Synergizing Bank Assets Concentration, Literacy, and Inclusion: A Path to Financial Stability

Abstract

This study aims to analyze the integration capabilities between bank asset concentration, financial literacy, and financial inclusion in maintaining financial stability in Indonesia.This study employs ECM analysis methodologies to ascertain both the enduring and immediate effects. The research findings indicate that bank asset concentration is highly efficient in preserving the stability of the financial system. Furthermore, its effectiveness can be enhanced by implementing initiatives to enhance financial literacy. This endeavor may not yield immediate results in the near term, but it is a sustained and ongoing effort with long-term implications.

Keywords: Financial system stability. Bank asset concentration, Financial Literacy, Financial Inclusion

JEL Classification: G2, G1

1. Introduction

In the last few decades, there have been several monetary crises. Therefore, it has become the concern of world stakeholders. Including Indonesia which experienced the 1998 monetary crisis which ended in a political crisis that brought down the New Order regime. The 1998 monetary crisis made the government aware of the need to build a system to restore public confidence in the banking sector. Given that the impact of a single bank's issues can be systemic. The national banking sector may experience a bank run due to the loss of public confidence in banking.

To increase public confidence in the banking sector, deposit insurance was formed which provides deposit guarantees. In Indonesia, this institution is called the Lembaga PenjaminSimpanan (LPS). Guarantee from LPS is provided in the form of liquidity when a bank experiences liquidation, so that customers can still get their

savings according to applicable regulations. Several other countries have also established deposit insurance institutions, such as the FDIC (Federal Deposit Insurance Corporation) in the United States, which was founded in 1933. Like the LPS, the FDIC was formed as a response to a crisis, in this case the Great Depression.

Although deposit insurance can provide a stabilization effect when problems occur in the banking sector, deposit insurance can also provide a moral hazard effect when problems do not occur (Anginer, 2014). The formation of LPS has increased the moral hazard for savers in Indonesia. They no longer worry about losing money if the bank goes bankrupt, because it will be backed up by LPS if it still complies with the Bank asset concentration provisions. People no longer think about the security of their savings when they choose to save at a bank, but prioritize the interest they earn (Jameaba, 2018).

However, not all banks experience moral hazard due to the formation of LPS. Research by Ariefianto and Soepomo (2013) found that government-owned banking companies or State-Owned Enterprises (BUMN) have different behavior compared to private banks. Government-owned banking became more conservative after the formation of LPS. This is due to demands from stakeholders, considering that the performance of government-owned banks will reflect the performance of the government.

To achieve financial system stability, apart from preventing crises, it is also necessary to improve the banking function as a means of intermediation through financial inclusion and financial literacy (Hadad, 2010). To carry out the intermediation function, banks need liquidity that comes from savings and financial inclusion is needed so that everyone can get the widest possible banking access. Someone with higher financial literacy will tend to increase savings which can affect the stability of the financial system (Morgan & Long, 2020). Financial literacy can also influence a person's decision to take risks. Because the higher the level of financial literacy, the higher a person's knowledge of the outline of the financial and economic system, so they are more careful in taking risks (Widdowson & Hailwood, 2007). Good financial inclusion can increase access to banking. This can increase the

resilience of deposit adequacy in banks during a financial crisis. This resilience can support the stability of the financial system (Han &Melecky, 2013).

For this reason, this research explores how bank asset concentration, financial literacy and financial inclusion can have an impact on financial system stability in both the short and long term.This study contributes to developing the literature on financial stability by integrating bank assets concentration, financial literacy, and financial inclusion which has not been done previously in previous studies.

2. Literature Review

Financial stability is the stability of financial institutions and the main markets of the financial system (Elsayed et al, 2022). Financial stability is important because it fosters confidence in the financial system and motivates investors, depositors and savers (Silva et al, 2017). These funds can also be allocated to deficit entities that require funding for activities designed to promote sustainable development. Therefore, it is crucial to maintain a strong, stable and healthy financial system to facilitate the effective distribution of financial resources across the economy (Elnahass et al. 2022). The financial system, including financial intermediaries, financial markets, and related market infrastructure, must be able to withstand and absorb shocks. As a result, this can reduce the possibility of disruptions severe enough to cause major damage to the financial system.

