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Factors affecting non-interest income at Vietnamese commercial banks

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ABSTRACT

This study reviews the theoretical foundations of banks' non-interest income (NII) and the standard financial indicators used to measure it. Based on this review, the study develops a framework that links bank-specific (internal) and macroeconomic factors to NII in Vietnamese commercial banks. A critical review of both domestic and international literature is conducted to identify areas of theoretical agreement and remaining research gaps. From this review, the study formulates context-specific research hypotheses and an empirical model for Vietnam. Using an unbalanced panel dataset of 24 Vietnamese commercial banks from 2011 to 2023, the study estimates several panel regression models. After conducting specification tests, the random-effects model (REM) is selected, and issues related to error variance are addressed using Feasible Generalized Least Squares (FGLS). The results show that bank size, deposit-to-asset ratio, credit risk provision ratio, income diversification, inflation, and the COVID-19 pandemic have a positive effect on NII, while loan-to-asset ratio and state ownership have a negative effect. Equity ratio and real GDP growth are not statistically significant. Based on these findings, the study offers policy implications to improve banks' operational efficiency.

1. Introduction

Commercial banks, besides their roles as financial intermediaries and transmission channels for monetary policy, pursue an essential objective of profit maximization to sustain operations, finance investment and development, and remunerate shareholders. Bank income is typically decomposed into two pillars: (i) interest income, arising from the net interest margin between lending and deposit rates, and (ii) non-interest income (NII), generated by fees and commissions (e.g., payments, account services, credit cards), trading income (foreign exchange and securities), and other services such as asset management and trust activities (DeYoung and Rice, 2004; Maudos, 2017). While loan-based income is exposed to liquidity, interest-rate, and credit risks that have amplified losses during past crises, expanding fee- and market-based activities is often viewed as a way to diversify revenue sources. However, the stabilizing benefits of NII are not uniform across settings: seminal work finds NII can be more volatile than traditional interest income, and its contribution to risk and profitability depends on bank specialization and market structure (DeYoung and Rice, 2004; Maudos, 2017).

Empirically, Vietnamese banks' NII has grown but remains heterogeneous. Based on 28 banks' 2022 financial statements, aggregate NII was VND 125,052 billion, up 11.4% year-on-year, with notable dispersion across institutions—consistent with banks' differing capabilities in payments, banc assurance, and market activities. Yet the share of NII in total operating income edged down relative to 2021, underscoring the sensitivity of some fee and trading lines to market conditions (e.g., securities revaluation, macro volatility). The macroeconomic backdrop since 2022–2024 has complicated reliance on interest income: Growth headwinds, property-sector stresses, and elevated non-performing assets have pressured profitability and provisioning needs. Vietnam's State Bank issued and then extended Circular 02/2023/TT-NHNN (April 2023) to permit restructuring of repayment terms while maintaining loan classifications, with policy discussions in June 2024 culminating in an extension to end-2024—highlighting system-wide concern about asset quality normalization as relief expires. These developments raise the salience of NII as a complementary, potentially more resilient revenue

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source when net interest margins compress. Against this context, international and regional scholarship provides mixed evidence on NII's benefits. In the United States and Europe, higher NII shares have at times reduced profitability or increased volatility, depending on what activities dominate (e.g., trading vs. recurring fee services) and on bank specialization (DeYoung and Rice, 2004; Maudos, 2017). Studies focused on business-model shifts after the global financial crisis also note that regulation, technology, and competition shape NII opportunities, meaning country-specific analyses are necessary. Vietnamese banks' evolving fee businesses (payments, banc assurance, FX) and ownership features (state vs. private) thus warrant localized empirical testing that incorporates both bank-level and macroeconomic drivers. This thesis examines determinants of NII for Vietnamese commercial banks over 2011–2023, spanning regulatory reforms and the COVID-19 shock. The empirical design includes internal factors (bank size, equity ratio, deposit-to-asset ratio, loan-to-asset ratio, credit-risk provision ratio, income diversification, state ownership) and macro factors (GDP growth, inflation, COVID-19 dummy). By estimating panel models and addressing heteroskedasticity/cross-sectional dependence via FGLS, the thesis provides evidence on which levers are most strongly associated with higher NII in Vietnam's institutional setting and discusses the policy implications in light of national targets for non-credit service income.

2. Theoretical background and hypothesis development

In banking, non-interest income (NII) refers to revenue that is not generated from the interest spread between assets and liabilities. It typically includes: (i) fees and commissions (such as payments, account services, card services, custody, and guarantees); (ii) trading and fair-value gains (including foreign exchange, securities, and derivatives trading); and (iii) other operating income (such as gains on financial assets not measured at amortized cost and bancassurance distribution fees) (DeYoung and Rice, 2004; Stiroh, 2004).

In empirical studies, NII is commonly measured as net non-interest income, meaning fee and trading revenues minus the related expenses reported in the income statement (Lepetit et al., 2008). More broadly, NII represents the total revenue generated from activities other than traditional interest-based lending. These activities mainly include fees and commissions, foreign exchange and gold trading, securities trading, and gains from investment securities (Lee et al., 2014; Stiroh, 2004; Lepetit et al., 2008). In line with Vietnamese bank financial reports, NII can be calculated as the sum of net fees and commissions, net foreign exchange and gold trading income, net securities trading income, and net gains from investment securities.

If banks merge the two securities lines, aggregate them consistently across time, and include other operating income when it reflects fees/agency commissions.

The theory of market power (MP) holds that the growth of a firm's market share is a manifestation of market power. Businesses will earn higher profits thanks to the power of market power. MP theory has two main approaches, namely Structure–Conduct–Performance (also known as SCP) theory and Relative Market Power theory (also known as RMP).

According to the SCP approach, the theory is that market structure will determine the behavior of the firm, and this behavior will determine the outcome of the firm in the market, including profitability, technical innovation, and growth. This means that commercial banks will have unplanned profits when lowering deposit rates and increasing lending rates (Tregenna, 2009).

Contrary to SCP's approach, the relative market power (RMP) approach holds that a bank's profitability is affected by market share. In this direction, banks, when differentiating themselves from different types of products, have a more convenient approach and exploitation of the market, seeking higher income than competitors (Athanasoglou et al., 2008). Therefore, large commercial banks with good brands and product and service quality can increase prices and achieve better profitability.

