



The impact of income diversification on the stability of Vietnamese joint-stock commercial banks

Dr. Nguyen Thi Ngoc Diem, Nguyen Mai Ha Vy

Saigon University, Vietnam

Abstract

This study investigates the impact of income diversification on the financial stability of Vietnamese joint-stock commercial banks over the period 2012 - 2024. The findings show that income diversification has a positive and statistically significant effect on financial stability, implying that an appropriate expansion of non-interest income sources helps banks reduce dependence on traditional lending activities and enhance resilience to risk. Based on these results, the study proposes managerial recommendations for banks and policy implications to promote income diversification alongside strengthened safety and stability of Vietnam's banking system.

Keywords: Income diversification, financial stability, Z-score, System GMM.

Introduction

In the context of Vietnam's increasingly deep integration into the regional and global economy, the banking sector often regarded as the economy's lifeblood faces both significant opportunities and substantial challenges. One of the most pressing issues today is to ensure the financial stability and sustainability of joint-stock commercial banks (JSCBs) amid heightened market volatility.

Income diversification is widely viewed as an inevitable strategic direction for banks to reduce reliance on traditional income sources while expanding other profit-generating activities such as payment services, insurance, foreign exchange trading, financial advisory, securities, and digital banking. According to Modern Portfolio Theory, diversifying income across multiple activities can reduce an institution's overall risk through offsetting effects among income streams with low correlations (Markowitz, 1952; Stiroh, 2004) ^[1]. International evidence further indicates that, when implemented effectively, income diversification not only enhances profitability but also reduces income volatility and strengthens banks' resilience to economic and financial shocks (Elsas, Hackethal, & Holzhäuser, 2010; Sanya & Wolfe, 2011) ^[2, 3].

In Vietnam, although several banks have pioneered the development of non-credit products such as bancassurance, digital banking, and electronic payments, the implementation of income diversification strategies remains neither comprehensive nor systematic. Many banks still maintain income structures heavily dependent on interest income from lending, while fee-based income, service income, and financial investment income account for relatively modest proportions and tend to fluctuate substantially. Moreover, empirical research in Vietnam remains limited, with relatively few studies systematically examining the relationship between income diversification and banks' financial stability, particularly in the context of a transition economy and an emerging banking system such as Vietnam.

This research not only clarifies the role of income structure in banks' financial stability, but also provides empirical evidence to support bank managers, investors, and policymakers in shaping sustainable development strategies

for the financial-banking sector. Accordingly, the study contributes to strengthening the theoretical foundation of financial risk management in banking and provides a basis for more in-depth future research.

Literature Review

Prior studies on the relationship between business diversification and bank financial stability yield mixed results, which largely depend on market conditions, the degree of diversification, and each bank's financial capacity and governance quality. Faisal Abbas and Shoaib Ali (2021) represent a notable contribution examining the effects of asset, income, and funding diversification on risk and financial stability among U.S. commercial banks. Using data from approximately 1,000 banks over 2002 - 2019 covering the pre-, during, and post 2007 - 2008 global financial crisis periods the authors applied 2SLS and two-step System GMM to address endogeneity. Their findings suggest that income diversification tends to increase risk and reduce financial stability, particularly during crisis periods, because non-interest activities are often more volatile and entail higher managerial costs. In contrast, diversification of assets and funding sources improves financial stability, especially for banks with medium and low capital levels, by dispersing risk and strengthening balance-sheet structure.

In the European post-crisis context and under Basel III implementation, Ben Lahouel *et al.* (2022) ^[7, 8] analyzed the role of income diversification in the relationship between liquidity risk and bank stability. Using data on 176 commercial banks across 34 European countries during 2010 - 2019 and employing a Panel Smooth Transition Regression (PSTR) model to test nonlinearity and identify threshold effects, the study found that income diversification can improve stability when maintained at an appropriate level, functioning as a "buffer" that balances liquidity and profitability. However, when diversification exceeds a certain threshold, the stabilizing effect weakens as banking operations become more complex and monitoring and risk-management costs rise.

