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The Influence of Fintech on the Economic Growth of Some Developing Countries

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Abstract: This paper uses panel data regression with a fixed-effects model to analyze the impact of fintech payments and lending on economic growth in developing countries. The analysis reveals that fintech payments and lending have a significant positive effect on economic growth. Fintech payments increase transaction speed and accessibility to financial services, while fintech lending offers an alternative source of financing for individuals and MSMEs, boosting economic activity. The study uses panel data from eight countries, spanning from 2017 to 2022. The results highlight the crucial role of fintech in supporting economic development. To foster fintech growth and consequently the broader economy in developing countries, policymakers are advised to strengthen regulatory frameworks, protect consumer data, and invest in digital infrastructure.

Keywords: fintech payment, fintech lending, economic growth, developing countries, panel data.

JEL Classification: G23; N20; O30; O40; O50

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Las fintech y su influencia en el crecimiento económico de algunos países en desarrollo

Resumen

Este artículo analiza el impacto de los pagos y préstamos fintech en el crecimiento económico de los países en desarrollo mediante una regresión de datos de panel con un modelo de efectos fijos. El análisis revela que los pagos y préstamos fintech tienen un efecto positivo significativo en el crecimiento económico. Los pagos fintech aumentan la velocidad de las transacciones y la accesibilidad a los servicios financieros, mientras que los préstamos fintech ofrecen una fuente alternativa de financiación para particulares y mipymes, que impulsa la actividad económica. El estudio utiliza datos de panel de ocho países, que abarcan el período 2017-2022. Los resultados destacan el papel crucial de las fintech en el desarrollo económico. Se recomienda a los responsables políticos fortalecer los marcos regulatorios, proteger los datos de los consumidores e invertir en infraestructura digital para impulsar el crecimiento fintech y, en consecuencia, la economía en general en los países en desarrollo.

Palabras clave: pagos fintech, préstamos fintech, crecimiento económico, países en desarrollo, datos de panel.

INTRODUCTION

The development of the economic transaction systems is inextricably linked to technological advances, especially the increasead adoption of financial technology (fintech) (Puschmann, 2017). Fintech is a financial innovation that is integrated through technology with the aim of obtaining new business transaction models (Leong 2018; Schueffel, 2016). Fintech has grown rapidly in the financial industry due to the strong push of the internet, mobile phones and digital technology (Shim & Shin, 2016). Fintech represents a broader advance in the financial ecosystem (Gomber et al., 2017), characterized by technological changes in three areas of finance, namely raising funds, allocating funds, and transferring funds (Das, 2019). Global investment funds in the fintech sector have reached US$ 210 billion in 2021, while it is estimated that the size of the global fintech market will increase by around US$ 305 billion until 2025 (KPMG, 2022). According to Thakor (2020), fintech has provided innovative advances in financial technology primarily in payment service systems and alternative credit or capital loan services, investment management, insurance and blockchain.

The establishment of fintech service start-ups is found to be more present in countries with developing economies and adequate technology (Haddad & Hornuf, 2019). According to reports Findexable (2021), fintech service start-ups in several developing countries have been ranked 15th largest fintech in each region such as China, India, Indonesia, Thailand, the Philippines, Vietnam in the Asia Pacific region, Nigeria in the Africa region, and Brazil in the Latin America region. Kanga et al. (2022) suggests that the development of digital payment access by fintech has driven a better increase in GDP per capita in the long term in several developing countries, such as in China and India by (Bu et al., 2023; Rooj & Sengupta, 2020). According to Agarwal and Zhang (2020) the development of fintech lending has contributed well to various economic sectors in encouraging economic growth.

Figure 1 shows that the value of transactions in fintech payment and fintech lending services has increased in several developing countries. Such as China which shows an increasing trend in transaction value in the fintech payment and fintech lending sectors is the highest, then followed by countries such as India, Indonesia and Brazil.

Although business transactions declined worldwide in 2020 due to the pandemic, especially in the fintech lending sector, which experienced significant fluctuations in several countries, the situation improved in subsequent years. The fintech payment and fintech lending sectors have proven their ability to encourage and facilitate community economic activities and provide an important impetus for the development of micro, small and medium enterprises (MSMEs).

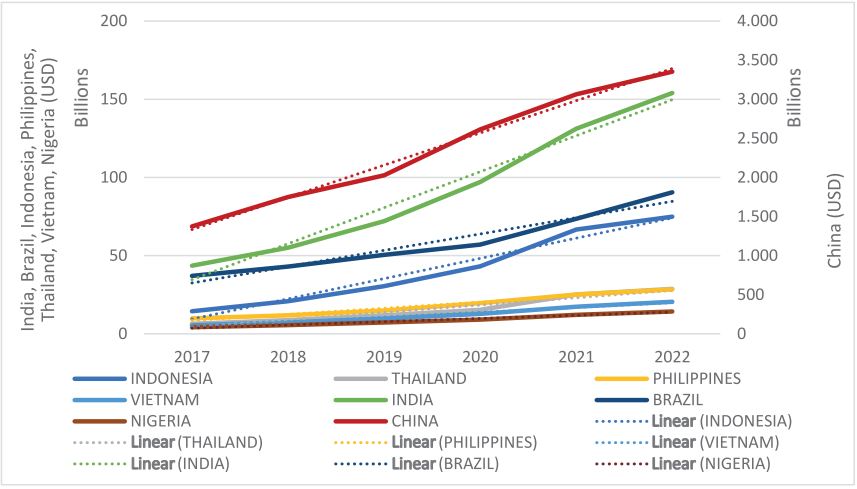

Figure 1. Total Transaction Value of Fintech Payment and Fintech Lending Services in Developing Countries

