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THE RELATIONSHIP BETWEEN FINANCIAL INCLUSION AND FINANCIAL STABILITY BANKING INDUSTRY IN G20 EMERGING MARKET COUNTRIES: A PANEL DATA EVIDENCE⁹

This study aims to identify the effect of the financial inclusion sub-index on financial stability in the banking industry proxied by Bank Z Score. This research uses secondary data in the form of panel data with annual data from 2011 to 2021 and the scope of 5 G20 Emerging Market countries. The analysis technique in this study uses the Fixed Effect Model (FEM). The results showed that the banking penetration dimension had a negative and significant effect, bank availability had a significant positive effect, while bank usage had a positive but not significant effect on banking stability. To achieve better financial inclusion and sustainable banking stability in emerging market countries, collaboration between governments, regulators, financial institutions, and other stakeholders is needed. Effective banking regulation and supervision can be the basis for introducing new financial practices and services that support financial inclusion for all levels of society.

Keywords: Financial Inclusion; Financial Stability; Emerging Market; Banking Industry

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1. Introduction

In the financial world, maintaining financial system stability is a top priority for all countries (Platonova et al., 2018). Past financial crises, such as the global financial crisis of 2008, have revealed how important it is to pay attention to financial system stability as a precaution against widespread and prolonged economic losses (Bordo, Meissner, 2016). Therefore, the management and maintenance of financial system stability has become a major focus in economic policy and financial regulation. Babar et al. (2019) support the idea that financial stability can be achieved through operational efficiency of the financial system, control of financial risks, and efforts to minimize the impact of systemic crises.

Financial inclusion became an important highlight after the 2008 crisis, considering its impact, especially on those at the lowest levels of society and often do not have access to banking, especially in developing countries (Soederberg, 2013). Although various definitions of financial inclusion have been put forward by the authors, it should be noted that there is a close relationship between financial inclusion and financial stability, especially in the face of global economic challenges. Financial inclusion provides opportunities for individuals and businesses to access financial products and services that are not only useful, but also affordable according to their needs, such as transactions, payments, savings, credit, and insurance (World Bank, 2022). In this context, Bank Indonesia (2011) states that financial inclusion includes circumstances where all adults of working age have effective access to credit, savings, payments, and insurance from formal service providers. This understanding is reinforced by Patwardhan's (2018) view, which explains that financial inclusion is not just a means, but as a key to achieving universal access to financial services at affordable prices.

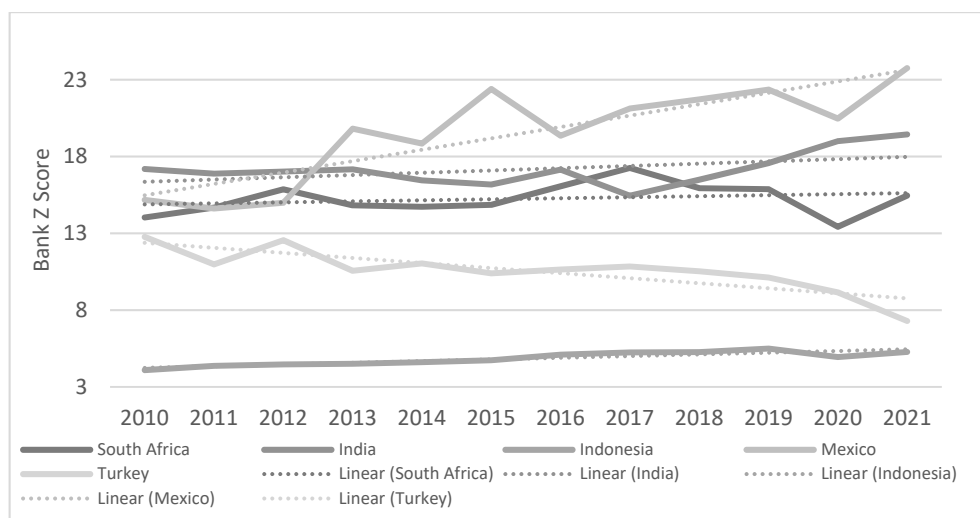
Many emerging market countries have high levels of economic inequality, namely the gap between rich and poor (Nature & Paramatic, 2016). Inequality can affect people's access to and participation in formal financial services (Demir et al., 2022). Financially underserved communities tend to have poorer asset quality and are vulnerable to higher credit risk, which will impact banking stability. Emerging market countries often face challenges in terms of infrastructure and access to technology (Marquis, Raynard, 2015). Technology limitations can also affect banks' ability to manage credit and liquidity risk efficiently (Shair et al., 2021). Emerging market countries are often in complex geopolitical environments and are vulnerable to systemic risks, such as global economic crises or currency fluctuations (Li, Huang, Chen, 2021).

