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Assessing the Impact of Macroeconomic Uncertainty on the Stability of Listed Commercial Banks in Vietnam

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ABSTRACT. This paper examines the impact of macroeconomic instability on the stability of listed commercial banks in Vietnam. The stability of the banking system plays a crucial role in the national economy and financial system. In the context of current policy instability, macroeconomic instability, and integration, the challenges to the banking system's stability are increasing. The paper uses the GMM estimation method to assess the impact of the Macroeconomic Instability Index (MII) on the Z-score of listed commercial banks in Vietnam. The research results show an inverse impact of macroeconomic instability on banking stability, implying that increased macroeconomic instability weakens banking stability. Macroeconomic shocks degrade credit quality, increase liquidity risk, and increase risk provisioning pressure, leading to banking instability. Furthermore, the national governance index is shown to have a positive impact on banking instability.

1. Introduction

Bank stability is the state in which a bank or banking system maintains the ability to operate continuously, safely, and efficiently in the long term. It is able to fully and promptly meet its financial obligations to customers and stakeholders, and withstands risks arising from both internal and external environments. A stable banking system not only contributes to ensuring the continuous and smooth operation of the financial market but also serves as a foundation to support sustainable economic growth, maintain public confidence, and limit the potential for widespread financial crises [1, 2].

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The stability of the banking system plays a crucial role in financial stability and economic growth. When the banking system maintains stability, it can provide credit, act as a financial intermediary, and transmit monetary policy, thereby contributing to sustainable economic growth. Conversely, banking instability increases systemic risk, erodes market confidence. It can lead to financial collapse with serious consequences for the economy [3, 4].

The stability of a bank depends on macroeconomic factors such as foreign direct investment, the money supply, interest rates, exchange rates, and inflation, as well as microeconomic factors. When both macroeconomic and microeconomic instabilities occur simultaneously, they strongly affect the bank's business operations [5]. A stable and predictable macroeconomic environment is essential for the production and investment of companies, as well as for banks' lending decisions. Macroeconomic instability leads to high inflation rates and large budget deficits, resulting in a sharp decline in private investment [6]. When macroeconomic instability occurs, economic policy decisions become unpredictable or inconsistent, market participants tend to cut investment and spending, reducing credit demand. Simultaneously, increased policy uncertainty exacerbates information asymmetry, increasing adverse selection risk and moral hazard in lending operations. This leads to increased non-performing loans, forcing banks to increase provisions, thereby reducing profitability and financial resilience. In severe cases, it can lead to instability in the banking system [7, 8, 9].

In Vietnam, the banking system plays a crucial role in the financial system, providing capital to the economy. Banks are considered financial intermediaries that channel capital and provide financial services. The stability of the banking system is vital to the national economy. Vietnam is increasingly integrating into the global economy amidst significant instability. Economic instability refers to the unpredictability of the future economic environment and potential risks [10]. This economic instability can arise from various causes such as political instability, changes in economic policy, natural disasters, or adverse market fluctuations.

Globalization facilitates the spread of macroeconomic concerns across borders, potentially impacting the global financial system. Geopolitical risks continue to escalate, trade tensions are increasing, and new protectionist policies could disrupt supply chains, driving up prices of goods and raw materials. In particular, the tax policies of the new US administration could significantly impact international trade, leading to global instability. Furthermore, climate change and extreme weather events are also worrying factors. Unusual developments could directly affect agricultural production, food security, and logistics costs, putting pressure on the prices of essential goods. Simultaneously, the implementation of stimulus packages, interest rate cuts, and increased credit to support growth could cause macroeconomic volatility. Macroeconomic fluctuations are expected to impact the economy in general and the banking system in particular.

This study assesses the impact of macroeconomic instability on the stability of listed commercial banks in Vietnam. Besides part 1, Introduction, part 2 is a research overview, part 3 presents the research model and hypotheses, part 4 contains the research results and discussion, and part 5 is the conclusion.

2. Literature review

Economic instability has been shown to exacerbate information asymmetry between banks and borrowers, leading to credit constraints when banks tighten lending terms, and borrowers fail to meet collateral requirements or have poor credit profiles [11]. Economic instability makes it difficult for credit institutions to assess the potential and future value of borrowers' projects because they cannot predict future economic fluctuations and their impact on borrowers [12, 13].

