# Analysis of the impact from non-interest income to the operational efficiency of commercial banks in Vietnam

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| C H R O N I C L E | A B S T R A C T |
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| | The research analyses the impact of non-interest income on the performance of 26 Vietnamese commercial banks in the period of 2008 - 2017 by the Generalized Method of Moments (GMM) method. The research results show that: (i) The average non-interest income ratio of Vietnamese commercial banks is only 8.32%, a significantly low level compared with the interest income ratio of more than 90% of the total income of the banks; (ii) Non-interest income has a positive impact on the performance of Vietnamese commercial banks in the research period. The research results assist in confirming the trend of diversifying non-credit activities to increase non-interest income ratio of Vietnamese commercial banks.<br> |

## 1. Introduction

In recent years, the world has undergone many major changes, especially in the field of technology, which requires transformation in the economy in general and the banking and financial sector, in particular, to meet the people's demands. The main income of commercial banks comes from credit activities and capital mobilization. However, the competitive business environment of commercial banks is increasingly fierce, so they need new trends to earn more. The new trend of seeking money from non-interest activities is gaining more and more attention to maintain and increase operational efficiency.

There have been many studies about increasing non-interest income by measuring the impact of non-interest activities on the performance of commercial banks. Studies supporting the trend of increasing non-interest income of commercial banks will increase bank performance as stated by De Young and Rice (2004) and Bian et al. (2015). Research by Alaaeddin et al. (2017) showed that non-interest income enhances equity and this has a positive effect on profitability. On the other hand, there is also a series of studies showing that this type of income has a negative impact on performance. For instance, the study of Smith et al. (2003) stated that the increase in non-interest income cannot fully offset income reductions. Moreover, some studies showed that the non-interest income and the bank's performance have a negative correlation and the instability of non-interest income can even reduce the profitability of commercial banks.

In Vietnam, most studies focus on analyzing the competitiveness of commercial banks after implementing non-credit activities in respect of operational efficiency. Most of the researchers' viewpoints support the increase in non-interest income, which will have a positive impact on the performance of commercial banks in Vietnam. For instance, research by Minh and Canh (2015), Dung et al. (2015), Hau and Quynh (2017) and Sang and Trang (2018) pointed out that non-interest income has no impact on risk but has a positive effect on the performance of commercial banks in the research period.

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In this study, the author will clarify the direction of the impact of non-interest activities on the performance of commercial banks in Vietnam with data from 26 Vietnamese commercial banks over the period of 2008-2017.

## 2. Literature review

There are many different views on diversifying income by expanding into non-credit activities and the performance of researchers, which are mainly divided into three groups:

(i) Group supports the diversification of income towards the non-interest income of commercial banks to improve the profitability of commercial banks. According to Markowitz's theory in 1952, the increase in non-interest income will help the bank minimize risks or maximize profits. Klein and Saidenberg (1997) argued that the combination of banking services would generate stable income, optimize management costs and contribute to bank profits; banks with non-interest trading reduce the volatility of profits (Santomero & Chung, 1992). Chronopoulos et al. (2011) used data envelopment analysis (DEA) to estimate both cost and profitability of banks in the early stages. The results show that there was a high efficiency of both the costs and profitability of banking operations. Recently, Lee et al. (2014) also analyzed the effectiveness of the banks' increase in non-credit income by using panel data on commercial banks in 29 Asian countries from 1995 to 2009. The authors provided evidence of the positive impact of non-interest income on the countries with outstanding banking and financial systems.

(ii) Group believes that although non-interest income helps to enhance efficiency, it also increases the risks for commercial banks, leading to the reduction in their operational efficiency. Empirical research by Lepetit et al. (2008) used data from 734 European banks from 1996 to 2002, in which they concluded the banks that expand their scope into non-traditional activities have a higher risk than those that focus only on traditional activities. Non-credit income can increase profitability, but at the same time increases risks for banks, leading to the decline in their performance. Pozsar et al. (2010) argued that the banks' non-traditional activities can bring about significant systemic risks. Research of Li and Zhang (2013) showed that non-interest income has a positive impact on the revenue of the banks, but it simultaneously increased the risks for the Chinese banking industry from 1986 to 2008. The reason is that non-interest income is more vulnerable and more sensitive than interest income, so the increase in non-traditional activities reduces the revenue from diversification, thus making the balance between risk and profitability worse.