Grounded in Modern Portfolio Theory, diversification reallocates resources across activities with imperfectly correlated payoffs to lower risk for a given expected return (Markowitz, 1952). For banks, shifting part of the business mix from traditional lending toward non-interest activities—fees, commissions, payments, FX/securities trading, and other services—can reduce exposure to credit-cycle risk and broaden revenue sources (Asif and Akhter, 2019). At the portfolio level, the choice to diversify assets and income streams is a board/management policy decision that jointly determines risk and return, given the cost structure of funding and operations. Empirically, a more diversified income profile can cushion shocks in one line of business with revenues from others, potentially stabilizing performance over the cycle (Chiorazzo et al., 2008). In short, income diversification is a strategic tool to enhance resilience and optimize risk-adjusted profits, while recognizing that the net benefit depends on which non-interest lines dominate and their volatility.

Panzar and Willig's (1977) theory of economies of scale showed that when more types of goods and services are produced at the organization, the average cost per type of product and service created will also decrease based on the whole. In other words, when business units diversify or expand business sectors, existing resources will be transformed, utilized, and wasted (Markides and Williamson, 1994). When multiple business activities are carried out jointly using the same available resources, total costs can be reduced, leading to higher profits and more efficient use of resources in generating income. Business units combine various input factors to produce financial products and services, and in commercial banks, diversification or expansion of products and services, while continuing to use existing resources such as human capital, technology, facilities, and information systems, can result in significant cost savings and improved operational efficiency. Moreover, diversification in related financial fields enables banks to make better use of their managerial and technical expertise, while also enhancing risk management and strengthening control over operational risks. But on the other hand, diversifying the bank's operations does not increase profits but can reduce them. Klein and Saidenberg (1997) argued that when commercial banks carry out diversification activities, the areas of expertise that are the bank's strengths will be diluted in terms of governance capabilities as well as the scope of operations. On the other hand, when diversifying business fields, commercial banks will also increase representative costs such as hiring more experts, adding human resources to manage or operate new areas with no experience (Deng and Elyasiani, 2008). In addition, as the scale of bank diversification increases, overall risk may also rise. This is because banks may expand into proprietary trading activities or venture capital investments in areas such as insurance, real estate, and securities, which can increase their exposure to systemic risk. However, not all forms of diversification lead to higher risk. For example, non-interest income activities, such as deposit services and trust services, generally do not significantly increase the bank's overall risk level.

Bank size is commonly measured by total assets, which represent the overall resources available to a bank (DeYoung and Rice, 2004). Large banks are often viewed as having stronger financial capacity and stability. However, in highly competitive markets, their marginal net profit margins may be lower than those of smaller banks. As a result, large commercial banks may expand into non-traditional activities to better utilize their available resources and generate additional income. In contrast, Chiorazzo et al. (2008) argue that as banks grow larger, NII may decrease because banks tend to focus more on traditional lending activities to expand market share and increase assets, thereby reducing their emphasis on diversified income sources.

The equity ratio is another important factor. Shareholders' equity represents a stable and long-term source of capital that can support the expansion of non-interest income activities (DeYoung and Rice, 2004). With stronger equity, banks can diversify their financial services, such as entering insurance, asset management, financial advisory, or investment banking. Equity also enhances financial autonomy, enabling banks to expand branch networks, strengthen distribution systems, and enter new financial markets, including modern non-traditional services (Shahimi et al., 2006).

Profitability reflects a bank's management efficiency in utilizing resources to generate income (Craigwell and Maxwell, 2006). Higher profitability indicates stronger managerial capability and improved financial performance. Since NII forms part of total profit, an increase in profitability may also suggest growth in non-interest income, alongside income from traditional activities (DeYoung and Rice, 2004). Common indicators such as return on assets (ROA) and return on equity (ROE) measure how effectively banks use their assets, technology, human capital, and equity to generate profits from both traditional and non-traditional sources.

The deposit ratio also plays a significant role. Deposits provide a primary and stable source of funds for commercial banks to perform their intermediation function. As deposits increase, banks have more capital for lending and investment, which can raise both interest income and related fees. Moreover, according to the theory of economies of scale, abundant and relatively low-cost deposits may also enable banks to expand non-traditional services and diversify income sources (Deng and Elyasiani, 2008; Damankah et al., 2014).

Credit growth is central to banking activities. Lending is traditionally considered the most profitable function of commercial banks. Therefore, banks often aim to increase their loan portfolios annually to enhance income. However, if banks concentrate most of their resources on expanding credit and other traditional products to maximize profits, they may allocate less attention to non-interest income activities (Hahm, 2008; Lepetit et al., 2008).

Credit risk is closely associated with credit growth in commercial banks. When lending expands rapidly, particularly under relaxed regulatory conditions, the likelihood of loan loss provisions (LLD) increases. As credit risk rises, income from lending activities may decline due to loan defaults or the need to allocate higher provisions to cover potential bad debts. In such situations, commercial banks may pursue diversification strategies to generate additional revenue from services, investments, and retail activities in order to offset losses arising from credit risk. In other words, non-interest income (NII) tends to increase when banks face high levels of loan loss provisions (Chortareas et al., 2012).

Economic growth plays an important role in banking performance. As the economy expands, higher per capita income increases consumers' ability to purchase goods and services. However, Hahm (2008) argues that rapidly growing economies with high GDP growth rates tend to exhibit lower levels of non-interest income (NII) compared to slower-growing economies, suggesting that banks may rely more on traditional lending activities during periods of strong growth. Conversely, when economic growth slows, banks may diversify toward alternative income sources. Furthermore, stable macroeconomic conditions, such as stable interest rates and exchange rates, create favorable opportunities for commercial banks to expand their operations, attract deposits and investments, and increase demand for financial products and services, thereby enhancing their overall financial resource (Chortareas et al., 2012; Hahm, 2008).

Inflation affects NII through its impact on price stability and resource allocation. Inflation distorts relative prices and leads to inefficient allocation of resources. As argued by Fischer (1993), inflation alters correlated prices in an unfavorable way, thereby skewing the distribution of resources within the economy. When inflation rises, changes in the prices of goods occur unevenly, distorting consumer decisions and weakening the market's ability to allocate resources efficiently. In response to high inflation, central banks often tighten monetary policy to reduce the money supply. However, demand for loans from businesses and individuals may remain high, while banks can only lend to a limited number of low-risk or contract-based projects. Additionally, higher deposit interest rates lead to higher lending rates, which can negatively affect the investment environment and increase moral hazard. Overall, high inflation disrupts capital markets, reduces investor and public confidence, and complicates decision-making for both customers and financial institutions. These conditions may reduce demand for banking services and, consequently, lower non-interest income. Therefore, inflation has a significant impact on NII (Atellu, 2016; DeYoung and Rice, 2004).