Furthermore, economic instability significantly reduces the information available in the market [14]. The reason is that businesses tend to conceal unfavorable information and distort financial information provided to external investors in order to manage earnings when economic instability increases [9, 14]. Previous studies have also shown that economic instability increases earnings volatility and degrades the quality of financial reporting [15]. Assessing the quality of a business's project or its ability to repay debt becomes more difficult. This leads to information asymmetry and the risk of making incorrect lending decisions, thereby causing instability in commercial banks.

Economic instability has been shown to negatively impact many macroeconomic factors by causing a precautionary effect. It occurs when firms delay investment decisions, and households reduce spending and increase savings to hedge risks [16, 17]. Firms delay investment decisions because they cannot predict future economic fluctuations, while many investment projects are irreversible or only partially reversible at very high cost [18, 19]. Many businesses downsize, increasing unemployment rates and triggering a precautionary effect from households. As a result, aggregate demand declines, increasing the likelihood of an economic recession [20]. In a negative macroeconomic environment marked by economic instability, the likelihood of commercial bank credit failures also increases. On the other hand, economic instability also causes banks to tighten credit standards, increase risk provisioning ratios, and prioritize maintaining liquidity over expanding lending, thereby affecting their ability to supply capital to the economy and weakening the banking sector's role as a financial intermediary [21]. Economic instability has also been shown to slow credit growth, increase risks, and threaten the stability of the banking system, especially for large-scale banks [21, 22]. Furthermore, uncertainty can reduce investor confidence, cause volatility in the capital market, and affect the value of bank assets [23]. In this context, the quality of banks' assets tends to deteriorate, bad debts increase, and profits shrink, undermining the financial safety buffer.

Literature review on the impact of macroeconomic policy instability on the stability of commercial banks

A review of previous studies demonstrates that economic instability factors affect bank performance [24, 5, 25] and bank lending activities [26, 27, 28, 29, 30], and only a few focus on assessing the impact of instability in the banking industry. Whyte [27] argues that macroeconomic uncertainty affects bank lending activities in the short term. Specifically, fluctuations in benchmark interest rates, influenced by fiscal and monetary policies, are considered the most important macroeconomic variable.

The study by Talavera et al. [31] on Ukrainian banks found that banks' responses to changes in uncertainty were heterogeneous and depended on each bank's specific characteristics. Similarly, it has been observed that the impact of macroeconomic conditions on non-performing loans varies across sectors [32]. Topi & Vilmunen [33] used the conditional variance of consumer or producer inflation, or the volatility of the money supply (M1 and M2), as a measure of macroeconomic uncertainty and examined the impact of monetary policy on bank lending channels in Finland. They found that bank lending activity reacted positively to changes in real income and inflation but negatively to monetary policy shocks.

Bayar & Ceylan [5] argue that macroeconomic instability harms business profitability, both in terms of return on assets (ROA) and return on operating profit (ROAF), by impacting business decision-making. The results show that establishing and maintaining a stable macroeconomic environment is crucial for business profitability, thereby achieving sustainable growth and lower unemployment rates.

However, a limitation is that there are currently no studies in Vietnam that delve deeply into the relationship between economic policy instability and the stability of the national banking system.

3. Model and hypothesis

To analyze the relationship between macroeconomic instability and the banking system's stability in Viet Nam, a research model was developed. The analysis was performed on panel data at the bank level, where bank stability was measured by the Z-score, and macroeconomic instability was represented by the MII index. The System GMM estimation method was used to ensure consistent estimates in the context of data with a large number of observations and a relatively short time dimension.

Research Hypothesis

The focus of this study is to examine whether macroeconomic instability undermines banking stability.

In Vietnam, where bank credit remains the dominant source of capital, policy and macroeconomic instability shocks are expected to strongly affect banks' balance sheets through

non-performing loans, profits, and provisions. Therefore, the study expects that higher levels of macroeconomic instability will degrade the banking system's stability.

The study proposes the following hypothesis:

H1: Macroeconomic instability has a negative impact on the stability of the banking system.

Data and Research Model

This study uses panel data from commercial banks operating in Vietnam during the period 2008–2023. Bank data was collected from audited financial statements of Vietnamese commercial banks, including balance sheets and income statements. Bank-level variables such as profitability, size, net interest margin, and capital adequacy ratio were calculated directly from these reports, following the empirical studies on bank stability.

Macroeconomic and institutional variables were collected from highly reliable international and domestic data sources. The Macroeconomic Instability Index (MII) was constructed based on key macroeconomic variables reflecting the level of instability in the Vietnamese economy each year.

After data collection and cleaning, the final dataset comprises 259 observations, reflecting the dynamics of the Vietnamese banking system amid numerous macroeconomic and institutional fluctuations.

