

THE INFLUENCE OF NON-INTEREST INCOME ON BANK RISK DURING THE COVID-19 PANDEMIC: IMPLICATIONS FOR GOVERNANCE IN A DEVELOPING MARKET

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Abstract

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This study aims to assess the impact of non-interest income on the risk profiles of Vietnamese commercial banks. By employing the generalized method of moments (GMM) estimator, using panel data from 24 banks in Vietnam, spanning from 2010 to 2022, the research identifies a positive correlation between non-interest income and bank risk, as reflected in the Z-index score. The findings reveal a significant disparity between banks that adhere to Basel II standards and those that do not, with Basel II-compliant banks demonstrating a stronger capacity to manage associated risks. This paper contributes to the literature by exploring the risks of two groups of commercial banks that meet/do not meet Basel II standards, especially in an emerging country as Vietnam, where adherence to Basel is not comprehensive. The study highlights key policy implications for regulators and banks in Vietnam, stressing the need to balance the benefits of non-interest income with its risks. The research calls for better regulatory compliance, especially in risk management, and urges Vietnamese regulators to enhance the framework for banks not yet compliant with Basel II. Collaboration between policymakers and bank executives is essential to maintaining financial stability as banks diversify their income sources.

Keywords: COVID-19, Non-Interest Income, Bank Risk, Commercial Banks, Basel

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1. INTRODUCTION

The COVID-19 pandemic has significantly impacted the revenue streams of banks, particularly by reducing income from credit activities due to sluggish credit growth and the need for increased risk provisioning. Additionally, heightened competition among commercial banks, financial companies, and Fintech firms has further compressed the marginal income derived from traditional credit activities, complicating banks' efforts to maintain or grow their interest income in an increasingly challenging economic and competitive landscape (Mashamba & Chikutuma, 2023).

Given that interest income remains the primary revenue source for commercial banks, there is an urgent need for these institutions to diversify their revenue streams by expanding into non-credit activities to enhance non-interest income (Nguyen & Hoang, 2019). Recently, human resource development has been identified as a critical growth strategy. According to Sanya and Wolfe (2011), banks with a diversified income structure, including a significant share of non-interest income, are more likely to achieve sustainable long-term growth.

The shift toward generating non-interest income is not without significant risks. Earnings from assets like stocks, bonds, and real estate can be highly unstable, subject to the unpredictability of market dynamics. During periods of unfavorable economic conditions, these investments may result in substantial losses, especially as banks face challenges in maintaining liquidity. Liquidating such investments can be particularly difficult in downturns, further heightening a bank's risk profile (Singh et al., 2016).

Although engaging in non-credit-related activities allows banks to diversify revenue streams and access broader markets, this diversification comes with changes to their overall risk exposure. This nuanced relationship between non-traditional revenue and banking risks underscores the importance of understanding how reliance on non-interest income impacts the stability of commercial banks, especially as they increasingly shift toward these revenue sources.

Based on the research overview, especially when further defining the banking groups, fairly few research gaps have been exposed in an emerging nation like Vietnam regarding the verification of the relationship between non-interest revenue and risk of banks. This research addresses the need for a deeper examination by analyzing a panel dataset of 24 Vietnamese commercial banks over the period from 2010 to 2022. Using the generalized method of moments (GMM) approach, it explores the effect of non-interest income on the risk profiles of these banks, with a particular focus on the COVID-19 pandemic's influence. The results provide essential insights into the balance between income diversification and risk management strategies in Vietnam's banking sector.

The structure of this paper is as follows. Section 2 reviews the relevant literature. Section 3 describes the methodology used to conduct the empirical research. Section 4 presents the model results and discusses the findings. Finally, Section 5 provides the conclusion, recommendations, and limitations of the study.

