

The relationship of digital payments, macroeconomic variables, and banking stability in developing Asia

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Abstract. *This study examines the relationship between digital payments and macroeconomic variables on banking stability in Asian countries. This research uses data sourced from the International Monetary Fund (IMF) and the World Bank with the period 2011 to 2021. This study used panel data regression analysis techniques in the form of Fixed Effect Model. The results showed a positive and significant relationship between digital payment variables, economic growth, inflation and banking stability. The negative correlation between exchange rates and banking stability highlights the potential adverse effects of currency exchange rate fluctuations.*

Keywords: digital payments, banking stability, panel data.

JEL Classification: B26, C23, E42, N25.

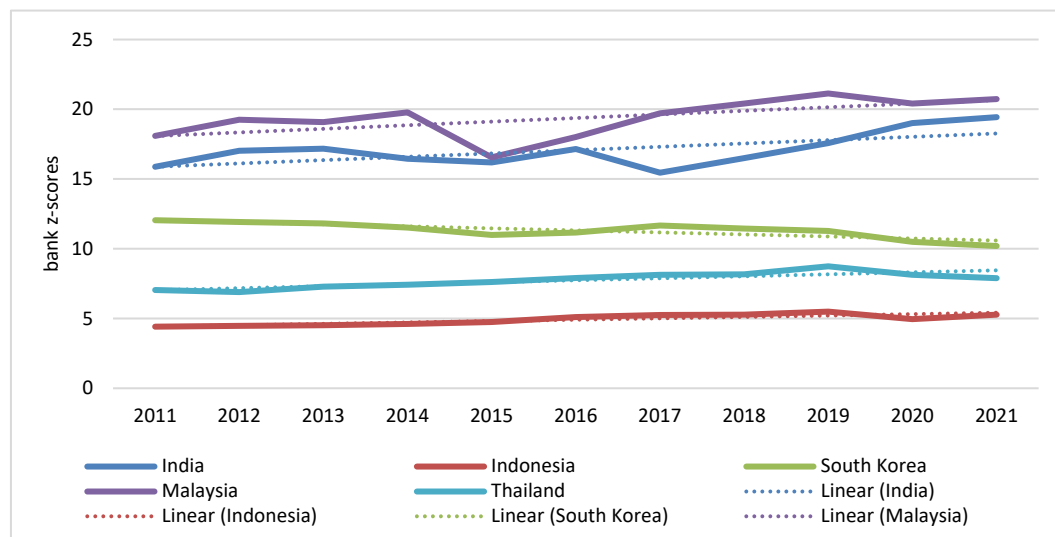
1. Introduction

The stability of the banking sector has a significant impact on the economic stability of a country Sun et al., (2022). The concept of banking stability relates to the circumstances in which financial institutions, particularly banks are able to operate effectively and safely (Ozili, 2018). Financial stability within a bank assesses its capacity to meet financial obligations and maintain banking soundness. This assessment requires an examination of sufficient capitalization, asset quality, liquidity levels, and effectiveness of risk management practices.

The importance of emerging market countries in the global financial landscape has increased in recent decades. These countries have experienced substantial economic growth and have progressively engaged in international investment and trade (Hanif et al., 2019). Emerging market countries are also highly vulnerable to fluctuations, especially in responding negatively to COVID-19 turmoil. Financial institutions, especially banks, tend to be more vulnerable to shocks in the international and national economic systems. For example, during COVID-19, almost all banks in the world face the risk of credit default and decreased performance due to social restrictions and the closure of businesses and micro-enterprises.

Banking stability can be proxied using a bank z-score that provides an overview of a country's banking system. A high bank z-score indicates a resilient and effective banking system. A high bank z-score serves as a confidence-building factor for domestic and international investors, encouraging investment in the host country's banking system. Investors tend to experience greater certainty and security when the banking system is stable and well protected (Vives, 2019).

Figure 1 reveals varying bank z-score variations in the emerging markets studied. From 2011 to 2021, there was a significant upward trend in India and Malaysia, indicating an increase in the financial stability of their banks. This shows that financial institutions in both countries have the capacity to fulfill monetary responsibilities, maintain fiscal prosperity, and are adept at handling risks. In contrast, South Korea showed a decline. The importance of innovation and technological advances in influencing the stability of the banking sector is considerable (Darehshiri et al., 2022). Significantly, a remarkable change in technological advancements is the increasing prevalence of digital payments in many countries, especially increasing since the advent of the Covid-19 pandemic. For example, in India, 33 percent of the population showed an increased frequency of digital payment usage compared to the pre-pandemic period (Statista, 2023). Indonesia experienced a substantial increase in digital payment adoption from 2018 to 2019 (Bank Indonesia, 2020). This trend underscores the shift in consumer transaction behavior towards a more digital orientation, highlighting the increasing role of digital payments in addressing contemporary challenges and demands.

Figure 1. Banking Stability in Five Emerging Market Countries

Source: International Monetary Fund (IMF), 2023.

