates that lending positively and significantly affects economic growth. It is expected to be an efficient and accountable online financing service with a multiplier effect on economic growth.

Keywords: Financial Technology, P2P lending, Efficiency, Economic,Growth

1. INTRODUCTION

Digital transformation is developing significantly in influencing all activities of human life (Suryono et al., 2021), and one of the effects is the development of advances in FinTech. The advances are increasingly getting high interest from the public since the existence of the Indonesian FinTech Association (AFI). There are 147 companies registered with the Financial Services Authority (FSA) (Arvianto et al., 2021). Furthermore, FinTech provides online technology-based financial products and system innovations (Hayati & Friantin, 2021; Arvianto et al., 2021) with smart, easy, low-cost transaction services (Pratama, 2021). It is categorized into 4 parts, including payment systems, risk and investment management, e-aggregator, and Peer-to-peer (P2P) Lending (Bank Indonesia, 2017). Existing FinTech finance options include online P2P lending platforms. It provides services to borrowers through an electronic system as a digital-based financial platform. Since September 2022, 102 P2P lending providers have been registered and licensed by the FSA (OJK, 2022).

In Indonesia, the accumulated number of recipients reached 90,211,983 entities, and the total distribution was 455,000.29 billion rupiahs in September 2022 (Financial Services Authority, 2022). This achievement is due to the users being able to access services that tend to be easy and practical. Therefore, borrower requests will be approved immediately after administrative fulfillment compared to offline loan services. P2P lending indicates the multiplier effect that drives the development and economy of a region. The Oxford economics study showed that a 1% increase in digital device penetration would increase Gross Domestic Product (GDP) and create jobs (Farraz, 2019; INDEF, 2019; Fisabilillah & Hanifa, 2021) as well as reduce poverty (INDEF, 2019; Maulana & Wiharno, 2022). Increasing digital-based financial inclusion and facilities stimulate an increase in GDP per capita of 0.03% (Fisabilillah & Hanifa, 2021) or 60 trillion rupiahs (Maulana & Wiharno, 2022).

P2P lending implementation still has inhibiting factors, including asymmetric information, determination of loan

scores, investment decisions, platform feasibility, consumer protection, and moral hazard behavior (Suryono et al., 2019). The public financial stability system is disrupted, especially moral hazard behavior such as predatory lenders and borrowers. Predatory lenders are assumed illegal providers and are not registered with the FSA. Meanwhile, predatory borrowers are lenders that do not carry out their responsibilities for good returns or bad credit. The expansion of the platform triggers increased competition and improved service structure, management, and risk control (Zhang & Cao, 2017). The selection of a safe and reliable P2P lending is the first thing to consider when lenders make investment decisions. Borrowers need to consider a platform to fulfill their capital needs quickly and easily (Zheng & Wang, 2018).

Previous studies analyzed the influencing factors or driving determinants, loan success, default risk, and P2P lending investment decisions. Rosavina et al. (2019) stated that interest rates, loan costs, amounts, and flexibility affect SMEs obtaining loans. Furthermore, Pratama (2021) reported that structural guarantees, ease of use, and brand image affect borrowers' trust in P2P lending. The amount of funds received affects the increase in profits but not assets, as evidenced by Miahendita (2020). The loan time limit affects the performance of small and medium enterprises (SMEs). This study is under Li & Cao (2017), Yan et al. (2018), Wang et al. (2015), Primary (2021), Aryaanto et al. (2021), Hsuehet al (2017), Lee (2017), and Pohan (2019).

Hidayatullah & Hanifa (2021) stated that P2P lending positively affects economic growth using time series data from 2018 to September 2020 with regression analysis. The INDEF (2019) study showed that it contributes 60 trillion rupiahs to GDP and stimulates the expansion of new jobs to reduce poverty. Maulana & Wiharno (2022) proved that the growth positively and significantly promotes economic growth through a simple regression test. However, Sari & Saraswati (2019) stated that P2P lending had no significant effect on income inequality in Central Java Province in 2018-2019.

Related literature studies have discussed analyzing the factors (determinants) of P2P lending. However, studies that state the efficiency level of this platform are still relatively few, such as Zhang & Cao (2017) on the factors affecting the efficiency of P2P lending in China with multiple regression analysis. The results show that duration, amount, interest rate, activity in social networks, and the environment affect the efficiency of loan success. The input-oriented DEA method in measuring P2P lending with different equity backgrounds is carried out by Bai & Huang (2016). The study shows the high efficiency of private platforms and venture capital, followed by state-owned, while the banking department has a relatively low-efficiency level.