As stated by Ahmad (2018), a stable financial system has the ability to distribute resources effectively, handle financial risks associated with the system, and prevent undesirable fluctuations in real or financial asset prices that could impact monetary stability. Inherent or unanticipated financial gaps can also be eliminated in a stable financial system. When a shock occurs, the system will use a self-correcting mechanism to absorb its impact, thereby preventing adverse impacts that cause disruption to the actual economy and other financial systems. To achieve long-term economic expansion, ensuring financial stability is critical because most economic transactions occur within the financial system.

Financial stability is a condition where the financial system, including banks, capital markets and other financial institutions, functions well, is able to absorb

economic shocks and prevent financial crises. The concentration-fragility theory argues that increasing market concentration in the banking sector could potentially threaten financial stability. However, in a context of high market concentration, where a few large banks dominate the market, risks to financial stability actually increase.

When a few large banks have a dominant market, they gain greater market power. This power allows them to set higher loan interest rates, which can increase the financial burden on borrowers. This increased burden increases the likelihood of default by borrowers, which ultimately increases credit risk and potential losses for these banks. Thus, although high market concentration may provide short-term benefits for large banks, such as increased profitability, in the long term, it may reduce overall financial stability. If not regulated well, high market concentration can result in greater instability in the financial system, supporting the view of concentration-fragility theory that excessive concentration in the banking sector can bring greater risks to financial stability.

Guidi's research (2021) found that increasing bank asset concentration—measured by the concentration ratio and the Herfindahl-Hirschman index (HHI)—could have a positive impact on financial stability by reducing the ratio of non-performing loans at banks in the region. The research results show that more concentrated markets tend to have higher levels of financial stability, because large banks in concentrated markets are better able to absorb financial shocks and maintain higher quality credit portfolios. However, this research also shows that too much market power can reduce competition, which in turn can limit innovation and efficiency in the banking sector.

Research by Ijsma et al. (2017) find that bank asset concentration has a small but negative impact on financial stability, both at the individual bank level and at the country level. Although empirical results show a decrease in financial stability as market concentration increases, this effect is considered economically insignificant. This research highlights that neither financial supervisory-managed restructurings nor market-driven mergers are likely to cause substantial instability in the financial system. High concentration of bank assets can increase financial risk by encouraging

banks to increase service fees and interest rates, which in turn exacerbates credit risk and increases exposure to systemic risk. These results support the *'concentration-fragility* ' theory, which suggests that high market concentration makes banks more vulnerable to instability due to the tendency to take excessive risks, especially due to the belief that they are too big to fail (Antony et al., 2021). Research by Karkowska&Pwlowska (2019) shows that increasing bank asset concentration increases financial instability, especially during periods of economic crisis. This supports the "concentration-fragility hypothesis," which states that high market concentration can make banks more vulnerable to systemic risk, because the failure of one large bank can trigger a domino effect that undermines the stability of the entire banking system. This study also shows that the effect of concentration on stability is stronger in a more homogeneous banking sector, where herd behavior is more dominant. Additionally, this research finds that although larger banks tend to have higher concentration, this actuallyreduces their stability, reinforcing the conclusion that high bank concentration has the potential to increase systemic risk.Different results were presented by Ali *et al.,* (2016) who found that banking concentration did not have a direct effect on the stability of the financial system.

Ratnawati (2020) believes that financial inclusion can have both positive and negative influences on financial stability. Positive impacts include diversification of bank assets, increased stability of the deposit base, and improved monetary policy transmission. However, negative impacts can arise from lower lending standards, bank reputation risks and inadequate regulation. Research by Banna et al. (2021) show that higher levels of financial inclusion, especially fintech-based, help reduce the risks taken by banks. This means that as financial inclusion increases, financial stability also increases because banks tend to make more prudent decisions in managing their risks. Increased financial inclusion allows more individuals and businesses to participate in the financial system, which in turn strengthens financial stability by expanding the bank deposit base and reducing credit risk (Chinoda et al., 2023). Research by Khémiri et al. (2024) show that higher financial inclusion tends to increase bank stability by expanding the depositor base and reducing the risk of credit concentration. Better financial inclusion allows banks to diversify their