2.1. Literature review

In Kenya, when studying the factors affecting TNN at banks, Atellu (2016) used secondary data from 2003 to 2012. At the same time, the authors used the Pooled OLS, FEM, REM, and GMM multivariate regression model to conclude. The results of the study have shown that the size of the bank and the efficiency of management affect the natural resources in the same direction. But the development of ATMs, GDP growth, and inflation has the opposite impact on the NII of commercial banks.

In China, when studying the factors affecting banks' income diversification activities, Meng et al. (2018) used secondary data from 88 commercial banks from 2003 to 2010. At the same time, the authors used the Pooled OLS, FEM, and GMM multivariate regression model to conclude. The results of the study show that the risk of bankruptcy, shareholders' equity ratio, bank size, and operating expense ratio affect the income diversification activities of commercial banks in the same direction. But the ownership structure has the opposite effect.

In Nepal, when studying the factors affecting personal income at banks, Nepali and Niroula (2020) used secondary data from 15 commercial banks from 2009 to 2018. At the same time, the authors used the Pooled OLS multivariate regression model to draw conclusions. The results of the study have shown that the marginal interest income ratio, the number of customers using e-banking services, the growth of deposits, and foreign ownership affect the NII of banks in the same direction.

In Pakistan, when studying the diversified activities of NII increase in foreign currency at banks, Ashraf et al. (2023) used data from 22 commercial banks from 2007 to 2018. At the same time, the authors used the Pooled OLS multivariate regression model to conclude. The results of the study have shown that the marginal interest income ratio, loan-to-asset ratio, management quality, ownership structure, income diversification, and interest rates affect the same direction. However, the size of banks, capital adequacy ratio, external interest rate, and GDP economic growth have the opposite effect on the NII of commercial banks.

In Indonesia, when studying NII and financial intermediation activities of commercial banks, Atmawidjaya and Nuryakin (2023) used secondary data from 291 banks from 1990 to 2019 in ASEAN countries. At the same time, the authors use the GMM multivariate regression model to draw conclusions. The results of the study have shown that bank size, shareholders' equity ratio, ROA profitability ratio, operating expense ratio, LLD provision ratio, digital transformation, and the economic crisis in 2008 affect NII in the same direction. However, the ratio of loans to deposits, the marginal interest income ratio, economic growth, and the economic crisis in 1998 had the opposite effect on NII at commercial banks.

Thach et al. (2020) examined the factors affecting NII in Vietnamese commercial banks using financial statement data from 27 banks over the period 2010–2017. The study applied a Bayesian multivariate regression model for estimation. The results indicate that the loan loss provision (LLD) ratio, operating expense ratio, accounting activities, political stability, and regulatory quality have a positive effect on NII in Vietnamese commercial banks.

Lu and Van Nguyen (2023) investigated the impact of intellectual capital on NII using data from 20 Vietnamese commercial banks during the period 2006–2020. The authors employed a generalized method of moments (GMM) multivariate regression model. Their findings show that capital structure efficiency, bank size, pre-tax profit ratio, and inflation have a positive impact on NII. In contrast, human resource efficiency and GDP growth were found to have a negative effect on NII.

2.2. Research gaps

After summarizing the studies related to non-interest income at commercial banks and the factors affecting it, the author finds that the works still focus on research with two scopes: Inside and outside commercial banks. However, with different research contexts, different countries, as well as different political institutions or economic characteristics, the results of the influence of factors on non-interest income still exist. In addition, large research gaps focus on the following two points:

- Ashraf et al. (2023) and Meng et al. (2018) have argued about the structure of State ownership of non-interest income at commercial banks in China and Pakistan. However, the results of the argument are different, but with studies in Vietnam, it has not been mentioned. Meanwhile, in Vietnam, there is a group of 4 commercial banks, namely Agribank, VCB, Vietinbank, and BIDV, with over 51% of the State's capital, so the business strategies and shaping with the diversification of business types or products will also be somewhat different from the rest of the commercial banks. Therefore, the ownership structure is considered an important aspect affecting non-interest income at commercial banks that needs to be considered in the context of Vietnam.
- Ashraf et al. (2023) argued that the Income Appetite Diversity Index (HHI) is important in assessing the increase in non-interest income. Or this index shows the diversification of commercial banks. However, empirical studies have not mentioned much about this aspect, creating a research gap that needs to be considered and analyzed in the context of current Vietnamese commercial banks.

2.3. Research hypotheses development

Bank size (SIZE) is expected to influence non-interest income (NII) through economies of scale and scope. Larger banks can reduce average fixed costs related to information technology, compliance, and distribution systems. They can also share information and distribution channels across various fee-based services, such as payments, cards, bancassurance, and wealth management. In addition, platform and network effects allow large banks to enhance cross-selling opportunities across a broader customer base. Empirical studies indicate that larger banks tend to expand lending and service activities, thereby increasing NII (Atellu, 2016; Meng et al., 2018; Lu and Van Nguyen, 2023; Atmawidjaya and Nuryakin, 2023). Therefore, H1 proposes that bank size positively affects the NII of Vietnamese commercial banks.

The equity ratio (ETA) reflects a bank's capital strength and its ability to absorb risk. A higher equity buffer reduces financial constraints and enables banks to expand into fee-based activities such as guarantees and advisory services. From the resource-based view, equity also represents organizational slack that can be invested in technology, human capital, and new service development. Previous studies show that better-capitalized banks are more likely to expand non-interest activities (Meng et al., 2018; Atmawidjaya and Nuryakin, 2023; Lu and Van Nguyen, 2023). Hence, H2 states that the equity ratio positively affects the NII of Vietnamese commercial banks.

The deposits-to-total-assets ratio (DTA) represents the strength of a bank's deposit franchise. A stable and diversified deposit base strengthens customer relationships and supports payment ecosystems, enabling banks to offer bundled services such as cards, transfers, cash management, and bancassurance. Empirical evidence suggests that higher deposit intensity is associated with stronger fee income (Nepali and Niroula, 2020). Accordingly, H3 posits that the deposits-to-total-assets ratio positively affects NII.

In contrast, a high loans-to-total-assets ratio (CTA) may reflect a strong focus on traditional lending activities. Excessive concentration in credit intermediation can limit managerial attention and investment in fee-based platforms, thereby reducing diversification benefits. Empirical findings in Vietnam suggest that loan-intensive balance sheets are associated with weaker fee income performance. Therefore, H4 proposes that the loans-to-total-assets ratio negatively affects NII.