Dependent Variable

The dependent variable is the Z-score, representing the level of financial stability of banks. The Z-score measures the safe distance of a bank from the insolvency threshold, based on profitability, capitalization level, and profit volatility. In this study, the Z-score is calculated using the formula:

$$ZSCORE_{i,t} = \frac{ROA_{i,t} + \frac{Equity_{i,t}}{Assets_{i,t}}}{\sigma(ROA_i)}$$

In which $ROA_{i,t}$ is the return on total assets of bank i at time t, $\frac{Equity_{i,t}}{Assets_{i,t}}$ is the ratio of equity to total assets, and $\sigma(ROA_i)$ is the standard deviation of ROA of bank i over the entire study period.

A higher Z-score indicates a lower probability of bankruptcy and greater bank stability. The use of the Z-score in this study is relevant to the Vietnamese context, where market data is incomplete and inconsistent across the entire banking system, while accounting data is more readily available and consistent.

Independence Variable: Macroeconomic Instability Index (MII)

The Macroeconomic Instability Index (MII) variable represents the degree of instability in Vietnam's macroeconomic environment over time. The MII reflects the overall volatility of the

economy, rather than focusing on a single aspect, thereby allowing for the measurement of the level of uncertainty faced by the banking system in each observed year.

The MII is constructed using a composite index method, in which important macroeconomic variables that can directly impact banking operations are standardized to a single scale. Specifically, this index combines information from components reflecting the main sources of instability in the economy, including inflation, GDP growth volatility, exchange rate volatility, and fiscal imbalance. After standardization, these component variables are averaged to reflect the overall level of instability in the macroeconomic environment during each period.

The use of MII addresses the limitations of one-dimensional instability measures, which reflect only a single aspect of the economy. In the Vietnamese context, macroeconomic shocks often do not occur independently but tend to happen simultaneously across multiple channels, such as rising inflation accompanied by exchange rate volatility or declining growth. Therefore, MII is considered a suitable measure to reflect banks' uncertainty.

A higher MII value implies greater macroeconomic instability, corresponding to a more unpredictable operating environment for the banking system. In the study sample, the MII fluctuates within a relatively wide range, indicating that the Vietnamese economy experiences periods of stability interspersed with periods of strong volatility, thereby creating different challenges to banking stability over time.

Control Variables

To control for bank-specific factors and macroeconomic conditions that may affect stability levels, the research model includes a group of control variables at both the bank and macroeconomic levels.

Worldwide Governance Indicators (WGI)

The WGI (Worldwide Governance Indicators) variable represents the quality of national governance and the institutional environment. WGI is a composite index developed and periodically published by the World Bank that reflects many core aspects of public governance and state administration efficiency.

Specifically, WGI comprises six components: voice and accountability, political stability and absence of violence, government effectiveness, quality of regulation, rule of law, and control of corruption. These components reflect the level of transparency, effectiveness of policy implementation, quality of the legal framework, and the level of institutional risk control in the economy.

In this study, WGI is used as a composite index, reflecting the overall level of governance and institutional quality over time, rather than analyzing each component individually. This approach allows for capturing the overall impact of the governance environment on banking stability while avoiding the high multicollinearity between the individual components of WGI.

A higher WGI value implies better national governance, reflected in higher operational efficiency, a clearer regulatory framework, and more effective law enforcement. Given the tight government regulation of Vietnam's banking system, changes in WGI are expected to significantly affect banking stability through supervisory channels, market discipline, and credit allocation.

Net Interest Margin

At the bank level, the net interest margin (NIM) is included in the model to reflect the profitability of core lending activities. A higher NIM is generally associated with the ability to generate stable income streams, helping banks strengthen provisions and absorb losses, thereby supporting financial stability. Bank size (SIZE), measured by the natural logarithm of total assets, is used to control the impact of size and diversification on bank stability. A larger size can help banks better spread risk, but it can also increase complexity and operational risk.

Capital Adequacy Ratio

The Capital Adequacy Ratio (CAR) reflects a bank's capital and risk-absorption capacity. Capital acts as a crucial buffer, helping banks withstand adverse shocks; therefore, CAR is often considered a stability-support factor. Return on Equity (ROE) is included in the model to assess the bank's financial performance, as sustainable profitability can contribute to medium-term stability.