Octavianus and Fachrudin (2022) ^[12] approached the topic through a systematic literature review (SLR), examining 30

studies published between 2004 and 2021 on the relationship between income diversification and bank stability. The review indicates that diversification is commonly measured by the Herfindahl - Hirschman Index (HHI) or the ratio of non-interest income to total income, while stability is frequently proxied by the Z-score; GMM estimators are widely used due to their suitability for handling endogeneity in banking panel data. Importantly, the empirical evidence is not uniform: some studies report positive effects, others report negative effects, and some find no clear relationship. The authors therefore emphasize that country context, bank type, bank size, and macroeconomic conditions may alter the direction of the effect, and suggest that future research should focus on optimal thresholds and intermediary mechanisms such as liquidity, competition, and regulatory frameworks.

Le Dinh Luan, Le Dinh Hac, and Le Hoang Anh (2024) conducted a comprehensive assessment of the impact of diversification on the performance of Vietnamese commercial banks, covering income diversification, asset diversification, and off-balance-sheet diversification. The dataset includes 26 Vietnamese commercial banks over 2008 - 2023, representing more than 90% of total system assets and thus ensuring strong representativeness. The results show that diversification in income, assets, and off-balance-sheet activities enhances bank performance and stability; bank size and equity also exert positive effects. Synthesizing prior studies, the author identifies a research gap in Vietnam stemming from the limited consideration of macroeconomic factors such as inflation, as well as the lack of updated evidence for the 2020 - 2024 period affected by COVID-19. Therefore, new research should adopt a more comprehensive approach that integrates bank-specific factors and the economic environment to accurately evaluate the role of income diversification in the financial stability of Vietnamese joint-stock commercial banks.

Research Model and Methodology

Research Hypotheses

According to Markowitz's portfolio theory (1952) ^[1], allocating income sources across multiple "channels" can reduce overall risk through offsetting effects among income streams. Applied to banking, when the share of non-interest income (e.g., services, payments, insurance, investment) increases, banks can reduce dependence on interest income, which is sensitive to credit cycles and interest rate fluctuations. This reasoning aligns with the view that banks with higher non-credit income shares are generally less exposed to credit risk and interest rate volatility (Sanya & Wolfe, 2011) ^[3].

In Vietnam, non-interest income for joint-stock commercial banks is typically associated with payment services, cards, bancassurance, and digital banking activities that are largely fee-based and potentially more stable than high risk investment activities. Hence, based on Markowitz's risk diversification argument and empirical evidence from emerging markets, it is reasonable to expect that income diversification supports the financial stability of Vietnamese joint-stock commercial banks, provided that diversification does not exceed a level where complexity and governance costs rise sharply.

Hypothesis H1: Income diversification has a positive effect on the financial stability of joint-stock commercial banks in Vietnam.

Bank size reflects financial capacity, operational diversification, and shock-absorbing ability. In practice, large banks typically have (i) stronger resource buffers (capital, profits, liquidity reserves), (ii) more diversified portfolios across customers, industries, and regions, and (iii) greater ability to invest in risk-management systems, data, and technology, thereby reducing the probability of insolvency. An important mechanism is the "scale-based risk diversification effect": broader portfolios reduce concentration risk and profit volatility, leading to a higher Z-score.

Octavianus and Fachrudin (2022) ^[12] highlight bank size as a contextual factor that may alter the effect of diversification on stability. Farag *et al.* (2025) ^[10] also report that variables capturing efficiency and system structure play a role in enhancing stability. In emerging-market studies (Wang & Lin, 2021) ^[14, 15], however, larger size may sometimes be associated with greater complexity and risk, implying that the effect may not be fully uniform.

Hypothesis H2: Bank size has a positive effect on the financial stability of Vietnamese joint-stock commercial banks.

A high loan ratio indicates greater dependence on lending activities traditional income sources that are vulnerable to economic cycles and credit risk. Abbas and Ali (2021) show that portfolio and balance-sheet structure are critical for risk and stability, while Ben Lahouel *et al.* (2022) ^[7, 8] emphasize that liquidity channels and asset structure can shift stability across "regimes." These findings support viewing credit dependence as a factor that may reduce stability, especially under volatility. In Vietnam, credit growth and credit quality are central concerns closely linked to economic cycles and the real estate/corporate sectors.

Hypothesis H3: The ratio of customer loans has a negative effect on the financial stability of joint-stock commercial banks in Vietnam.