Source: Statista, data processed (2024)

This research reveals significant findings and insights into the development of fintech payments and fintech lending, especially as important contributors in supporting economic growth. Most studies only focus on specific countries and research that samples developing countries is still very minimal. In addition, fintech indicators in previous studies still use e-money, internet, and smartphones. By testing using the Fixed Effect model panel data regression method, the study was able to test variation between countries over time, solving unobserved heterogeneity problems (Collischon & Eberl, 2020). Another important thing lies in the highest fintech development in several

developing countries such as Indonesia, China, Thailand, the Philippines, Vietnam, India, Brazil and Nigeria. In developing countries, the financial sector is still in the developmental stage and is not fully mature. This is interesting to be investigated further because it encourages the emergence of new phenomena in the fintech field that can be an alternative solution in overcoming the limitations of the traditional financial sector.

The findings of this study reveal that fintech payments are positively correlated with and significantly influence economic growth in developing countries. Fintech has accelerated and reduced transaction costs, increased public and business accessibility to financial services and encouraged productivity, which can increase output and promote economic growth. The significant development in fintech lending services reflects the sector's capacity to provide alternative credit solutions that target precisely segments of society and MSMEs previously underserved by traditional banking institutions.

The study is divided into several sections. Section 1 provides background information and Section 2 discusses the literature review. Section 3 explores data and methodology. Section 4 discusses the movement of variables, empirical results, and conclusions. Section 5 provides conclusions and recommendations.

LITERATURE REVIEW

Economic growth is an indicator of a country's economic progress, which is indicated by the increase in the production of goods and services and the welfare of the community from one period to the next. Todaro (2000) argues that economic growth is the long-term capacity of a developing country to provide a wide range of economic goods to its population. These capabilities and advances develop along with the procurement of technology, institutional alignment, and the ideology that supports the situation. This is in line with the theory put forward by Barro (1996) which states that countries with higher levels of technological advancement tend to experience faster economic growth.

According to Carlaw and Lipsey (2003), technological advances are an additional component that allows long-term economic growth to flourish. Romer (1997) explained that in addition to the accumulation of capital and labor, technology is an important component that can explain economic growth. These technological developments encourage innovation that increases productivity and in turn drives economic growth. Schumpeter (cited by Swedberg, 2013) assess that economic growth is driven by the creativity factor of entrepreneurs in utilizing expertise, as well as technological advancements, in this case fintech, which can increase productivity and expand their business. Schumpeter

and Keynes (1936) analyzed economic behavior known as aggregate demand, which plays an important role in driving short-term economic growth.

According to Baltgalis et al. (2023), fintech payments have contributed to building an inclusive economy, encouraging unbanked communities to engage in commerce, and reducing shadow economies and illegal economic activities. This can create opportunities for real economic growth. Findings Loukil and Kammoun (2020) provide an empirical picture that proves that, when fintech is used in transactions (receiving and making digital payments), fintech contributes significantly to the economic cycle. In addition, research by Parvez et al. (2023) measures of improvement in the fintech sector show that fintech can drive inclusive growth in a country by increasing incomes and narrowing income inequality. This is in line with a study Yang and Zhang (2022) which found that the adoption of fintech can accelerate financial inclusion and improve access to financial services for individuals previously underserved by traditional banking systems.

Studies on fintech loans show that the existence of fintech loans can reach the middle and lower segments of society and encourage the development of MSME businesses through loan solutions. In the long run, this can encourage sustainable economic development (Cornelli et al. 2019). According to DeYoung and Jang (2016), fintech lending can also reduce reliance on traditional bank loans, which often have stricter requirements and limit access for most segments of society. With the advent of fintech lending, more individuals and small businesses can obtain the capital needed to grow.

Based on several theories and previous literature, the hypothesis formulated in this study is that fintech payments and fintech loans have a positive impact on economic growth in developing countries. From the various literature that has been discussed, it can be concluded that the existence of fintech can encourage economic growth. The rapid development of fintech payments and fintech loans in facilitating economic transactions, encouraging economic activity through increasing consumption levels and accelerating money circulation, can increase aggregate demand output which in turn drives economic growth. This is also supported by research by Danladi et al. (2023) which shows that fintech can accelerate financial inclusion and reduce barriers in economic transactions.

DATA AND METHOD

The data used is secondary data sourced from the World Bank and Statista for the period 2017-2022. The countries sampled in this study are Indonesia, Vietnam, Nigeria, Thailand, India, China, the Philippines, and Brazil. These countries were selected based on their significant role in fintech development, particularly in fintech payments

and lending. These countries represent diverse regions with large and growing populations, substantial reliance on MSMEs, and burgeoning digital financial sectors. Furthermore, they face challenges related to financial inclusion, making them ideal cases to explore the impact of fintech on economic growth. This study uses panel data regression analysis techniques consisting of three approaches, namely fixed effect, random effect, and common effect model. However, based on the model selection test, namely the Chow, Hausman and Lagrange Multiplier tests, it shows that the best model used in this study is the fixed effect model. In their research, Collischon and Eberl (2020) mentioned that using FE model estimation can solve the problem of heterogeneity that is not observed in constant time and provide causality in a theoretically good direction of causation. The dependent variable in this study uses economic growth proxied by gross domestic product (GDP) in current US dollars. The independent variables are fintech payment and fintech lending. Fintech payment is proxied by the transaction value of the combination of fintech payment services namely Mobile POS Payment, Digital Commerce, Digital Remittances. While fintech lending is proxied by the transaction value of the combination of fintech lending services, namely marketplace lending (consumer) and crowdlending (business). Thus, the function in research can be interpreted as follows:

$$GDP = f\,(fintech\ payment, fintech\ lending) \quad [1]$$

From equation (1) a regression equation can be formed for this research model, which is as follows:

$$\ln GDP_{it} = \alpha + \beta_1 \ln\_PAY_{it} + \beta_2 \ln\ \_LEND_{it} + \varepsilon_{it} \quad [2]$$