Macroeconomic Variables

At the macro level, the model controls the GDP growth rate, which reflects the state of the economic cycle and general economic conditions. High economic growth typically improves the cash flow of businesses and households, thereby reducing credit risk and supporting bank stability. In addition, inflation (INF) is included in the model to control the impact of price fluctuations and the monetary environment on banking operations. Inflation can affect banking stability in multiple ways, through real interest rates, credit quality, and market expectations.

Research Model

This study applies the Generalized Method of Moments (GMM) proposed by Arellano and Bond [34] to address endogeneity and dynamic autocorrelation in panel data models. In this study, bank stability is modeled dynamically, with the current Z-score strongly influenced by its past value. When introducing lagged Z-score variables into the regression model, using OLS or Fixed Effects can produce biased and inefficient estimates. GMM overcomes this problem by using lagged values of the explanatory variables themselves to eliminate endogeneity [34]. The proposed estimation model is as follows:

$$ZSCORE_{i,t} = \beta_0 + \beta_1 ZSCORE_{i,t-1} + \beta_2 MII_t + \beta_3 WGI_t + \beta_4 NIM_{i,t} + \beta_5 SIZE_{i,t} + \beta_5 CAR_{i,t} + \beta_6 ROE_{i,t} + \beta_7 GDP_t + \beta_8 INF_t + \epsilon_{i,t}$$

Furthermore, the model includes macroeconomic variables such as GDP, inflation, and, especially, the macroeconomic instability variable (MII) and the national governance index (WGI), which may have bidirectional relationships with banking stability. In this case, GMM

provides better control over endogeneity than traditional regression methods. At the same time, GMM is particularly suitable for short-term panel data (small T) with a large number of observers (large N), a characteristic of Vietnamese banking research data [17].

Details of the model variables and the expected direction of impact are explained in Appendix 1.

To improve estimation efficiency, the study uses System GMM instead of the traditional Difference GMM, as recommended by Blundell and Bond [35]. The GMM system combines both difference and level equations, increasing the tool's power and limiting bias when variables exhibit high dynamic stability, such as Z-scores. After estimation, tests are used to assess the model's fit. The AR(1) and AR(2) tests indicate the existence of first-order autocorrelation but the absence of second-order autocorrelation, which is a necessary condition for the tool's validity. In addition, the Hansen/Sargan test is used to assess the tool's validity; if the p-value is not too small, it indicates that the tool is suitable and does not degrade the model's estimation quality.

4. Research Results and Discussion

The descriptive statistics in Table 1 show that the Z-score, a measure of financial stability, has an average of approximately 12.76 and a standard deviation of 5.35, ranging from 3.5 to 45.6. This indicates significant differences in safety levels among Vietnamese commercial banks. Banks with low Z-scores are generally associated with limited profitability, high risk, and thin capital adequacy margins, while banks with high Z-scores demonstrate a solid financial foundation and greater resilience to economic shocks. This reflects clear stratification within the Vietnamese banking system and shows a tendency for banks to pose systemic risks if not properly controlled.

The Macroeconomic Instability Index (MII) is a composite measure of macroeconomic instability based on the method of Ismihan et al. [36]. According to this method, the MII is calculated by standardizing key macroeconomic indicators (such as inflation, budget deficit, foreign debt, exchange rate volatility, etc.) to a single scale from 0 to 1, and then averaging them. Therefore, a higher MII indicates greater macroeconomic instability. In the study sample, the average MII value is approximately 0.46, with a standard deviation of 0.13, ranging from 0.26 to 0.76, indicating that Vietnam's macroeconomic environment during the study period remained highly volatile. There are periods when the economy remains relatively stable, but there are also periods of significantly increased instability, posing potential risks to the financial and banking system.

For the World Governance Index (WGI), the average value is approximately 0, ranging from -0.96 to 0.79, with a standard deviation of about 0.47. This reflects that the quality of governance and institutions in Vietnam has seen some periods of improvement, but overall it has not yet reached a high, sustainable level. Negative WGI values indicate a limited institutional environment, such as low efficiency in state administration, incomplete regulation of the financial market, or limited control over corruption. Conversely, periods in which WGI gradually moves

towards positive values indicate improvements in transparency, governance efficiency, and institutional stability, thereby creating more favorable conditions for banking operations.

The control variables at the banking and macroeconomic levels generally have values appropriate to the Vietnamese context. The average NIM is approximately 0.03, reflecting profitability from lending activities that, while not excessively high, are fairly stable. The average SIZE of 8.31 indicates stratification in bank sizes, but without extreme disparities. The average ROE is 0.19, indicating generally positive profitability, while the CAR fluctuates significantly, with a large standard deviation, suggesting uneven capital capacity across banks. On the macroeconomic level, average GDP growth is around 6%, and inflation is around 5.26%, reflecting relatively strong growth but still marked by periods of price volatility. Overall, the statistical picture suggests that the Vietnamese banking system operates within a macroeconomic and institutional environment characterized by some volatility, and that the banks themselves exhibit significant differences in financial foundations and operational efficiency.