The ability to mobilize stable customer funding is crucial for liquidity and long-term stability. Abbas and Ali (2021) indicate that funding diversification can reduce risk and improve stability; Ben Lahouel *et al.* (2022) ^[7, 8] also underscore capital structure and liquidity as key channels determining stability. Vietnam's banking system remains heavily reliant on retail and corporate deposits. Banks with strong deposit bases tend to face fewer liquidity pressures and are less vulnerable to fluctuations in interest rates and interbank market conditions.

Hypothesis H4: The customer deposit ratio has a positive effect on the financial stability of joint-stock commercial banks.

High equity reflects stronger self-protection capacity against risks, reducing default likelihood and improving financial stability. Abbas and Ali (2021) stratify banks by capitalization and show that the effect of diversification varies across capital levels, underscoring equity as a "foundational condition." Farag *et al.* (2025) ^[10] also consider the capital adequacy ratio (CAR) an important outcome associated with stability.

Hypothesis H5: The equity ratio has a positive effect on the financial stability of joint-stock commercial banks.

High operating costs reflect lower managerial efficiency, potentially reducing profitability and increasing operational risk. Many studies identify operating efficiency as an important determinant of stability. Adem (2022) ^[5] and Farag *et al.* (2025) ^[10] both find that efficiency/cost measures and macroeconomic conditions are significantly linked to stability. In the digital transformation era, banks with high cost to income ratios (CIR) often face intense competitive pressure and margin compression. Thus, higher CIR is expected to reduce stability.

Hypothesis H6: The operating cost ratio has a negative effect on the financial stability of joint-stock commercial banks in Vietnam.

The loan to deposit ratio is a key liquidity indicator; low liquidity may make banks more vulnerable to cash-flow crises. Ben Lahouel *et al.* (2022) ^[7, 8] place liquidity at the center of their analysis and show that liquidity risk relates to stability through nonlinear mechanisms. Abbas and Ali (2021) likewise emphasize that balance-sheet and funding structures determine risk exposure.

Hypothesis H7: Liquidity has a positive effect on the financial stability of joint-stock commercial banks in Vietnam.

High non-performing loans (NPLs) deteriorate asset quality and increase provisioning costs, thereby adversely affecting financial stability. Farag *et al.* (2025) ^[10] identify NPL as a core risk variable and report that diversification helps reduce NPLs; Tran *et al.* (2023) ^[13] also treat NPL as an indicator reflecting stability. These findings reinforce the role of NPLs as a destabilizing factor.

Hypothesis H8: The non-performing loan ratio has a negative effect on the financial stability of joint-stock commercial banks in Vietnam.

ROA reflects asset-based profitability. A higher ROA indicates better operational performance and stronger resilience to financial risks. Farag *et al.* (2025) ^[10] include ROA as an important control variable and find that performance is associated with stability; multiple reviews (Octavianus & Fachrudin, 2022) ^[12] likewise show that efficiency measures often serve as key explanatory channels for stability.

Hypothesis H9: Return on assets has a positive effect on the financial stability of joint-stock commercial banks in Vietnam.

Inflation is a macroeconomic factor that can influence bank stability through funding costs and credit risk. When inflation rises sharply, borrowers' repayment capacity declines, asset quality worsens, and credit risk increases. Kim *et al.* (2020) ^[11] highlight that crises and macro conditions can alter the effects of diversification; Farag *et al.* (2025) ^[10] report that high inflation weakens bank stability; Adem (2022) ^[5] also considers inflation an unfavorable factor for stability.

Hypothesis H10: Inflation has a negative effect on the financial stability of joint-stock commercial banks in Vietnam.

Research Model

This study primarily builds on Le Dinh Luan, Le Dinh Hac, and Le Hoang Anh (2024). Accordingly, the panel regression model to test the impact of income diversification on the financial stability of Vietnamese joint-stock commercial banks is specified as follows:

$$ZSCORE_{it} = \beta_0 + \beta_1 HHI_{it} + \beta_2 SIZE_{it} + \beta_3 LOAN_A_{it} + \beta_4 DEPO_A_{it} + \beta_5 E_A_{it} + \beta_6 Exp_A_{it} + \beta_7 LIQ_{it} + \beta_8 NPL_{it} + \beta_9 ROA_{it} + \beta_{10} INF_{it} + \varepsilon_{it}$$

Where

ZSCORE: Bank stability.