Description: gross domestic product (GDP) as the dependent variable, β is the coefficient of the independent variable, ln_PAY is the total transaction value of fintech payment, ln_LEND is the transaction value of fintech lending, i is cross section while t is time series, and ε is the standard error.

Table 1. Variable Operational Definition

Variable	Variable Description	Formula/Unit	Data Sources
Economic Growth (GDP)	The total value of goods and services produced in a country over a period of time	Current USD	World Bank
Fintech Payment (pay)	Total transaction value of fintech services: Mobile POS Payment, Digital Commerce, Digital Remittances.	Transaction value of Mobile POS Payment + Digital Commerce + Digital Remittances (USD)	Statista
Fintech Lending (lend)	Total transaction value of fintech services: Marketplace Lending (consumer loan services) and Crowdlending (loan services for businesses).	Transaction value of Marketplace Lending + Crowdlending services (USD)	Statista

Source: author compilation.

RESULTS AND DISCUSSION

Development Trends of Fintech Payment in Developing Countries

Of the various fintech services, fintech payment is the most crucial service because it is able to quickly acquire customers at a lower cost and is one of the fastest moving services in terms of innovation and adoption of new payment capabilities (Lee & Shin, 2018). The fintech payment sector involves three main services, namely Mobile POS Payment, Digital Commerce, and Digital Remittances. This service enhances the experience of customers who are looking for efficient payment experience in terms of speed, convenience, and multi-channel accessibility. Especially in developing countries, the technological innovation presented in this service is able to enable financial delivery to groups of people who do not have a bank account and are at the bottom (Hidayat et al., 2025). The most important objective of this fintech payment service is to increase transaction efficiency and in turn be able to encourage consumption and investment activities and encourage economic growth.

As social restrictions tightened globally in 2020, digital financial services increased significantly. The uncertainty created by the pandemic affected many people and businesses. Fintech is able to stimulate it all to present digital payment innovations as an alternative to financial transactions (Beaunoyer et al., 2020). Thailand, the Philippines, and Vietnam are also attracting attention by experiencing an increasing trend in transaction value on the highest fintech payment services in 2022 even though they are not on par with previous countries. This comes as regulators in those countries have launched reform programs to increase competition in the financial sector, implement large-scale digital payment infrastructure, and foster a supportive regulatory environment (Jahan et al., 2019).

Figure 1 shows the value of transactions in fintech payment services from 2017 to 2022. From the developing countries studied, each country shows an increasing trend in fintech payment service transactions every year, including China, India, Brazil and Indonesia. China is showing a significant increase in fintech payment. China has become the country with the highest fintech adoption rate in the world, one of whose services focuses on mobile payments and transfers at 95% (Ernst & Young, 2019). Governments that has established a new regulatory body to regulate and supervise the fintech sector called the Payment and Clearing Association of China and issued policy rules related to simplifying the licensing process for new fintech companies.

Following China, India is the second highest. India's large population and initially cash-dependent economy are responding positively to fintech

opportunities, particularly fueled by the growth of e-commerce and the adoption of digital money transfers. The use of technologies like artificial intelligence (AI) has improved the security and efficiency of digital payments in India. These include better fraud detection in high-risk transactions and an improved peer-to-peer payment platform (Jakhiya et al., 2020).

The fintech payment sector in Brazil has increased significantly. Remittance-based fintech payment services in Brazil have grown rapidly thanks to increased financial inclusion, the growth of a strong fintech ecosystem, the adoption of blockchain technology, high public acceptance of fintech, and progressive regulatory support. This has resulted in a significant increase in the value of fintech payment transactions, strengthening fintech's role in facilitating remittances and increasing financial inclusion in Brazil (Emara & Zhang, 2021)

Indonesia has seen a significant increase in fintech payments. The local Central Bank and the government strongly support the involvement of this sector in Indonesia (Aris et al., 2025). Policy to strengthen the digital economy, strengthen monetary policy, and Bank Indonesia to issue payment systems in the form of QRIS, SNAP and BI-FAST that can encourage the development of digital payment transformation (Batunanggar, 2019). Although the financial literacy index has reached a fairly high level, there are still challenges, including the number of unlicensed financial institutions that are still used by the public (Hidayat & Shodrokova, 2025).

The Philippines, Vietnam, and Nigeria showed an upward but not significant trend in the development of fintech payments. In the Philippines, fintech payment services face several challenges that limit the growth of their transaction value. One major factor is the still high dependence of Philippines on traditional financial institutions for their financial access. Unclear and consistent regulations are also a challenge to the growth of fintech payments in the Philippines. Although the number of fintechs is increasing, according to Findexable, the existence of undefined regulations can complicate the operation and growth of the fintech industry (Quimba et al., 2021).