Zheng and Wang (2018) in China stated that the efficiency level in the eastern region is higher using the super-efficiency SBM model analysis. This study also adds a regression analysis which shows that operating time, annual interest rate, average investment period, and efficiency collaborate positively on the success of P2P lending loans. Li et al. (2017) estimated the efficiency level using the DEA method through regional clustering. The efficiency level in the eastern region is higher than in the western and central.

A literature study that links P2P lending and macroeconomics was conducted by INDEF and the Indonesian FinTech Association (2019). The results show that it negatively affects poverty, inequality, and household consumption levels. Likewise, Zhang et al. (2018) in China and Demir et al. (2020) in 140 countries with panel data from 2011 – 2017 showed the same results. Maulana and Wiharno (2022) on the effect of P2P lending showed positive and significant results in promoting economic growth in Indonesia. Similarly, Fisabilillah and Hanifa (2021) stated that it affects 68.18% of economic growth. Even though this online lending platform affects economic growth and income inequality, the World Bank study (2021) stated that the distribution to GDP is not very significant or only reached 38.70% in 2020. According to Oh and Rosenkranz (2020), P2P lending has significant potential as a financing service in the financial, real, and capital market sectors.

Based on the literature gap, it is necessary to analyze the efficiency of P2P lending and its effect on economic growth. Efficiency is a channel in the the competition that can affect digital financial stability (Rusydiana & Marlina, 2019). Studies on efficiency are rarely conducted, including Zhang & Cao (2017), Bai & Huang (2016), Zheng and Wang (2018), as well as Li et al. (2017). Previous study on the effect of P2P lending still focuses on the macro scope. Therefore, this study analyzes the efficiency of P2P lending and its effect on the economy based on the clustering of regions from 2019 to 2022.

2. RESEARCH METHOD

This study adopts descriptive quantitative and explanatory approaches. A quantitative study focuses on numerical data (Baldin, 2018) processed using statistical methods. Meanwhile, the explanatory study is used as a reflection of the depth level of data analysis. This is included in the basic study to explore and find answers to the problems of economic phenomena. It also analyzes the efficiency level between input and output variables (Cooper et al., 2011) and between dependent and independent (Woldridge, 2016; Gujarati, 2012).

This study uses secondary data sources as the basis for the analysis obtained indirectly from third parties and published orally and in writing (Gujarati, 2012). The data used are obtained from the 2019-2022 monthly publication. These include all data related to the variables studied. First, input variables include operational costs and paid-in capital, while output includes total financing and operating income. The data sources above come from official publications from the Financial Technology Statistical Report of the Financial Services Authority. Second, it consists of accumulated loans received by lenders from the FSA report and economic growth from Badan Pusat Statistik (BPS) Publication Report per region. Each variable that will be used in the analysis as follows 1) Operational Cost; 2) Capital deposited; 3) Total financing; 4) Operating income; 5)Lender loan accumulation; 6) Economic growth.

The analysis method is Data Envelopment Analysis (DEA) and panel data regression.

1. Data Envelopment Analysis (DEA)

   DEA is an analytical method with a non-parametric approach, namely a linear programming model, to calculate the ratio of input-output ratio for all units (Cooper et al., 2011; Rusydiana & Hasib, 2020).

   The DEA method has been widely used to measure the economic efficiency of the banking industry and financial institutions (Shahreki et al., 2012; Tsolas and Dimitris, 2012). However, the analysis has been widely developed in measuring the efficiency of non-banks such as insurance, hospitals, universities, tax offices, zakat institutions, and others (Rusydiana & Hasib, 2020). This study uses DEA analysis to measure the efficiency of the non-bank financial industry, namely FinTech P2P Lending. The analysis

tool used is the Banxia Frontier - Data Envelopment Analysis (DEA) Software application.

Efficiency Model 1:
$$\text{Max } E = \mu_1 Y + \mu_0$$
Subject to :
$$U_1 C + U_2 X_2 = 1$$
$$\mu_1 Y + \mu_0 - (U_1 X_1 + U_2 X_2) \leq 0$$
$$\mu_1 U_{1,2} \geq 0 \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(1)$$

Efficiency Model 1:
$$\text{Max } E = \mu_1 Z + \mu_0$$
Subject to :
$$U_1 C + U_2 X_2 = 1$$
$$\mu_1 Z + \mu_0 - (U_1 X_1 + U_2 X_2) \leq 0$$
$$\mu_1 U_{1,2} \geq 0 \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots(2)$$

Where :
Y is the total financing output, Z is the operating income output, X1 is the operational cost, and X_2 is the capital paid up by P2P Lending investors.