The ongoing COVID-19 crisis has reinforced the need to increase digital financial inclusion. In 2021, additional needs due to the COVID-19 pandemic have increased strong linkages between Emerging Market countries and domestic banks (Feyen et al., 2021). The surge in sovereign debt by domestic banks of Emerging Market countries is a finding revealed in the global financial stability report published by the International Monetary Fund (2022). This phenomenon reflects the significant impact of the pandemic on the financial sector in these countries. In the face of global financial sector weakness and to address the crisis, various organizations and institutions, such as the World Bank, IMF, G20 countries, and the Alliance for Financial Inclusion, have launched initiatives to strengthen the financial inclusion agenda in both developing and developed countries (Čihák, Mare, Melecký, 2016). Global

cooperation within the framework of the G20 has also implemented a financial inclusion action plan since it was agreed in Seoul at the 2010 G20 Summit (Danisman, Tarazi, 2020).

Based on Figure 1, in 2020, most emerging market countries experienced a decline in the value of the Bank Z Score, indicating an increase in the vulnerability of the banking industry to bankruptcy risk (Chiaramonte et al., 2015; Khasawneh, 2016). This is related to the impact of the COVID-19 pandemic that affects the economy as a whole, including declining business performance, declining revenue, as well as increasing credit risk and economic uncertainty. The decline in Bank Z Score reflects significant pressure on the banking industry and indicates potential systemic risks that could disrupt financial stability (Klomp, 2014). However, as we head into 2021, there are signs of recovery and improvement in banking stability in various countries over time. This can be due to policy measures taken by financial and monetary authorities to overcome the negative impact of the pandemic (Elnahass, Trinh, Li, 2021). Among the measures are fiscal and monetary stimulus, liquidity assistance, and regulatory intervention aimed at maintaining the stability of the banking industry.

Figure 1. Bank Z Score (Banking Stability) of G20 Emerging Market Countries



Source: World Bank (2011-2021).

Despite signs of recovery, it should be noted that the situation may vary between different countries and banking sectors in Emerging Market countries. Some countries are experiencing faster recovery and showing more significant improvements in banking stability, while others may still face greater challenges in coping with the impact of the pandemic on their banking industries. Thus, careful monitoring of the stability of the banking industry and an in-depth assessment of the vulnerability of the banking industry amid the COVID-19 pandemic remain important priorities (Siregar, Gunawan, Saputro, 2021).

Some measures in measuring financial inclusion include bank penetration, bank availability bank, and bank usage dimensions. With wider access, more equitable distribution, and active

public participation in formal financial services, credit and liquidity risk can be better managed (Hassan, Khan, Paltrinieri, 2019). Strengthening banking stability can have a positive impact on sustainable economic growth and overall public welfare (Sharma, 2016). Therefore, efforts to improve these three dimensions must be the focus in the design of financial inclusion policies and initiatives to achieve a strong and highly resilient banking system.

In previous studies, it was mentioned that the lack of financial inclusion can potentially lead to ongoing systemic crises (Čihák, et al., 2016). However, the literature also highlights a positive correlation between increased financial inclusion and increased financial stability, especially in the banking sector (Ahamed, Mallick, 2019; Alvi et al., 2020; Anarfo et al., 2019; Wang, Luo, 2022). In addition, increasing the number of domestic savers can help reduce dependence on external sources of funds that tend to be less stable in developing countries (Feghali, et al., 2021).

Although many studies have explored the impact of financial inclusion on banking stability, there is still debate in the literature. For example, Wu et al., (2017) investigated financial stability in developing countries, and Mulyaningsih et al. (2015) examined the effect of financial inclusion in the Indonesian banking industry. Both studies show that financial inclusion can improve banking stability. Mader (2018) argues that broader financial inclusion allows more individuals and businesses to access a variety of financial products and services. In addition, Renn et al., (2022) imply that financial inclusion can reduce systemic risk by distributing financial risk more evenly among various economic stakeholders. However, Vučinić (2020) research indicates the potential negative impact of high financial inclusion on banking stability, such as increased systemic risk or adverse competitive influences.

The importance of discussing and understanding the relationship between financial inclusion and financial stability is the purpose of this study. Further in-depth research is needed to investigate the effect of the financial inclusion subindex on banking system stability in developing countries that are members of the Group of Twenty (G20). In examining the relationship between financial inclusion and financial stability in the banking industries of G20 emerging market countries, this study makes an important contribution to investigating how smart and adaptive banking regulation and supervision supports the introduction of new financial practices and services, and the development of financial inclusion in a sustainable and stable manner in these countries. The choice of the G20 as the focus of research on emerging market countries, even though they have differences in financial systems, can be explained by considering the high diversity of economies and financial systems. This allows research to explore the impact of financial inclusion on financial stability by considering diverse economic contexts. Emerging market countries are major actors in the global economy and have a strategic role in the dynamics of international finance. The novelty of this research lies in the panel data approach used to analyse the relationship between financial inclusion and financial stability in the banking sector of G20 emerging market countries. The use of panel data provides advantages in overcoming endogeneity and heteroscedasticity problems, so that analysis results can be more robust and accurate. Therefore, this research does not only focus on local aspects, but also has implications for global policies and strategies in achieving better financial stability.