Although Vietnam has great potential for fintech growth, its transaction value is still relatively low due to several factors. The lack of financial awareness and education among the public, along with challenges related to regulatory clarity and the hesitancy of fintech companies to invest heavily, are major barriers. In addition, the small ratio of transactions and active clients, as well as the young fintech market, also influenced the growth of fintech transaction value in Vietnam (Tam & Hanh, 2018).

Nigeria has the lowest value of fintech service transactions, due to consumers' understanding of payment technology in the country is still low compared to other countries (Samuel et al., 2023). Nigeria has the potential to establish itself as one of the largest fintech markets in the world. However, Nigeria does not have a comprehensive legal framework for fintech regulation, and existing fintech laws are insufficient to support the progress and needs of the fintech industry (Ojo & Nwaokike, 2018).

Development Trends of Fintech Lending in Developing Countries

Fintech lending has been known to create innovations in lending services by connecting borrowers directly through online platforms (Agarwal & Zhang, 2020). The distribution of funds and capital in fintech lending is divided into two types of services, namely marketplace lending and crowdlending. Fintech lending is considered one of the financial services that uses online-based platforms that provide money lending services to make it easier for people to access them (Vasenska et al., 2021). The difficulty of accessing banking loans has become a common problem in every country especially in most countries whose economies are developing.

Based on Figure 2, in 2020, developing countries such as Thailand, the Philippines, Vietnam, India, Brazil and Nigeria had experienced a downward trend. The COVID-19 pandemic has made economic conditions face serious challenges in all sectors, one of which is fintech lending, which makes users who default due to declining business activities and people's incomes decline, especially in developing countries (Damilola et al., 2020).

China shows the highest upward trend in fintech services. The significant encrease in the value of fintech transactions in China reflects its large scale and the active participation of more consumers who previously lacked access to traditional banking services. This phenomenon has been a major driver for the growth of the P2P (Peer-to-Peer) sector in the industry, which was initially uncontrolled and experiencing challenges, but is now beginning to show significant development (Chen et al., 2020). However, China's 2018 established a relatively complete regulatory regime for online lending, including restrictions on the business models platforms can adopt, registration and custodial requirements, and loan restrictions. The new regime has resulted in a market overhaul and collaboration between online lending platforms and traditional banks (Huang, 2018).

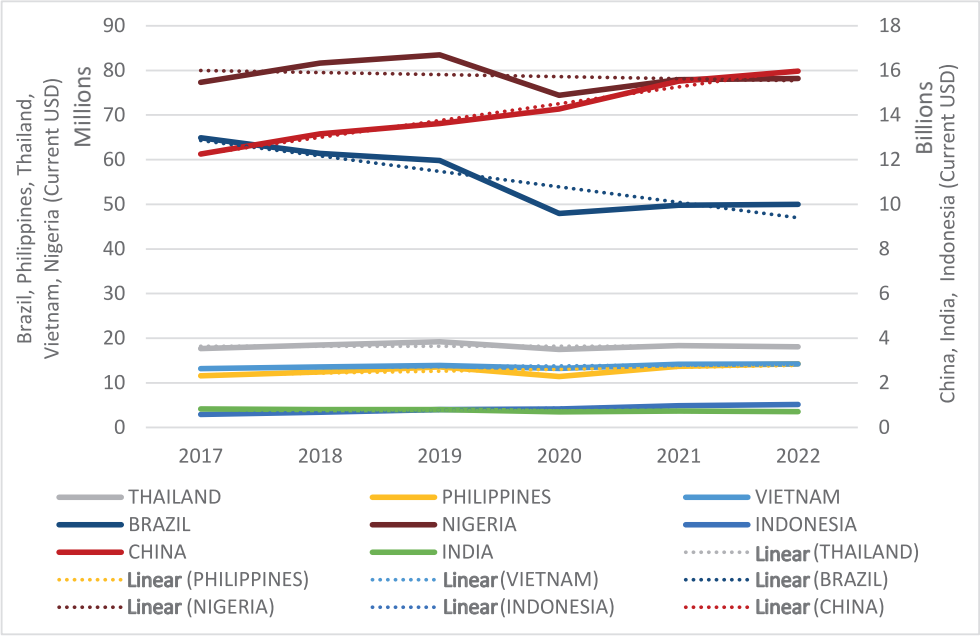

Figure 2. Total Transaction Value of Fintech Lending Services in Developing Countries

Source: Statista, data processed (2024)

The growth of fintech lending in Indonesia shows an increasing trend. When the COVID-19 pandemic worsened banking conditions in Indonesia, fintech actually provided alternative credit stimulus for the public and MSMEs. The government of Indonesia through OJK and Bank Indonesia has created a regulatory framework related to the fintech sector related to the policy of limiting the maximum interest rate, strengthening consumer protection and cooperation between fintech, banks and the digital economy so that fintech innovation for the community and MSMEs becomes the main force driving economic development (Butar et al., 2022).

India also shows the highest fintech lending after China and Indonesia. According to The Securities and Exchange Board of India (SEBI), only reaccredited investors are allowed to participate in crowfunding to avoid systemic risks in the economy (Sarkar, 2016). India is becoming a major hub in fintech lending, particularly in marketplace lending and crowdfunding, thanks to a surge in venture capital investment. Between 2015 and 2018, fintech startup funding soared. Significant demand in India's MSME sector, driving the growth of fintech lending in India. The potential of the digital finance market in India is sparking huge interest from

fintech investors and entrepreneurs (Sachdev et al., 2021).