Macroeconomics plays an important role as a factor influencing the stability of the banking sector (Rupeika-Apoga et al., 2018). The high rate of economic growth has stimulated conditions conducive to banking stability. Strong economic growth signifies an increase in overall economic activity, leading to an increase in income by the people. As a result, it benefits an individual's capacity to meet financial commitments, including repayment of loans to banks. In addition, the role of inflation in shaping banking stability needs to be considered for examination. High inflation rates can reduce an individual's purchasing power and increase credit risk to be non-problematic. If the value of money continues to decline, banks face difficulties in recovering borrowers' financial commitments. In addition, exchange rate fluctuations appear as another important factor affecting banking stability, especially in countries that rely heavily on international trade. Variations in currency exchange rates can affect a bank's asset quality, its foreign exchange liabilities, and the level of liquidity risk. Currency exchange rate instability has the potential to cause financial losses for banks and increase overall systemic risk.

Many empirical investigations corroborate the rationale for the purpose of this study. According to Riisman et al., (2021), the introduction of digital finance has an impact on financial stability. Research conducted by Kwaku et al., (2021) reveals a positive correlation between variable GDP and interest rates with banking stability. Instead Seirgeieiva (2022) presents different results, showing a negative relationship between inflation and banking stability. The novelty of this research lies in the sample studied, namely Emerging countries in Asia, where it is still minimally studied. In addition, this study used a Fixed Effect Model that allows individual cross section effects between countries.

The study is outlined as follows. Part 2 reviews literature. Part 3 explores data and methodology. Movement variables, empirical results and discussion are reported in Section 4. Section 5 presents conclusions and policy implications for emerging markets.

2. Literature review

Crises in the financial system and the factors affecting them occur due to complex fluctuations in the monetary system. Mishkin (1999) elaborates that instability in the financial situation arises due to the inability to raise the funds needed for investment purposes. Wen & Yu (2013) Highlighting that the performance and stability of the bank depends heavily on the knowledge and technology it has.

Two common indicators used as proxies to measure banking stability are Non-performing Loans (NPLs) as a percentage of non-performing loans, and bank z-scores. Previous research using bank z-scores has been researched by Kim et al., (2020) and Syed et al., (2021). The high NPL ratio indicates bank instability due to increased default risk. In various literatures, bank z-scores are often used as a neutral indicator of bank risk (Banna et al., 2021), reflecting the potential failure of the bank. Bank z-scores characterize the strength of the banking system in terms of returns and capitalization, describe its ability to withstand fluctuations in returns and indicate the level of volatility at which profits can decline before a bank faces bankruptcy (Klapper & Lusardi, 2019). Larger bank z-scores indicate a reduced likelihood of bankruptcy.

In evaluating bank stability, more research uses a commonly used indicator, namely bank z-scores (Ahmed et al., 2023, Chiaramonte et al., 2015, Kabir & Worthington, 2017). Bank z-scores are measured at the bank level, making them more suitable for the purposes of this study. This parameter measures the degree of deviation from a potential bank failure by using accounting indicators to calculate the distance from the default conditions. The greater the deviation of bank z-scores, the more stable the bank's position. This assessment is based on a comparison of the sum of the bank's equity and profitability ratios against the bank's profitability standard deviation. The underlying assumption of this method is that the bank will default if its capital reaches zero.

3. Data and methods

This study examines the influence of digital payments and macroeconomic variables on banking stability in five Asian countries, namely India, Indonesia, Korea, Malaysia, and Thailand. This study used secondary data types sourced from the World Bank and the International Monetary Fund (IMF) with an annual period from 2011 to 2021. This study used descriptive statistical analysis and regression panel data, using Fixed Effects Model (FEM). By integrating fixed effects on each individual or group, FEM provides more effective control over individual effects that could potentially affect the dependent variable (Carnahan et al., 2014). The data regression model of this research panel is represented by the following equation:

$$BZS = \beta_0 + \beta_1DPI_{it} + \beta_2INF_{it} + \beta_3GDP_{it} + \beta_4EXR_{it} + e_{it} \quad (1)$$

In equation (1), BZS is bank z-scores, DPI is Digital Payment, INF is inflation, GDP is a proxy for economic growth, EXR is the exchange rate, i is cross section, t is time series, and e is error term.

Table 1. Operational Variables

Variable	Definition	Formula/ Measurement	Source
Z-score bank (BZS)	A tool used to measure a bank's financial health. It provides an overview of bank bankruptcy risk and financial stability.	Score	World Bank
Digital Payments (DPI)	The proportion of the value of banking transactions conducted through mobile banking services and the internet in a given period as a percentage of a country's GDP.	Mobile and Internet Banking Transaction Value (% of GDP)	International Monetary Fund (IMF)
Inflation (INF)	An economic metric that measures fluctuations in the average cost of goods and services used by households in a country over a period of time.	Inflation, Consumer Prices (%)	World Bank
Gross Domestic Product (GDP)	A metric that characterizes changes in the overall value of commodities and services produced by a country over a period of time.	GDP Growth (%) Yearly	World Bank
Exchange Rate (EXR)	A metric that evaluates the value of a country's currency in units of local currency per USD one over a specific duration.	Official exchange rate (LCU per US\$, period average)	World Bank