The series of structures for this research are as follows. After the introduction in Part 1, the researcher reviews relevant literature and formulates a hypothesis which is explained in Part 2, the data and research methodology are explained, then continued in Part 3, the researcher presents the analysis of variable movements, estimation results and discussion. Section 4 explains the conclusions and recommendations for emerging markets.

2. Research Methods

The data used in this research comes from various sources, including the International Monetary Fund (IMF) and the World Bank. This research focuses on five Emerging Market countries that are members of the G20, with data ranging from 2011 to 2021. The variables used in this study include Bank Z Score, Bank Penetration, Bank Availability, and Bank Usage.

This study uses quantitative analysis techniques using calculation methods with regression estimation techniques of Ordinary Least Square (OLS) panel data in analyzing the effect of financial inclusion on financial system stability. Where the financial inclusion sub-index is used as an independent variable and financial stability as a dependent variable, the functions of this study are formed as follows:

$$\text{BZS} = f(\text{PTT}, \text{AVB}, \text{USG}) \quad (1)$$

From the above function, a regression equation can be formed for this research model, which is as follows:

$$\text{BZS}_{i,t} = \beta_0 + \beta_1 \text{PTT}_{i,t} + \beta_2 \text{AVB}_{i,t} + \beta_3 \text{USG}_{i,t} + e_{i,t} \quad (2)$$

BZS is the dependent variable, β is the coefficient of the independent variable, PTT is banking penetration, AVB is the bank availability dimension, USG is the bank usage dimension, it is time series and cross-section, and e is the error standard.

Table 1. Variable and Data Source Description

Variable	Notation	Variable Description	Formula	Data Sources
Bank Z-Score	BZS	Data Bank Z-Score Data		World Bank
Bank Penetration	PTT	Number of deposit accounts per 1000 adults in a commercial bank	$D_i = w_i \frac{A_i - m_i}{M_i - m_i}$	International Monetary Fund (IMF)
Bank Availability	AVB	Number of commercial bank branches per 100,000 adult population		International Monetary Fund (IMF)
Bank Usage	USG	Outstanding loans + Deposits from commercial banks as a percentage of GDP		International Monetary Fund (IMF)

Source: World Bank and International Monetary Fund (IMF), 2023.

Where: D_i presents the dimensional value of the financial inclusion indicator, w_i is the value weight, A_i is the actual value of the i -th dimension indicator, m_i is the lowest value of the i -th dimension and M_i is the highest value of the i -th dimension.

3. Data Trend Analysis

3.1. Trend of Bank Penetration Dimensions in G20 Emerging Market Countries

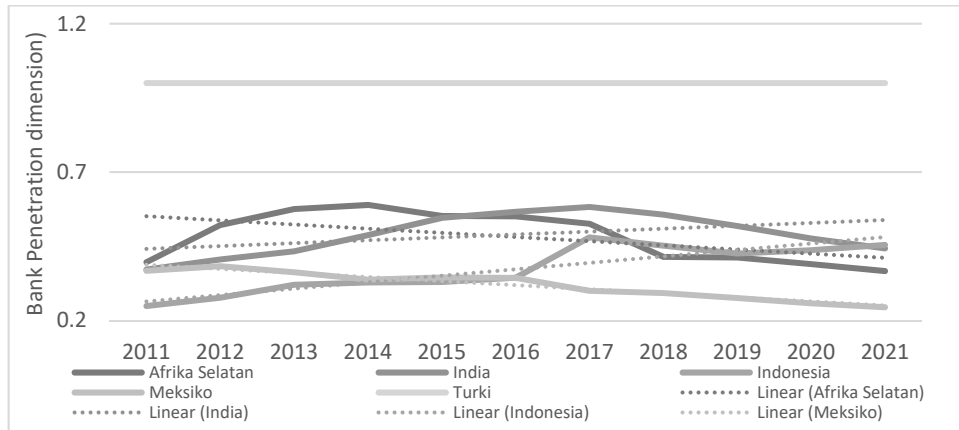
The bank penetration dimension is one of the key aspects in measuring financial inclusion, as banks as formal financial institutions play a central role in providing various financial services to the public (Sharma, 2016). In measuring financial inclusion, the bank penetration dimension includes various indicators such as the number of bank accounts, per capita bank account penetration, and the level of community participation in rural and urban areas. Information on the use of digital banking services also provides insight into the adoption of financial technology by the public, which can be key in increasing financial inclusion in the digital age (Aziz, Naima, 2021). The dimension of bank penetration in India is important given its large population and diverse income levels (Goel, Sharma, 2017). The dimension of bank penetration is also key to overcoming geographical differences in Mexico, Indonesia, and Turkey. High economic inequality in South Africa makes the bank penetration dimension critical in facing these challenges (Tchamy, Asongu, Odhiambo, 2019).

The downward trend in the movement of bank penetration dimensions occurred in South Africa and Mexico. South Africa faced significant economic challenges during the period 2011-2021, including slow economic growth, high unemployment, and rising inflation (Blecher et al., 2017). Such economic instability can reduce public confidence in the banking industry and hinder participation in banking services (Han, Melecky, 2013). Income inequality can affect people's access to banking services, as most people do not have enough income to open a bank account or use banking products and services (de Haan and Sturm, 2017). The downward trend in bank penetration movements in Mexico was caused by economic instability during 2011-2021, including currency exchange rate fluctuations, high inflation, and fluctuating economic growth (Hsing et al., 2020; Baharumshah et al., 2017). Economic instability can reduce public confidence in the banking industry and cause uncertainty in using banking services.