(iii) Group considers the diversification of income through boosting non-interest income because it neither brings the expected benefits, note it also has a negative impact on the performance and value of banks. DeYoung and Roland (2001) pointed out three reasons on why non-interest income can increase the volatility of income for commercial banks. First, most bank loans are based on building relationships, resulting in the high costs to generate interest income while most fee collection activities need relationship building. Thus, despite credit risks and fluctuations in interest rates, interest income may be less volatile than non-interest income. Second, to maintain and develop sources of interest income, it is necessary to exploit more loans than changes in interest expenses; on the contrary, the main input needed to create multiple products is usually fixed. Therefore, the fee collection activities may require greater leverage than lending activities, making the income of commercial banks more vulnerable. Third, most service fee income requires banks to hold little (or even no) fixed assets, so unlike interest-based activities such as portfolio loans, collection activities like trust services and cash management require little or no legal capital. Therefore, fee collection activities may use greater financial leverage than lending activities. Using research data from the US banks in the 1990s, the authors demonstrated that three traditional revenue streams from activities - interest from loans, interest from securities trading (brokerage services) and service fees from deposits - are less volatile than income from other fee collection activities. Mercieca et al. (2007) showed that small European banks do not achieve good results from diversification into non-interest activities. High non-interest income tends to reduce performance and at the same time increase the risk of the banks, leading to the lower risk adjustment profits. The study found that small European banks would not perform well if they followed the strategy of diversifying non-credit activities. The non-interest income ratio has the opposite relationship with profitability and is directly proportional to the risk of lower profitability. The authors explained that this was a study of the lack of expertise of small banks in implementing activities mainly based on commissions and fees during the product diversification process.

There have been many studies on the impact of non-interest activities as well as other factors on the efficiency of banking operations in the past time. This study clarified the direction of impact factors with the expectation that non-interest activities have a positive impact on the profitability of the Vietnamese commercial banking system.

## 3. Data and research method

### 3.1. Data

The authors conducted the estimation of panel data regression in the study. The data in the study is cited from the audited financial statements of commercial banks, along with some official data sources from the State Bank of Vietnam.

### 3.2. Research model

The study examined the shortcomings in the research models, then used the Generalized Method of Moments (GMM) estimation model for dynamic panel data, which was shown in Arellano and Bover (1995) and perfected in Blundell and Bond (1998), to analyze the direction of impact factors. After using the GMM model to regress panel data and provide research results to ensure more authenticity, the study will continue to use two models – the Fixed effects model (FEM) and the Random effects model (REM) – as well as the Hausman test to select the most suitable data.