2. Panel Data Regression

   Panel data is a combination of cross-section and time series showing repeated measurements of several variables over a certain time, such as individuals, households, regions, and companies (Wooldridge, 2016; Gujarati, 2012; Eom et al., 2020). The stages of the panel data regression analysis method are as follows:
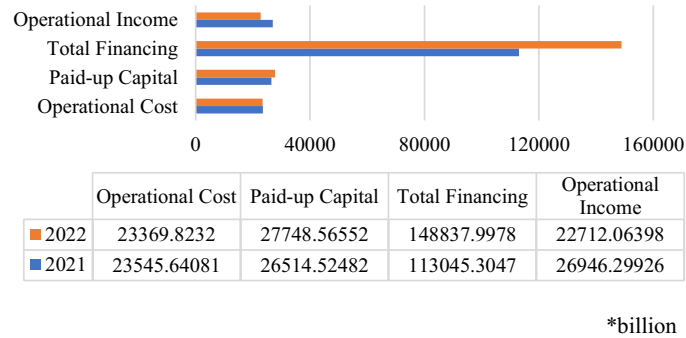
The panel data estimation model can be written as follows:
$$\text{PDRB}_{it} = \alpha + \beta_1 \text{Pinj}_{it} + \varepsilon_{it} \ldots\ldots\ldots\ldots\ldots\ldots(3)$$
Description   :
PDRB   : Gross Domestic Product / Economic Growth
Pinj   : Accumulation of loans received by recipients
α : Constant
β : Regression coefficient
ε : Error term
i   : Province
t   : Year

3. RESULT AND DISCUSSION

In the efficiency analysis, the input variables are operational cost as expenses incurred by P2P lending in their operations and paid-up capital as investment. The input and output variable data starts from May 2021 monthly data until August 2022.

	Operational Cost	Paid-up Capital	Total Financing	Operational Income
■ 2022	23369.8232	27748.56552	148837.9978	22712.06398
■ 2021	23545.64081	26514.52482	113045.3047	26946.29926

*billion

Source: Data processed by author, 2022
Figure 1. Accumulation of P2P Lending Input-Output Variables in Indonesia in 2021-2022

Figure 1 shows the annual accumulation of data on input and output variables in P2P lending in 2021-2022. The figure shows that lenders' interest in investing their capital and borrowers accessing digital-based loans has increased. In 2022, paid-up capital will increase by 4.6 % from the previous year, from around 26,514 billion in 2021 to 27,748 billion in 2022. The total financing access by borrowers also experienced a significant increase of 31.66 % from the previous year. However, operating income from 2021 to 2022 experienced a slight decrease of 15.7 %. This is estimated because there are still total outstanding loans, and the default rate of 90 days (TWP90) or the default level in completing the obligations stated in the above agreement is 90 days after the due date by the borrowers in 2022.

Figure 2 shows the marginal percentage of P2P lending per province in Indonesia in 2021-2022. The provinces with dark green shading have the highest significant percentage increase in 2022 compared to Gorontalo at 33.8%, Bangka Belitung Islands at 15.14%, and Central Sulawesi at 10.62% from the previous year. Furthermore, an increase below 10% in 2022 is in the provinces of Central Java, Yogyakarta, East Java, West Sumatra, Riau Islands, Lampung, West Kalimantan, Central Kalimantan, North Kalimantan, East Kalimantan, West Sulawesi, Southeast Sulawesi, East Nusa Tenggara, North Maluku, and West Papua. Other provinces that have faded green shading have a decline in the percentage of loans from 2021 to 2022. Papua Province shows the lowest decline at 20.04% from the previous year.
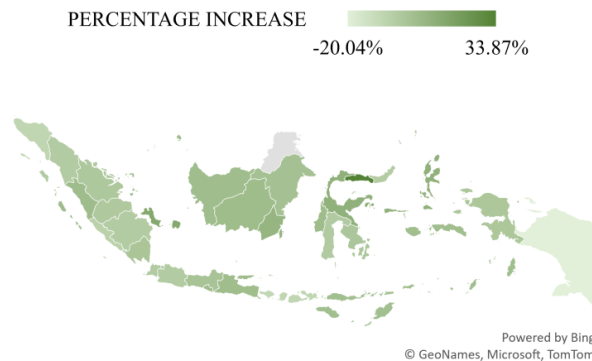
Source: Data processed by the author, 2022
Figure 2. Percentage of Marginal Lending by Province in Indonesia in 2021-2022