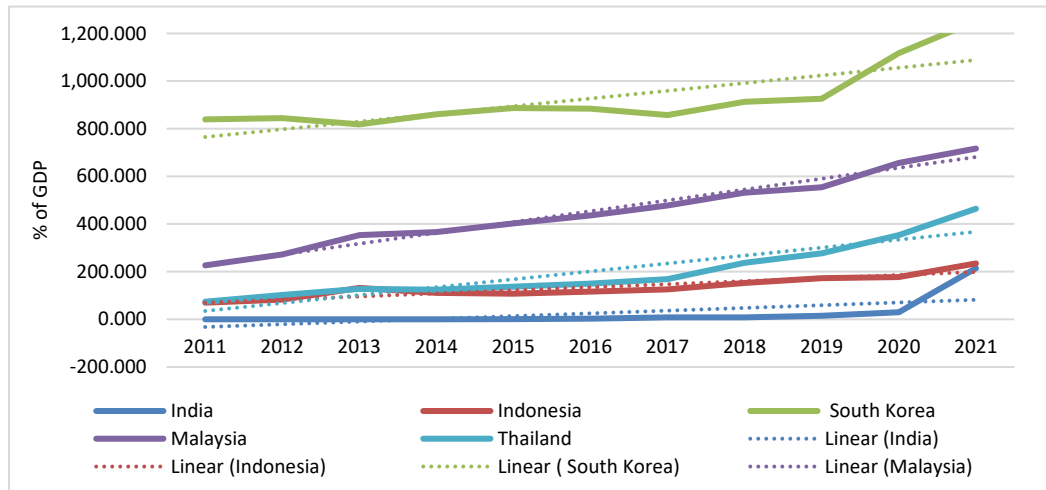
Source: Author Compilation (2024).

4. Results and discussion

4.1. Digital Payment Variable Trends

The utilization of digital payments has seen a significant surge in emerging markets in recent years. Figure 2 shows that South Korea shows the highest level of digital payment usage. South Korea has a highly sophisticated technological infrastructure on a global scale, characterized by fast internet speeds, extensive telecommunications networks, widespread use of smartphones and speed in technology. This creates a favorable environment for widespread acceptance and utilization of digital payment methods. This technology landscape facilitates fast and convenient online transactions as well as mobile banking. South Korea has embraced a strong cashless culture, with its residents showing a preference for electronic payments over the use of cash. This trend is due to the convenience, speed, and security provided by digital payment systems (Gorshkov, 2021).

In contrast, India shows a relatively low level of digital payment usage (Chawla and Joshi, 2019). Despite its sizeable population, India faces bottlenecks in its technological infrastructure. Challenges such as limited internet availability in certain areas, slow internet speeds, and lack of reliable telecommunications networks could hamper widespread acceptance of digital payments across the country. Many rural areas and individuals with low income levels do not have adequate access to technology and the internet. Most of the population of large India prefer cash as the main mode of payment. The financial market infrastructure in India needs further development, especially in terms of technology and internet accessibility (Hidayat et al., 2023). However, since 2015 there has been an emphasis on the push given by the government through the Digital India Campaign, which aims to promote digital payments as part of the economic transformation towards a "Faceless, Paperless, Cashless" model (Joshi, 2017).

Figure 2. Digital Payment Trends in Five Emerging Markets

Source: IMF, 2023.

The COVID-19 pandemic led to physical distancing and increased awareness of hygiene and health precautions. Due to concerns about potential transmission of the virus, many people choose to minimize physical contact with cash. As a result, digital payments are emerging as a safer and more practical alternative, driving a growing trend towards increased use of digital payments. Throughout the pandemic, there has been a huge surge in demand for e-commerce services (Sardjono et al., 2021). In addition, to reduce the risk of virus transmission, many people have turned to online shopping for their daily needs.