Table 1. Descriptive statistics of the variables

Variables	Number of observations	Mean	Std. Dev.	Min	Max
$ZSCORE$	259	12.7608	5.3549	3.5	45.6
MII	259	0.4626	0.1323	0.2688	0.7626
WGI	259	$3.45*10^{10}$	0.4762	-0.9620	0.7867
NIM	259	0.0307	0.0116	0.0058	0.0873
$SIZE$	259	8.3172	0.5097	4.5626	9.3619
CAR	259	2.6639	41.4828	0.04	6.676887
ROE	259	0.1978	0.1310	-0.1195	0.6322
GDP	259	5.9800	1.6268	2.554	8.124
INF	259	5.2589	5.1157	0.631	23.115

Source: Author's analysis

Correlation Matrix

The correlation matrix shows that the dependent variable, the Z-score, is negatively correlated with the Macroeconomic Instability Index (MII) ($r = -0.1523$), suggesting that as macroeconomic instability increases, bank stability tends to decrease. This correlation is consistent with theoretical expectations that macroeconomic shocks, policy fluctuations, or economic instability often increase financial risk and weaken the banking system's resilience. Conversely, the Z-score shows a positive correlation with the Composite Governance Index (WGI) ($r = 0.0473$), although this is not significant, reflecting the general trend that a better

governance environment, higher institutional quality, and greater stability of the banking system are associated.

Among the variables characteristic of banking operations, NIM showed a positive, statistically significant correlation with the Z-score (r = 0.3055), indicating that higher profitability is associated with greater financial stability. Bank size (SIZE) showed a slightly negative correlation with the Z-score (r = −0.0959), suggesting that larger banks are not always more stable, possibly due to higher operational risks and complexity. Other variables, such as ROE, CAR, and macroeconomic factors (GDP, INF), showed relatively low correlations with the Z-score, mainly reflecting their supplementary role in the research model.

Notably, the correlations among the independent variables were generally low. The strongest correlation was between WGI and MII (r = −0.6607), suggesting that better governance is generally associated with lower levels of macroeconomic instability. The remaining pairs of variables had significantly lower correlation coefficients, all below 0.8, indicating no strong linear correlation between the explanatory variables.

Table 2. Correlation matrix of variables used in the model

	ZSCORE	*MII*	*WGI*	*NIM*	*SIZE*	*CAR*	*ROE*	*GDP*	*INF*
ZSCORE	1.0000								
MII	-0.1523 ***	1.0000							
WGI	0.0473	-0.6607 ***	1.0000						
NIM	0.3055 *	-0.1184 ***	0.1083 **	1.0000					
SIZE	-0.0959	-0.4224 ***	0.4376 **	0.1599 ***	1.0000				
CAR	-0.0445	0.1154 ***	-0.0880	0.0083	-0.4599 ***	1.0000			
ROE	0.0918	-0.2821 ***	0.2724 ***	0.5122 ***	0.5008 ***	0.0236	1.0000		
GDP	-0.0970	0.2912 **	-0.3093 ***	-0.0397	-0.1169 **	0.0165	-0.115 ***	1.0000	
INF	0.0875	0.4179 ***	-0.7230 ***	0.0227	-0.3730 ***	0.1640 ***	-0.0558	0.0196	1.0000

Source: Author's analysis

Regression Results with GMM Model

The results in Table 3 show that all independent variables have relatively low VIF values. The highest values of MII are 3.69, and WGI is 2.57, while the remaining variables range around 1.24–2.36; Mean VIF = 2.09. These levels are significantly lower than commonly used warning thresholds, indicating that multicollinearity is not a significant concern in the dataset. Thus, multicollinearity is not a significant concern, allowing these variables to be reliably included in the GMM model.