Loan-loss provisioning (LLR) reflects a bank's risk recognition and pricing capacity. Under dynamic provisioning frameworks, timely risk recognition may complement the development of fee-based services such as restructuring advisory, guarantees, and trade finance. Studies in ASEAN countries and Vietnam report a positive association between provisioning intensity and NII (Atmawidjaya and Nuryakin, 2023; Thach et al., 2020). Thus, H5 states that the loan-loss provisioning ratio positively affects NII.

Income diversification (DIVER) is grounded in portfolio diversification theory (Markowitz, 1952) and economies of scope. Expanding into non-traditional services allows banks to share information and distribution channels, stabilize cash flows, and access new revenue sources. Empirical research finds that greater diversification is associated with higher NII (Ashraf et al., 2023; Meng et al., 2018). Accordingly, H6 suggests that income diversification positively affects NII.

State ownership (STA) may influence NII through governance mechanisms. Agency theory suggests that state-owned banks may face policy mandates, softer budget constraints, and slower innovation processes, which could limit the development of fee-based services. Empirical evidence shows that higher state ownership is associated with weaker diversification and lower NII (Meng et al., 2018; Ashraf et al., 2023). Therefore, H7 proposes that state ownership negatively affects NII.

Economic growth (GDP) is expected to stimulate demand for financial services. Higher GDP growth increases transaction volumes and investment activities, raising demand for settlement, trade finance, and advisory services. Financial accelerator mechanisms may further strengthen these effects. Studies in Pakistan, ASEAN, and Vietnam document a positive relationship between GDP growth and NII (Ashraf et al., 2023; Atmawidjaya and Nuryakin, 2023). Hence, H8 states that economic growth positively affects NII.

Inflation (INF) may have a nonlinear impact on NII. At moderate levels, inflation can increase nominal transaction values and fee income. However, high inflation reduces money demand, creates macroeconomic instability, and weakens demand for banking services. Evidence from Vietnam suggests that high inflation is associated with lower NII. Therefore, H9 proposes that inflation negatively affects NII at high levels, while the effect may be weaker or positive at moderate levels.

Finally, the COVID-19 pandemic (COVID) accelerated digital adoption and increased the use of mobile banking and electronic payments. Network effects may enhance platform-based fee income and persist beyond the crisis period. Evidence from Vietnam and ASEAN indicates that digital migration during the pandemic was associated with higher fee income (Atmawidjaya and Nuryakin, 2023). Thus, H10 proposes that the COVID-19 pandemic positively affects NII through accelerated digital adoption and increased platform usage.

The measurement of the dependent and independent variables used in this research model is summarized in Table 1.

Table 1: Definition and measurement of variables

No.	Code	Variable	Definition and measurement
			Dependent variable
1	NII	Non-interest income ratio	Net non-interest income divided by total assets, expressed as a percentage
			Bank-specific variables
2	SIZE	Bank size	Natural logarithm of total assets
3	ETA	Equity-to-assets ratio	Shareholders' equity divided by total assets, expressed as a percentage
4	DTA	Deposits-to-assets ratio	Total deposits divided by total assets, expressed as a percentage
5	CTA	Loans-to-assets ratio	Total outstanding loans divided by total assets, expressed as a percentage
6	LLR	Loan-loss reserve ratio	Loan-loss reserves divided by total outstanding loans, expressed as a percentage
7	DIVER	Income diversification index	One minus the sum of the squared shares of interest income and non-interest income in total income
8	STA	State ownership	Dummy variable equal to 1 if state ownership exceeds 51 percent (Agribank, Vietcombank, VietinBank, and BIDV), and 0 otherwise
			Macroeconomic variables
9	GDP	Economic growth rate	Annual percentage change in gross domestic product
10	INF	Inflation rate	Annual percentage change in the consumer price index
11	COVID	COVID-19 pandemic	Dummy variable equal to 1 for the period 2020–2022, and 0 otherwise

The research model includes ten factors that affect the NII of Vietnamese commercial banks. The conceptual framework and hypothesized relationships are illustrated in Fig. 1.

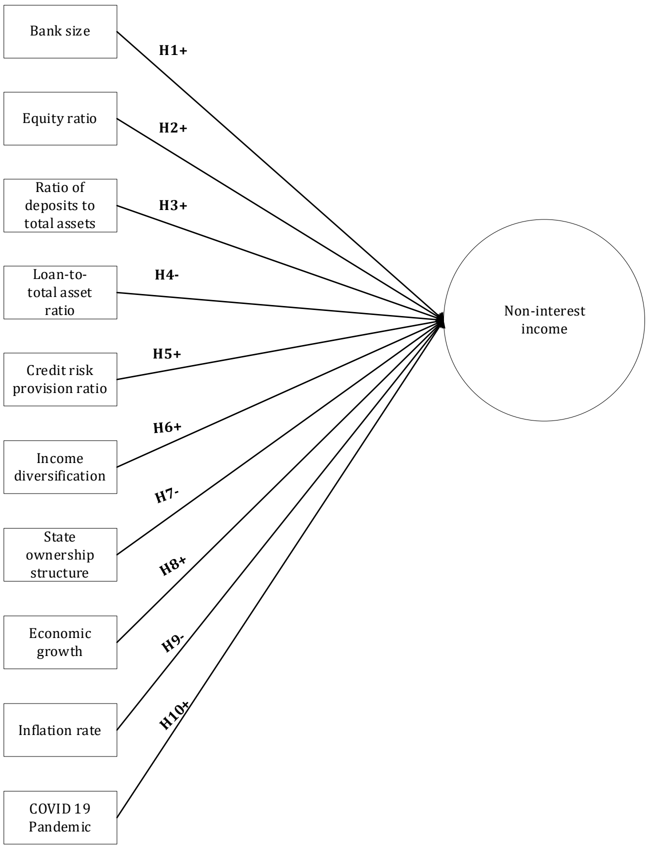

Fig. 1: Proposed research model

3. Research methodology

Guided by the rule-of-thumb in quantitative research, $n \geq 50 + 8m$, where m is the number of predictors, the thesis with $m = 10$ requires at least 130 observations. The compiled panel comprises 24 Vietnamese commercial banks over 2011–2023 (13 years), yielding 24×13 = 312 bank–year observations, comfortably exceeding the minimum. Data are drawn from audited consolidated financial statements and annual reports disclosed on banks' official websites, supplemented by CAFef for archival consistency.

The sampling frame focuses on Vietnamese-owned commercial banks, excluding foreign bank subsidiaries/branches headquartered in Vietnam. This cohort represents the dominant segment of the domestic banking system (well over half of institutions and assets), thereby offering a sector-representative view over the study horizon. The final dataset covers 24 banks that meet disclosure and continuity criteria.