Based on Figure 2, Turkey has the highest dimension of banking penetration among other countries. Turkey has the highest score with a score of one in the banking penetration dimension, making it the only country to achieve a high category of financial inclusion among the five countries studied. That is, Turkey has succeeded in providing its people with wide access to banking services (Yorulmaz, 2013; Atkinson & Messy, 2014). This success was able to contribute to the improvement of the stability of the Turkish financial system.

The Turkish government has successfully implemented active policies in promoting financial inclusion and increasing public access to banking services. Turkey has also successfully launched programs such as the Financial Literacy and Inclusion Program and Turca-style Microcredit aimed at improving financial literacy and expanding people's access to banking services (Güngen, 2017; Atkinson, 2017). This has enabled new approaches to providing financial services, such as digital banking and electronic payments. The adoption of this technology facilitates people's access to banking services through digital platforms, which in turn increases the penetration rate of banking in Turkey.

Figure 2. Trend of Bank Penetration Dimensions in Five G20 Emerging Market Countries

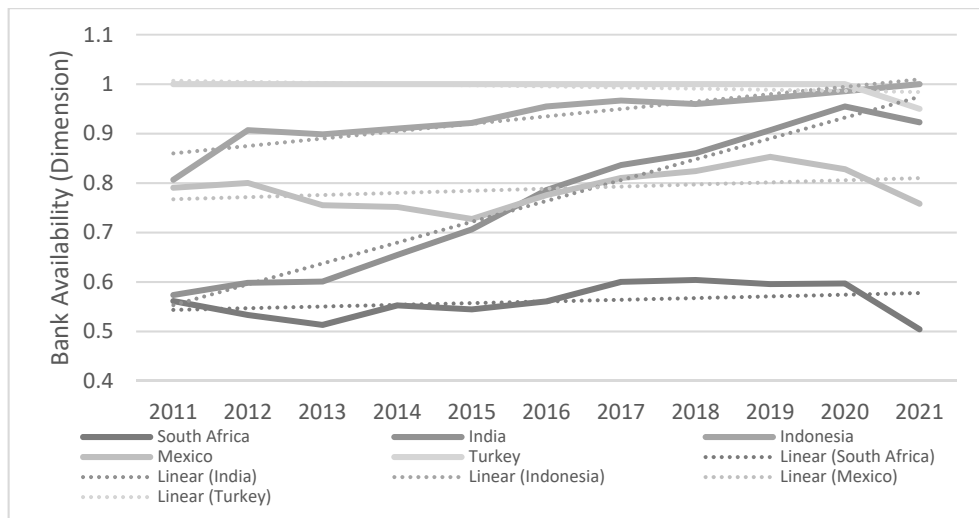


Source: International Monetary Fund (IMF) (2011-2021).

3.2. Trend of Bank Availability Dimensions in G20 Emerging Market Countries

The bank availability dimension is one of the important aspects in measuring financial inclusion, which reflects the level of availability and accessibility of formal financial institutions, especially banks, to the public (Sharma, 2016). The availability of bank branches is a key factor in ensuring public access to formal financial services (Iqbal, Sami, 2017). In Emerging Market countries such as India, Indonesia, and South Africa, bank availability becomes very important due to the large geographical area and diverse levels of settlement (Tang, Yao, 2018). Thus, the dimension of bank availability is an integral component in realizing an inclusive and resilient financial system at the global level. Based on Figure 3, in all countries studied there has been a downward trend since 2020. The COVID-19 pandemic has had a significant impact on the global financial sector, including in emerging market countries (Raza et al., 2022). To control the spread of the virus, many countries implemented lockdown policies and physical restrictions (Hoon, Wang, 2020; Han et al., 2020). This resulted in the temporary closure or reduction of bank branch operations. Lack of direct access to branch offices can hinder the physical availability of banks for the public. In response to physical restrictions, many banks are upgrading and expanding their online and mobile banking services (Kwan et al., 2020).

Figure 1. Trend of Bank Availability Dimensions in Five G20 Emerging Market Countries



Source: International Monetary Fund (IMF) (2011-2021).