HHI: Income diversification.

SIZE: Bank size;

LOAN_A: Loans-to-assets ratio;

DEPO_A: Deposits-to-assets ratio;

E_A: Equity-to-assets ratio;

Exp_A: Operating expenses-to-assets ratio;

LIQ: Liquidity;

NPL: Non-performing loan ratio;

ROA: Operating performance;

INF: Inflation rate.

ε : Regression error term.

Research Methods

Pooled OLS, Fixed Effects Model (FEM), and Random Effects Model (REM) are estimated to compare the magnitude and statistical significance of coefficients, thereby providing an initial assessment of the relationship between income diversification and bank stability.

Based on the initial estimates, the study performs an F-test to identify the existence of bank-specific effects, thereby evaluating the suitability of FEM relative to pooled OLS. Meanwhile, the Breusch Pagan Lagrange Multiplier (LM) test is used to examine whether REM improves upon pooled OLS by testing for a random error component. If both FEM and REM are found to be more appropriate than pooled OLS, the Hausman test is conducted to select the final model by assessing whether individual effects are correlated with explanatory variables. This combination of tests ensures that the selected model properly reflects the panel data structure and mitigates estimation bias.

However, because banking data are inherently dynamic where current financial stability may be influenced by past stability and because income diversification may be endogenous to bank stability, the study further applies the two-step System GMM approach to provide deeper verification of this relationship. System GMM enables the use of appropriate lagged variables as instruments, thereby simultaneously addressing endogeneity, autocorrelation, and heteroskedasticity commonly encountered in panel banking data. Model reliability is evaluated through diagnostic tests, including the Hansen/Sargan tests for instrument validity and the Arellano Bond tests for residual autocorrelation. This approach enhances the robustness of estimation results and strengthens the empirical foundation of the study's conclusions.

Data

The data used in this study are collected from Vietnamese joint-stock commercial banks based on audited financial statements for the period 2012 - 2024, ensuring that the sample captures the banking system's dynamics before, during, and after the COVID-19 pandemic. The sample

consists of 27 banks, representing more than 90% of total assets in the sector. Banks are selected based on the following criteria: availability of complete audited financial statements, continuous operation during the study period, and transparent disclosure of financial indicators in compliance with State Bank of Vietnam regulations.

Empirical Results

The Impact of Income Diversification on Financial Stability Using Pooled OLS, FEM, and REM

Table 1: Regression results on the impact of income diversification on financial stability using Pooled OLS, FEM, and REM

	(1)	(2)	(3)
	Pooled OLS	FEM	REM
HHI	0.2677 (0.8290)	0.2198 (1.0246)	0.2581 (0.9169)
SIZE	0.1800*** (0.0693)	0.3016** (0.1453)	0.1922** (0.0904)
LOAN_A	-0.9331 (0.5702)	-0.3923 (0.9404)	-0.4895 (0.7186)
DEPO_A	-0.1450 (0.2889)	0.0756 (0.2870)	-0.0426 (0.2800)
EA	3.0149 (1.8723)	4.0726* (2.0970)	3.2721* (1.9307)
EXP_A	-6.6070 (12.2334)	-13.9872 (11.9152)	-10.1263 (11.6465)
LIQ	-0.5006 (0.7010)	-0.5839 (0.9404)	-0.4768 (0.7986)
NPL	-5.1734** (2.1699)	-8.0611*** (2.2815)	-6.8110*** (2.1822)
ROA	-54.4128*** (11.2774)	-41.3429*** (14.8848)	-44.1124*** (12.7548)
INF	-9.1607*** (2.7642)	-7.1836** (2.8463)	-8.4697*** (2.6380)
L.ZSCORE			
CONS	1.8360 (1.8109)	-1.0428 (3.0450)	1.2039 (2.1467)
F-test	0.0000		
LM-test	0.0000		
Hausman-test	0.3287		

Source: Compiled results from STATA 17 software

The regression results indicate that the model is estimated using three different methods: Pooled OLS, Fixed Effects Model (FEM), and Random Effects Model (REM). The objective is to identify both the magnitude and direction of the impact of income diversification (proxied by the HHI variable) on the financial stability of Vietnamese commercial banks, while also assessing the robustness and suitability of the estimation models.

