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Determinants Of Net Interest Margin: Empirical Evidence From Vietnamese Commercial Banks

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ABSTRACT
This study aims to analyze the determinants of Net Interest Margin (NIM) of Vietnamese commercial banks, based on 200 observations from 20 listed banks during 2015–2024 and estimated using the System GMM method. The results indicate that the non-performing loan ratio (NPL) has a positive effect on NIM, while bank size (SIZE), loan exposure (LOAN), and liquidity (LIQ) have negative effects, reflecting competitive pressure, high funding costs, and excessive liquidity reserves. The COVID-19 pandemic reduces NIM, but the NIM × COVID interaction variable shows that banks can leverage previous-period NIM to mitigate the impact, highlighting the importance of internal governance and risk management strategies. The study suggests that banks should optimize size and capital structure, manage credit risk and liquidity efficiently, and develop flexible strategies to respond to economic shocks, thereby maintaining stable NIM and enhancing competitiveness...
Keywords: *Net Interest Margin;Determinants; COVID-19 pandemic;System GMM model; Vietnamese commercial banks.*

1. INTRODUCTION:

Net Interest Margin (NIM) is one of the key indicators reflecting the performance and profitability of commercial banks. NIM is defined as the ratio of the difference between interest income from interest-bearing assets (such as loans and investments) and interest expenses on mobilized capital, to total interest-bearing assets [11]. According to Tarus et al. (2012), net interest income is determined by the difference between total interest revenue and total interest expenses, divided by average earning assets [14]. This indicator reflects the profit that a bank earns from financial intermediation activities, that is, the ability to convert mobilized capital into effective earning assets. On the one hand, a high net interest margin indicates efficient use of capital, strong risk management capability, and solid competitive positioning; conversely, a low NIM often reflects intense competitive pressure, high capital costs, or deteriorating credit quality [7]

Empirical studies indicate that NIM is significantly influenced by internal factors of banks, including the scale of operations, credit risk, liquidity capacity, and equity ratio [1,4]. Large banks often leverage economies of scale to optimize capital costs, while high credit risk can reduce profit margins due to increased provisioning costs. Additionally, the ability to maintain liquidity and a reasonable capital structure also plays an important role in stabilizing and enhancing NIM.

In Vietnam, the banking system is undergoing restructuring, affected by intense competition and increasingly stringent risk management requirements. In particular, the period of 2020 - 2021 witnessed the COVID-19 shock, which led to a decline in credit quality, narrowing of net interest margins, and increased profit pressures. Therefore, this study is conducted to analyze and quantify the impact of intrinsic micro-level factors such as bank size, credit risk, loan portfolio, liquidity, and equity ratio on the net interest margin (NIM) of Vietnamese commercial banks. At the same time, the study also examines the specific impact of the COVID-19 shock on NIM, thereby providing empirical evidence to support bank managers in adjusting interest rate policies, managing assets and liabilities, and enhancing risk resilience in a volatile environment.

2. Theoretical basis and empirical evidence

Net interest margin is a

comprehensive indicator that reflects the effectiveness of a commercial bank's intermediary activities, showing the ability to convert mobilized funds into earning assets. Essentially, NIM measures the profitability from financial intermediation activities, specifically the ability to turn mobilized capital into earning assets, such as loans or investments. Therefore, NIM is determined by the difference between total interest income and total interest expenses on average earning assets, thereby reflecting the efficiency of the bank's capital and risk management [7,14].

The NIM indicator not only reflects profitability but also indicates competitive position, risk level, and the bank's interest rate pricing strategy in the financial market. With a high NIM, banks can demonstrate effective capital utilization, efficient risk management, and maintain a strong competitive position; conversely, a low NIM is often a sign of intense competitive pressure, high capital costs, or poor credit quality [7].