A data envelopment analysis (DEA) method was used based on the results of the output-oriented model on the return to scale variable to obtain information regarding the level of program efficiency or the performance of a financial institution. Table 1 show the efficiency level of P2P lending from 2021 to 2022. The score is calculated on a scale of 0-1, where 0 indicates inefficiency and 1 means efficiency. The activities of the P2P lending

program, which the FSA officially registers, run relatively efficiently. The results show that the efficiency score for 2021-2022 ranges from a scale value of 0.82 – 0.99. The efficiency analysis is shown in the table below:

Table 1. Efficiency of Peer-to-peer Lending (P2P) in Indonesia in 2021 - 2022

Period		Efficieny Value		Description
Year	Month	Output : Total Financing	Output : Operational income	
(1)	(2)	(3)	(4)	(5)
2021	May	0.8226938	0.99874237	Relatively efficient
	June	0.92562533	0.99889498	Relatively efficient
	July	0.9978638	0.99895396	Relatively efficient
	August	0.97483515	0.99880679	Relatively efficient
	September	0.97659205	0.99906104	Relatively efficient
	October	0.91912908	0.99896509	Relatively efficient
	November	0.90289507	0.9987019	Relatively efficient
	December	0.98112255	0.99881532	Relatively efficient
2022	January	0.99930408	0.99557138	Relatively efficient
	February	0.99930312	0.9884139	Relatively efficient
	March	0.99931137	0.97824868	Relatively efficient
	April	0.99930647	0.97378105	Relatively efficient
	May	0.99930655	0.97158825	Relatively efficient
	June	0.99930933	0.99287106	Relatively efficient
	July	0.99930446	0.99701286	Relatively efficient
	August	0.999301	0.99393895	Relatively efficient

Source: Data processed by the author, 2022

The effect of P2P lending loans on economic growth is analyzed through panel data regression interpreted in table 2 below. The t-test is carried out partially or for each independent variable on the dependent. Table 2. compares the results of the fixed effects regression test and random effects panel data. The constant value is 16.30768, meaning that when the independent variables increase by 1 unit, the economic growth increases by 16.30768 units. Furthermore, the fixed effect results show that the loan accumulation given to borrowers officially registered with the FSA positively and significantly impacts economic growth. Every 1 unit increase in credit accumulation has a positive effect of 0.04 on economic growth. It is different from the random effect results where the loan accumulation given to borrowers of P2P lending officially registered with the FSA has a negative impact on economic growth. The F test aims to determine the effect of the independent variables on the dependent (overall) or simultaneously. From the table results, the probability value (F-statistic)

is 0.0000 (0.0000 <0.05), meaning the variables of loan accumulation on the borrowers and the accounts influence economic growth. The significance level used in this analysis is 5% (α = 0.05). The coefficient of determination (R^2) is used to determine the effect of the independent variable on the dependent. The analysis showed an R2 value of 0.280823, which identifies that the variables of loan accumulation can explain 28% of economic growth, while other variables outside the model explain the rest. The others are estimated to affect economic growth, such as inflation and population. The results of the best model from fixed and random effects are tested by chow test and hausman test. The chow test has a chi-square probability of less than 0.005 (prob. 0.000 <0.005). Therefore, the best model test is the fixed effect, where H_0 is rejected. The Hausman test shows the results of the chi-square probability value of less than 0.05 (prob. 0.000 <0.005) or H_0 is rejected. It can be concluded that the best model used to test the data is to use the fixed effect model.

The results show that in Indonesia, a digital financing service program called P2P lending, officially registered with the FSA, has a relatively efficient performance (close to a scale value of 1). This is in line with a previous study by Zhang & Cao (2017), which found that digital lending activities affect a higher efficiency rate of loan success in China. Bai & Huang (2016) found a high-efficiency level in P2P lending platforms operated by private and venture capital followed by state-owned. In

China, it shows that the P2P Lending program runs efficiently. However, studies from Zheng & Wang (2018) and Li et al. (2017) reported a similar result in the eastern region compared to others. P2P lending has become an important part of digital finance. It can fulfill individual funding needs with a more optimal social fund utilization than the traditional method. Therefore, it provides good efficiency in implementing financing service activities. Competition is increasing with the stages and expansion

of online loans to improve a good response. Financial institutions that offer digital P2P services should set up a good system for controlling structure, service, management, investment, and loan risk control. Consumer behavior in selecting P2P lending platforms also influences the success and efficiency of digital lending. The provision of information related to P2P lending registered with FSA still needs to be optimized.