Table 3: Results of multicollinearity testing of variables used in the model

Variables	VIF	1/VIF
MII	3.69	0.2712
WGI	2.57	0.3898
NIM	2.36	0.4237
$SIZE$	2.11	0.4736
CAR	1.90	0.5265
ROE	1.46	0.6841
GDP	1.39	0.7179
INF	1.24	0.8075
Mean	2.09	

Source: Author's analysis

The study chose System GMM estimation because this method is suitable for the characteristics of time-series bank panel data, in which: (i) the dependent variable reflects bank stability with high dynamicity and robustness; (ii) there is a potential for endogeneity to arise between bank stability and explanatory variables (due to bidirectional relationships and/or omitted variables); and (iii) the data structure usually has a small number of time-series observations T. The methodological basis of GMM was developed from Arellano & Bond's Difference GMM [34] and extended to System GMM by Blundell & Bond [35] to enhance the effectiveness of the tool and improve estimation quality.

First, regarding residual autocorrelation, the Arellano–Bond test is used to assess the key GMM assumption: the absence of second-order autocorrelation (AR(2)) in the differenced errors. Arellano & Bond [34] showed that in the dynamic panel model, AR(1) in the difference may appear due to the difference transformation, but the condition determining the consistency of the tool is that AR(2) is not statistically significant [34]. The estimation results of the study show that the p-value of AR(2) = 0.374 > 0.10, thus not rejecting the hypothesis of no second-order

autocorrelation; this implies that the model satisfies the core assumption of System GMM, and the lag tools used in the difference equation are appropriate in terms of the correlation condition with the error.

Secondly, the study examines the validity of the toolkit using two overidentifying constraint tests: the Sargan and Hansen tests. In principle, both tests test the hypothesis that the instrumental variables are valid (i.e., uncorrelated with the error term). However, with panel data, especially when the model uses robust standard errors, the Hansen test is often preferred for interpretation because it is more robust in cases of heterogeneous error variance or generalized noise patterns; whereas the Sargan test is more sensitive to the assumption of homogeneity of variance, so it sometimes yields more strict results. The results show that the Hansen test has a p-value of 0.764; therefore, it does not reject the hypothesis of instrumental validity. In other words, the toolkit is considered appropriate, and there is no evidence of violation of the exogenous condition. Meanwhile, the Sargan test has a p-value of 0.092, which is at the borderline, suggesting that the test is tighter but not strong enough to conclude that the toolkit is invalid at conventional significance levels (especially with a 5% threshold). The difference between Sargan and Hansen is a common phenomenon in GMM studies. In addition, the study also noted the risk that too many tools could weaken the Hansen test; however, with small degrees of freedom (chi2(3)), the number of effective tools is not large, so this risk is considered limited, and the Hansen results can be trusted to confirm the validity of the toolkit.

Third, Difference-in-Hansen tests were used to assess the validity of the supplementary tool set [35]. The Difference-in-Hansen results, with p-values of 0.770 and 0.427, respectively, do not reject the hypothesis that the tools used for the level equation are valid. Thus, the synthesis of diagnostic tests (AR(2), Hansen, Difference-in-Hansen) concludes that the System GMM model in the study meets the econometric requirements, providing a sufficient basis to interpret the estimated coefficients as statistically and economically significant relationships within the model framework. The results of the GMM model are shown in the table below:

Table 4: GMM estimation results of variables in the model

	Coef.	**Std. Err.**	**P > |t|**
Dependent variable: *ZSCORE*			
L.ZSCORE	0.7745**	0.2897	0.015
MII	-4.6619*	2.2714	0.054
WGI	1.2839*	0.7097	0.086
NIM	93.5129***	31.6956	0.008
SIZE	-0.6854	1.5719	0.668
CAR	-0.0075	0.0097	0.448
ROE	-0.4021	3.4703	0.909
GDP	0.1879**	0.0863	0.042
INF	0.1369*	0.0776	0.094
_cons	6.2078	15.5106	0.693
Arellano-Bond AR(1)	0.316		
Arellano-Bond AR(2)	0.374		
Sargan test chi2(3)	0.092		
Hansen test chi2(3)	0.764		
Difference-in-Hansen chi2(2)	0.770		
Difference chi2(1)	0.427		

Source: Author's analysis

The results in Table 4 show that macroeconomic instability (MII) has a negative coefficient (β = -4.6619, p = 0.054). International evidence also shows that uncertainty, such as geopolitical risk, policy uncertainty, or news shocks, tends to reduce the Z-score (i.e., reduce bank stability) [37, 38, 39]. In the context of Vietnam, a highly open economy with a business sector significantly dependent on bank credit, fluctuations in inflation, exchange rates, global financial conditions, or growth slowdowns can quickly translate into banks' balance sheets through increased non-performing loans, higher cost of capital, and pressure to make provisions. Therefore, the negative sign of MII is not only theoretically appropriate but also has clear policy implications. Macroeconomic stability plays a fundamental role in safeguarding the banking system.