The observation window 2011–2023 spans multiple macro–financial regimes—post-post-global crisis adjustment, the U.S.–China trade tensions, the COVID-19 shock, the Russia–Ukraine conflict, and the 2022–2023 inflationary episode—all of which plausibly influenced banks' business models and non-interest income dynamics. The resulting (largely) balanced panel supports robust econometric analysis of both bank-specific and macroeconomic determinants of non-interest income.

Using the research sample after screening, the authors carried out methods such as descriptive statistics, correlation matrix analysis, running F-test and Breusch-Pagan, Hausman tests to select a suitable testing model, then testing the phenomenon with the selected model (multi-linear, variable error variance, self-correlation) and overcoming disability phenomena.

4. Research results

4.1. Changes in the non-interest income ratio of Vietnamese commercial banks from 2011 to 2023

The situation of the NII coefficient of Vietnamese commercial banks from 2011 to 2023 is considered through the average value of 24 banks in each year. Fig. 2 shows that change.

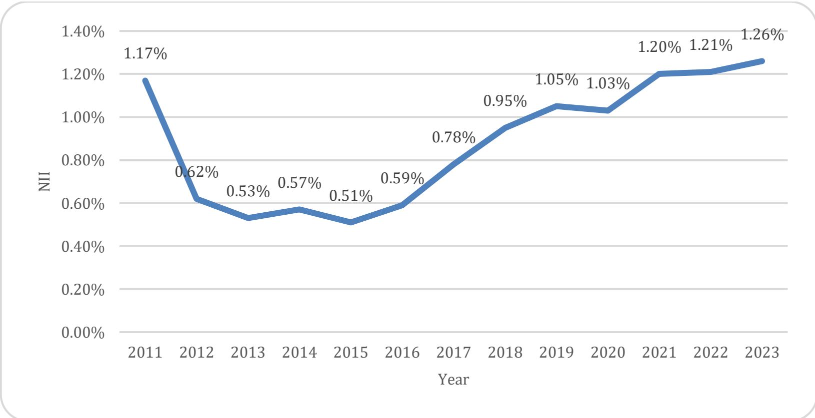

Fig. 2: Changes in the non-interest income ratio from 2011 to 2023 of 24 Vietnamese commercial banks

From 2011 to 2023, the non-interest income of 22 Vietnamese commercial banks generally increased from 1.17% in 2011 to 1.26%, although there were deep fluctuations. In particular, the period of 2011–2015 is the period when Vietnamese commercial banks restructured according to the directive of the State Bank to limit bad debts and weak management activities of commercial banks causing damage to the system from the previous period, or in other words, the State Bank of Vietnam (SBV) customers tightened the business activities of Vietnamese commercial banks, so the NII rate decreased from 1.17% to 0.51%. Starting from 2016 onwards, this rate increases steadily every year from 0.59% to 1.26%. This shows that Vietnamese commercial banks still create general stability in their business activities and still focus on developing diversified activities in search of NII. Especially in the period of 2020–2022, when the COVID-19 pandemic appeared, commercial banks took advantage of opportunities with retail, insurance, toll collection, and investment products to increase NII to compensate for losses in ineffective loans or business difficulties. In the following period, the ratio of NII is expected to continue to grow.

4.2. Statistics describing the study sample

The variables in the research model are summarized in the average value (Mean), smallest value (Min), maximum value (Max), and standard deviation in Table 2.

For NII, the average of Vietnamese commercial banks from 2011 to 2023 is 0.88% with a high corresponding deviation of 0.56%. This shows that there are big differences and gaps between Vietnamese commercial banks in this period in the search for non-interest income, because the business characteristics or strategies of banks are different. In which the lowest NII was 0.01% of VIETCAP in 2016, and the largest was 2.65% of ACB in 2021.

Bank size (SIZE) has an average Log (Total Assets) value of 32.87 with a small deviation of 1.28. In which, the smallest scale with Log (Total Assets) is 30.32 of SGB in 2014, and the largest is 35.88 belonging to BIDV in 2023. On the other hand, commercial banks with more than 51% ownership of the State, such as VCB, CTG, and BID, always rank first in terms of asset size. The average ratio of equity to total assets (ETA) of Vietnamese commercial banks from 2011 to 2023 is 8.92%, with a high corresponding deviation of 3.87%. Therefore, it can be seen that Vietnamese commercial banks still maintain the level of equity in the capital structure at a moderate level, but there is a big difference between banks with a high deviation. The rate is the lowest at 2.69% of VPB in 2020, and the highest is 23.84% of SGB in 2013.

The average deposit-to-total assets (DTA) ratio of Vietnamese commercial banks from 2011 to 2023 is 40.35%, with a high corresponding deviation of 8.01%. Therefore, it can be seen that Vietnamese commercial banks still prioritize the use of savings deposits for their capital structure, in order to perform the financial intermediary function well. In addition, the cost of using savings mobilization is the cheapest.

The rate is the lowest at 16.52% at MSB in 2014, and the highest is 66.74% at SCB in 2023. The average loan-to-total asset ratio (CTA) of Vietnamese commercial banks from 2011 to 2023 is 33.63% with a high corresponding deviation of 11.28%. Therefore, it can be seen that Vietnamese commercial banks still make a big difference in lending activities. In which this rate is the lowest at 18.00% of VPB in 2015, and the highest is 92.71% of SHB in 2012.

Table 2: Descriptive statistics

Variable	Mean	Standard deviation	Min	Max
NII	0.88%	0.56%	0.01%	2.65%
SIZE	32.87	1.28	30.32	35.88
ETA	8.92%	3.87%	2.69%	23.84%
DTA	40.36%	8.01%	16.53%	66.74%
CTA	33.63%	11.28%	18.00%	92.71%
LLR	1.15%	0.36%	0.29%	3.53%
DIVER	0.36	0.14	0.22	0.50
STA	0.17	0.37	0.00	1.00
GDP	5.79%	1.52%	2.58%	8.02%
INF	4.86%	4.49%	0.63%	18.68%
COVID	0.15	0.36	0.00	1.00

The average credit risk provision ratio (LLR) of Vietnamese commercial banks from 2011 to 2023 is 1.15%, with a high corresponding deviation of 0.36%. Therefore, it can be seen that Vietnamese commercial banks still maintain this risk reserve level lower than 3% and make a difference with each other in the system. In particular, the lowest credit risk provision ratio was 0.29% of VPB in 2011, and the highest was 3.53% of TPB in 2011. The average income diversification coefficient (DIVER) of Vietnamese commercial banks from 2011 to 2023 is 0.5, with a high corresponding deviation of 0.14. We can see that commercial banks are still trying to increase the gap between each other in this diversification coefficient to improve competitiveness and market share in the system. In which this coefficient is the lowest is 0.22 of TPB in 2011, and the largest is 0.5 of MSB in 2014.