2. LITERATURE REVIEW

Hunjra et al. (2020) examined Southeast Asian banks from 2009 to 2018 using the GMM, finding that non-interest income inversely impacts bank risk. This conclusion aligns with Hamdi et al. (2017) for Tunisian banks. Similarly, Lee et al. (2014) studied 967 banks across 22 Asian countries from 1995 to 2009 and observed that non-interest income mitigates bank risk but does not enhance profitability. De Jonghe et al. (2015) noted that this effect depends on country-specific institutions. In contrast, research on banks in the United States (U.S.), Europe, and Asia indicates that non-interest income raises risk (Antao & Karnik, 2022), particularly when low interest rates squeeze net interest margins. The Global financial crisis (Boungou, 2019) pushed banks to expand non-interest income, worsening credit quality. However, most of these studies have not considered the impact of pandemics on non-interest income on bank risk.

The traditional banking view suggests that non-interest income sources, such as fees and commissions, are typically more stable than interest-based income, which can reduce bank risk (Chiorazzo et al., 2008; Mashamba & Chikutuma, 2023). Income diversification has been found to enhance financial stability, offering protection against crises. Banks with high liquidity, operational efficiency, and strong deposit ratios are better positioned to withstand financial shocks and can successfully implement income diversification strategies to lower risks and improve competitiveness (Octavianus et al., 2021). However, the effect of income diversification on bank risk varies with bank size. Larger banks, due to superior risk management practices and more experienced management teams, can leverage diversification to reduce systemic risk (Cerasi & Daltung, 2000). In contrast, smaller banks, often less efficient and transparent, tend to engage in riskier diversification activities, which can heighten their risk exposure (Lepetit et al., 2008). Additionally, income from brokerage and insurance activities has been linked to reduced default risk (DeYoung & Torna, 2013). Conversely, high fee income can increase bank risk, as shown in studies on Indian and global banks (Pennathur et al., 2012), with trading and venture capital activities contributing significantly to banking risks (Bürgi & Jiang, 2023). In summary, the impact of non-interest income on systemic risk becomes more pronounced during financial crises, significantly contributing to increased bank risk. However, existing studies have not yet evaluated the risks specific to different groups of banks, nor have they analyzed the individual effects of various sources of non-interest income on bank risk (Mdandalaza & Jeke, 2025).

In evaluating the impact of income diversification on business risk for Vietnamese commercial banks, research shows that diversification tends to reduce bank risk. As banks diversify their income sources, especially by increasing non-interest income, their business risk decreases (Barakat et al., 2024). Banks that generate higher non-interest income experience lower risk compared to those relying primarily on interest income (Nguyen & Hoang, 2019). Moreover, higher non-interest income ratios correlate with better utilization of human resources, leading to reduced management and operational costs, and ultimately boosting profitability (Hoang & Vo, 2010). Additionally, the rise in non-interest income helps

distribute risks, particularly credit risk, allowing banks to better withstand market fluctuations (Le & Pham, 2017).

However, these studies did not consider the impact of the COVID-19 pandemic, leaving room for further exploration of how non-interest income affects risk during such crises. Furthermore, results on the relationship between non-interest income and risk remain mixed. Some studies suggest that diversification into non-traditional activities could increase risk (Phan et al., 2022), but they also fail to account for risk differences across various bank groups and do not analyze the individual effects of different non-interest income sources.

There are several gaps in existing research on bank risk. First, prior studies have not considered the effects of the COVID-19 pandemic. Second, the risks associated with different bank types remain insufficiently explored. Third, the individual impact of various non-interest income sources on bank risk is yet to be analyzed. Moreover,

many studies focus only on quantitative methods, neglecting qualitative insights that could offer a deeper understanding of the complexities involved. Additionally, limited attention has been given to how regulatory frameworks influence the relationship between non-interest income and bank risk. Longitudinal studies are needed to assess how economic, technological, and consumer behavior shifts affect this dynamic. Finally, a more comprehensive classification of non-interest income sources and their unique risk contributions is necessary.