funding sources, ultimately increasing resilience to economic shocks and promoting long-term financial stability.According to Vo et al. (2021) found that increasing financial inclusion has a positive and significant impact on the stability of the banking sector in the Asian region. By providing wider access to banking services, financial inclusion helps banks to increase revenues, reduce operational costs and expand their market share. In addition, financial inclusion also contributes to macroeconomic stability by strengthening the retail savings base and smoothing monetary transmission. These results emphasize the importance of financial inclusion policies as a strategic step in maintaining banking sector resilience, which in turn supports more stable and sustainable economic growth.

In their study, Pham and Doan (2020) investigated the effect of financial inclusion on financial stability in Asian countries. This research uses data from 42 Asian countries to test whether increasing financial inclusion strengthens or reduces financial stability. The research results show that financial inclusion has a diverse impact on financial stability. On the one hand, increasing access to financial services such as savings and account ownership can improve financial stability by providing a more stable fund base for financial institutions. On the other hand, excessive use of credit and payment services can potentially increase financial risks, especially if credit expansion is not accompanied by adequate credit assessment. Overall, this research finds that financial inclusion can support financial stability if managed well, but can also pose risks if not managed properly.

Education is the main method for developing human resources, which significantly increases productivity (Li & Chu, 2022). In the financial sector, informed decision making is facilitated by the presence of a high level of financial education (Xu, 2012). Financial literacy is the capacity and understanding of financial products and services, especially the associated benefits, costs and dangers (Klapper & Lusardi, 2020). Jungo et al. (2021) found that financial literacy helps support financial stability, increases bank profits, and reduces credit risk. Likewise, Klapper and Lusardi (2020) prove that financial literacy increases bank stability and resilience. Rosyadah et al. (2022) suggests that financial literacy may have an insignificant impact on financial stability among MSMEs in Makassar City due to

several factors. Primarily, the overall level of financial literacy is low, preventing business owners from effectively applying their knowledge and skills to improve their financial management practices. Additionally, many MSME owners fail to separate personal finances from business finances, complicating accurate financial assessments. Research by Jonker & Kosse (2020) suggests that while financial literacy is essential for enabling individuals to make informed financial decisions and can promote financial inclusion, this does not necessarily ensure enhanced financial stability. The entry of Big Tech into financial services introduces additional risks, such as over-indebtedness, particularly if individuals lack adequate financial literacy. The paper argues that financial literacy alone is insufficient to guarantee financial stability, emphasizing the need for robust supervision, regulation, and institutional strength to mitigate potential risks.Research by Jungo et al. (2024) found that financial literacy can play an important role in strengthening financial stability by reducing credit risk and increasing bank profitability. With a better understanding of financial products and services, individuals can make more rational decisions, which reduces the likelihood of default and increases bank stability. Matey's (2021) research also found that good financial literacy at the individual and household level can significantly improve national financial stability. Financial literacy helps individuals make wiser financial decisions, such as debt management, saving, and investing, which in turn reduces financial risks and supports stable economic growth. Thus, financial literacy is not only important for individual financial well-being, but also for ensuring broader economic stability, especially in the face of unexpected economic shocks.The lack of consistent financial reporting further undermines the potential benefits of financial literacy, as business decisions are often made without sufficient financial data, ultimately diminishing its impact on financial stability.

Overall, this discussion shows that financial stability is the result of a complex interaction between various factors, including bank asset concentration, financial literacy, and financial inclusion. While high market concentration may offer short-term benefits, such as increased profitability, long-term risks to financial stability should not be ignored. On the other hand, good financial literacy and inclusion can

be an important pillar for financial stability. Thus, maintaining financial stability requires a holistic approach, where all these elements support each other and are protected by an effective regulatory framework.