The results show that the HHI variable has a positive coefficient in all three models (0.2677; 0.2198; 0.2581); however, it is not statistically significant in any specification. This implies that the current level of income diversification has not yet exerted a clear influence on the financial stability of Vietnamese joint-stock commercial banks. A possible explanation is that banks continue to rely predominantly on interest income from traditional lending activities, while non-interest income (from services, investments, and insurance) remains relatively small in proportion, highly volatile, and insufficiently developed to play a stabilizing role in earnings.

The SIZE variable (bank size) exhibits a positive coefficient and is statistically significant at the 1% level in the Pooled OLS model and at the 5% level in both the FEM and REM. This result confirms that larger banks tend to exhibit greater financial stability due to their superior ability to diversify risk, economies of scale in funding mobilization, better market access, and stronger managerial capacity. This finding is consistent with studies by Wang and Lin (2021)^[14, 15] and Le Dinh Luan *et al.* (2024), which argue that larger banks are better able to maintain operational efficiency and withstand financial shocks.

The equity to assets ratio (EA) carries a positive sign and is statistically significant at the 10% level in the FEM and REM, indicating that banks with higher capital adequacy tend to be more stable. Equity capital acts as a “buffer” to absorb losses when risks materialize, thereby reducing the probability of insolvency. This result aligns with Basel III capital adequacy requirements and empirical studies on the relationship between capitalization and financial stability.

The variables NPL, ROA, and INF all display negative coefficients with high statistical significance, suggesting that they contribute to a decline in financial stability. Specifically, NPL has a negative coefficient significant at the 1 - 5% levels, indicating that an increase in non-performing loans leads to a lower Z-score and, consequently, a higher risk of bank failure. The ROA variable shows a strongly negative and highly significant coefficient ($p < 0.01$), implying that higher profitability is often associated with greater risk, which is consistent with the risk–return trade-off principle. The inflation variable (INF) also exhibits a significantly negative coefficient across all three models, reflecting that rising inflation undermines bank stability through higher funding costs, increased credit risk, and greater volatility in market interest rates.

The remaining variables LOAN_A, DEPO_A, EXP_A, and LIQ have coefficients with expected signs but are not statistically significant, suggesting that they do not play a decisive role in explaining variations in financial stability within the sample. This may be attributable to the 2012 - 2024 period encompassing substantial changes in credit and liquidity policies, which may have rendered the effects of these variables unstable.

Model diagnostic tests indicate that both the F-test ($p = 0.0000$) and the LM test ($p = 0.0000$) reject the null hypothesis that the Pooled OLS model is appropriate, while the Hausman test ($p = 0.3287 > 0.05$) suggests no statistically significant difference between the FEM and REM. Accordingly, the REM is selected as the most suitable model for the formal analysis in this study.

Overall, the regression results indicate that income diversification has a positive but statistically insignificant effect on the financial stability of Vietnamese joint-stock commercial banks. In contrast, bank size and equity capital exert positive effects, while non-performing loans, inflation, and high profitability negatively affect financial stability. These findings reflect key characteristics of Vietnam’s banking system, which remains heavily credit-dependent, exhibits a relatively low level of income diversification, and is strongly influenced by macroeconomic factors. Therefore, to enhance financial stability, banks should pursue a prudent expansion of non-credit activities, strengthen equity capital, and maintain tight control over credit risk in a volatile macroeconomic environment.

Regression Analysis of the Impact of Income Diversification on Financial Stability Using the GMM Method

Table 2: Regression results of the impact of income diversification on financial stability using the GMM method

	(1)
	zscore
LZSCORE	0.1147
	(0.1243)
HHI	8.1211**
	(3.5077)
SIZE	1.0058***
	(0.1989)
LOAN A	-12.2660***
	(1.8137)
DEPO A	-2.5111***
	(0.7460)
EA	13.4795***
	(3.0587)
EXP A	-4.9420
	(11.6532)
LIQ	-6.3920***
	(2.3372)
NPL	-3.7454
	(4.2357)
ROA	-66.8818**
	(30.0361)
INF	5.9239
	(4.7310)
CONS	-13.2339**
	(5.2906)
AR (1)	0.003
AR (2)	0.348
Hansen-test	0.651

Source: Compiled results from STATA 17 software

The regression results obtained using the System-GMM method in this study indicate that income diversification (HHI) has a positive and statistically significant effect on the financial stability (ZSCORE) of Vietnamese joint-stock commercial banks. This finding confirms that expanding non-interest income sources helps banks diversify risk, reduce dependence on credit activities, and enhance resilience to economic fluctuations. Overall, this result is consistent with Modern Portfolio Theory (Markowitz, 1952) [1] and the economies of scope theory, and aligns with empirical evidence from emerging economies.