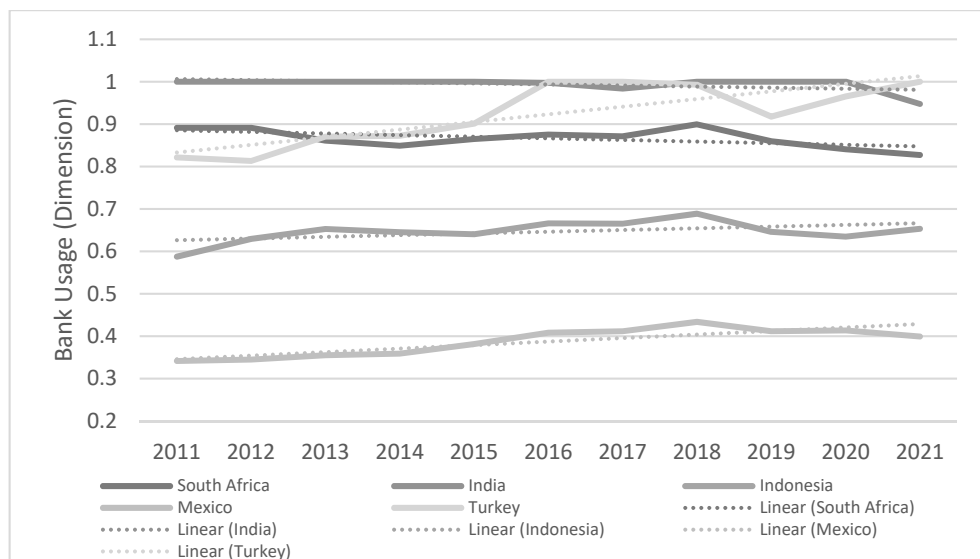
The COVID-19 pandemic has caused uncertainty, making banks reluctant to provide new loans (Didier et al., 2021). Uncertainty about the future of the business as well as economic conditions make banks more cautious in taking credit risk (Chi, Li, 2017). The COVID-19 pandemic has driven instability in global financial markets (Ibrahim, 2020). Volatility and a decrease in asset value make it difficult for banks to obtain the liquidity needed to finance loans (Gornall, Strebulaev, 2018). This decrease in liquidity can affect banks' ability to expand credit and offer a wider range of financial services. In an effort to overcome the economic impact of COVID-19, governments in emerging markets adopted stricter policies and regulations related to the banking industry (Miroslav, Usman, Tariq Sahyouni, 2021).

During this period, the banking industry in India experienced significant growth and expansion. Many private banks as well as state-owned banks, opened new branches in various parts of India (Acharya et al., 2013; Cooper et al., 2007). The Indian government has increased financial inclusion by launching programs such as the Jan Dhan Yojana (Winn, Koker, 2013; Singh, Ghosh, 2021). The program aims to expand access to financial services for the entire population, especially the unbanked. So, there is an increase in the number of bank accounts and an increase in the availability of banking services as a whole. The Indian government has also encouraged the development of banking networks in remote and rural areas. Through programs such as Pradhan Mantri Jan Dhan Yojana, banks are encouraged to open branches as well as ATMs in areas that have not been well served before (Barua, Kathuria, Malik, 2016). It aims to increase the accessibility and availability of banking services.

3.3. Trend of Bank Usage in Five G20 Emerging Market Countries

The Bank Usage Dimension is an important dimension for measuring financial inclusion, reflecting the extent to which people use formal financial services provided by banks (Camara, Tuesta, 2017). The use of banks is an important benchmark in evaluating the extent to which financial services have been adopted and utilized by people to meet their financial needs (Ali et al., 2020). High bank utilization can create diverse sources of funding for banks, encouraging a reduction in the risk of dependence on certain sources of funds (Neaime and Gaysset, 2018). Based on Figure 4, Turkey shows a fluctuating trend in bank usage dimensions with the highest decline occurring in 2019. In the period 2018-2019, Turkey experienced a financial crisis involving the weakening of the currency exchange rate (turkey) and high inflation. This crisis resulted in significant economic instability, making people lose confidence in the banking system and choose to reduce the use of banks. High economic uncertainty can also be a factor in decreasing bank usage. During the period, the unstable economic situation made people hesitant to deposit their money in banks or use banking services. High inflation rates can also affect bank usage. High inflation reduces people's purchasing power and discourages them from keeping money in banks that may not provide enough returns to fight inflation.

Figure 2. Trend of Bank Usage in Five G20 Emerging Market Countries



Source: International Monetary Funds (IMF) (2011-2021).

The downward trend in bank usage occurred in South Africa during the 2011-2021 period. South Africa has one of the highest levels of income inequality in the world (Solt, 2016). This inequality impacts financial accessibility and inclusion for a large part of the population. For some people with low incomes, banking services may be unaffordable or not easily

accessible. This factor can hinder the growth of bank usage among people with weaker economies. In addition to economic and infrastructural factors, changing preferences and adoption of technology also play an important role. Along with the development of fintech and digital financial services, some people in other countries in emerging markets have switched to digital banking services or non-bank alternatives. However, in South Africa, the adoption of this technology has not reached the same level due to the infrastructure and accessibility challenges faced by a large part of the population (Akpan, Udoh, Adebisi, 2022).

India has the highest dimensional level of bank usage (Figure 4). India has launched various strong financial inclusion initiatives and the adoption of innovative financial technologies such as UPI (Unified Payments Interface) and e-wallets has also helped increase the use of banks in India (Sharma, 2018; Gochhwal, 2017). Steady economic growth and increased financial literacy have also contributed to the high level of bank usage in the country. However, in 2020 there was a decline in the trend of bank usage in India. The COVID-19 pandemic caused a significant decline in economic activity in India (Debata, Patnaik, Mishra, 2020). Many businesses face temporary closures or operational reductions, resulting in a decrease in banking transactions related to those businesses.