According to theories on financial intermediation, NIM is mainly influenced by the internal factors of banks, including size, credit risk, liquidity capacity, and loan portfolio structure [1,4]. Many international studies have identified the determinants of banks' net interest margin. Athanasoglou et al. (2008) demonstrated that credit risk, equity capital, and management efficiency significantly affect NIM in European banks [2]. Maudos and Guevara (2004) showed that bank size, capital, and inflation are important factors impacting NIM in the context of the European Union [7]. In the context of COVID-19, Beck & Keil (2021) and Shen et al. (2021) pointed out that interest margins were compressed due to reduced credit demand, increased credit risk, and central bank interest rate cuts [3,13]. In Vietnam, the research by Nguyễn Thị Bích Thuận and Lê Minh Thanh (2016) found that credit risk and interest expenses increase NIM, while management quality has an opposite impact [9]. In addition, Lê Hoàng Vinh and Lê Xuân Hoàng (2019) found that size, management efficiency, and equity capital have a positive impact, while credit risk has a negative impact on NIM [5]. Phạm Hồng Châu Oanh (2025) pointed out that the loan-to-deposit ratio (LDR) and credit quality (NPL) positively affect NIM, whereas bank size (SIZE) and liquidity (LIQ) have a negative impact [10].

From there, the author develops research hypotheses to test the impact of banks' internal factors, including credit risk, bank size, liquidity capacity, and loan portfolio structure, on the net interest margin (NIM) of commercial banks in Vietnam. First, credit risk (NPL) is an important internal factor affecting the net interest margin (NIM). According to financial intermediation theory, banks must balance between capital costs and credit risk [1,4]. When non-performing loans increase, banks often raise interest rates to compensate for the risk, causing NIM to rise [2,10]. However, if the risk exceeds management capacity, increased provisioning costs will reduce profits [5,9]. International and Vietnamese studies also confirm the two-way impact of NPLs, especially in the context of economic shocks [8]. In this study, credit risk is measured by the ratio of non-performing loans to total bank loans with the hypothesis:

H1: The non-performing loan (NPL) ratio has a positive impact on the NIM of commercial banks in Vietnam.

Bank size (SIZE) is an important internal factor affecting net interest margin (NIM). According to financial intermediation theory, large banks have cost advantages due to economies of scale, the ability to diversify their asset portfolios, and access to cheaper capital, thereby improving NIM [1,4]. However, both international and domestic studies also indicate that a larger size does not always equate to higher profit margins; on the contrary, a larger size can create competitive pressure on pricing, compressing profit margins [6,10,15]. Research in Vietnam shows a similar reality, where large banks sometimes have to lower lending rates to attract customers in a highly competitive environment, thus reducing NIM [8]. In this study, bank size is measured by the natural logarithm of total assets.

H2: Bank size (SIZE) has a negative impact on the NIM of commercial banks in Vietnam.

Liquidity (LIQ) is an important intrinsic factor affecting a bank's net interest margin (NIM). According to financial intermediation theory, high liquidity helps banks ensure their ability to meet short-term payment obligations, reduce liquidity risk and funding costs, thereby increasing profitability [1,4]. At the same time, liquidity also helps banks maintain a stable income-generating asset portfolio and flexibility in lending [2,7]. However, excessive liquidity reserves can reduce capital utilization efficiency, causing part of the assets to generate no income and lowering NIM [8,9,10]. Both domestic and international studies have shown the negative impact of excessive liquidity on profit margins, especially during periods of economic instability or shocks such as COVID-19 [3]. The liquidity variable is calculated by dividing short-term assets by short-term liabilities.

H3: Liquidity (LIQ) has a negative impact on the NIM of commercial banks in Vietnam.

Loan outstanding (LOAN) reflects the ability to utilize mobilized capital for lending and is an important internal factor affecting net interest margin (NIM). According to financial intermediation theory, increasing the loan size allows banks to earn from lending interest rates, but it also raises credit risk and provisioning costs [1,4]. International studies indicate that loan size generally has a positive impact on profit margins in the short term [6], whereas studies in Vietnam show that this effect is not statistically significant in the long term [10]. Therefore, in the research model, loan outstanding is considered to have a negative effect on NIM when credit risk and provisioning costs increase beyond a certain level. The LOAN variable is calculated as Total loan outstanding divided by Total assets.

H4: The loan-to-deposit ratio (LOAN) has a negative impact on the NIM of commercial banks in Vietnam.

The impact of the COVID-19 pandemic (COVID) is an important external factor affecting banks' net interest margins (NIM). In the context of COVID-19, credit demand declined, credit risk increased, and many banks

had to lower lending rates following the central bank's interest rate reduction policy, leading to compressed NIM [3,13]. Studies in Vietnam also show that profit margins decreased during 2020–2021 due to reduced credit activities, increased non-performing loans, and higher risk management costs [8,10]. Therefore, the impact of the pandemic is assumed to reduce the NIM of commercial banks in Vietnam. The COVID variable is a dummy variable, set to 1 if the study year is 2020 or 2021, otherwise 0.