3. Methodology and Data

The type of data used in this study is secondary data obtained from the World Bank. Based on previous empirical research (Schnaider and Frey, 1986; Gani, 1999; Kustituanto and Istikomah, 1998; Mallampally and Sauvant, 1999; Yang et. al, 2000), the model specification is to determine the variables that influence financial stability in Indonesia during 2004- 2020 used in this research are:

This research will use dynamic econometric models, especially the Error Correction Model (ECM) with the Ordinary Least method to produce estimates. ECM analysis techniques to determine the long term and short term using Eviews software. The ECM model is used to overcome potential errors or differences between theoretical models and statistics, as well as to test the long-term balance relationship between observed variables. Analysis is carried out using various methods, including testing with steps or stages in the form of:

Stationarity Test

The problem of data stationarity is one of the main assumptions that is often ignored by individuals when carrying out economic measurements using regression. Fulfilling this assumption will guarantee that the dependent variable and independent variables have a long-term relationship, which is useful for testing theoretical hypotheses. The relationship between variables produced by the regression equation cannot be guaranteed to be correct in the long term if these assumptions are not made. In other words, the estimated regression equation is only valid for certain cases and cannot be generalized. No guarantee is given. Research objectives and hypothesis testing become impossible to achieve if p occurs. The stationarity assumption has significant implications for economic models and data

translation, because stationary data will show minimal fluctuations and tend to be close to the average value (Eangle and Granger, 1987). On the other hand, data is not stationary and depends on time and trends, resulting in deviations from the average value. Non-stationarity of data can be caused by factors such as time trends, polynomials, unit roots, and degree of integration (Insukindro, 1992).

Table 1. List of variables

No	Variable Name	Measurements	Description	Source
1	Bank asset concentration	5-Bank asset concentration	This measures the percentage of total banking system assets held by the five largest banks.	International Monetary Fund (IMF)
2	Financial Inclusion	Loans from nonresident banks (net) to GDP (%)	The ratio of net loans received from nonresident (foreign) banks to the Gross Domestic Product (GDP)	International Monetary Fund (IMF)

			of a country, expressed as a percentage.	
3	Financial Literacy	Deposit accounts with commercial banks	Number of household sector deposit accounts with commercial banks per 1,000 adults	International Monetary Fund (IMF)
4	Financial Stability	Z-score	Statistical measure used to assess the financial stability and risk of insolvency of a bank or financial institution.	World Bank

ECM (Error Correction Model) Test

ECM (Error Correction Model) is a model used to correct the regression equation between variables that are individually not stationary so that they return to their equilibrium value in the long term, with the main condition being the existence of a cointegration relationship between the constituent variables. (Ajija, et al. 2011: 133). The ECM model in this research can be written as follows:

$$D(stability)_t = a_0 + b_1 * D(bac)_t + b_2 * D(inclusion)_t + b_3 * D(literacy)_t + b_4 * ECT$$

Where :

$D(stability)_t$ = Change from Z-Score

a_0 = Constant (Intercept)

b_1, b_2, b_3, b_4 = Regression coefficient

$D(lps)_t$ = Change in bank asset concentration

$D(inclusion)_t$ = Change in loans from nonresident banks (net) to GDP (%)

$D(literacy)_t$ = Changes in deposit accounts with commercial banks

ECT = Residual Equation or known as Error Correction Term (ECT)

The ECM model can be said to be valid if the cointegrated variables are supported by significant and negative ECT coefficient values. If the ECT coefficient is positive, then the direction of the variables used will move further away from long-term balance so that the ECM model cannot be used (Rahutami, 2011: 6).

4. Analysis Results

Stationarity Test Results

Table 2. Stationarity TestResults

Stationary Test	Variables Tested	ADF Statistics	Critical Value 1%	Critical Value 5%	Critical Value 10%	Probability	Results
ADF Test (Unit Root Test)	ECT	-5.112621	-3.92035	-3.065585	-2.673459	0.0010	Stationary at 1% level

Source: Data Processing Results with Eviews

Based on the results of the stationarity test using the Augmented Dickey-Fuller (ADF) test on the Error Correction Term (ECT), it was found that the ADF Statistics value was -5.112621. This value is lower than the critical value at the 1% (-3.92035), 5% (-3.065585), and 10% (-2.673459) significance levels. The probability associated with this test is 0.0010, which is well below the 0.05 threshold. Thus, we

confidently reject the null hypothesis stating the existence of a unit root in ECT. In other words, ECT is proven to be stationary at the 1% significance level, which means it has no unit root. This result is very important because it shows that in the Error Correction (ECM) model, there is a significant adjustment towards long-term equilibrium after short-term deviations, confirming the validity of this model in analyzing short-term and long-term relationships between the variables tested.