4. Results and Discussion

4.1. Descriptive Statistics

Statistical descriptions for each of the variables used in this investigation are compiled in Table 2. The variables studied include Bank Z score which was influenced by the financial inclusion sub-index in G20 Emerging Market countries for eleven years from 2011 to 2021. In the table obtained, the mean, median, maximum and minimum values and standard deviation with the sum of all observations is 55.

Table 2. Descriptive Statistics of Five G20 Emerging Market Countries (2011-2021)

	BZS	PTT	AVB	USG
Means	13.55164	0.532512	0.808706	0.763353
Median	14.85629	0.443034	0.828195	0.859631
Maximum	23.75342	1.000000	1.000000	1.000000
Minimum	4.370431	0.244652	0.504340	0.341559
Std. Dev.	5.594071	0.252509	0.167975	0.226216
Observations	55	55	55	55
Cross sections	5	5	5	5

Source: Output EViews 9 (2011-2021).

Financial stability in the banking sector can be reflected by the bank Z score variable which shows how much the level of bank solvency is in facing the crisis. The average Bank Z Score for 11 years in the G20 Emerging Market was 13.55% and the highest Bank Z score occurred in Mexico in 2021 at 23.75%. However, the lowest bank Z score occurred in Indonesia in 2011 with a value of 4.37%.

In this study, all three dimensions of the financial inclusion index (banking penetration, banking availability, and banking usage) were associated with financial inclusion. A comprehensive financial system requires wide consumer penetration. The proportion of individuals who have bank accounts is used to calculate banking penetration. Based on Table 2 it is seen that between 2011 and 2021, the variable of banking penetration in the G20 emerging markets had an average value of 0.53, with Turkey having the highest value of 1 for all annual periods and Mexico having the lowest value of 0.24.

Financial services must be accessible to all residents of the country to be part of an inclusive financial system. So, the dimension of accessibility of bank services, which has an average value of 0.80 and the highest value of 1 in Turkey, is one of the indications used to calculate the financial inclusion index. In 2021, Indonesia will have the highest score, while South Africa will have the lowest score. Furthermore, the average score of 0.76 belongs to the dimension of bank service use with a maximum score of one achieved by India and Turkey while the lowest score is owned by Mexico in 2011 of 0.34. The level of access to banking services is used as an indicator to create the Financial Inclusion Index because some groups of individuals are still unable to take advantage of the availability of financial services.

4.2. *Econometric Analysis*

In the selection of regression models used in this study, the best model testing was carried out including the Chow test which gave results that the Fixed Effect Model was better than the Common Effect Model or Pooled Least Square seen from a p-value of less than 0.1. Then a Hausman test is carried out which gives a p-value result smaller than 0.1 so that the model chosen from the Hausman test is a fixed effect model better than the random effect model. As an alternative model selection according to determining the method whether Fixed Effect Model or Random Effect Model is better in research can also be seen from, if the number of time series periods is large and the number of cross-section units is small, there will likely be small differences in the estimated parameter values between FEM and REM then choosing FEM or REM depends on convenience, however, FEM models are better to use. Based on this, it is known that the number of time series is 11 years and the cross-section unit used is small as many as 5 countries, so the model used in this study is the Fixed Effect Model (FEM). The fixed effects model has the advantage of including individual fixed effects for each unit in panel data analysis, allows control of variables that do not change over time, overcomes the problem of omitted variables, and provides robustness to constant factors over time, as well as controlling for overall differences between units, so it is effective in identifying the influence of the independent variable on the dependent variable without being influenced by factors that do not change over time.

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

$$BZS_{i,t} = 10.16672 - 6.927524PTT_{i,t} + 6.372205AVB_{i,t} + 2.516103USG_{i,t} + e_{i,t} \quad (3)$$

From the equation above, it is known that the results shown are bank penetration seen from the probability of less than $\alpha=10\%$ having a negative and significant effect as well as the variable bank availability which has a significant effect with a positive direction seen from

the probability of less than $\alpha=10\%$. In contrast to the variable bank usage which does not have a significant effect on financial stability in the banking sector because the probability is more than $\alpha=10\%$. Then when viewed from the value of the coefficient of determination of 0.93 shows that the three independent variables can describe the effect of bank penetration, bank availability and bank usage on the financial stability of the banking sector by 93% and the remaining 7% explained by other variables. Then looking at the F-statistical probability below $\alpha=1\%$ shows that the three independent variables together affect the banking financial sector.