H5: The impact of the COVID-19 pandemic (COVID) has a negative effect on the NIM of commercial banks in Vietnam.

3. Research Methods and Data

3.1. Research Data

The study uses balanced panel data of commercial banks listed in Vietnam during the period 2015 - 2024. The research data have been compiled from multiple reliable sources, including the annual financial reports of banks, collected from the banks' official websites, the Hanoi Stock Exchange (HNX), and the Ho Chi Minh City Stock Exchange (HOSE). All collected data were cleaned and checked for completeness to ensure the consistency, reliability, and quality of the research dataset.

3.2. Research Methods and Models

3.2.1. Research Methods

In this study, to minimize the issues of endogeneity and estimation bias due to unobserved fixed characteristics of each bank—a common limitation when using OLS, FE, or RE—the author applies the System Generalized Method of Moments (S-GMM). This method, based on Hansen's (1982) GMM and developed by Blundell & Bond (1998), is suitable for dynamic panel data, handles lagged dependent variables, and addresses problems of endogeneity, heteroskedasticity, and autocorrelation in errors. Specifically, S-GMM combines two regression systems: one using differenced variables with lagged

instruments for the differenced endogenous variables, and one using level variables with differenced instruments for the level variables. This approach improves estimation efficiency, especially when the dependent variable such as NIM is highly persistent or affected by long-term lags, while also increasing the number of available instruments compared to Difference GMM, reducing biases in small sample sizes. This method is suitable for banking data, where endogenous variables such as NPL, SIZE, LIQ, and LOAN are influenced by past values and may be endogenous due to feedback from financial outcomes or unobserved fixed factors. Additionally, S-GMM addresses common issues such as heteroskedasticity and autocorrelation, ensuring consistent and reliable estimates. As a result, the study provides strong evidence on the impact of endogenous factors and the COVID-19 pandemic on the net interest income of commercial banks in Vietnam.

3.2.2. Research model

Based on previous studies by scholars such as Angbazo (1997); Athanasoglou et al. (2008); Phạm Hồng Châu Oanh (2025); and Nguyễn Kim Chi and Nguyễn Thị Minh Ngọc (2022), the research model is constructed as follows:

$$\begin{aligned} NIM_{,} = {}& {}_{0} + {}_{1}NPL_{,} + {}_{2}SIZE_{,} + {}_{3}LIQ_{,} \\ & + {}_{4}LOAN_{,} + {}_{5}COVID \\ & + \beta_6(NIM_{i,t-1} \times COVID_t) \\ & + {}_{,} \quad (1) \end{aligned}$$

Among them:

Dependent variabl:

NIM: Net interest margin of commercial banks.

Independent variables

NPL: Non-performing loan ratio.

SIZE: Bank size.

LIQ: Liquidity.

LOAN: Outstanding loans.

COVID: Dummy variable for the COVID-19 pandemic (1 if the year is affected, 0 if not).

NIM × COVID: Interaction variable between lagged NIM and COVID, used to test the changing impact of the pandemic on net interest margin.

u: Random error, including unobserved factors.

4. Research results

4.1. Descriptive statistics and correlation matrix

Table 1 presents descriptive statistics showing that the variables in the research model have distribution characteristics suitable for analyzing the impact on the net interest margin (NIM) of commercial banks in Vietnam.

Table 1. Descriptive statistics of the research variables

Variable	Observations	Mean	Standard Deviation	Minimum	Maximum
NIM	200	0,431	0,014	0,022	0,069
NPL	200	0.023	0,010	0,006	0,040
SIZE	200	16,590	2,026	13,053	19,908
LOAN	200	0,605	0,121	0,401	0,795
LIQ	200	0,256	0,088	0,105	0,39
COVID	200	0,200	0,401	0	1

Source: Results analyzed using Stata 14 software

Specifically, NIM has a mean value of 0.431, reflecting the average net interest margin of banks in the research sample. The standard deviation of NIM is only 0.014, indicating relatively low variation among banks, meaning

the profitability from intermediary financial activities is relatively stable.