Brazil and Nigeria show a downward trend in fintech lending. One of the main challenges is the complex and uncertain regulatory issues, which make the licensing and licensing process for fintech operations complicated and slow. In addition, the low level of financial inclusion among Brazilians is also a hindering factor. Limited technological infrastructure and political uncertainty also contribute to this challenge. In addition, concerns related to data security and privacy are also obstacles in adopting fintech solutions in Brazil (Claessens et al., 2018). Nigeria has a fairly high rate in fintech lending due to increased innovation in the financial sector, especially with the emergence of various crowdfunding platforms as financing alternatives. However, despite its great potential, the fintech lending movement in Nigeria tends to decline. One of the challenges faced is regulatory uncertainty and the lack of laws and regulations governing the operation and implementation of financing for MSME activities. The Securities and Exchange Commission (SEC) does not provide regulatory support for crowdfunding due to provisions stipulated in the Companies and Societies Act (CAMA) of 1990. In addition, there are other challenges such as the absence of a complete crowdfunding database, as well as the lack of financial support for MSMEs. Although there are several local crowdfunding platforms in Nigeria, such as Naturfund, Imeela, Donate-ng, and Funmilowo, there is no clear evidence of financing for MSMEs.

Vietnam and Thailand showed a flat trend. Thailand's challenges in fintech lending are related to strict regulation by the SEC that only allows equity-based crowdfunding. Despite several initiatives from the National Innovation Agency (NIA) and commercial banks, including incubator programs and crowdfunding platforms backed by the country's largest mobile phone operators, the industry's growth has been hampered by the need for an active secondary market. The development of an efficient secondary market requires high time and operational costs, and is currently a challenge for the Thai government (Wonglimpiyarat, 2018). Vietnam faces challenges in fintech lending that require government protection for growing fintech companies, but safeguards too early can weaken startups. SBV's Fintech Steering Committee focuses on building innovative payment solutions, blockchain, peer-to-peer lending, open API, and eID/e-KYC. SBV pledged to update regulations to encourage fintech and tackle money laundering and will test new regulations for unregulated fintech activities (Dang & Vu, 2020).

Development Trends of Economic Growth in Developing Countries

Economic growth refers to the process by which an economy

develops or changes over time by considering the dynamic aspects of the economy, not just the economic picture at a particular point in time. Most of the developing countries studied showed a downward trend in 2020 such as Indonesia, Thailand, the Philippines, India, Brazil, Nigeria (Figure 3). On the other hand, China and Vietnam with strong economies show that the country's GDP value is still growing amid the COVID-19 pandemic. Vietnam ranked first in the fight against COVID-19. Vietnam as one of the Asian countries that has managed to maintain the positive dynamics of its economy amid the global pandemic with the country's government that has pushed digital transformation is the only way to reduce the economic development gap in the country (Guzikova et al. 2020).

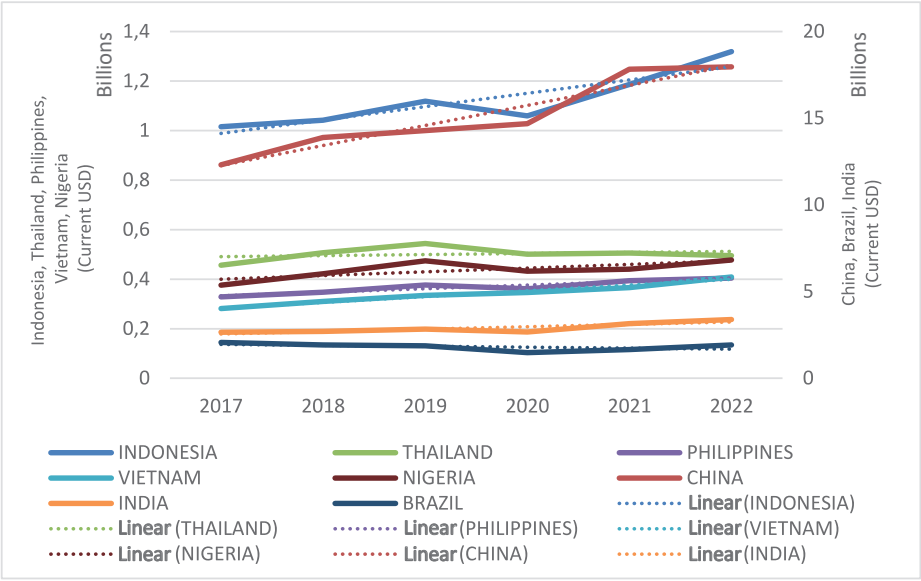

Figure 3. Value of Gross Domestic Product (GDP) in Developing Countries

Source: Statista, data processed (2024)

China, Brazil, India, and Indonesia have higher GDPs compared to other developing countries studied, such as Thailand, Vietnam, and Nigeria. The four countries' membership in the BRICS group strengthens their position in the global economy. The BRICS group has a significant contribution to world GDP, with a total contribution of more than a quarter of the world's total GDP. For example, in 2020, the contribution of BRICS to world GDP was around 27% (Khan, 2020). Membership in the BRICS demonstrates the impor-

tance and economic influence of these countries on a global scale, and strengthens their position in the formation of global economic policy.