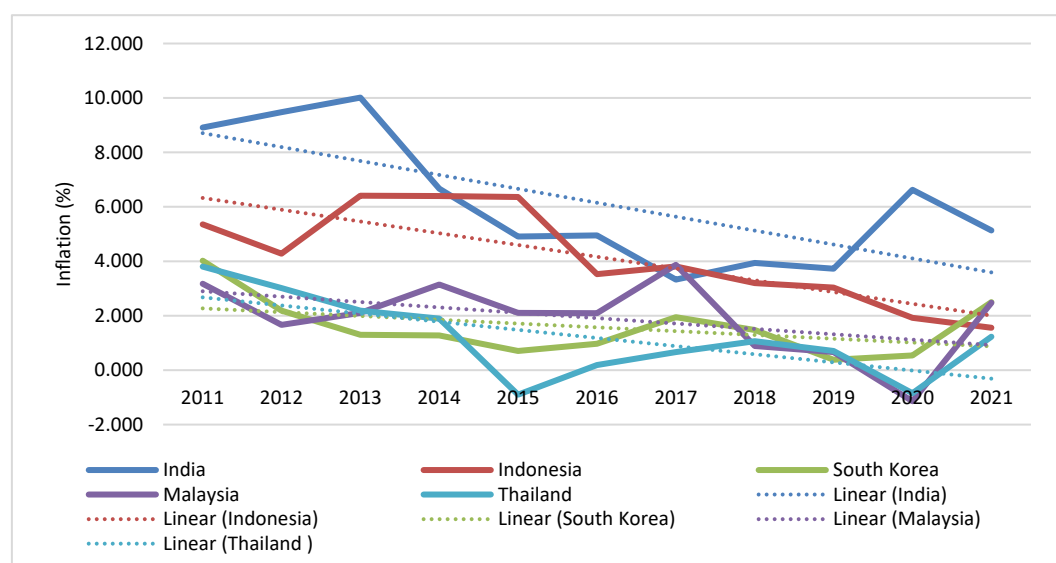
The significant adoption of digital payments in Malaysia, Thailand and Indonesia is driven by a number of policies designed to stimulate the growth of the sector. Increased smartphone penetration in the region has given wider access to digital banking technology. Governments and telecommunications companies have undertaken initiatives to ensure accessibility and availability of affordable smartphones for the public, enabling more people to engage in digital banking activities. Indonesia, as the largest economy in the Southeast Asia region and the only G20 member in the region, is one of the countries experiencing the fastest adoption of digital technology in the world (Li et al., 2020). In research by Yucha et al., (2020), Indonesia still faces challenges because digital payment facilities and infrastructure in rural areas are not yet fully available. Among Southeast Asian countries, Malaysia has the highest number of phone users and internet access. However, the adoption rate of digital payment services is low, and most of these services are favored by young users (Balakrishnan & Shuib, 2021). Electronic payments in Thailand will help e-commerce businesses compete and increase sales. It will also enable the creation of financial databases for SMEs and customers (Yakean, 2020).

4.2. Variable Inflation Trends

Inflation in Emerging Asia shows a downward trend. During the period 2010 to 2021, with India the most significant decline (Figure 3). In 2020, India experienced a substantial rise

in inflation. Rising inflation rates often prompt central banks to adopt an accommodative monetary policy approach. Central banks may choose to reduce interest rates to stimulate lending and investment, in addition to implementing quantitative easing measures to increase liquidity in financial markets (Reisenbichler, 2020). These measures can contribute to maintaining sufficient liquidity, reducing debt burdens, and strengthening stability in the financial sector in the short term. Rising inflation rates may prompt the government to implement assertive economic stimulus measures. In crisis scenarios such as the COVID-19 pandemic, governments use high inflation as justification to increase public spending, fund aid programs, and boost economic growth.

Figure 3. Inflation Trends in Five Emerging Markets



Source: World Bank, (2023).

In Indonesia, inflation during the Covid-19 period showed a downward pattern. This decrease is due to restrictions on individual physical activity, mainly due to measures related to the pandemic. Measures such as lockdowns and travel restrictions have resulted in substantial reductions in overall economic activity (Chowdhury et al., 2022). Many businesses and sectors witnessed a decline in the level of operations, accompanied by a decrease in demand for goods and services. To cope with reduced demand, producers often reduce prices to maintain sales, leading to a decrease in inflation. In addition, the global situation of Covid-19 has contributed to the decline in world commodity prices (Ezeaku and Asongu, 2020). This decline was influenced by the decline in global demand and economic uncertainty stemming from the pandemic. Indonesia as a producer of important commodities such as crude oil, coal, and agricultural products, is vulnerable to negative impacts arising from falling commodity prices.

In a controlled inflationary environment, central banks typically keep interest rates low (de Haan and Eijffinger, 2019). Lower interest rates facilitate more cost-effective financing options for individuals, businesses, and governments. This can ease the debt burden,

promote investment, and contribute to short-term stability within the financial sector (Chugunov et al., 2021). In 2020 and 2021, inflation trends in several Asian countries, especially Thailand, Malaysia, and South Korea showed significant increases as a result of the COVID-19 pandemic. These three countries are in line with post-pandemic economic recovery efforts to implement economic stimuli and fiscal incentives to overcome the negative impact of the COVID-19 pandemic. In addition, increasing consumer demand and investment, rising commodity and energy prices, and currency exchange rate fluctuations can be the main causes of rising inflation in these countries. These factors together create inflationary pressures in the economic recovery and global uncertainty.