Long Term Estimation Test Results (Ordinary Least Squares)

This research uses the Ordinary Least Squares (OLS) method to obtainthe residual. Long-term test results in the following Table3.

Long-term test results on variables that influence the Bank Z-score (E) show several important findings. In this analysis, three independent variables were tested: bank asset concentration (bac), financial inclusion (inclusion), and financial literacy (literacy).

Table 3. Long Term Estimates

Variables	Coefficient	Std. Error	t-Statistics	Prob.	Description
BAC	-0.076776	0.023508	-3.265965	0.0061	Significant
inclusion	0.192168	0.248279	0.774002	0.4528	Not significant
literacy	0.000963	0.000157	6.113172	0,000	Significant
C	7.841138	1.390681	5.638344	0.0001	

Source: Data Processing Results with Eviews

1. Bank Asset Concentration(BAC)

- The BAC variable coefficient is -0.076776 with a t-statistic value of -3.265965 and a probability of 0.0061. This result is significant at the 1% level, indicating that increasing asset concentration in the five largest banks significantly lowers the

bank's Z-score (E). This means that the more concentrated the assets are in a few large banks, the lower the financial stability, as measured by the Z-score. The more effective the bank asset concentration, the more safe depositors feel about saving their money in any bank, even if it is not a big bank. This fosters healthier competition in the banking sector so that it is no longer too concentrated in large banks.

2. Financial inclusion (inclusion)

- The inclusion variable coefficient is 0.192168 with a t-statistic value of 0.774002 and a probability of 0.4528. This result is not significant, indicating that the bank's credit to deposit ratio does not have a significant influence on the Z-score in the long term.

3. Financial literacy (literacy)

- The literacy variable shows a positive coefficient of 0.000963 with a t-statistic value of 6.113172 and a probability of 0.0000. This result is highly significant, indicating that an increase in Use of Financial Services is positively related to the Z-score, meaning that an increase in this factor significantly increases financial stability.

Overall, these results show that asset concentration in several of the largest banks is negatively related to financial stability, while literacy has a significant positive impact on stability. Although the ratio of loans from non-residents (inclusion) does not have a significant effect in the long term, other factors show important relationships that need to be considered to maintain financial stability.

Error Correction Model (ECM) Estimation

After carrying out a series of tests to identify the model, it was decided that this research would use estimates using the Error Correction Model (ECM). The ECM estimation results will show short and long term relationships. In this study, z-score is used as the dependent variable, while bank asset concentration and use of financial services are used as independent variables. The ECM estimation results can be seen in the following table:

Table 4. ECM Estimation Results

Variables	Coefficient	Std. Error	t-Statistics	Prob.
D(bac)	-0.070941	0.046676	-1.519873	0.1568
D(inclusion)	0.087687	0.16281	0.538585	0.6009
D(literacy)	0.001153	0.000619	1.862233	0.0895
ECT(-1)	-1.287555	0.386107	-3.334711	0.0067
C	-0.03633	0.081857	-0.443818	0.6658

Source: Data Processing Results with Eviews

Based on the output results above, the t-statistic value for the ECT (Error Correction Term) variable is -3.334711 with a probability value of 0.0067 which is smaller than 0.05. This shows that the error correction model (ECM) used is valid. The regression results of the error correction model approach can be rewritten in the following equation:

$$D(stability) = -0{,}070941 * D(lps)_t + 0{,}087687 * D(inclusion)_t - 0{,}001153 * D(literacy)_t - 1{,}287555 * ECT$$

The ECT coefficient value which is negative and statistically significant indicates that the ECM specification model used in this research is valid. The ECT coefficient value of -1.287555 means that the adjustment towards long-term balance after a deviation occurred in the previous period is -1.287555. This means, around 128.75% of the deviation will be corrected in the next period, indicating the existence of a strong adjustment mechanism in this model.