China, India, and Indonesia are the three countries with the largest populations in the world. A large population size can intrinsically increase GDP due to more labor and consumers. Such countries have experienced significant economic growth in recent decades. China has become a global manufacturing hub and the world's second-largest economy (Li, 2018). India has a thriving service sector and a strong information technology industry. India's rapidly growing services market offers significant potential for foreign investors (Erumban & Das, 2016). Brazil has rich natural resources and a large agricultural sector, while Indonesia has an important manufacturing sector (Fulquet & Pelfini, 2015). Such countries also receive substantial foreign investment, both in the form of direct and portfolio investment.

However, Thailand, Vietnam, and Nigeria show lower GDPs, signaling different levels of economic development. This lower GDP can affect the role and influence of these countries' economies on a global scale as well as in the formation of global economic policies. Therefore, while China, Brazil, India, and Indonesia are key players in the global economy through their membership in the BRICS, Thailand, Vietnam, and Nigeria have their own challenges in improving their economic positions in the global economy.

Descriptive Statistics

The descriptive statistics in Table 2 illustrate the main specifications of each variable, such as mean, median, maximum and minimum values, and spread measures such as standard deviation.

Table 2. Descriptive Statistics

	GDP	Fintech Payment	Fintech Lending
Mean	27.54748	24.21817	18.74461
Median	26.88858	23.51883	18.08100
Maximum	30.51934	28.83609	23.49388
Minimum	26.36288	22.15597	16.25000
Std. Dev.	1.274499	1.819587	2.356823
Skewness	1.267620	1.463225	0.734414
Kurtosis	3.279055	4.087922	2.345183
Jarque-Bera	13.01064	19.49537	5.172486
Probability	0.001495	0.000058	0.075302
Sum	1322.279	1162.472	899.7414
Sum Sq. Dev.	76.34432	155.6122	261.0669
Observations	48	48	48

Source: EViews, data processed (2024)

The results of skewness and kurtosis were used to show the asymmetry and steepness of the data distribution. From the results of the Jarque-Bera test, it is interpreted that the data shows normality. The mean and median of the economic growth data are 27.54748 and 26.88858, respectively, which illustrates that the data shows a relatively symmetrical distribution. In addition, the range of values from the minimum

fintech payment 22.15597 to the maximum is relatively symmetrical which is 28.83609 and illustrates significant data. The fintech lending variable with a mean of 18.74461 and a median of 18.08100 which is relatively close shows a symmetrical distribution, the minimum value range of 16.25000 to a maximum of 23.49388 which is not too far indicates a symmetrical distribution in fintech lending data.

Stationery and Cointegration Test

The stationery test in this study used two approaches, namely Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP). The test results showed that fintech lending and fintech payment were not stationary at the level level, but became stationary after the first differentiation. These findings indicate that these variables are integrated of order one or I(1), which is a general requirement for continuing the cointegration test.

Table 3. Unit Root Test

Variable	Augmented Dickey-Fuller		Philips-Perron	
	Level	1st difference	Level	1st difference
ln_pay	16.6747	59.5912***	19.0222*	96.6892***
ln_lend	5.95923	39.9678***	3.55616	44.7257***
Pedroni Residual Cointegration Test				
		Statistics		Prob
Group rho-Statistic		-1.556596		0.9402
Group PP-Statistic		1.595077		0.9447
Group ADF-Statistic		-2.548475		0.0054

Notes: ***,**, and *, illustrate statistical significance at the level of 1%, 5%, 10%.

Source: Eviews Output (2025).

Regression Results

To determine the best panel data regression method, two tests must first be carried out: the Chow test and the Hausman test. The results of the Chow and Hausman tests show that the Fixed Effect Model is the best model, so this method is used in this study.

Table 4. Fixed Effect Model Estimation Results

Variable	Coefficient	t-Statistics	Probability
Constant	17.80209	17.08605	0.0000***
ln_pay	0.128942	9.542897	0.0000***
ln_lend	0.353310	5.631794	0.0000***
	FPAYMENT	FLENDING	
Multicollinearity test			
FPAYMENT	1.000000	0.858793	
FLENDING	0.858793	1.000000	
R-squared		0.998098	
Prob(F-statistic)		0.0000***	
Chow Test		0.0000***	
Haustman Test		0.0013***	
Normality Test		0.7879	
Cross Section Effect (individual constant)			
Indonesian		-0.430273	
China		0.615655	
Thailand		0.219110	
Philippines		0.009181	
Vietnam		-0.040829	
India		0.422487	
Brazil		-0.428804	
Nigeria		-0.366527	

Note: *, **, and *** indicate at significance levels of 10%, 5% and 1%

Source: EViews, data processed (2024)

The results of testing the estimation model using the Fixed Effect Model (FEM) are as follows:

$$\ln GDP_{it} = 17.80209 + 0.1289 \ln\_PAY_{it} + 0.3533 \ln\_LEND_{it} + \varepsilon_{it} \quad [4]$$

Based on Table 4, the constant magnitude of economic growth is 17,802. The fintech payment variable has a coefficient of 0.1289, so economic growth will increase by 0.12%. While the fintech lending variable which has a coefficient of 0.3533, then GDP will increase by 0.35 percent. Based on the R-square result of 0.998, it shows that the independent variable has an effect of 99.8 on economic growth, the rest is influenced by other variables outside the model. Based on the results of the individual constanta, several countries have negative intercept values such as Indonesia, Vietnam, Brazil and Nigeria. Meanwhile, several countries showed positive intercept values, including China, Thailand, the Philippines, and India 0.422487. This indicates that when the independent variable is at the lowest or constant level, the value of economic growth will increase.