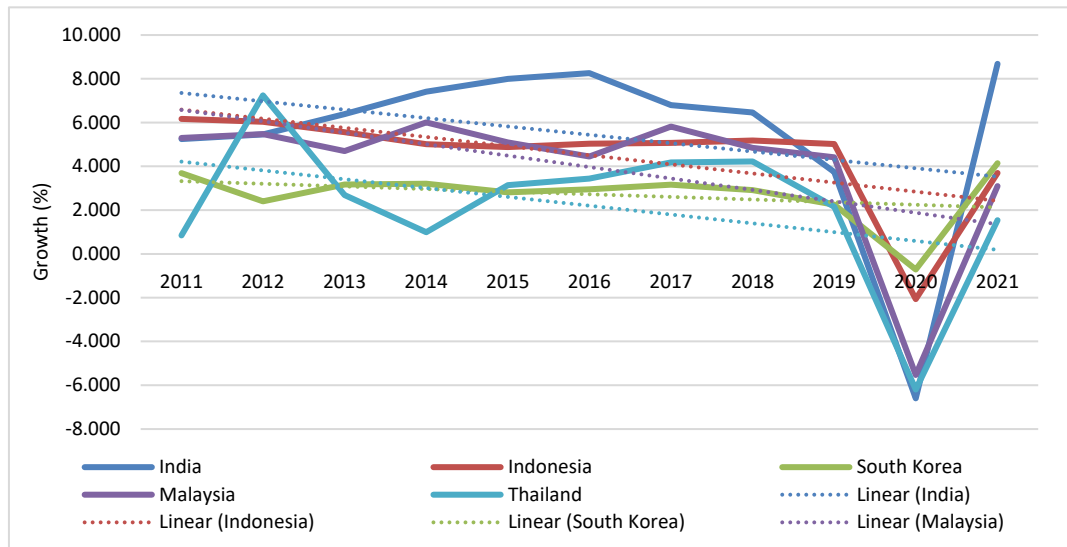
The high inflation rate in India in 2020, especially in the food sector, can be attributed to a number of factors influenced by the impact of strict lockdown policies in response to the COVID-19 pandemic. The sudden and strict lockdown, with strict movement restrictions and the closure of businesses, including wholesale and retail markets, caused serious disruptions in the food supply chain. This leads to scarcity and uncertainty in supply, which in turn increases commodity prices (Islam et al., 2020). Disruptions in supply chains, including decreased trade activity and worker migration, also contributed to price increases, especially in small-town markets.

4.3. Gross Domestic Product (GDP) Trends

There is an observed downward trend in economic growth in Emerging countries observed (Figure 4). The recent global economic slowdown is mainly due to uncertainty in geopolitics and trade tensions (Song and Zhou, 2020). This slowdown in global economic expansion has had devastating consequences for emerging market countries, especially given their dependence on exports and foreign direct investment (Koçak and Barış-Tüzemen, 2022). A decline in global demand for their goods and services could hamper their GDP growth. Many emerging market countries rely heavily on income from commodity exports, and falling commodity prices—such as oil, gas, and metals—negatively impact them by reducing export earnings. Falling commodity prices have the potential to contract GDP growth, contributing to an overall economic downturn.

The highest GDP growth trend is shown by the country of India. India's large population and huge domestic market potential have been drivers of economic growth (Ohlan, 2015). The information technology and services sector has been a major contributor to India's economic growth. India has become a global hub for technology services and business process outsourcing (BPO), which creates jobs, boosts service exports, and contributes significantly to GDP (Golpelwar, 2016). Economic structural reforms and pro-investment policies implemented by the Indian government have supported long-term economic growth. Measures such as the Goods and Services Tax (GST) and the "Make in India" program are examples of reforms aimed at improving the efficiency and competitiveness of the Indian economy. Thailand shows fluctuating economic growth data, especially in 2014 showing a significant decline. In 2014, Thailand experienced high political tensions that culminated in a military coup in May. This political instability affects investor confidence and disrupts economic activity, especially in the tourism and investment sectors (Sukhampha & Kaasch, 2023).

Figure 4. *Economic Growth Trends in Five Emerging Markets*

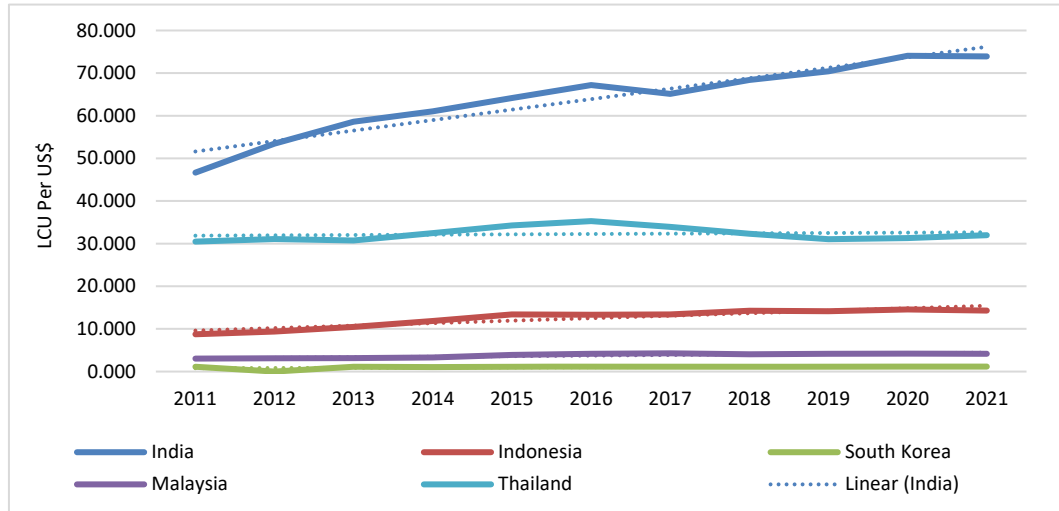


Source: World Bank, 2023

Indonesia and Malaysia, as two countries in the Southeast Asian region, are often affected by similar regional conditions. Elements such as global economic conditions, fluctuations in commodity prices, and regional investment trends can exert a comparable influence on the economic growth of both countries. Indonesia and Malaysia, as two Southeast Asian countries, are often subject to analogous regional conditions (Latif et al., 2018). Factors such as global economic conditions, changes in commodity prices, and regional investment trends can have a similar impact on the economic growth of both countries. In addition, the existence of regional economic cooperation and trade agreements involving Indonesia and Malaysia can create an investment climate that supports economic growth in line (Turner, 2014).