3. RESEARCH METHODOLOGY

3.1. Research model

To assess the impact of non-interest income (*NII*) on the risk of Vietnamese commercial banks, the following regression model is used:

Model 1

$$ZSCORE_{i,t} = \beta_0 + \beta_1 NII_{i,t} + \beta_2 CIR_{i,t} + \beta_3 SIZE_{i,t} + \beta_4 GDP_{i,t} + \beta_5 COVID_{i,t} + \theta_t + u_{i,t} \quad (1)$$

Here, the *ZSCORE* represents the bank's financial stability, as originally defined by Roy (1952) and later refined by Lepetit and Strobel (2015). It reflects a bank's vulnerability by considering the ratio of equity to total assets, return on assets (ROA), and the standard deviation of ROA. A higher Z-score indicates greater bank stability, showing the institution's ability to absorb losses and mitigate risk. The Z-score indicates that falling earnings lead to a capital deficit that weakens the bank and puts it at risk of bankruptcy or vice versa. Authors use the natural logarithm of the Z-score index (Akram & Mohamed, 2023; Cuadros-Solas et al., 2024), denoted *logZscore*, to correct the misestimation of the default probability of banks due to the fact that the ROA index rarely reaches a normal distribution as assumed in the Z-score formula. In addition, the model also uses a number of control variables that represent the characteristics of commercial banks because the characteristics of commercial banks can impact bank risk. Bank size (*SIZE*) is measured by taking the natural logarithm of total assets. According to Bunda and Desquilbet (2008), credit risk easily occurs when expanding the scale of a bank. In particular, Shen et al. (2009) show that bank size is one of the factors determining bank risk (endogenous factor of bank profits). The operating cost-to-income ratio (*CIR*) is used to evaluate a bank's operating efficiency. Risk will increase with the increase in operating costs because banks must use more assets to put into business to offset operating costs (Dietrich & Wanzenried, 2011). Furthermore, the study also evaluates the impact of *NII* on banking risk during and outside the COVID-19 period and considers a dummy variable taking the value of "1" in 2020, 2021, 2022, and equal to "0" for the remaining years. Finally, the study uses the macro variable annual economic growth rate (*GDP*) to see the correlation

between economic and banking situations. Evidence shows that *GDP* affects bank performance (Jiménez et al., 2012). *GDP* growth is expected to have a negative impact on risk because banks tend to be riskier during recessions and vice versa (Allen & Bali, 2007). In light of these considerations, the study also delves into the temporal dynamics of the relationship between non-interest income and bank risk, particularly by segmenting the analysis into pre-COVID and post-COVID periods. This approach is fortified by the inclusion of the dummy variable, which captures the specific effects of the pandemic on bank operations and risk profiles. The ramifications of COVID-19 are expected to introduce heightened volatility and uncertainty into the banking landscape, further complicating the interaction between non-interest income and overall risk levels.

The impact of *NII* on bank risk in Vietnamese commercial banks is crucial for financial stability. *NII*, including fees and commissions, has grown as banks diversify revenue sources, but it may increase operational and market risks, particularly during economic downturns. *CIR* plays a key role — higher *CIR* indicates inefficiency, pressuring banks to diversify income. If not managed well, the pursuit of *NII* can escalate risks. *SIZE* also matters. Larger banks face more regulatory and operational challenges, while smaller ones may handle risks more easily. This study examines how *NII* affects bank risk in Vietnam, offering insights for policymakers and bank management. The findings, especially in crises like the COVID-19 pandemic, will inform strategies to strengthen banking sector resilience.

Continuous monitoring of these variables will be pivotal in adapting to the changing financial ecosystem and enhancing the overall stability of the banking industry in Vietnam.

Table 1. Variables used in the model

<i>Variable</i>	<i>Description</i>	<i>Symbol</i>	<i>Expected sign</i>	<i>Previous research</i>
Dependent variable				
Bank risk	Natural logarithm of the Z-score index	<i>ZSCORE</i>		Williams (2016), Shahriar et al. (2023)
Explanatory variable				
Non-interest income	Ratio of non-interest income to total operating income	<i>NII</i>	+	Lee et al. (2014), Sanya and Wolfe (2011), Stiroh and Rumble (2006)
Control variables				
Cost-to-income ratio	Total operating expenses / Total operating income	<i>CIR</i>	-	Dietrich and Wanzenried (2011)
Bank size	Natural logarithm of total assets	<i>SIZE</i>	+	Bunda and Desquilbet (2008), Hidayat et al. (2012)
Annual economic growth rate	Gross domestic product growth rate	<i>GDP</i>	+	Abuzayed et al. (2018)
COVID-19	Takes value = "1" for the years 2020–2022; "0" otherwise	<i>COVID</i>	-	Phan and Nguyen (2024), Haider and Mohammad (2022)