For the independent variables, the average non-performing loan ratio (NPL) is 0.023, indicating low credit risk in the banks, with a standard deviation of 0.010, reflecting moderate differences between banks in credit quality. Bank size (SIZE), measured by the logarithm of total assets, has a mean of 16.590 and a standard deviation of 2.026, showing that banks in the research sample are fairly diverse in size, ranging from small to large banks, with a minimum of 13.053 and a maximum of 19.908.

In addition, the loan outstanding variable (LOAN) accounts for an average of 60.5% of total assets, with a standard deviation of 0.121, ranging from 40.1% to 79.5%, reflecting significant differences in credit strategy and the ability to utilize mobilized capital among banks. Liquidity (LIQ) has a mean of 0.256, meaning approximately 25.6% of bank assets are liquid, with a standard deviation of 0.088 and a range from 10.5% to 39%, indicating differences in flexibility to meet short-term obligations and manage liquidity risk among banks.

The COVID-19 pandemic variable (COVID), coded as a dummy, has a mean value of 0.200, meaning 20% of observations in the sample fall within the years affected by the pandemic. The range from 0 to 1 accurately reflects the binary nature of the variable and allows testing the changing impact of the pandemic through the interaction variable NIM × COVID. Overall, bank-specific variables such as NPL, SIZE, LOAN, LIQ, and the COVID dummy have moderate standard deviations, no extreme outliers, and sufficient variability to perform S-GMM analysis. This data ensures suitability and reliability, providing a solid basis to test the impact of internal and external factors on the net interest margin of commercial banks in Vietnam.

Next, Table 2 below presents the Pearson correlation matrix among the variables in the research model as follows:

Table 2. Correlation matrix

	NIM	NPL	SIZE	LOAN	LIQ	COVID
NIM	1					
NPL	-0,01	1				
SIZE	-0,04	-0,02	1			
LOAN	0,01	0,06	0,04	1		
LIQ	-0,12	0,14	-0,03	-0,08	1	
COVID	0,07	-0,08	-0,04	0,15	0,05	1

Source: Results analyzed using Stata 14 software

Table 2 above presents the Pearson correlation coefficients among the variables in the research model, including the dependent variable NIM and the independent variables NPL, SIZE, LOAN, LIQ, and COVID. The results show generally low correlation levels, implying that multicollinearity is not a serious issue in the data.

To assess this more accurately, the study further tests for multicollinearity using the variance inflation factor (VIF). The VIF test results (detailed in Table 3) show that the VIF values of all variables in the model are below 10. This indicates low correlation among the independent variables, suggesting that multicollinearity is not significant and does not substantially affect the regression estimation results.

Table 3. VIF test

	VIF coefficient
NPL	1,04
SIZE	1,00
LOAN	1,04
LIQ	1,04
COVID	1,04
VIF trung bình	1,03

Source: Results analyzed using Stata 14 software

To achieve a more accurate assessment, the study continues to test for multicollinearity using the Variance Inflation Factor (VIF). The VIF test results (Table 3) show that the VIF values of all variables in the model are less than 10. This indicates that the correlation among the independent variables is low, the level of multicollinearity is insignificant, and it does not greatly affect the estimation results of the regression model.

4.2. Results and Discussion

The estimation results using the System GMM method show that the intrinsic factors of banks and the COVID-19 pandemic have differential impacts on net interest margin (NIM), as presented in Table 4. First, the test results indicate that the model is appropriate. Specifically, the Arellano–Bond test shows the presence of first-order autocorrelation but no second-order autocorrelation (AR1 with $p<0.05$ and AR2 with $p>0.05$, respectively), while the Hansen test ($p>0.05$) confirms the validity of the instruments. At the same time, the F-test ($p<0.05$) indicates that the model is statistically significant.

Table 4: Research results

Dependent variable	NIM
L.NIM	0,087***
NPL	0,327*
SIZE	-0,001*
LOAN	-0,012*
LIQ	-0,045**
COVID	-0,050***
NIM × COVID	1,171***
_cons	0,060***
Number of tools	20
Number of banks	20
Pro>chi2	0,000
Hansen Test	0,569
AR(1)	0,003
AR(2)	0,785

Source: Results extracted from Stata 14 software analysis. Note: *** indicates significance at the 1% level, ** indicates significance at the 5% level, * indicates significance at the 10% level.