4.4. Exchange Rate Trends

The exchange rate of the rupee against the US dollar showed significant depreciation (Figure 5). Imports became expensive and foreign exports became slightly cheaper as the rupee slumped (Tasleem, 2015). India is one of the world's largest oil importers. High dependence on crude oil imports could put additional pressure on the rupee exchange rate, especially if world oil prices rise. In 2013, India experienced a period of economic tension that triggered a significant depreciation in the exchange rate of the rupee against the US dollar (Mohan & Ray, 2019). One of the main factors causing the depreciation was the country's growing trade balance deficit, which raised market concerns about India's ability to meet its external obligations. Moreover, internal factors such as high inflation rate and inconsistent monetary policy also affect market sentiment towards the Indian currency. External conditions, such as global market uncertainty and declining foreign exchange reserves, also contributed to the decline in the rupee exchange rate.

Figure 5. Exchange Rate Trends in Five Emerging Markets

Source: World Bank, 2023.

Indonesia and Malaysia showed consistent and stable exchange rate trends, avoiding significant fluctuations during the study period. These countries have considerable foreign exchange reserves (Shrestha and Semmler, 2015). This ability of intervention contributes to maintaining the stability of their currency exchange rates. All three countries have strong currency stabilization policies, with their central banks actively participating in market interventions to enforce currency exchange rate stability (Domanski et al., 2016). Through activities such as buying or selling their own currencies, these central banks can prevent excessive and adverse fluctuations, ensuring stability in the economy.

South Korea shows a flat trend in its exchange rate against the US dollar, reflecting relative stability in the country's economy. The Korean won is stable against the US dollar due to a number of economic factors that affect the strength and stability of the currency. Continued economic growth, especially through strong exports, provides a stable foundation for the won exchange rate (Wei, 2015). Steadily increasing exports create stable demand for the Korean won in the international market, which can help maintain its exchange rate against foreign currencies. The consistent and transparent policies of the South Korean government and central bank in carrying out monetary policy can also contribute to the stability of the Korean won against the US dollar. Proper intervention in the foreign exchange market and prudent policy measures can help prevent large exchange rate fluctuations.

4.5. Descriptive Statistics

Table 2. Descriptive Statistics

	BZS	DPI	INF	EXR	GDP
Mean	12.08382	347.6160	2.997963	2751.486	3.767098
Median	11.44263	214.7817	2.477102	65.12157	4.413190
Maximum	21.13619	1251.660	10.01788	14582.20	8.681229
Minimum	4.416093	-46.74719	-1.138702	3.060003	-6.596081
Std. Dev.	5.576008	342.9418	2.494715	5034.228	3.162221
Slope	0.131972	0.912262	0.884392	1.580732	-1.620612

	BZS	DPI	INF	EXR	GDP
Kurtosis	1.557474	2.631218	3.580388	3.678095	6.145878
Jarque-Bera	4.928337	7.940366	7.941650	23.95862	46.75478
Probability	0.085080	0.018870	0.018858	0.000006	0.000000
Sum	664.6100	19118.88	164.8879	151331.7	207.1904
Total Sq. Dev.	1678.961	6350888	336.0744	1.37E+09	539.9805

Source: Data Processed, 2023.

Based on Table 2, there is substantial variation in each observed variable. From the results of statistical analysis, it can be seen that banking stability data tends to be close to normal distribution, reflected in the skewness (0.13) and kurtosis (1.56) values which are close to zero and three respectively. Meanwhile, digital payments and inflation, although showing slight deviations from normal distribution, are still within a reasonable range with relatively moderate skewness and kurtosis values.

4.6. Panel Data Regression Estimation Results

In determining the best panel data regression method, it must first be tested using the chow test and the Hausman test. Based on the Chow Test and Hausman Test, the results show that the selected model is the Fixed Effect Model.

Table 3. Estimation

Variable	Coefficient	Std. error	t-Statistics	Prob.
C	14.683	0.340	43.162	0.000***
DPI	0.007	0.000	16.986	0.000***
INF	1.004	0.060	16.812	0.000***
GDP	0.082	0.041	2.031	0.048**
EXR	-1.638	0.042	-39.210	0.000***
R-Square	0.715			
F-Statistics	31.340			
Prob F-Statistics				0.000***
Chow Test				0.000***
Hausman test				0.000***
Cross Section Effect				
India	7.431			
Indonesian	-16.197			
Korean	-5.802			
Malaysia	15.264			
Thailand	-0.696			

Note: The *, **, and *** symbols indicate significance levels of 10%, 5%, and 1%, respectively

Source: EViews, data processed, (2023).

$$\widehat{BZS} = 14.6837 + 0.00689DPI_{it} + 1.00433INF_{it} + 0.08239GDP_{it} - 1.63838 EXR_{it} + e_{it} \quad (2)$$

Furthermore, in the Cross Section Effect section, there is a specific impact of each country on the dependent variable after considering the effects of other independent variables in the regression model. India had a positive impact of 7,431, indicating that India has a significant influence in increasing the dependent variable. Meanwhile, Indonesia had a large negative impact of -16,197, indicating that Indonesia has a significant influence in reducing the dependent variable. Korea and Malaysia also had significant negative and positive impacts of -5,802 and 15,264 respectively. Meanwhile, Thailand had a relatively small impact in reducing the dependent variable by a value of -0.696.