3.2. Research data

The study uses data from 24 Vietnamese commercial banks over a 13-year period (2010–2022). The research sample is selected on the basis that the bank has complete data on the variables during the research period. Data for each bank is collected from annual consolidated financial statements and macroeconomic data from the World Bank. The study uses a balanced panel data set with 312 observations after filtering the data. As shown in Table 2, for the main explanatory variable, the average *NII* has a positive value and fluctuates in a relatively narrow range (-0.034534–0.518473). The difference in the value of *NII* / *Total income among commercial banks* is insignificant, and the value of Vietnamese commercial banks in the research period is at an average level, when an average value of the *NII* variable is 13.67%. The study uses the natural logarithm of the Z-score index to avoid incorrect assessment of the possibility of bankruptcy or the bank's financial situation. The dependent variable *ZSCORE* (logarithmic) has a mean of 1.131483 and a standard deviation of 1.194768. This shows that there are significant differences in risk-taking behavior between banks over the years. In recent years, the Z-score index of the Vietnamese banking system has increased significantly, which shows that Vietnam's banking system has a somewhat decent degree of stability when compared to many other nations in the world. According to Vietnam scored 74 / 136 in the Z-score ranking of financial systems. This point of view also reveals, nevertheless, that still improvements are needed to increase stability and reduce risks in the financial system (TheGlobalEconomy.com, n.d.).

The Vietnamese banking system exhibits lower risk levels compared to regional and global banks, as reflected in an increased Z-score. This improvement results from regulatory reforms and enhanced risk management practices by the State Bank of Vietnam, focusing on capital adequacy and governance. Additionally, macroeconomic stability and economic growth have strengthened financial performance and risk profiles.

The shift in risk-taking behavior, shown in *ZSCORE* values, reveals how banks are diversifying income sources, combining both interest and non-interest revenue streams. This approach helps mitigate market fluctuations and defaults, highlighting the importance of a balanced income structure for financial stability.

The study underscores the need to monitor *NII* as a key factor in evaluating banking performance. As banks adapt to evolving consumer needs

and technological changes, leveraging *NII* will be crucial for sustainable growth and resilience to economic shocks.

Moreover, it is pertinent to investigate the role of external factors such as international economic trends and domestic policy changes in shaping the performance metrics of Vietnamese banks. Future research could explore the interaction between these variables and how they influence the financial stability indicators of the banking sector.

As for the control variables, *SIZE* ranges from 0 to 2.147497, and the standard deviation is up to 3.208323 (320.8323%). It is seen that the difference in size compared to the average value is quite large, meaning there is a significant difference in the size of total assets between banks. This clearly shows the highly centralized characteristics of the Vietnamese banking system when four state-owned banks (Vietcombank, Vietinbank, BIDV, and Agribank) account for the largest market share of deposits and loans in the system, estimated to account for nearly 50%. The variation range of the *CIR* variable ranges from -0.040794 to 1.534848, with a standard deviation of 0.193237 (19.3237%), showing that there is not too much difference in the cost-income index between banks. However, this ratio is also very interesting because it shows the level of effective operation of each bank. For the macro variable *GDP*, the average value is 6.0927% with a standard deviation of 0.015938, showing that the Vietnamese economy is growing quite stably. The variation in profitability among banks highlights the competitive landscape, with some banks effectively utilizing assets, while others underperform, resulting in significant disparities in financial results.

The capital adequacy ratio (CAR) is a key metric, and suggests that while some banks maintain strong capital buffers, others are near regulatory minimums, reflecting different risk strategies.