The two-step System GMM estimation results show that NIM is influenced by a complex interplay of banks' internal factors and the COVID-19 shock. The lagged dependent variable of NIM (L.NIM) has a positive coefficient of 0.087 and is statistically significant at 1% (p = 0.009), indicating that current NIM positively depends on previous period NIM, consistent with the theoretical basis of financial intermediation efficiency, where the interest margin reflects the effectiveness of capital management and risk [1,10]. The non-performing loan ratio (NPL) has a positive coefficient of 0.327 and is statistically significant at the 10% level, suggesting that when credit risk increases, banks often adjust interest rates to compensate for the risk, increasing NIM, but there remains a risk of higher provisioning costs if non-performing loans exceed manageable levels [9,10].

Conversely, bank size (SIZE) has a negative coefficient of -0.001 and is statistically significant at the 10% level, indicating that large banks sometimes have to compete on price, reducing profit margins [6,15]. Additionally, loan outstanding (LOAN) and liquidity (LIQ) also have negative impacts on NIM (with respective beta coefficients of -0.012 and -0.045, statistically significant at 10% and 5% levels, respectively), reflecting that large loan portfolios and excess liquidity reserves can reduce the efficiency of profitable capital use, especially in volatile market conditions [4,10].

Notably, the COVID variable has a negative coefficient of -0.050 and is statistically significant at 1%, while the interaction variable NIM × COVID has a positive coefficient of 1.171 with 1% statistical significance, indicating that the pandemic reduces the overall NIM due to decreased credit demand and increased risk, but the previous period NIM combined with COVID helps banks maintain their profit margins, reflecting adaptive capacity during crises [3,8,13].

5. Conclusion

Research results show that the net interest margin (NIM) of Vietnamese commercial banks is significantly affected by both internal bank factors and external shocks, notably the COVID-19 pandemic. The lagged dependent variable NIM (L1.NIM) has a positive and statistically significant effect at the 1% level, indicating that the current NIM is influenced by the previous period's NIM, reflecting the stability and long-term maintainability of interest margins, consistent with the financial intermediation mechanism that commercial banks use to optimize profits from mobilized capital [1,2,10]. The non-performing loan (NPL) ratio has a positive impact on NIM, in line with the theory that banks often increase lending rates to compensate for credit risk; however, excessively high provisioning costs can reduce profits, creating a bidirectional effect depending on the actual level of credit risk [9,10].

Conversely, factors such as bank size (SIZE), loan outstanding (LOAN), and liquidity capacity (LIQ) all have a negative impact on NIM. This reflects the reality that large banks often face strong competitive pressure, high funding costs, or excess liquidity that reduces capital efficiency, thereby lowering profit margins [4,6,15]. A large loan portfolio helps increase interest income from loans, but at the same time increases credit risk and provisioning costs, especially when non-performing loans rise, leading to a negative impact on NIM in the long term [10]. Excess liquidity capacity is also a factor that restrains net interest margins, as non-earning assets account for a high proportion of total assets, reducing the bank's financial intermediation efficiency [4,9].

Notably, the COVID-19 pandemic had a strong negative impact on NIM, due to reduced credit demand, increased credit risk, and banks having to lower interest rates in line with the State Bank's rate cuts to support the economy, thereby compressing profit margins [3,8,13]. However, the NIM × COVID interaction variable has a positive effect and is statistically significant at 1%, indicating that banks can leverage the previous period's NIM to mitigate the negative impact of the pandemic, highlighting the role of internal governance efficiency and risk management strategies during periods of instability.

From these results, several important policy implications can be drawn.

First, credit risk management needs to be strengthened, combined with a reasonable interest rate pricing strategy to balance profitability and risk, especially in the context of rising potential non-performing loans.

Second, banks should optimize their size and capital structure, both to leverage economies of scale and to avoid price competition that pressures NIM downward.

Third, proper liquidity management is key, maintaining sufficient levels to meet short-term obligations without reducing the efficiency of interest-earning asset utilization.

Finally, banks need to develop flexible strategies to respond to economic shocks such as COVID-19, using previous-period NIM information to adjust operations and coordinate with flexible credit and interest rate policies of the State Bank to maintain the stability of interest margins and financial markets.

Thus, the combination of strict internal governance, reasonable interest rate strategies, and flexible macroeconomic policies constitutes a necessary condition to ensure sustainable NIM, enhance resilience, and maintain the competitive position of Vietnam's commercial banking system..

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