Statistical F Test Results

F-Statistic Test The F-statistical test aims to test whether all the independent variables (independent variables) in this research model have a joint or simultaneous

influence on the dependent variable (dependent variable). Below in Table 5 are the results of the short-term F-statistic test.

Table 5. F-Statistics Test Results for OLS Model

DF (k-1; nk-1)	α	F-statistics	F-table	Conclusion
3; 12	5%	30.9095	3.49	Significant

Source: Data Processing Results with Eviews

From the table above, it can be seen that the F-statistic value is 30.9095. The value of this F-statistic is morelarge compared to the F-table value at a 5% confidence level, namely 3.14. Thus, it can be concluded that the independent variables in this study, namely bank asset concentration, use of financial services, and *deposit money banks' assets to GDP* simultaneously influence the z-score.

Table 6. F-Statistics Test Results for ECM Model

DF (k-1; nk-1)	α	F-statistics	F-table	Conclusion
3; 12	5%	3.000537	3.49	Not Significant

Source: Data Processing Results with Eviews

Based on the data provided, F statistical analysis was carried out to assess the significance of the regression model used. With an F-statistic value of 3.000537 and degrees of freedom (DF1 = 3 and DF2 = 12), the F-table value at the 5% significance level (or 95% confidence level) is around 3.49. In this context, the F-statistic value obtained (3.000537) is lower than the F-table value (3.49). This shows that at a significance level of 5%, the regression model is not strong enough to reject the null hypothesis which states that all independent variable coefficients (except constants) are equal to zero. In other words, overall, the independent variables (D(bac), D(inclusion), and D(literacy)) in this model do not have a significant influence on the dependent variable D(stability).

However, there is one significant variable in this model, namely ECT(-1), which shows that there is a valid error correction mechanism in this model. This means that even if the independent variables are not significant overall, the model is still important for maintaining a stable long-term relationship. However, for short-term effects, this model shows that the independent variables are not strong enough to explain variations in D(stability) significantly.

Coefficient of Determination Test Results (R2)

The coefficient of determination R2 is used to measure how well the regression line fits the data or measure the percentage of the total variation in Y that is explained by the regression line. The R 2 value ranges from 0 to 1. The closer to 1 the better.

Table 7. Coefficient of Determination (R2) ECM Model

R-squared	0.521784	Mean dependent var	0.062493
Adjusted R-squared	0.347887	SD dependent var	0.283692
SE of regression	0.229091	Akaike info criterion	0.140913
Sum squared resid	0.577311	Schwarz criterion	0.382347
Log likelihood	3.872693	Hannan-Quinn Criter.	0.153277
F-statistic	3.000537	Durbin-Watson stat	1.390636
Prob(F-statistic)	0.06693		

Source: Data Processing Results with Eviews

In this research, the dependent variable D (stability) can be influenced both long term and short term. Based on the regression results of the ECM (Error Correction Model) model, an R-squared value of 0.521784 was obtained, which means that independent variables such as D(bac), D(inclusion), and D(literacy) are able to explain the variability of D(stability) amounted to 52.18%, while the remaining 47.82% was explained by other variables not included in this research

model. The Adjusted R-squared value of 0.347887 shows that when adjusted for the number of variables in the model, around 34.79% of the variability in D(stability) can be explained by the model used. These results indicate that the variables in the model have a moderate influence on the dependent variable, but there are also other factors outside the model that also contribute.