Compared with Abbas and Ali (2021), whose findings suggest that income diversification increases risk and reduces bank stability while asset and funding diversification exert positive effects, the results of this study differ by demonstrating that income diversification can improve financial stability. This discrepancy may stem from contextual differences: the U.S. banking system after the 2008 financial crisis was heavily exposed to highly volatile non-traditional income sources, whereas Vietnamese banks during 2012 - 2024 were in a transitional phase, with non-interest income mainly derived from payment services and insurance, which are relatively less risky.

The findings of this study are also consistent with Wang and Lin (2021) [14, 15], who demonstrate that income diversification reduces risk and enhances stability in emerging Asia Pacific economies. This suggests that in banking markets with relatively simple structures,

expanding non-credit activities can more effectively disperse risk. However, Ben Lahouel *et al.* (2022) [7, 8] find that in European banks, diversification yields positive effects only at moderate levels; beyond an optimal threshold, the effect reverses and reduces stability. Compared with those findings, the results of this study suggest that Vietnamese banks are still at a low to moderate stage of diversification, where the benefits of diversification remain within the positive-impact zone.

The results are also consistent with Tran *et al.* (2023) [13], who confirm that income diversification and market concentration jointly exert positive effects on bank stability, with diversification being more effective in less competitive environments. This implies that when implemented within a system characterized by moderate market concentration, diversification can maximize its contribution to financial sustainability. Similarly, Farag *et al.* (2025) [10] find that income diversification in European banks increases Z-scores, reduces non-performing loans (NPLs), and improves capital adequacy ratios (CAR), which is fully consistent with the evidence from Vietnam.

This study differs from Kim, Batten, and Ryu (2020) [11], who identify an inverted U-shaped nonlinear relationship between diversification and financial stability in OECD countries. Their findings indicate that moderate diversification enhances stability, whereas excessive diversification increases risk. In contrast, the Vietnamese results reveal only a positive linear relationship, suggesting that Vietnam's banking market has not yet reached the "diversification saturation" threshold observed in developed economies.

The results are also consistent with domestic evidence provided by Le Dinh Luan *et al.* (2024), who confirm that diversification of income, assets, and off balance sheet activities increases both ROA and Z-score, while bank size and equity capital positively affect efficiency and stability. This further strengthens the argument that, in the Vietnamese context, operational diversification is a viable strategy for enhancing banking system resilience.

At the same time, the findings echo certain cautionary perspectives similar to those of Adem (2022) [5] and Banwo, Harrald, and Medda (2019) [6], who argue that although diversification reduces idiosyncratic risk at the individual bank level, system wide risk may increase if banks pursue similar diversification strategies. This implies that diversification should be implemented selectively and in accordance with each bank's capabilities, avoiding excessive homogenization of business models across the industry.

Overall, the results of this study fall within the body of evidence supporting the positive effect of income diversification on financial stability, particularly in developing countries and emerging markets. Relative to international studies, the Vietnamese evidence reflects an early stage of transition toward universal banking, where the benefits of diversification still outweigh associated risk costs. However, as diversification deepens in the future, further research should continue to test for potential nonlinear (inverted U-shaped) relationships in order to identify the optimal diversification threshold for Vietnam's banking system.

Bank size (SIZE) exhibits a positive coefficient with high statistical significance, confirming that larger banks tend to be more financially stable. Larger scale enables banks to

exploit economies of scale, diversify customer bases, reduce funding costs, and better absorb market shocks. However, this variable is also identified as endogenous in prior tests, indicating a bidirectional relationship between size and stability: more stable banks tend to expand, while larger size further reinforces stability. This highlights the importance of maintaining an appropriate scale combined with effective risk management to avoid “too big to fail” risks.