Regulatory policies in the online lending industry are an important requirement for optimization with the magnitude of the potential for P2P lending in the current digitalization era, especially regarding the attributes of online loans. Lending systems and information disclosure impact the market's efficiency, which can lead to potential risks and the development of the platforms. This is because online loans are easily affected by policy changes. The domestic digital banking industry will feel the effects of overly restrictive policies, while lax regulations will facilitate the proliferation of illegitimate internet lending. The results indicate that P2P lending loans have a positive and significant effect on economic growth. This is in line with previous studies conducted by Zhang et al. (2018) in China, Demir et al. (2020) in 140 countries, Maulana & Wiharno (2022), and Fisabilillah & Hanifa (2021), which show that P2P lending increases economic growth. Fisabilillah & Hanifa (2021) stated that the influence reached 68.18%. Oh & Rosenkranz (2020) stated that P2P lending has great potential as a digital financial service in the real and capital market sectors.

OJK Regulation Number 13/POJK.02/2018 concerning digital financial innovation is the basis for strengthening FinTech companies in implementing digital-based innovations with low risk and strong consumer protection and driving the national economy. P2P lending is indicated to create inclusive development. It can increase gross domestic product, namely when there is high penetration of digital devices by 1% (Farraz, 2019). FinTech positively impacts an increase in economic growth by 0.45% (INDEF, 2019) and a GDP of more than 60 trillion (Fisabilillah and Hanifa, 2021). Based on the results, 28% of the variable can explain economic growth. This is in line with a study from the World Bank (2021) that digital P2P Lending loans have not had a massive impact, reaching 28.70% of the GDP. However, P2P Lending gives a positive signal to GDP/GRDP.

P2P lending is the solution for MSMEs in the digitalization era, especially in reaching venture capital financing services. During the Covid-19 pandemic, FinTech P2P Lending was the foundation for MSMEs actors to survive (Fisabilillah & Hanifa, 2021; Saraswati, 2021; Ardiansyah, 2019; Rosavina et al., 2019; Muzdalifa et al., 2018; Rahma, 2018). Channeling funds can promote increased income for economic actors, such as households, companies, and the government. Adhinegara et al. (2018) found that income increased by 1.77% for each use of digital financing services by urban households. Therefore, the development of the real sector can certainly affect the economy of provinces in terms of economic growth and development of the business sector. Maulana and Wiharno (2022) stated that the increase in the accumulated number of P2P lending loans promotes equal access to capital for business actors, contributing to national economic growth. Despite the positive results of P2P lending and economic growth, strengthening regulations and optimizing the socialization of public literacy for online loans need to be improved. Therefore, they are not trapped in illegal online loans (Santi et al., 2017; Maulana & Wiharno, 2022). P2P lending registered with the FSA is expected to create a conducive and optimal online lending climate to boost the economic growth rate (Maulana & Wiharno, 2022).

4. CONCLUSION

Based on the results and discussion, it can be concluded as follows:
1. P2P lending has a relatively efficient level of efficiency.
2. The loan accumulation provided has a positive and significant impact on economic growth.
3. Loan accumulation and borrowers' accounts significantly affect economic growth.

P2P lending can explain economic growth of 28%, while the variables outside the model explain the others. This study has not analyzed the long-term effect of P2P lending on economic growth. Efficiency analysis is limited to the scope of Indonesia with two years due to limited data available. As a recommendation, further studies are expected to add other variables, analyze the efficiency level at the provincial level, and add other macro variables to the analysis.

Table 2. Panel Data Regression Analysis Results

Dependent Variable: Economic Growth (GRDP)
Method : Pooled Least Squares
Sample : 2019M12 2022M04
Included Observations : 29
Cross-sections included : 34
Total pool (balanced) observations : 986

Variable	Coefficient		Std. Error		t-Statistic		Prob.	
(1)	(2)		(3)		(4)		(5)	
	Fixed	Random	Fixed	Random	Fixed	Random	Fixed	Random
C	16.30768	17.45567	0.116854	0.054395	139.5565	320.9041	0.0000	0.0000
Akumulasi Pinjaman	0.041032	-0.012337	0.007132	0.003745	5.753386	-3.294163	0.0000***	0.0010***
Akun *Lender*	-0.008562	0.014624	0.005926	0.003524	-1.444770	4.149265	0.1489	0.0000***
Effects Specification								
Test	**Fixed Effects**			**Random Effects**				
R-Squared	0.280823			0.040595				
Adjusted R-Squared	0.254327			0.038643				
F-Statistic	10.59867			20.79648				
Prob(F-Statistic	0.000000			0.000000				
Durbin-Watson Stat	0.789433			0.590221				

Source : data processed by author, 2022

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