In addition, the L.ZSCORE is positive and statistically significant at the 5% level (β=0.7745, p=0.015), reflecting the sustainability of bank stability, as past stability tends to persist

into the present. This result is consistent with the characteristics of banking operations, where asset quality, risk management capacity, profitability, and capital buffers/reserves tend to accumulate over time and do not fluctuate instantaneously. Empirical studies on bank stability in Vietnam also often note the persistence of the stability indicator when estimated using a dynamic panel framework (GMM), thereby confirming the suitability of the specification with a lagged dependent variable in the context of the Vietnamese banking system during the restructuring and enhanced safety supervision phase [40, 41]. In practical terms, this aligns with the observation that banks with strong governance, effective bad-debt control, and stable liquidity tend to remain safe for many years; conversely, weak banks may prolong their precarious situation without restructuring, bad-debt resolution, or improved governance.

Third, the world governance index (WGI) had a positive and significant impact at the 10% level ($\beta = 1.2839$, $p = 0.086$). The WGI is a composite index published by the World Bank that measures six aspects of governance, including government effectiveness, regulatory quality, rule of law, and control of corruption. The empirical results of the study are consistent with much previous evidence suggesting that better institutional quality and governance reduce systemic risk and improve financial stability. For example, transnational and regional studies in Asia have noted that good governance is positively associated with financial stability, and that elements such as the rule of law, corruption control, or government efficiency are often associated with lower banking risk and higher Z-scores [42, 43, 3]. For Vietnam, the positive impact of WGI can be interpreted through the following transmission channels: (i) improved legal framework and enforcement quality reduces information asymmetry and moral hazard in credit; (ii) more effective and transparent banking supervision limits risk accumulation; (iii) corruption control and improved policy effectiveness help reduce credit allocation distortions and improve market discipline. These channels are particularly important as Vietnam strengthens capital adequacy standards, addresses non-performing loans, and enhances banking governance in line with international practices.

Among the bank-specific variables, NIM has a strong positive impact and is highly statistically significant ($p<0.01$), indicating that net interest income generation capacity is a key factor in consolidating stability. Essentially, NIM reflects the ability to generate core earnings from intermediary activities. This is a crucial resource for banks to strengthen provisions, absorb losses, and maintain resilience against shocks. Many studies on bank stability emphasize the role of profitability and income structure in relation to the Z-score; another branch of research also indicates that not only the NIM level but also its volatility can be related to risk (high NIM volatility is often associated with low stability) [44, 45, 46]. In the context of Vietnam, where interest rate spreads and deposit and lending structures are influenced by deposit competition, interest rate policies, and credit cycles, these results suggest that improving asset quality, optimizing capital costs, and enhancing the efficiency of credit risk pricing will support bank stability more sustainably than simply expanding scale.

The variables SIZE, CAR, and ROE are not statistically significant in the model. This result may reflect several scenarios in the Vietnamese fact. Firstly, the impact of size and capitalization may not be linear or may depend on risk structure, governance quality, and income structure; since the model has controlled for the long-term stability (L.ZSCORE) and net interest margin (NIM), the remaining "independent" impact of SIZE/CAR/ROE may no longer be significant. Secondly, ROE is an accounting profit indicator that can fluctuate cyclically and is influenced by provisioning policies, whereas stability (Z-score) reflects safety in general; therefore, the relationship between ROE and Z-score may not be stable over time. Third, during the period when Vietnam was strengthening safety standards and restructuring its system, CAR may have been adjusted to align with supervisory requirements and risk management practices, making the marginal impact of CAR on the Z-score difficult to identify in the endogenously controlled model. Studies on banking stability in Vietnam and emerging markets also show that results on SIZE/CAR are sometimes inconsistent across samples and periods, reinforcing the argument that these variables should be interpreted in relation to the profit channel, credit risk, and macroeconomic conditions [3, 40, 41].

In the macroeconomic variables group, GDP has a positive and significant impact at the 5% level (β=0.1879, p=0.042), implying that economic growth supports banking stability. This result is consistent with basic economic mechanisms. When growth improves, corporate cash flow and household income increase, debt repayment capacity improves, bad debt decreases, and provisioning pressure is reduced, thereby strengthening the Z-score. Empirical evidence in many contexts also often shows that GDP/economic growth is a positive factor for banking stability [3, 46]. For Vietnam, this result is particularly significant because bank credit remains the main channel for capital flow in the economy; therefore, maintaining the quality of growth and the health of the business sector will directly contribute to improving the stability of the banking system.