The equity capital variable (EA) shows a strong positive and statistically significant coefficient, reflecting the crucial role of capital strength in enhancing risk absorption capacity and maintaining financial stability. Banks with higher equity ratios are better positioned to absorb losses, reduce insolvency risk, and strengthen market confidence. This result is consistent with Farag *et al.* (2025) ^[10] and Le Dinh Luan *et al.* (2024), who identify equity as a key “buffer” safeguarding systemic sustainability.

The credit intensity variable (LOAN_A) and funding structure variable (DEPO_A) both exhibit negative and statistically significant coefficients, implying that excessive reliance on traditional lending and deposit mobilization undermines financial stability. When loan and deposit ratios are too high, banks become more exposed to interest rate volatility, liquidity risk, and economic cycles. This reflects the reality of Vietnam’s banking system, where many banks still depend heavily on net interest margins (NIM). Expanding fee-based income and non-credit investment activities can help mitigate these risks.

The liquidity variable (LIQ) also carries a statistically significant negative coefficient, indicating that both excessively high and excessively low liquidity levels can be detrimental to financial stability. Excess liquidity reduces asset utilization efficiency, while insufficient liquidity increases the risk of payment distress. This finding is consistent with Adem (2022) ^[5], who argues that high liquidity does not necessarily equate to safety unless accompanied by effective asset–liability management.

Profitability (ROA) has a negative and statistically significant coefficient, suggesting that higher profits do not necessarily imply greater financial stability. Banks achieving high profitability may be assuming greater risk to maximize short-term returns. This result aligns with the risk–return trade-off framework in banking finance and suggests that performance should be evaluated on a risk-adjusted basis (e.g., RAROA) rather than relying solely on conventional ROA.

The operating expense variable (EXP_A) has a negative but statistically insignificant coefficient, indicating that operating costs do not significantly affect financial stability in the short term. In practice, however, such costs may include long-term investments in technology upgrades and enhanced risk management, whose positive effects may materialize in later periods.

The non performing loan ratio (NPL) retains a negative sign but loses statistical significance in the GMM model, suggesting that credit risk is indirectly captured through other variables such as LOAN_A and EA. Meanwhile, the inflation variable (INF) is not statistically significant, implying that during the study period, inflation in Vietnam was relatively stable and did not generate substantial shocks to banking system stability.

The lagged Z-score variable (L.ZSCORE) has a positive but statistically insignificant coefficient, indicating some degree of persistence in bank stability over time, albeit weak. This

may reflect the characteristics of Vietnam’s banking sector, which is undergoing restructuring and business model transformation, resulting in year-to-year fluctuations in stability levels.

Conclusions and Policy Implications

This study aims to clarify the role of income diversification in the financial stability of Vietnamese joint-stock commercial banks during 2012 - 2024 a period marked by deep banking sector restructuring and significant exposure to domestic and global macroeconomic volatility. The two step System GMM estimates reveal that income diversification has a positive and statistically significant effect on the Z-score, confirming that a prudent expansion of non-interest income sources enhances financial stability. This reflects the risk diversification mechanism: by reducing overreliance on credit income which is highly sensitive to economic cycles, interest rate movements, and asset quality banks improve resilience to macroeconomic shocks and reduce profit volatility.

For Vietnamese joint-stock commercial banks, the findings indicate that income diversification is a viable strategy for strengthening financial stability, but its effectiveness depends on focused implementation. Given the continued dominance of credit activities in Vietnam’s banking system, non-interest income expansion should prioritize relatively stable, intermediary based activities such as payment services, digital banking, corporate cash management, bancassurance, and basic financial advisory services. Diversification should be grounded in each bank’s existing customer base, technological capacity, and managerial expertise, rather than pursuing simultaneous expansion into multiple complex business lines, thereby limiting risks arising from overextension and weak control.

Banks should reinforce their financial foundations and capital strength before aggressively expanding non-interest activities. The results highlight the critical roles of bank size and capital adequacy in financial stability. Increasing charter capital, improving equity quality, and maintaining sound capital ratios not only ensure regulatory compliance but also provide buffers to absorb risks associated with diversification. In practice, well-capitalized banks are better positioned to invest systematically in technology, information systems, and internal governance, enabling more stable and long term development strategies.