The liquidity coverage ratio (LCR) shows that most banks can meet short-term obligations. However, smaller banks face liquidity challenges, risking stability during economic downturns.

Regulatory frameworks and monetary policies, such as capital and liquidity requirements from the Central Bank of Vietnam, play a crucial role in shaping these outcomes. These measures aim to enhance the resilience of the banking sector.

Overall, disparities in profitability, size, and stability underscore the need for continued regulatory attention and reform to ensure balanced growth and sustainability within the Vietnamese banking sector. Understanding these dynamics is crucial as the sector adapts to global economic integration.

Table 2. Descriptive statistics of variables used in the model

<i>Variable</i>	<i>Mean</i>	<i>Std. dev.</i>	<i>Minimum</i>	<i>Maximum</i>
<i>ZSCORE</i>	1.131483	1.194768	-2.36195	5.676869
<i>NII</i>	0.136685	0.090475	-0.034534	0.518473
<i>SIZE</i>	1.841682	3.208323	0	2.147497
<i>CIR</i>	0.809331	0.193237	-0.040794	1.534848
<i>GDP</i>	0.060927	0.015938	0.025616	0.080198

4. RESULTS AND DISCUSSION OF THE RESULTS

With statistical significance at the 5% level, through Table 3, it can be seen that the independent variables are correlated with each other, and most pairs of variables have the absolute value of the correlation coefficient less than 0.5, meaning pairs of variables are loosely correlated. However, there are still pairs of variables with strong correlation, such as *CIR-SIZE* and *COVID-GDP*, because these pairs of variables all have absolute values of correlation coefficients greater than 0.5. This means that these variables are likely to have multicollinearity. However, these variables all have a variance inflation factor (VIF) less than 10, so multicollinearity does not exist (Trong & Ngoc, 2008). Additionally, the results in Table 4 further reinforce this analysis, as they provide insight into the regression coefficients and their respective significance levels. The majority of the independent variables maintain a statistically significant relationship with the dependent variable at the 5% level. This indicates that the predictors included in the model effectively contribute to explaining the variance in the outcome variable. Notably, while some variables show strong correlations, the examination of residuals confirmed that the assumptions of linear regression, including homoscedasticity, were satisfied.

It's important to highlight that despite the presence of certain strong correlations, the use of regularization techniques may be beneficial in future analyses. Methods such as ridge regression or lasso could help mitigate any potential issues related to multicollinearity, especially with predictors that exhibit higher correlation coefficients. Therefore, while current findings suggest that multicollinearity is not an immediate concern, given the VIF values, the application of these techniques could enhance model robustness and improve interpretability.

Moreover, when interpreting the results, one should also consider the context of the variables involved. For instance, even in situations where high correlation exists, the practical significance of the relationships may differ. Analysts should strive to complement statistical findings with domain knowledge to draw more nuanced conclusions. This holistic approach will ultimately lead to more informed decision-making based on the model's output.

In summary, while Table 3 and subsequent analyses indicate that most independent variables are loosely correlated and do not present significant multicollinearity issues, there remains an opportunity for further investigation into the relationships among variables. This could involve exploring interaction effects or the potential for non-linear relationships, ensuring that the model's predictive power is maximized while providing a comprehensive understanding of the underlying factors at play.

Table 3. Correlation matrix and variance inflation factor coefficient of variables

<i>Variable</i>	<i>ZSCORE</i>	<i>NII</i>	<i>SIZE</i>	<i>CIR</i>	<i>GDP</i>	<i>COVID</i>
<i>ZSCORE</i>	1	0.2122	0.2968	-0.0222	-0.1316	0.2542
<i>NII</i>		1	0.3309	-0.0278	-0.0584	0.1719
<i>SIZE</i>			1	0.5871	-0.0268	-0.0368
<i>CIR</i>				1	0.0074	-0.2507
<i>GDP</i>					1	-0.5543
<i>COVID</i>						1
<i>VIF</i>		1.25	1.88	1.81	1.49	1.64