Discussion

The Effect of Fintech Payment on Economic Growth in Developing Countries

The results show that fintech payments have a positive and significant influence on economic growth. From a theoretical point of view, Endogenous Growth Theory by Romer (1997) it has been stressed that long-term economic growth depends in part on technological advances. Technology, in this case fintech, has been able to accelerate and reduce transaction costs, increase people's accessibility to financial services and encourage good productivity. Fintech can increase output in encouraging economic growth. These results provide empirical support to the assumptions or hypotheses underlying the study, which confirms that fintech payments have a real impact in supporting economic growth in developing countries. These results are in line with the results of the study Parvez et al. (2023), Song and Appiah-Otoo, (2022) and Loukil and Kammoun, (2020). Increased accessibility and efficiency of financial services have a significant impact on a country's economy. As economic transactions become more practical, efficient, and accessible, consumption and investment grow. This positive impact triggers an increase in aggregate demand, which reflects the total demand for goods and services within a country. As aggregate demand increases, so does a country's national income.

Fintech payments offer practical benefits, such as reducing the risks associated with cash transfers, and have a broader impact on improving payment security and transparency. In addition, with lower costs, fintech payments play an important role for individuals and businesses to enter the formal financial system (Malady & Buckley,

2014). In developing countries, fintech plays a key role in generating profits and driving broader financial inclusion. This creates a more inclusive financial system where financial products and services can meet the needs of individuals and businesses at all income levels. The government's stimulus response triggered by the COVID-19 pandemic and lockdowns has accelerated the adoption of fintech payments globally (Muganyi et al., 2022). There is a significant upward trend in the use of fintech payment services in developing countries. China as one of the leading fintech centers in Asia, is a prime example in developing countries. Concrete steps have been taken by the Chinese government to regulate this fintech sector through the establishment of the Payment and Clearing Association of China and the issuance of policy rules supporting simplification of the licensing process for new fintech companies (Zhou et al., 2018).

The development of fintech has been a significant catalyst in changing the Indian economic landscape. This phenomenon is not only reflected in the increasing number of fintech startups in India, but also in the huge investments that continue to flow into the sector, in line with the global trend in the transformative role of digital technology in reinventing the financial ecosystem (Baporikar, 2021). On the other hand, fintech payments in Brazil have grown rapidly thanks to factors such as ease of use, technological innovation, and cooperation between fintech companies. Nonetheless, challenges such as uncertain regulation, the need for large investments, difficulty finding partners, and conflicts of interest with major financial market players remain obstacles (Braido et al., 2021). Meanwhile, the rapid growth of digital remittances services in Indonesia has contributed to the increase in fintech payments. Increasing internet penetration and mobile device penetration expand public access to fintech services, including digital money transfer services. With the high number of migrant workers, especially in East Asian and Middle Eastern countries, the demand for digital remittance services is growing (Ilinitchi, 2020).

Although the Philippines, Thailand, and Vietnam have low fintech lending transaction values, they show an increase. There are policies in each country that support the development of the sector. In the Philippines, policies such as the National Strategy for Financial Inclusion have been implemented to facilitate fintech operations and improve access to financial services (Llanto & Rosellon, 2017). Meanwhile, Thailand has launched clear and flexible regulation through cooperation between the Central Bank and the Financial Sector Authority (Morgan & Huang, 2021). In Vietnam, the establishment of a regulatory sandbox and investment in digital infrastructure are part of the government's efforts to support fintech growth (Nathan et al., 2022).

The Effect of Fintech Lending on Economic Growth in Developing Countries

Fintech lending has a positive and significant influence on economic growth. This finding illustrates that the increase in alternative lending in fintech lending services has an increasing impact on economic growth in developing countries. The increase in fintech lending services has become a reflection of the sector's ability to provide targeted alternative credit access to communities and MSMEs that were previously underserved by traditional financial institutions. This improves the standard of living and productivity of individuals and businesses, stimulating consumption and investment growth in the sector. This, in turn, results in increased aggregate demand and national income. This indicates the vital role of fintech lending in reducing financial inequality, promoting inclusive economic growth, and accelerating overall socioeconomic development. Thus, the implementation of fintech lending is not only about financial innovation, but also about strengthening the foundation of an inclusive and sustainable economy. This aligns with the findings of Cornelli et al. (2019).

In developing countries, fintech can help lenders by reducing credit risk associated with anticipating information asymmetry and lack of collateral, as well as reducing the cost and time required to collect data and assess borrowers (Larios-Hernández, 2017). The rapid rise of fintech lending in developing countries is based on the demand for new financial services, as most financial markets in developing countries are at the formation stage (Sanga & Aziakpono, 2023). According to Xiang et al. (2021) alternative financing schemes such as crowdlending and marketplace lending are another step to bridge the SME financial gap with debt and equity financing. MSMEs in developing countries are considered as social and economic development. This is consistent with Schumpeter's (1934) theory, which emphasizes the importance of innovation, such as fintech lending technology and efforts to boost productivity.