Table 3. Estimated Output

Variable	Coefficient	T-Statistics	Probability
C	10.1667	2.0508	0.0459
PTT	-6.9275	-1.9252	0.0603*
AVB	6.3722	1.9912	0.0523*
USG	2.5161	0.4493	0.6553
R-squared	0.9328		
Prob(F-statistic)	0.0000***		
Chow Test	0.0000		
Hausman Test	0.0000		
Country	Intercept		
SOUTH AFRICA	2.7748		
INDIA	3.0217		
INDONESIA	-10.2576		
MEXICO	5.9928		
TURKEY	-1.5317		

Note: *, **, and *** indicate significance levels at levels of 10%, 5% and 1%
Source: Output EViews 9 (2011-2021)

From the intercept value of each country presented in Table 3, South Africa, India and Mexico have positive intercept values, while Indonesia and Turkey have negative intercept values. Positive intercept scores in South Africa, India, and Mexico indicate that when the independent variables (Bank Penetration, Bank Availability, and Bank Usage) have a value of zero (or when there is no influence from the independent variable), then Bank z-scores (banking stability) in these countries have a value higher than zero. This can mean that these countries have naturally quite good basic banking stability, before considering the impact of factors measured by independent variables. The negative intercept values of Indonesia and Turkey indicate that when the independent variable has a value of zero, then banking stability in these countries has a value lower than zero. This can mean that these countries have relatively lower basic banking stability or may face greater challenges in terms of banking stability, without considering the influence of independent variables.

4.3. Bank Penetration Relationship to Banking Stability

The banking penetration has a significant effect with a negative correlation to banking stability. Banking penetration refers to the level of public access and participation in using banking services. The negative correlation between the banking penetration and the stability

of the banking system indicates that the higher the banking penetration, the lower the stability of the banking system. The more individuals or businesses that have access to banking facilities, the more likely there is a demand for credit. This can lead to increased credit risk for banks that have to evaluate and lend to large numbers of debtors. If the quality of credit provided is not properly supervised, the risk of default and deterioration in the quality of bank assets may increase, which in turn reduces the stability of the banking system. With more customers and funds circulating in the banking system, banks may face challenges in managing liquidity. If not managed properly, this increase in liquidity can lead to unstable short-term financing risks. Banks may struggle to meet customer withdrawal requests or face uncontrollable liquidity pressures. A high banking penetration index can also mean that more customers have access to a wide range of financial products and instruments. If a customer's financial education and understanding of the product and associated risks is low, they may be more vulnerable to abuse or inadequate risk-taking. This can lead to increased risk and a deterioration in the asset quality of the bank.

In India, low levels of financial inclusion and limited infrastructure in some rural areas have resulted in a low banking penetration. The negative impacts include an increase in the risk of non-performing loans as many people use informal loans and high-risk sources of funds. This situation can threaten the stability of the banking system and the overall financial health. On the other hand, Indonesia faces challenges in inequality of access to financial services between urban and rural areas. More advanced infrastructure in urban areas supports higher levels of financial inclusion and better banking penetration indexes. However, rural areas that still have limited infrastructure experience a low banking penetration index, which has the potential to create inequality in banking system stability. South Africa, with its more advanced infrastructure and technology, supports higher levels of financial inclusion. However, low levels of financial literacy and economic inequality issues may cause some groups of people to remain financially underserved. This can affect the bank's asset quality and increase credit risk, which impacts the stability of the banking system. Mexico, on the one hand, faces differences in infrastructure and financial inclusion between metropolitan areas and rural areas. More advanced infrastructure in metropolitan areas supports an increase in the banking penetration dimensions, while rural areas may experience limited access. The negative impact that may arise is inequality in the stability of the banking system in various regions. Meanwhile, Turkey enjoys strong economic growth overall, supporting better financial inclusion rates and a higher banking penetration index among other countries. However, Turkey has challenges in managing liquidity risk and regulatory changes that may affect the stability of the banking system in the future. These results are in line with research by Quisumbing et al., (2014); Camara & Tuesta (2017); Ghosh, (2015).

4.4. The Relationship of Bank Availability to Banking Stability

The dimension of bank availability has a positive and significant effect on banking stability. The bank availability dimension refers to the level of presence of banks in a banking system, which can be measured by the number of banks operating or the level of geographical presence of banks in a particular region. The positive and significant correlation between the dimensions of bank availability and banking system stability shows that the higher the level

of bank availability, the higher the stability of the banking system. With more banks operating, the risks faced by the banking system can be more diversified (Meslier, Tacneng, Tarazi, 2014). If a bank is experiencing difficulties or facing certain risks, the presence of other banks can help reduce its overall impact. In other words, risk diversification can help protect the banking system as a whole from vulnerability to external pressures (Dionne, 2013). High bank availability also means that people have better access to banking services. It can promote financial inclusion, where more individuals and businesses can use banking products and services to store and manage their money. With increased access to banking services, people can reduce dependence on the informal financial sector which may be more vulnerable to risk.

The difference in bank availability levels between urban and rural areas is a major challenge in countries like India and Indonesia which have populations spread across different geographical regions. In urban areas, there are more bank branches and ATM machines with better access to technology. Conversely, in rural areas, access to banking services is limited due to long distances between villages, lack of bank branches, and lack of technological facilities. Despite such challenges, Indonesia and India have experienced positive improvements in the Bank Availability Dimension. Some banks have partnered with microfinance institutions (MFIs) to reach communities in rural areas. MFIs have strong networks at the local level and can be a conduit for providing banking services to smaller groups of people. As it did in India, Indonesia has also implemented an inclusive finance program to bring banking services to previously underserved segments of society. These programs include low-cost bank account opening, financial literacy training, and financial assistance for the poor. Banking services through banking applications, e-wallets, and fintech platforms have become an alternative to providing financial services in hard-to-reach areas.