For the macro economy, represented by GDP and the inflation rate in the period 2011 – 2023, it is easy to see that the average GDP growth rate per year is 5.79% with a low deviation, with the lowest is 2.58% in 2021, and the highest is 8.02% in 2022. As for the inflation rate, the average per year is 4.86%, with the lowest rate of which in 2015, the lowest rate is 0.63% and the highest is 18.68% in 2011. In addition, in the thesis, pseudo-variables are used for the Covid-19 pandemic and the structure of state ownership, but they exist in the form of receiving two values of 0.1. Therefore, it is specific by group or year, so the statistics described in this section are not presented.

4.3. Correlation analysis between independent and control variables of the research model

Based on Table 3 and considering the magnitude of the correlation coefficient between the independent variables, most of them are lower than 0.8. However, there is a COVID variable and GDP with a correlation coefficient with a magnitude of 0.856; this is a high correlation, so multi-linearity can occur with this pair of variables. However, the COVID variable is a false variable different from the quantitative variable of GDP, so it is necessary to examine it further to determine whether this phenomenon is really happening or not.

4.4. Results of estimation and validation of the multivariate regression model

Based on the results of Table 4, we can see that the Pooled OLS, FEM, and REM models all have a determination coefficient of R-squared greater than 50% under [0.5; 1], which shows that the statistically significant variables affected by these models will explain over 50% of the change in NII in Vietnamese commercial banks. In addition, based on the initial results of the multivariate regression of the models, the independent variables SIZE, DTA, LLR, DIVER, INF, and COVID positively affect NII at Vietnamese commercial banks with a significance of 1%, 5%. CTA and STA variables negatively affect NII at Vietnamese commercial banks with a significance of 1%. On the other hand, GDP has a statistical significance that positively affects NII in the FEM and REM models with a significance of 10%, but these two variables do not have a statistical significance at Pooled OLS.

With variable ETA, there is no statistical significance affecting NII for all models. However, in terms of the influence of variables in the three models, there is a high similarity, thus creating consistency with the research data collected from Vietnamese commercial banks in the period 2011–2023. This is the basis for further inspections. Next is the inspection related to the choice of the right model.

For the selection test between Pooled OLS and FEM, the thesis uses the F-test with the hypothetical pair of H0, the suitable Pooled OLS model, and H1, the suitable FEM model. The results show that the Prob>F is 0.000, which is 5% lower than 5%, so H1 is accepted, and the FEM model is suitable. For the selection test between Pooled OLS and REM, the thesis uses the Breusch-Pagan test with the hypothesis pair that H0 is suitable for the Pooled OLS model, and H1 is the suitable REM model. The results show that the Prob > Chibar2 is 0.000, which is 5% lower than H1, so the REM model is suitable. With the above two tests, we see that FEM and REM are more suitable than Pooled OLS. Therefore, the following Hausman examination will conclude the most suitable model for this thesis.

Table 3: Correlation matrix of independent variables

Variable	SIZE	ETA	DTA	CTA	LLR	DIVER	STA	GDP	INF	COVID
SIZE	1.000									
ETA	-0.574	1.000								
DTA	0.198	0.151	1.000							
CTA	-0.256	0.164	0.005	1.000						
LLR	-0.296	0.424	0.143	0.117	1.000					
DIVER	0.093	0.033	0.102	0.064	-0.380	1.000				
STA	0.603	-0.341	0.109	-0.078	-0.215	0.027	1.000			
GDP	-0.056	-0.034	-0.055	-0.013	0.038	-0.018	-0.001	1.000		
INF	-0.261	0.167	-0.026	0.256	0.059	-0.178	-0.001	0.052	1.000	
COVID	0.150	-0.056	0.147	-0.129	-0.071	0.026	-0.001	-0.856	-0.222	1.000

Table 4: Regression results of Pooled OLS, FEM, and REM

Variable name	NII		
	OLS	FEM	REM
SIZE	0.003***	0.004***	0.003***
ETA	-0.001	-0.008	-0.005
DTA	0.018***	0.014***	0.015***
CTA	-0.014***	-0.008***	-0.01***
LLR	0.410***	0.202*	0.247**
DIVER	0.0001***	0.0001***	0.0001***
STA	-0.003***	0	-0.004**
GDP	0.040	0.049*	0.049*
INF	0.044***	0.050***	0.047***
COVID	0.003*	0.003**	0.003**
R-squared	54.06%	57.30%	56.87%

***, **, *: Corresponding to the meaningful level of 1%, 5%, and 10% respectively

On the other hand, when testing Hausman to consider the compatibility between the two models, FEM and REM, with the hypothetical pair as follows: H0 is that there is no existence between independent variables and correlated residuals, so the REM model is suitable; H1 is the existence between independent variables and correlated residuals, so the FEM model. The results in Table 5 show that the P-value of this test is 0.7269 greater than 5%, so H0 is accepted, or in other words, the REM model is more suitable. In addition, the REM model is also more stable than Pooled OLS, and the determination coefficient of this model is higher, with a rate of 56.87%, so this model is suitable for carrying out subsequent tests to conclude the results.

Table 5: Inspection results for the selection of suitable models

Accreditation	Inspection results	Selection results
F–test	F (09.278) = 41.45 Prob > F = 0.000	Suitable FEM model
Breusch-Pagan inspection	Chibar2(01) = 208.93 Prob > Chibar2= 0.000	Suitable REM model
Hausman accreditation	Chi2(8) = 5.28 Prob > Chi2 = 0.7269	Suitable REM model

Based on the result of Table 6, we can see that the VIF variance magnification coefficients are lower than 10, and the average VIF value is lower than 5. This suggests that the H0 hypothesis is supported, or in other words, that the model does not have multilinearity. Therefore, the data is independent and reliable to continue the inspection.

Table 6: Multicollinearity inspection results

Variable	VIF
COVID	4.76
GDP	4.41
SIZE	2.60
ETA	1.95
STA	1.67
LLR	1.60
DIVER	1.36
INF	1.32
DTA	1.27
CTA	1.20
VIF average	2.21

With the variable error variance, the H0 hypothetical pair is that there is no error variance in the model, and H1 is that there is an error variance in the model. The test results in Table 7 show that the Prob is 0.000, which is 5% lower than the significance level, thus rejecting H0, which means that the REM model has a variable error variance.