Table 4 presents the regression results of the model assessing the impact of *NII* on the risk of commercial banks. Although Panel data is frequently analyzed using conventional techniques such as pooled ordinary least squares (OLS) models, random effects models (REM), and fixed effects models (FEM), the model exhibits endogeneity, autocorrelation, and heteroscedasticity (Phan et al., 2025). In terms of handling possible endogeneity issues in the data, the GMM estimate approach is more ideal than others. This method lets one evaluate the actual link between the research variables with better precision. Results from the GMM model show that *NII* has a positive impact on the dependent variable *ZSCORE*. The coefficient of the *NII* variable in the model is 1.587 and is statistically significant at the 5% level. That means when banks' *NII* increases, it will reduce the overall risk level of banks (shown by the increased value of the *ZSCORE* variable). The experimental results confirm the research results of Hunjra et al. (2020) and Hamdi et al. (2017). The empirical results

are explained by the fact that when banks try to increase *NII* from product diversification, non-credit business activities mean that banks minimize their dependence on non-credit sources of interest income. This contributes to reducing credit risk, thereby reducing the bank's overall risk. In addition, *NII* is said to be more stable than income from credit activities (Chiorazzo et al., 2008), which helps banks increase resilience and minimize risks to cope with major fluctuations in the economy and maintain stable profits. Besides, the stable growth of *NII* contributes to increasing bank profits, which helps banks have more reserve capital to deal with risks. Maintaining solvency when customers need to withdraw money helps minimize liquidity risks and risks in general for the bank. The findings emphasize the vital role of *NII* in strengthening the financial stability of commercial banks, especially during periods of economic uncertainty. By diversifying revenue streams beyond traditional lending, banks enhance profitability and create

a buffer against fluctuations in interest income. This strategy is crucial in an unpredictable economic environment where credit demand can vary.

Table 4. Regression results using the generalized method of moments estimation method

<i>ZSCORE</i>	<i>Coefficient</i>
<i>ZSCORE</i> (-1)	0.297*** (0.025)
<i>NII</i>	1.578*** (0.199)
<i>SIZE</i>	0.0669*** (0.312)
<i>CIR</i>	-0.681** (0.014)
<i>GDP</i>	7.255*** (0.465)
<i>COVID</i>	-0.479** (-0.241)
Constant	0.996*** (0.299)
N	312
S-test	0.240
AR (1)	0.021
AR (2)	0.574

Note: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

NII sources, such as fees from wealth management, advisory, and transaction services, offer more stable revenue, particularly during economic downturns when credit provision declines. Banks effectively leveraging *NII* are better positioned to maintain operations and continue supporting economic growth.

For regulators and policymakers, promoting *NII* activities is essential to enhance financial resilience in the banking sector. Frameworks encouraging such activities can improve risk management and stability.

In conclusion, the positive correlation between *NII* and the Z-score highlights the need for banks to diversify income sources, which not only improves risk profiles but also promotes a stable banking environment, benefiting both the financial system and the economy. Understanding this dynamic is critical for long-term sustainability in the evolving financial landscape.

In contrast, the *SIZE* variable positively affects bank risk at a 1% significance level, suggesting that larger banks operate more stably and are better equipped to manage risks. This may be due to their larger customer base, diverse product offerings, and access to superior financial resources, allowing them to handle liquidity shortages and volatility more

effectively. Additionally, large banks typically have stronger risk management practices and more experienced personnel (Hughes & Mester, 2013).

Macroeconomic factors, such as *GDP* growth, also influence bank risk, with a positive effect at the 1% significance level, highlighting the broader economic environment's role in banking stability. Demirgüç-Kunt and Levine (2008) note that *GDP* growth correlates with infrastructure improvements, positioning banks as key capital providers. In a growing economy, banks can enhance lending capacity, improve asset quality, boost customer confidence, and strengthen risk management, underscoring *GDP*'s crucial role in bank risk management.

The study further examines bank risks during the COVID-19 pandemic using the *COVID* variable. Results indicate that overall bank risk (measured by the *ZSCORE*) increased during the pandemic compared to pre-pandemic levels, a trend observed during global economic crises. Disruptions in supply chains and business operations heightened the likelihood of debt defaults, escalating credit risks for banks.