4.7. Discussion

4.7.1. The Relationship of Digital Payments with Banking Stability

The utilization of digital payments has a significant and positive impact on banking stability. Digital payments increase transaction efficiency in the banking system by enabling fast, secure, and efficient financial transactions, thereby minimizing the risks associated with human error and loss of physical currency. Improved transaction efficiency contributed to improved overall banking performance and strengthened financial stability. This facilitates more precise credit risk evaluation, better credit portfolio quality management, and reduction of the likelihood of non-performing loans. The overall decrease in credit risk contributed to improved banking stability. In addition, digital payments offer higher security in financial transactions. They also accelerate the movement of funds and increase liquidity in the banking system. Enabling smooth and fast electronic transactions, digital payments contribute to increased banking liquidity. The presence of sufficient liquidity is essential to maintain banking stability and ensure timely fulfillment of financial commitments. This is in line with research by Ozili (2018) and Gomber et al., (2017).

The positive outcome between digital payments and banking stability is supported by the movement of data in Figures 1 and 2, where the variables of banking stability and digital payments show a positive increase. When compared to the GDP ratio, the use of digital payments in India is the lowest compared to other countries, but when COVID-19 India showed a rapid increase. During the COVID-19 pandemic in India, the government and private sector implemented various initiatives and policies such as digital awareness campaigns, digital stimulus or subsidies in the form of discounts or cashback, physical restrictions, even before the pandemic India had implemented "digital India" programs. South Korea is highest based on the value of mobile and internet banking transactions (% of GDP). South Korea has a large population of technology adopters and has a high smartphone penetration rate. People with a culture that is accustomed to mobile devices tend to be more comfortable using digital banking services. Investments in technology infrastructure and digital security by financial institutions and fintech service providers in Malaysia play a role in increasing public confidence in the use of digital banking services. Thailand and Indonesia based on transaction value, tend to be lower than South Korea and Malaysia, but during COVID-19 their usage has increased quite significantly. During the pandemic, there has been a significant increase in e-commerce activity in many countries, including Thailand and Indonesia.

4.7.2. The Relationship of Inflation with Banking Stability

Based on the regression results, inflation has a positive and significant effect in affecting banking stability in Emerging Markets in Asia. The positive effects are in line with the findings Srairi (2013) and Ghenimi et al., (2017). Rising inflation rates can provide positive support to banks' profit margins. An increase in inflation is often followed by an increase in interest rates, which in turn increases the interest income that banks earn from loans granted. This creates an opportunity for banks to increase their profit margins, as higher interest rates can result in a larger interest spread between loans granted and funds received. The positive impact on the health of the credit portfolio can come from economic conditions reinforced by controlled inflation. An increase in controlled inflation is often

accompanied by economic growth, which can create an environment in which businesses and individuals can meet their financial obligations. This can reduce credit risk and improve the quality of banking assets. Economic growth driven by controlled inflation can also have a broader positive impact on banking stability. Increased economic activity can create new business opportunities, increase creditors' repayment capacity, and support the overall sustainable growth of the banking sector.

This positive result was also supported by several trends in Thailand, Malaysia, and South Korea that showed a significant increase in inflation during the COVID-19 pandemic. Increased consumer demand and investment, rising commodity and energy prices, as well as currency exchange rate fluctuations can be the main causes of rising inflation in these countries. Meanwhile, India and Indonesia showed declines during the COVID-19 outbreak. In Indonesia, the implementation of the Large-Scale Social Restrictions (PSBB) policy resulted in a decrease in people's economic activity, which was reflected in a reduction in spending and an increase in savings (Asmadina et al., 2021). As a result, people's purchasing power decreases. Disruptions in the supply chain and distribution of goods can also put deflationary pressure on the prices of goods in India. Movement restrictions and uncertainty in lockdown policies can hamper production and distribution processes, which in turn can affect the supply of goods and lower prices.

4.7.3. The Relationship of GDP to Banking Stability

GDP has a positive and significant effect in influencing banking stability. An increase in GDP reflects healthy economic growth and can have a positive impact on the banking sector. High GDP growth indicates an increase in people's overall income. This increase in revenue creates the potential for increased community storage and investment. With higher incomes, people have more funds that can be deposited in banks or invested in financial instruments, creating greater liquidity in the banking system. This supports the main function of banks in channeling and managing funds in the economy. In addition, strong GDP growth played an important role in substantially improving the bank's asset quality. In advanced economies, the credit risk faced by banks tends to be reduced. Entrepreneurs and consumers, enjoying increased access to income and resources, demonstrate greater capacity to meet their borrowing obligations. Improved asset quality indicates reduced default risk and reduced potential losses for banks. This fosters a stable and favorable atmosphere for financial institutions, which ultimately strengthens banking stability. These findings are in line with research Batuo et al., (2018); and Ashraf et al., (2016).