Table 7: Results of testing the variance of the change error of the REM model

The phenomenon of variable error variance
Chi2 (01) = 208.93 Prob > Chi2 = 0.0000

With the autocorrelation phenomenon, the hypothesis pair H0 is that there is no autocorrelation phenomenon in the model, and H1 is that there is an autocorrelation phenomenon in the model.

The test results in Table 8 show that the Prob is 0.000, which is 5% lower than the significance level, thus rejecting H0, which means that the REM model has a variable error variance.

Table 8: Autocorrelation test results of the REM model

Autocorrelation phenomenon
F (1.21) = 78.350
Prob > F = 0.0000

Thus, when it is determined that the REM model has two phenomena of variable variance and self-correlation, it is necessary to overcome these two phenomena according to the FGLS method. With this method, the errors in the defects will be misused, and after overcoming, the regression model will return to its correct form, in order to determine the final results to discuss and test the corresponding research hypotheses. With the dependent variable being NII, after testing the defect phenomena and overcoming the corresponding problems, the P-value of the model according to the FGLS method is 0.000, which is 5% lower than the significance level. This proves that this final model is consistent with the overall and has statistical significance for subsequent analysis. Specifically, the independent variables SIZE, DTA, CTA, LLR, DIVER, STA, and INF have a P-value lower than 5%, which means that these variables have statistical significance affecting the NII of banks. In other words, the size of banks, the ratio of deposits to total assets, the ratio of loans to total assets, the ratio of LLD provisions, income diversification, the structure of state ownership, the inflation rate, and the Covid-19 pandemic affect the NII of Vietnamese commercial banks.

The REM model has an R-squared coefficient of 56.87%, which can be said to be statistically significant, independent variables that explain 56.87% of the change in NII. In other words, the size of the bank, the ratio of deposits to total assets, the ratio of loans to total assets, the ratio of provisions for credit risks, income diversification, the structure of state ownership, the inflation rate and the Covid-19 pandemic explain 56.87% of the change in the balance sheet at Vietnamese commercial banks in the period 2011–2023. Based on the results of Table 9, the regression model is set up as follows:

$$NII_{it} = \alpha + \beta_1 SIZE_{it} + \beta_2 DTA_{it} + \cdots + \beta_8 COVID_t + \varepsilon_{it}$$

Based on the results of Table 9, the results are summarized and matched with the initial statistical hypothesis to conclude that if the results of each factor have an angle coefficient different from the original hypothesis, the conclusion will be inappropriate. If the P-Value of that variable is greater than 5%, the hypothesis will be rejected. Based on the FGLS estimation results in Table 9, the research hypotheses are verified and matched with the initial expectations. The summary of these hypothetical conclusions is presented in Table 10.

Table 9: Results of estimation of the REM model by the FGLS method

Independent variables	Dependency variables NII		
	Regression coefficients	Standard Error	P-value
SIZE	0.003***	0.0003	0.000
ETA	-0.002	0.008	0.754
DTA	0.012***	0.003	0.000
CTA	-0.010***	0.001	0.000
LLR	0.376***	0.069	0.000
DIVER	0.0001***	0.000	0.000
STA	-0.003***	0.001	0.000
GDP	0.022	0.015	0.157
INF	0.043***	0.004	0.000
COVID	0.002*	0.001	0.026
Wald chi2(8)	338.66		
Prob > Chi2	0.0000		
R-squared	56.87%		

Table 10: Summary results

Research hypothesis	Independent variables	NII			Hypothetical conclusion
		Expectations	Result		
			Direction	P-value	
H1	SIZE	+	+	0.000	Suitable
H2	ETA	+	-	0.754	Rejected
H3	DTA	+	+	0.000	Suitable
H4	CTA	-	-	0.000	Suitable
H5	LLR	+	+	0.000	Suitable
H6	DIVER	+	+	0.000	Suitable
H7	STA	-	-	0.000	Suitable
H8	GDP	-	+	0.157	Rejected
H9	INF	-	+	0.000	Not suitable
H10	COVID	+	+	0.026	Suitable

5. Results and discussion

The coefficient on bank size (SIZE) is positive and statistically significant (β = 0.003), indicating that larger banks tend to generate higher levels of non-interest income. This finding is consistent with prior empirical evidence suggesting that scale enhances banks' capacity to expand fee-based activities and diversify revenue streams. Studies conducted in Kenya, China, Indonesia, ASEAN countries, and Vietnam similarly report a positive association between bank size and non-interest income or income diversification (Atellu, 2016; Meng et al., 2018; Atmawidjaya and Nuryakin, 2023).

The cross-country consistency of this relationship suggests that scale economies facilitate broader distribution networks, stronger digital infrastructure, and greater product diversification. Larger institutions are typically better positioned to leverage technological investments and cross-selling strategies, which enhance their ability to generate fee-based revenues.

However, the magnitude of the coefficient in our sample is relatively modest. This aligns with the view that size alone does not guarantee substantial income diversification. Rather, complementary organizational capabilities—such as innovation capacity, managerial efficiency, and strategic orientation—are necessary to fully exploit scale advantages.

The deposits-to-assets ratio (DTA) exhibits a positive and statistically significant coefficient (β = 0.012), indicating that banks with a stronger deposit base tend to generate higher non-interest income. This finding aligns with evidence from Vietnam and Nepal, where deposit expansion has been associated with greater fee-based revenue generation (Nepali and Niroula, 2020). A stable and broad depositor base provides opportunities for cross-selling payment services, cards, bancassurance, and wealth management products, thereby supporting non-interest income growth.

In contrast, the loans-to-assets ratio (CTA) is negatively associated with non-interest income (β = −0.009). This suggests that greater reliance on traditional lending activities may limit banks' engagement in fee-generating services. The result supports the argument that balance-sheet-intensive intermediation can crowd out non-interest activities unless complemented by strong managerial capabilities and pricing strategies. Similar conditional dynamics have been observed in Pakistan, where loan intensity contributes positively to non-interest income only when supported by effective management and pricing mechanisms (Ashraf et al., 2023).

Although prior domestic evidence on the deposit ratio is mixed—some studies report a positive relationship, while others find a negative one—our results jointly suggest that funding structure matters. Specifically, a deposit-rich model appears more conducive to expanding fee-based services, whereas heavy reliance on lending may constrain diversification into non-interest income streams.