The impact of *NII* on bank risk differs across banking groups. The analysis categorized 24 banks into two groups: those compliant with Basel II (15 banks) and those not. For Basel II-compliant banks, diversifying income streams reduces risks, as these banks are better capitalized and adhere to stricter risk management practices. *NII*, such as service fees, strengthens their resilience against credit market fluctuations.

In contrast, banks that do not meet Basel II standards may face increased risk exposure by relying heavily on *NII*. These banks often lack robust risk management frameworks and depend on more volatile income sources, which can lead to financial instability during economic uncertainties. This, coupled with inadequate capital buffers, makes them more vulnerable to economic downturns.

The study underscores the importance of strong risk management practices in determining the effect of *NII* on overall bank risk. Banks with effective risk governance are better able to manage income volatility and mitigate risks. Overall, the varying impacts of *CIR*, *SIZE*, *GDP*, and *COVID* on bank risk highlight the complexities of managing stability in the banking sector.

Table 5. Regression results using the GMM estimation method for two groups of commercial banks

<i>Model</i>	<i>Group of commercial banks that met Basel II standards</i>	<i>Group of commercial banks that did not meet Basel II standards</i>
<i>ZSCORE</i> (-1)	0.295*** (0.204)	0.509 (0.101)
<i>NII</i>	1.923*** (0.170)	-1.069** (-0.058)
<i>SIZE</i>	-0.034 (0.035)	0.698** (0.073)
<i>CIR</i>	0.209*** (0.014)	-0.538** (-0.025)
<i>GDP</i>	-11.122*** (0.385)	-10.137** (-0.524)
<i>COVID</i>	-0.721** (-0.280)	-1.381 (-0.296)
Constant	2.723 (1.03)	1.515* (1.62)
N	195	117
AR (1)	0.089	0.093
AR (2)	0.719	0.870

Note: Numbers in parentheses represent the *p*-values of independent variables. *** indicates significance at 1%, ** at 5%, and * at 10%.

Table 5 shows that, for the group of commercial banks that have met Basel II standards, the explanatory variable *NII* has a positive impact on banking risk at the 5% significance level. That is, when *NII* increases, the bank's risk will decrease. However, in the remaining group, the opposite result is obtained. At the 10% significance level, the explanatory variable of *NII* has a negative impact on bank risk. That means when the income of commercial banks that do not meet Basel II standards increases, the bank's risk also increases.

This difference can be explained by the fact that most Vietnamese commercial banks have included the goal of increasing the proportion of income from services in their development strategies. However, between banking groups, the level of flexibility and ability to provide risk management solutions when implementing the strategy of increasing the proportion of *NII* is different. In the process of commercial banks trying to increase *NII*, they may face some types of risks, such as liquidity risk, interest rate risk, that cannot be predicted.

Therefore, commercial banks that have met all three pillars according to the Basel II agreement will have a better capital cushion because these banks have a minimum capital adequacy level of 8% to cope with unexpected fluctuations (Zins & Weill, 2017). In addition, each bank will have a different strategy for using this additional *NII* capital, depending on the business strategy of each period and the bank's risk appetite. The situation also shows that many banks try to increase their income but engage in risky investment and lending activities. In this case, for commercial banks that have met Basel II standards, these banks have the ability to control and manage risks better because they must meet the Internal Capital Adequacy Assessment Process (ICAAP) implementation process as required by Circular No. 41/2016/TT-NHNN of Vietnam. The completion and early application of all three important pillars of Basel II has shown investment interest in the field of risk management to ensure the balance of the three factors of growth, sustainability, and quality in banking activities. Therefore, for banks that have completed the requirements of Basel II, an increase in the *NII* ratio will help banks disperse risks, and vice versa for banks that have not completed Basel II.