In 2020, the fintech sector experienced a decline, the COVID-19 pandemic has made economic conditions face serious challenges in all sectors, one of which is fintech lending, caused by some users who have defaulted due to declining business activities and declining revenue. On the other hand, however, fintech lending has a positive impact; according to Fu and Mishra (2022), the COVID-19 pandemic has helped close gaps higher in developing countries than in developed countries. During the COVID-19 period, many borrowers were limited in access to credit and thus unable to enter the traditional financial lending market, and opted for alternative loans (De Roure et al., 2016). Of all the countries studied highlighting the development of the fintech sector, most

notably China, due to repressive financial laws and policies in China, financial institutions cannot operate optimally. In addition, because state-owned banks (SOEs) control the financial sector, they have an unfair preference in lending to SOEs and large private companies. As a result, SMEs do not get adequate services. This pushed the P2P industry, which had been uncontrolled for some time, to develop and develop more (Chen et al., 2020).

Many developing countries in Southeast Asia face limited access to bank loans and credit, so fintech for MSMEs is growing rapidly. An uneven financial system and large rural population hinder financial inclusion, contributing to low productivity, poverty, and unemployment. Therefore, with the provision of fintech lending loans, MSMEs in several countries are able to support growth for long-term development, support income equality, job creation and poverty reduction and national export growth (Anisa 2021).

The development of Fintech is very rapid in Indonesia, especially Fintech peer-to-peer loan which is one of the most developed (Safitri, 2020). One of the government policies is the provision of licenses and regulations that support Fintech companies. With an official license from the competent authority, Fintech companies can operate legally and reliably, thereby increasing public trust in their services. Meanwhile, efforts to increase fintech penetration and growth in Brazil involves collaboration between local platforms and the government to support MSMEs with the provision of government loans. The Brazilian government also uses the Caixa Tem app to distribute subsidies to informal workers, which results in increased financial activity within the app rather than cash withdrawals (Smeets & Zeisberger, 2020).

In 2018, the Reserve Bank of India (RBI) published a report by the Inter-Regulatory Working Group on FinTech and Digital Banking in India. The report studied the spread of fintech in India and identified new regulatory considerations that may arise from its expansion. The report recommends a deeper understanding of fintech deployment and its interaction with the existing financial sector. The RBI is even experimenting with new regulatory tools such as the regulatory sandbox (Chugh, 2019). Vietnam's fintech market, especially in P2P lending, is experiencing rapid growth and attracting investors. Many fintech companies have emerged, although most are still on a small scale. Investor interest is fueled by high demand for loans, supported by a large population and high internet penetration in Vietnam (Quang et al., 2022). Fintech lending in Thailand is driven by the government's efforts in realizing the vision of Thailand 4.0, which focuses on economic growth driven by innovation and added value. The Thailand government has a significant role to play in establishing

crowdfunding platforms to provide financial support to startups, in line with the national innovation system approach (Wonglimpiyarat, 2017). Despite the growing popularity of online loans, the P2P lending industry in China did not experience significant growth in 2022. This is due to the Chinese government's imposition of stricter regulations in response to problems arising in the industry. The new regulations include restrictions on allowed business models, stricter registration requirements, custodial arrangements to protect the safety of investor funds, more transparent disclosure of information to borrowers and investors, as well as limits on the number of loans that P2P lending platforms can provide (Huang, 2018). Nigeria has seen a significant increase in Fintech innovation and adoption, with a large number of startups raising huge funds in 2018. However, the lack of a comprehensive legal framework for Fintech regulation has been a challenge for the growth of this industry (Anichebe, 2019).

CONCLUSIONS

Fintech payments are positively correlated and significantly influence economic growth. Advances in digital payment technology, money transfers and digital spending have been able to become facilitators of economic activity, building a country's level of consumption and investment — especially in developing countries — and encouraging economic growth. Fintech loans have proven to contribute positively to economic growth, by providing an important source of capital for communities and MSMEs in developing countries. This increases living standards, business productivity, as well as consumption and investment, which in turn boosts GDP per capita.

China dominates the fintech sector. The Chinese government established a regulatory body to oversee the fintech sector and issue policy rules that simplify the licensing process for new fintech companies. India ranks second in fintech due to its large population, particularly the unbanked, and the high demand for financial services. Third is Brazil, where financial institutions have partnered with banking and financial web services. Several other developing countries in Southeast Asia have also experienced significant development, especially Indonesia with a large population followed by a high financial inclusion drive, regulators such as Bank Indonesia and The Financial Services Authority (OJK) who are proactive in supporting the development of fintech. Several other countries such as Thailand, the Philippines, Vietnam also experienced significant development but not as high as previous countries because n this country the financial system is not fully developed. In Nigeria, real financial innovations include the development of fintech and digital payment platforms, P2P lending, the use of blockchain, the digitization of financial products such as microinsur-

ance, and e-wallets to support MSMEs. The initiative aims to expand access to financial services, increase inclusion, and support economic growth.

It is important for governments in developing countries to strengthen and develop regulations governing fintech, protect consumer data, and minimize the risk of financial instability through bad loans that can hamper economic growth in a country. Strong regulation can increase consumer confidence and attract foreign investment in this sector, and the government needs to encourage financial inclusion and the government can allocate budget to support digital infrastructure that supports the growth of these two fintech sectors which in turn is able to support economic growth in developing countries in the long term. On the other hand, governments in developing countries are able to ensure that barriers to entry for fintech service companies can be minimized.

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DECLARATION OF AI USE

We hereby declare that AI, specifically ChatGPT, was used in a limited capacity during the preparation and revision of this manuscript. Its contribution was primarily for language refinement and formatting. The authors have thoroughly reviewed and approved all content generated with AI assistance and confirmed that its role was minimal in the overall research process.

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