The INF variable in the model has a positive sign and is significant at the 10% level (p=0.094), suggesting that the impact of inflation on bank stability may be threshold-dependent and context-non-homogeneous. Theory and empirical evidence show that inflation can have both beneficial mechanisms (reducing the real value of some debt obligations, improving nominal revenue) and adverse mechanisms (increasing uncertainty, distorting real interest rates, weakening creditworthiness and market confidence) [42, 40, 37]. Therefore, the positive sign in the sample may reflect periods of relatively controlled inflation, accompanied by nominal growth and improved interest income; However, from a policy perspective, this result should not be interpreted as asserting that high inflation is good for stability, but rather as an indicator that the INF–stability relationship may be subject to the conditions of the credit cycle, credit risk, and monetary policy framework.

In summary, the empirical results show that banking stability in Vietnam is a composite product of three groups of factors: (i) institutional foundation and national governance quality

(WGI), (ii) the level of macroeconomic environment stability (MII, GDP, INF), and (iii) the internal operational capacity of banks (especially NIM), while being strongly influenced by the long-term nature of stability (L.ZSCORE). This result is consistent with the common approach while emphasizing the simultaneous role of institutional, macroeconomic, and microeconomic factors. In terms of policy implications, the study suggests that strengthening the stability of the Vietnamese banking system should be implemented in a coordinated manner: (1) continuing to improve institutional quality, regulatory capacity, and enforcement effectiveness; (2) maintaining macroeconomic stability and minimizing policy uncertainty; and (3) improve banking performance in depth (optimize sustainable profit margins, credit-liquidity risk management, and income quality), instead of relying solely on expansion or short-term accounting profit indicators.

5. Conclusion

The study results show a negative MII coefficient ($\beta = -4.6619$) and significance at approximately 10% ($p = 0.054$), indicating that increased macroeconomic instability undermines banking stability, consistent with hypothesis H1 and the argument that macroeconomic shocks worsen credit quality, increase liquidity risk, and increase provisioning pressure. A positive WGI coefficient ($\beta = 1.2839$; $p = 0.086$) suggests that improved national governance quality is associated with higher stability. A better institutional environment reduces information asymmetry, enhances supervisory effectiveness, and reduces risk accumulation within the system.

Thus, macroeconomic instability is a significant source of risk for the Vietnamese banking system, consistent with the conclusions of many international studies on EPU/GEPU [7, 47, 3]. The estimated coefficients indicate that the Z-score's sensitivity to MII is relatively high, especially in an economy with increasing financial openness and an underdeveloped capital market, placing the burden of financial intermediation on the banking sector.

The quality of national governance acts as an institutional buffer, mitigating the adverse impact of macroeconomic instability on the banking system. Periods of improved WGI often coincide with a recovery in the Z-score, and WGI shows a strong negative correlation with MII, suggesting that improved public governance is associated with reduced macroeconomic instability.

Compared to previous studies that primarily focused on the impact of EPU/GEPU or individual institutional indicators, the results of this study highlight the importance of simultaneously analyzing both institutional factors and macroeconomic instability within a unified model, thereby providing additional evidence for the argument that improved national governance is an indispensable pillar of banking stability strategies in emerging economies.

Appendix 1:

List of variables used in the model and expected sign

Variables	Explaination	Expected sign
$ZSCORE$	The Z-score measures the financial stability of bank i at time t. A higher Z-score indicates a lower probability of bankruptcy and a more stable banking system. This is the dependent variable of the model.	
MII	The macroeconomic instability index reflects the level of stability or instability of the economy, and is constructed from variables representing key aspects of the macroeconomic environment, including inflation, GDP growth volatility, exchange rate volatility, and fiscal imbalances.	-
WGI	The National Governance Quality Index, constructed using the PCA based on six components of the WGI, includes: Voice and Accountability, Political Stability, Government Effectiveness, Regulatory Quality, Rule of Law, and Control of Corruption. The composite index reflects the level of effectiveness of state governance and the institutional environment.	+
NIM	The bank's net interest margin, reflects its profitability from core lending activities.	+
$SIZE$	Bank size, typically measured by the natural logarithm of total assets.	+
CAR	The capital adequacy ratio reflects capital capacity and the ability to absorb risk.	+
ROE	Return on equity reflects the overall financial performance of the bank.	+
GDP	Economic growth represents the overall macroeconomic conditions.	+
INF	Inflation reflects the degree of price fluctuations in the economy.	-

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