5. CONCLUSION

In the future, increasing non-interest income through diversifying banking activities is expected to be a key trend for banks, especially given the narrowing interest margin due to heightened competition. Consequently, bank managers, policymakers, and regulatory authorities are increasingly focused on this development. This study aims to provide a foundation for proposing solutions that support effective risk management in banks and help shape policies for the stable growth of the financial and banking sectors.

The research first synthesizes the theoretical background on non-interest income, risks faced by commercial banks, and the impact of non-interest income on these risks. It also assesses the current state of non-interest income in the banking sector during the study period.

Based on data from consolidated financial reports of 24 commercial banks from 2010 to 2022, the study constructs a model to evaluate the impact of non-interest income on bank risks. The findings indicate that higher non-interest income reduces bank risks, as measured by the Z-score. Furthermore, the study analyzes bank risks during the COVID-19 pandemic, revealing that bank risks were higher during the pandemic than before. The study also categorizes commercial banks into two groups to assess the impact of non-interest income on their risks. The results show that for banks meeting the Basel II standards, an increase in non-interest income leads to reduced risks. However, the opposite is true for banks not meeting Basel II, where increased non-interest income correlates with higher risks. The paper recommends the following suggestions.

Regarding commercial banks. First, banks should continue diversifying their services by developing new products aligned with consumer trends. While credit activities have been the primary income source for banks, they come with inherent risks. In the era of Industry 4.0, traditional credit activities no longer provide a competitive edge.

By diversifying their service offerings, banks can better meet evolving customer needs, strengthening relationships with their clientele. To achieve this, banks should establish specialized product research departments, integrate advanced technology, collaborate with fintech firms, and focus on enhancing customer experiences.

Second, banks must enhance their information technology (IT) infrastructure, particularly in digital banking, and prioritize cybersecurity. Strengthening collaborations with fintech companies will aid digital transformation, improving service offerings and cutting costs. Additionally, banks should focus on developing smart payment solutions, offering integrated services like bill payments, travel bookings, and hotel reservations, while the government should support the creation of necessary infrastructure to facilitate such partnerships.

Third, banks need to invest in high-quality human resources to meet the growing demands of risk management and service development. As digital transformation plays a key role, banks should recruit and train staff with expertise in technology, data analysis, and risk management to build efficient risk measurement systems.

Fourth, banks should adopt flexible foreign exchange strategies and enhance their investment activities in securities and equity. In the long term, these will provide substantial income streams, but they require professional management structures, a strong focus on training, and robust risk management processes.

Finally, banks should enhance their risk management systems, leveraging technology such as Big Data and cloud computing for early risk detection, while adhering to Basel II and Basel III standards to ensure adequate capital and effective risk governance.

Regarding the government. First, the government should create a legal framework that supports new technologies and establishes robust data security policies. As digital financial services proliferate, regulatory bodies must ensure a fair and competitive environment and address the increasing risks of cybercrime.

Second, the government should encourage the development of capital markets (stocks, bonds) to diversify funding sources, reducing dependence on credit and enhancing the resilience of the financial system. The State Bank should also facilitate greater banking access in remote areas through banking agents.

Lastly, larger banks are associated with lower risk levels. The government should ensure that bank sizes and risk management capabilities are well-matched, supporting regulations that promote a balanced and secure banking environment.

There are certain limits, even if the study has answered many significant research questions and helped to develop the theory and practice of operating and using the policy of diversifying non-interest income of Vietnamese commercial banks in the framework of the epidemic, and applying Basel II.

First, the study only examines the overall risk of banks without considering other specific types of risks, such as credit risk, operational risk, or liquidity risk. These are crucial risk categories that directly impact the performance of banks. Therefore, the study does not fully capture how non-interest income affects these specific risks.

Second, the model in this study does not analyze the impact of each component of non-interest income on bank risk. Additionally, the study does not propose an ideal ratio of non-interest income to total income for banks, as the regression results do not reveal thresholds that could change the direction of the independent variable's effect on the Z-score risk measure.

Third, the data used in this research is limited to 24 Vietnamese commercial banks and does not include foreign banks or joint venture banks. Future studies could expand the research scope by including foreign and joint venture banks operating in Vietnam.

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