South Africa, as an upper middle-income country, has a relatively developed and diversified banking sector. Strong bank availability in major cities supports wide access to banking services. However, challenges include financial inclusion issues among people with low-income levels and in rural areas. Financial inclusion policy and the development of banking infrastructure in remote areas are priorities to increase bank availability equally. Meanwhile, Mexico, as a middle-income country, faces challenges in addressing regional inequalities in bank availability. Large cities have good access to banking institutions, but rural and remote areas may have limited access. Banking infrastructure in remote areas needs to be improved to achieve better financial inclusion and improve overall banking stability. On the other hand, Turkey, as an upper-middle-income country, tends to have a more advanced level of technological availability and extensive internet connections. This enables the rapid development of digital banking and fintech services, which contributes to the increasing availability of banks nationwide. Nevertheless, currency fluctuations pose a challenge to banking stability in the country. This is in line with research by Akhisar et al. (2015), Alvi et al., (2020) and Villarreal (2017).

4.5. The Relationship of Bank Usage to Banking Stability

A positive but not significant correlation between dimensions of bank usage and banking stability suggests that there is a positively likely relationship between public use of banks and banking system stability, but this relationship is not strong enough to be considered statistically significant. The positive correlation between bank usage and banking system stability can be explained by the presence of several other factors that have a greater influence on banking system stability. For example, factors such as good regulation, strict supervision, appropriate monetary policy, and strong banking governance can have a more significant impact on the stability of the banking system than the level of bank usage. The use of banks by the public can be influenced by behavioural factors as well as individual preferences. It is possible that the high level of use of banks by some people does not necessarily have implications for the stability of the banking system as a whole. Some individuals tend to prefer to use non-bank financial services or have other preferences in managing their finances. In addition, Turkey's highly fluctuating state data and large variations from year to year can cause the influence to be insignificant.

India has the highest bank usage dimension value among other countries. The widespread adoption of banking technology and the growing accessibility of banking services are able to contribute to banking stability. Mexico and Indonesia tend to be stable in their bank usage dimensions, but experience relatively low growth. This means that there are challenges in achieving more significant growth in bank availability and access to banking services for people in these countries. The decline in the dimension of bank usage in South Africa shows the challenges in achieving bank availability and accessibility of banking services for the public. South Africans such as rural areas and low-income communities are numerous, unable to open and maintain bank accounts due to the associated costs and difficulty of meeting requirements. Although the results showed a positive relationship between dimensions of bank usage and banking stability in these five countries, the relationship was not always significant. That is, there are other factors beyond the dimension of bank usage that also affect banking stability, such as aggregate economic conditions, banking regulation, and political stability. These results are in accordance with the findings of Hallam and Ahlem (2022), Feghali et al. (2021), Fabris (2018) and Merhi et al. (2019).

5. Conclusion

Banking penetration is negatively correlated and significantly affects banking stability. This is due to several risk factors that have not been managed properly, including increased credit risk, uncontrolled liquidity risk, and the risk of abuse or inadequate risk-taking by customers. To overcome this, the government needs to adopt policies that can strengthen banking regulation and supervision, as well as improve credit and liquidity risk management. The dimension of bank availability is positively correlated and significantly affects banking stability. This indicates that risk diversification and better financial inclusion can contribute to strengthening banking system stability. Emerging Market countries can achieve this by encouraging the growth of the banking industry, the implementation of financial inclusion programs, the development of banking networks, and the adoption of technology that

facilitates the accessibility of banking services. There is also a positive but not significant correlation between the dimensions of bank usage and the stability of the banking system. This shows that there are other factors that are more dominant in influencing the stability of the banking system, such as regulation, supervision, monetary policy and individual preferences towards financial management. Active financial inclusion policies, digital technology development, and efforts to improve accessibility can increase bank penetration rates.

India experienced a significant increase in the dimension of bank availability due to the growth of the banking sector, financial inclusion programs, banking network development, and several programs that support the enhancement of financial inclusion. On the other hand, Turkey achieved the highest banking penetration rate due to the active adoption of financial inclusion policies, the development of digital technologies, and efforts to improve accessibility. Taking these findings into account, emerging market countries need to design holistic and balanced policies. The importance of effective banking regulation and supervision lies in its role as a solid foundation for introducing innovative financial practices and services that support financial inclusion for all levels of society. Given the different characteristics and challenges in each country, a tailored approach needs to be applied to improve bank availability and accessibility of banking services. The importance of the role of government policies and regulations cannot be overlooked either, as they play a central role in creating an environment that supports the introduction of new financial practices and services. Thus, well-coordinated collaborative efforts between various relevant parties are required to ensure that effective banking regulation and supervision are key drivers for the advancement of financial inclusion and banking stability at the national level.

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