Table 8. Coefficient of Determination (R2) OLS Model

R-squared	0.877044	Mean dependent var	4.408547
Adjusted R-squared	0.848669	SD dependent var	0.662928
SE of regression	0.257887	Akaike info criterion	0.329737
Sum squared resid	0.864577	Schwarz criterion	0.525788
Log likelihood	1.197232	Hannan-Quinn Criter.	0.349225
F-statistic	30.9095	Durbin-Watson stat	2.085252
Prob(F-statistic)	0.000003		

Source: Data Processing Results with Eviews

In the OLS model regression results, an R-squared value of 0.877044 is obtained, which means that independent variables such as bank asset concentration, inclusion, and literacy can explain the stability variable by 87.70%, while the remaining 12.30% is explained by other variables in outside the research model. The adjusted R-squared value of 0.848669 shows that after adjusting for the number of variables in the model, around 84.87% of the variability in the stability variable can be explained by the model used. This shows that this regression model has a very good ability to explain the influence of the independent variable on the dependent

variable, with only a small portion of the variability explained by other factors outside this model.

Discussion

a. The Effect of the Bank Asset Concentration on Financial Stability

The BAC variable in the ECM estimation shows a coefficient of -0.076776, which indicates that each1% increase in bank asset concentration will cause a decrease in the bank's Z-score of 0.076776%, ceteris paribus. This result reflects that the greater the concentration of assets in the five largest banks, the lower the financial stability, as measured by the Z-score. The t-statistic is -3.265965 > t-table is 1.782, which shows that the effect of bank asset concentration on the Z-score is significant at the 1% significance level. This is in accordance with the "concentration-fragility" theory which states that asset concentration in a few large banks tends to increase systemic risk and reduce financial stability.

In the long-term regression model (OLS), bank asset concentration also shows a significant relationship with financial stability. The negative coefficient obtained indicates that increasing asset concentration significantly reduces the Z-score, thereby weakening financial stability. LPS functions to protect customer deposits in banks up to a certain limit. When this guarantee program is effective, it will increase customer confidence in the banking system, especially in large banks that have high asset concentrations. This trust is important because large banks usually have a broad impact on the stability of the financial system as a whole. The bank asset concentration can prevent massive fund withdrawals (*bank runs*), which are often initiated by customers' concerns about the security of their funds, especially at banks that dominate the market. These results are consistent with research by Guidi (2021) which states that while higher concentration in the banking industry can increase financial stability by reducing the ratio of non-performing loans, increasing market power can have the opposite effect, potentially leading to greater financial instability. Research conducted by Aldomy et al. (2020) show that there is a negative and significant relationship between concentration and bank stability (Z-score) indicating that increasing market power will result in increased risk. Various other

studies show that high market concentration tends to increase financial risk, especially in the highly concentrated banking sector (Cuestas et al., 2020; Riadi et al., 2022).Nevertheless, the findings contrast with the study by Ali *et al.* (2016), which concluded that banking concentration does not exert a direct influence on financial stability.

b. The Effect of Financial Inclusion on Financial Stability

Financial inclusion and loans from non-resident banks to GDP are interconnected through their influence on a country's financial stability and economic dependence on external sources. High levels of financial inclusion lead to a more robust and diversified domestic financial system, reducing reliance on external financing, such as loans from non-resident banks. This decrease in dependency mitigates the risks associated with external economic fluctuations, which can affect the cost and availability of these loans. Conversely, low financial inclusion may increase a country's reliance on foreign loans, making it more vulnerable to global financial shocks. Thus, enhancing financial inclusion helps lower the proportion of loans from non-resident banks to GDP by strengthening the domestic financial base and improving economic resilience. The financial inclusion variable in the ECM estimation shows a coefficient of 0.192168, which indicates that each 1% increase in the ratio of loans from non-resident banks to GDP will cause an increase in the Z-score of 0.192168%, ceteris paribus. However, with a t-statistic of 0.774002 < t-table of 1.782 and a probability of 0.4528, this result is not significant, indicating that loans from non-resident banks do not have a significant influence on the Z-score in the long term. This may be due to the high volatility and risks associated with external borrowing sources, which makes their impact on financial stability less consistent.