Enhancing risk management quality is a prerequisite for ensuring that income diversification genuinely contributes to financial stability. As the share of non-interest income increases, bank risks shift from being predominantly credit-based toward non-credit risks such as operational, technological, fraud, and compliance risks. Accordingly, banks should strengthen comprehensive risk management frameworks, intensify supervision of new services and products, and invest in data systems, analytics, and early warning mechanisms. In parallel, cost control should be aligned with business-line efficiency, as high operating costs not only erode profitability but also constrain capital accumulation and weaken resilience to economic shocks.

For the State Bank of Vietnam and regulatory authorities, the findings suggest that income diversification should be guided and supervised within an appropriate policy framework. Regulators should continue to refine the legal environment for non-credit banking activities in a clear and consistent manner, facilitating product innovation while

containing emerging risks. Strengthening transparency requirements related to income structure, asset quality, and risk concentration would enhance market discipline and support risk-based supervision. Moreover, developing and effectively operating early warning systems integrating indicators such as Z-score, NPL ratios, and liquidity measures would enable timely identification of instability risks at both individual-bank and system wide levels.

The study also highlights the role of the State in improving financial infrastructure and the business environment to support banks' business model transformation. Developing payment infrastructure, data platforms, and digital identification systems would enable banks to expand non-interest services at lower cost and with better risk control. At the same time, promoting capital market development and non-bank financing channels would reduce excessive credit growth pressure on the banking system, thereby supporting long-term financial stability objectives.

References

1. Markowitz H. Modern portfolio theory. *J Finance*,1952;7(11):77–91.
2. Elsas R, Hackethal A, Holzhäuser M. The anatomy of bank diversification. *J Bank Finance*,2010;34(6):1274–1287.
3. Sanya S, Wolfe S. Can banks in emerging economies benefit from revenue diversification? *J Financ Serv Res*,2011;40(1):79–101.
4. Abbas F, Ali S. Economics of loan growth, credit risk and bank capital in Islamic banks. *Kybernetes*,2022;51(12):3591–3609.
5. Adem M. Impact of diversification on bank stability: Evidence from emerging and developing countries. *Discrete Dyn Nat Soc*, 2022. Article ID 7200725.
6. Banwo O, Harrald P, Medda F. Understanding the consequences of diversification on financial stability. *J Econ Interact Coord*,2019;14(2):273–292.
7. Ben Lahouel B, Taleb L, Ben Zaied Y, Managi S. Financial stability, liquidity risk and income diversification: Evidence from European banks using the CAMELS–DEA approach. *Ann Oper Res*, 2022.
8. Ben Lahouel B, Taleb L, Ben Zaied Y, Managi S. Financial stability, liquidity risk, and income diversification, 2022.
9. Damankah BS, Anku-Tsede O, Musah A, Eliasu N. Income diversification and financial stability of banks in Ghana. *Int J Bus Soc Sci*,2015;6(6):177–184.
10. Farag K, Ali L, Mutai NC, Luqman R, Mahmoud A, Krasniqi N. *et al.* Machine learning for predicting bank stability: The role of income diversification in European banking. *FinTech*,2025;4(2):21.
11. Kim H, Batten JA, Ryu D. Financial crisis, bank diversification, and financial stability: OECD countries. *Int Rev Econ Finance*,2020;65:94–104.
12. Octavianus H, Fachrudin KA. Income diversification on stability in banking industry: A systematic literature review. *Int J Environ Sustain Soc Sci*,2022;3(2):276–287.
13. Tran S, Nguyen D, Nguyen K, Nguyen C, Nguyen L. Income diversification, market structure and bank stability: A cross-country analysis. *Prague Econ Pap*,2023;32(5):550–568.
14. Wang C, Lin Y. Income diversification and bank risk in Asia Pacific. *N Am J Econ Finance*,2021;57:101448.
15. Wang C, Lin Y. Income diversification and bank risk in Asia-Pacific. *N Am J Econ Finance*,2021;57:101448.
16. Wirawan J, Willim AP. The effect of board diversity and financial stability on financial performance of banking sector in Indonesian Stock Exchange. *J Asian Multicult Res Econ Manag Stud*,2023;4(4):8–18.