Loan-loss provisioning (LLR) exhibits the largest coefficient in our model (β = 0.376), indicating a strong positive association with non-interest income. This suggests that higher provisioning levels—often reflecting greater credit risk exposure—may coincide with increased engagement in fee-generating activities. One possible explanation is that periods of heightened credit risk stimulate demand for restructuring advisory services, guarantees, trade finance, and other risk-related financial products that generate fee income.

This finding is consistent with domestic evidence documenting a positive relationship between loan-loss provisions and non-interest income (Thach et al., 2020), as well as evidence from Indonesia and the broader ASEAN region reporting similar effects (Atmawidjaya and Nuryakin, 2023). The cross-country consistency implies that risk management intensity and fee-based activities may be complementary rather than substitutive.

At the same time, the positive association may partially reflect cyclical dynamics: deteriorating asset quality can increase both provisioning and the pricing or demand for risk-related services. To address potential simultaneity concerns, additional robustness checks—such as employing lagged provisioning variables or controlling more extensively for asset quality—would help strengthen causal interpretation.

Income diversification (DIVER) is positively associated with non-interest income (β = 0.0001), although the economic magnitude is small. This indicates that diversification contributes to fee-based revenue expansion, but its quantitative impact remains limited in our sample. The finding is broadly consistent with evidence from China and Pakistan, where diversification strategies are linked to higher non-interest income, particularly when supported by scale, capital strength, and risk-bearing capacity (Meng et al., 2018; Ashraf et al., 2023). In the Vietnamese context, prior research suggests that the gains from diversification depend critically on operating efficiency and risk management quality (Thach et al., 2020). Our results align with this conditional view: diversification breadth appears present, yet its depth and monetization remain modest, consistent with a banking system still transitioning from traditional intermediation toward more platform-oriented fee models.

Inflation (INF) shows a positive and statistically significant association with non-interest income (β = 0.043), a result that differs from several domestic and international studies documenting negative inflation–non-interest income relationships. One explanation is that moderate inflation increases nominal transaction values and payment volumes, thereby raising fee revenues in the short term. However, when inflation becomes elevated and persistent, macroeconomic uncertainty and weakened real activity may suppress demand for financial services, potentially reversing the relationship. The positive average effect observed here may therefore reflect moderate inflation dynamics within the sample period. A nonlinear specification, such as a threshold or spline model, would help determine whether the relationship changes at higher inflation levels and reconcile divergent findings in the literature.

State ownership (STA) is negatively associated with non-interest income (β = −0.003), although the magnitude is economically small. This result is consistent with evidence that ownership structure influences banks' diversification capacity and revenue composition (Meng et al., 2018; Ashraf et al., 2023). In the Vietnamese setting, governance frictions in state-controlled banks—such as slower product innovation, policy mandates, and weaker managerial incentives—may constrain the expansion of fee-based activities. The modest coefficient suggests incremental rather than structural disadvantages, yet the consistent negative sign highlights ownership as an institutional factor shaping income structure.

The COVID-19 dummy (COVID) exhibits a small positive effect (β = 0.002), suggesting that the pandemic period modestly supported non-interest income growth. This likely reflects accelerated digital adoption, increased use of electronic payments, and greater reliance on platform-based services during mobility restrictions. Whether this effect represents a temporary shock or a persistent structural shift toward digital fee generation warrants further empirical examination.

Finally, capitalization and macroeconomic growth do not show statistically significant effects. This finding echoes the mixed evidence in the literature, where the influence of capital adequacy and GDP growth on non-interest income appears context-dependent. In our sample, bank-specific structural characteristics—such as funding composition, provisioning behavior, scale, and ownership—appear to exert stronger influence on fee-based revenue performance than macroeconomic or capital-related factors.

6. Conclusion

Building on the empirical evidence, we propose a focused policy agenda that links directly to the determinants of non-interest income (NII) in Vietnamese commercial banks. First, because NII is highly sensitive to the quality of credit-risk recognition and provisioning, supervisors should consolidate IFRS 9 and Basel-consistent practices—mandating back-testing of staging and public error bands for probability-of-default and loss-given-default models, Board Risk Committee attestations on overlays, and a supervisory "provisioning quality score" disclosed under Pillar 3. These measures align the pricing of guarantees, trade services, and restructuring advisory with through-the-cycle risk, thereby stabilizing fee income. Second, macro-financial coordination should prioritize predictable, moderate inflation and calibrate credit-growth limits using income-diversification metrics (e.g., a Herfindahl index of income sources), while embedding consumer-protection outcomes, complaint resolution timeliness, mis-selling incidence, and remediation, in supervisory dialogues on diversification strategies. Third, to mitigate conduct risk as cross-selling expands in cards, payments, bancassurance, and wealth management, regulators should require standardized key-facts statements, transparent fee disclosure, and time-bound redress with public league tables. Fourth, continued investment in interoperable fast-payment rails, open-banking data-sharing, secure APIs, and QR ecosystems can reduce transaction frictions and catalyze durable fee streams; tiered interchange caps and transparent acquirer pricing would broaden merchant acceptance without undermining sustainability.

Fifth, deepening linkages with capital markets and insurance requires clear guidance on bancassurance remuneration with claw-backs and suitability assessments, explicit post-sale service KPIs, and streamlined connectivity to brokerages and central securities depositories to expand custody, advisory, and transaction-based fees. Finally, given the negative association between state ownership and NII, governance reforms in state-controlled banks should ensure at least one-third independent directors, separation of chair and CEO roles, merit-based executive appointments with incentives tied to fee-income stability, conduct outcomes, and provisioning quality, as well as time-bound product approvals and robust safeguards for related-party transactions. Centralizing the state's ownership function, publishing annual "owner's expectations," and enhancing disclosure of NII composition and fee waivers can reduce organizational frictions and align public mandates with commercial targets.

List of abbreviations

API	Application programming interface
ATM	Automated teller machine
CPI	Consumer price index
CTA	Loans-to-total assets ratio
DIVER	Income diversification index
DTA	Deposits-to-total assets ratio
ETA	Equity-to-assets ratio
FEM	Fixed effects model
FGLS	Feasible generalized least squares
GDP	Gross domestic product
GMM	Generalized method of moments
HHI	Herfindahl–Hirschman index
IFRS	International financial reporting standards
INF	Inflation rate
LLD	Loan-loss provision
LLR	Loan-loss reserve ratio
MP	Market power
NII	Non-interest income
OLS	Ordinary least squares
REM	Random effects model
RMP	Relative market power
ROA	Return on assets
ROE	Return on equity
SBV	State Bank of Vietnam
SCP	Structure–conduct–performance
SIZE	Bank size
STA	State ownership structure
VIF	Variance inflation factor

Compliance with ethical standards

Conflict of interest

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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