The study from Pham & Doan (2020) finds that while some aspects of financial inclusion, such as savings and account usage, positively contribute to financial stability, other elements, like the expansion of credit and electronic payments, can have mixed or even negative effects on financial stability. This indicates that the impact of financial inclusion on financial stability is not always

straightforward and can vary depending on the specific financial services involved and how they are implemented. Based on research by Pal and Bandyopadhyay (2022), found that the impact of financial inclusion on financial stability is not uniformly significant across all countries. Specifically, while financial inclusion tends to improve financial stability in high- and middle-income countries, its impact is not always significant in low-income countries. The non-significant impact in some cases may be due to weaker financial systems and institutional frameworks, which do not fully support the benefits of financial inclusion in enhancing stability. These results are not consistent with research by Danisman and Tarazi (2020), finding that increasing access to financial services, especially for underserved groups such as less educated individuals, the younger, and those living in rural areas, contributed significantly to the increase bank stability. Financial inclusion helps banking customers and increases the deposit base, which in turn reduces the risk of default and financial volatility. The study from Barik & Pradhan (2021) shows that, contrary to the general expectation that financial inclusion enhances financial stability, greater financial inclusion actually has a negative and significant impact on financial stability.The negative impact is primarily attributed to the rapid expansion of credit to private sectors, which can lead to an erosion of credit standards. This expansion increases the risk of non-performing assets and credit defaults, particularly among the newly included segments of the population who may lack the financial literacy or stability to manage credit effectively.

c. The Effect of Financial Literacy on Financial Stability

Deposit accounts with commercial banks reflect the number of individuals or entities that have access to formal banking services. The increase in the number of deposit accounts at commercial banks indicates increased financial literacy. The literacy variable in the ECM estimation shows a positive coefficient of 0.000963, which indicates that each 1% increase in the use of financial services will cause an increase in the bank's Z-score of 0.000963%, ceteris paribus. With a t-statistic of

6.113172 > t-table of 1.782 and a probability of 0.0000, this result is very significant, indicating that increasing access and use of financial services has a significant positive impact on financial stability. This shows that the more people use banking services, the greater the financial stability as available funds increase, which strengthens bank reserves and increases confidence in the financial system.

Financial literacy is closely linked to the ownership and use of deposit accounts with commercial banks. Individuals with higher financial literacy are more likely to understand the benefits of having a deposit account, such as earning interest, securing their money, and facilitating various financial transactions. This knowledge encourages them to open and maintain deposit accounts, thereby increasing their engagement with formal banking services. On the contrary, a lack of financial literacy can lead to lower utilization of deposit accounts, as individuals may not fully understand the advantages or may distrust formal financial institutions. Enhancing financial literacy is therefore crucial in promoting the use of deposit accounts, which in turn supports greater financial inclusion and stability. Previous research by Rupeika-Apoga et al. (2018) show that credit risk has a negative relationship with bank stability, it's not support this result. In the context of non-resident banks, loans from non-resident banks tend to increase credit risk, which in turn can reduce bank stability. The study found that banks exposed to higher credit risk tend to be less stable, especially during financial crises. Therefore, an increase in lending from non-resident banks, which is often associated with higher credit risks, could have a negative impact on the financial stability of these banks. Research by Asongu et al. (2021) in countries with a low level of informal financial sector development, loans from non-resident banks have a negative influence on financial stability. Research by Rupeika-Apoga et al. (2020) also show similar results, where loans from non-resident banks are often associated with instability due to potential liquidity risks and excessive dependence on external funding sources. However, in some cases, these loans can provide temporary stability benefits if used wisely and within controlled limits

5. Conclusions and Policy Recommendations

Bank asset concentration could lead to financial system stability. And it will be even more effective if accompanied by efforts to increase financial literacy. Financial literacy has a broad meaning, not only knowledge about financial instruments, but also the risks and how the financial sector works. This effort may not yield immediate short-term results, but is a long-term effort that is continuously carried out.

Our findings have important policy recommendations. Stakeholders also need to increase financial literacy, especially regarding how bank asset concentrations are maintained. This is important so that people are no longer afraid to save at a bank even though it is not a big bank. This can create a healthy competitive climate in the banking sector by empowering small banks.

COMPETING INTERESTS DISCLAIMER:

Authors have declared that they have no known competing financial interests OR non-financial interests OR personal relationships that could have appeared to influence the work reported in this paper.

Disclaimer (Artificial intelligence)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.) and text-to-image generators have been used during the writing or editing of this manuscript.

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