GDP growth in Developing Asia showed an increase before the COVID-19 pandemic, as a result of stable economic conditions and strong growth in the region (see Figure 4). However, economic dynamics took a sharp turn in 2020, when the global pandemic broke out. All countries that were the focus of the study experienced significant declines in GDP growth, reflecting the widespread negative impact of the pandemic on economic activity across Developing Asia. Social distancing, business closures, and supply chain disruptions played a central role in the decline. However, 2021 showed signs of improvement in GDP growth in all countries studied. While it has not yet reached pre-pandemic levels, this positive trend provides an indication of continued economic recovery. The easing of restrictions, mass vaccination programs, and adaptation to new realities after the pandemic were the main drivers of such improvements.

4.7.4. Exchange Rate Relationship to Banking Stability

The stability of banks is significantly and negatively affected by exchange rate fluctuations. Unpredictable or inconsistent exchange rates can pose foreign exchange risk for banks. A substantial decrease in the exchange rate between two currencies poses a risk of financial loss for banks exposed to a particular currency. When banks hold assets or liabilities denominated in foreign currencies, a decline in the exchange rate can adversely affect the quality of banking assets and capital, thereby disrupting overall financial stability. In addition, exchange rate fluctuations can affect bank risks associated with external financing. In cases where the value of a currency depreciates, banks with debt denominated in that currency may experience increased external financing costs. High financing costs can reduce a bank's profitability, increase its bankruptcy risk, and affect its financial stability, especially for banks that rely heavily on foreign financing. Exchange rate instability creates uncertainty and market risk for banks, forcing them to grapple with the challenges of managing the risks associated with exchange rate fluctuations and anticipating potential losses. This uncertainty has the potential to cause market volatility, leading to shifts in interest rates and asset prices. Increased market volatility can disrupt banking stability, affecting banks' profitability and liquidity. This is in line with the findings Ghosh et al., (2016).

The depreciation of the local currency unit (LCU) against the US dollar (US\$) in some countries has triggered a serious response from governments and central banks, requiring careful implementation of economic policies to manage the impact. In global conditions, this phenomenon highlights the importance of adaptability and policy responsiveness in the face of changing economic dynamics. Governments and central banks in various countries adopt a number of policy instruments to manage exchange rate depreciation. Foreign exchange intervention is one of the measures taken to influence exchange rate movements and maintain stability. In some cases, interest rate adjustments are also the main focus of monetary policy to counter the impact of depreciation. As India faces depreciation as it seeks to boost export competitiveness and tackle inflationary pressures, government policy is focused on measures that support macroeconomic stability. Meanwhile, Thailand, Indonesia and Malaysia are taking an approach of monetary easing and foreign exchange intervention to support affected export sectors and adapt to changing global conditions. South Africa, a highly dependent commodity export, responded to depreciation with foreign exchange interventions and interest rate adjustments to manage pressures on the trade balance and inflation. The measures reflect the complexity of the challenges facing these countries in maintaining economic stability, especially amid changing global dynamics.

5. Conclusion

Based on the estimated results, the use of digital payments has proven to have a positive and significant impact on banking stability in countries such as India, Thailand, Indonesia, South Africa, and Malaysia. The use of digital payments in these countries has improved transaction efficiency, reduced credit risk, and accelerated cash flow and liquidity in the banking system. In addition, inflation shows a positive and important impact on banking stability in these regions. Increasing GDP growth in India, Thailand and Indonesia also contributed positively to banking stability by improving liquidity and asset quality. On the contrary, the exchange rate has been set to have a detrimental and significant effect on

banking stability. Volatility in exchange rate fluctuations may pose foreign exchange risk, thus affecting the asset and capital quality of banks in India, Thailand and Indonesia. In addition, pandemic-induced lockdowns and physical restrictions are driving a shift towards more convenient and contactless payment solutions, increasing demand for digital payments. In addition, concerns over the transmission of the virus through cash have also prompted people to switch to non-cash payment methods. The adoption of digital payments was also influenced by a shift in consumer behavior that increasingly shifted towards online activities during this period, including the purchase of goods and services digitally.

Efforts to encourage the use of digital payments are critical to a sustainable approach to banking progress, with governments playing a central role in spearheading these efforts. These include the development of a strong digital infrastructure, the improvement of financial literacy, and the promotion of extensive digital technology integration in various sectors of the economy. In addition, effective government measures are needed to control inflation through prudent monetary policy, ensuring price stability and overseeing sustainable fiscal practices. In addition, policies should focus on stimulating high economic growth by investing in infrastructure, education, and workforce training, while encouraging sectors with potential for job creation and productivity gain. Finally, strong government policy is essential in managing exchange rate risk, including the maintenance of adequate foreign exchange reserves, the implementation of capital control measures, and the formulation of effective risk mitigation strategies.

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