**Table 1**

Detailed description of variables in the regression model

| Variable Name / Meaning | Symbol | Measurement | Expected direction | Research |
|---|---|---|---|---|
| **Dependent variable** | | | | |
| Profitability of total average assets represents the performance | $ROAA_{i,t}$ | $ROAA_{i,t}$ = Profit after tax / Total average assets | / | Lee et al. (2014b), Mercieca and colleagues (2007), Ariss (2010), Meslier and colleagues (2014) |
| Return on average equity represents the performance | $ROAE_{i,t}$ | $ROEA_{i,t}$ = Equity / Total average assets | / | Sanya and Wolfe (2011) |
| **Independent variables** | | | | |
| Measurement variables of net non-interest income: Using the proportion of net income from non-credit activities compared to the total net operating income of each bank. The higher NNII, the higher income from non-credit activities | $NNII_{i,t}$ | $NNII_{i,t}$ = Non-interest income in the year t / Total annual income in year t | + | Delpachitra and Lester (2013); Lepetit et al. (2008); Li and Zhang (2013); Maudos (2017); and Williams (2016) |
| **Control variable** | | | | |
| Bank size: as the effect of the bank size on profitability seems to be non-linear, the study uses the logarithm of total assets to represent this relationship. Many researchers agree that initial profitability will increase with the size, but will subsequently decrease (Athanasoglou et al., 2008). However, the large scale also brings economic benefits thanks to the scope, and increased profits. | $SIZE_{i,t}$ | $SIZE_{i,t}$ = Natural logarithm value of the bank's total assets in year t | + | Kwan (2006); Lee et al. (2014); Elyasiani and Wang (2012); Gaganis et al. (2013); Ayadi (2013); Alhassan (2015 |
| Loan outstanding balance ratio: to assess the impact of asset structure on profitability. Most documents suggest that the bank's profitability is expected to increase when its portfolio of loans increases compared to other lower-risk assets. | $LOAN_{i,t}$ | $LOAN_{i,t}$ = Total outstanding loans to customers in year t / total assets in year t | + | Kwan (2006); Sufian (2009); Elyasiani and Wang (2012); Gaganis et al. (2013); Alhassan (2015) |
| Equity ratio: to assess the appropriateness of capital. According to traditional hypotheses regarding risk and profitability, the study predicts the negative effect of capital ratios on profitability. | $EQUITY_{i,t}$ | $EQUITY_{i,t}$ = Equity in year t / Total assets in year t | + | Sufian (2009); Elyasiani and Wang (2012); Gaganis et al. (2013); Ayadi (2013); Alrafadi et al. (2014); Alhassan (2015) |
| Customer deposit rates: to analyze the impact of funding structure on profitability. | $DEPOSIT_{i,t}$ | $DEPOSIT_{i,t}$ = Customer deposits in the year t / the total assets in year t | + | Kwan (2006); Gaganis et al. (2013); Alrafadi et al. (2014) |
| General expense ratio: this indicator is essential for any business by providing the necessary capital to generate profits and respond to changes in operating costs across the banking system. | $OVERHEADS_{i,t}$ | $OVERHEADS_{i,t}$ = General expenses in year t / Total assets in year t | - | Karakaya and Er (2013); Bashir (2003) |

Source: Compiled by the authors based on theory and prior literature

Based on empirical studies conducted by Baele et al. (2007); Demsetz and Strahan (1997); Stiroh and Rumble (2006); Deyoung and Roland (2001), the study states further internal variables such as NNII (Net non-interest income/Gross operating income), COM (Net income from banking services/Gross operating income), TRAD (Net income from other non-credit activities/Gross operating income). Accordingly, NNII = COM + TRAD and macroeconomic factors - GDP growth and inflation transmissions can affect profitability including EQUITY (Equity/Total assets); OVERHEADS (Total operating costs/Gross operating income); SIZE (Natural logarithm of total bank value of each bank); LOAN (Customer loan/Total assets); DEPOSIT (Customer deposits/Total assets).

$$ROAA_{i,t} = \beta_1 + \beta_2\,ROAA_{i,t-1} + \beta_3\,NNII_{i,t} + \beta_4\,SIZE_{i,t} + \beta_5\,LOAN_{i,t} + \beta_6\,EQUITY_{i,t} + \beta_7\,DEPOSIT_{i,t} + \beta_8\,OVERHEADS_{i,t} \quad (1)$$
$$+ \varepsilon_{i,t}$$

$$ROAE_{i,t} = \beta_1 + \beta_2\,ROAE_{i,t-1} + \beta_3\,NNII_{i,t} + \beta_4\,SIZE_{i,t} + \beta_5\,LOAN_{i,t} + \beta_6\,EQUITY_{i,t} + \beta_7\,DEPOSIT_{i,t} + \beta_8\,OVER\text{-} \quad (2)$$
$$HEADS_{i,t} + \varepsilon_{i,t}$$

The study conducted the GMM estimation method provided by Arellano and Bover (1995) and Blundell and Bond (1998) to analyze table data. The regression results would be analyzed by using a two-step GMM model, the xtabond2 command introduced by Roodman (2006).

## 4. Result and discussion

### 4.1. Descriptive statistics

Descriptive statistical results of independent variables include non-interest income ratio (NNII), customer deposit rate (DEPOSIT), equity ratio (EQUITY), loan outstanding balance ratio (LOAN), bank size (SIZE) and general expense ratio (OVERHEAD).

**Table 2**
Descriptive statistics parameters used

| | Total observations | The average value | Standard deviation | Smallest value | Greatest value |
|---|---|---|---|---|---|
| NNII | 258 | 8.32% | 5.85% | 0.78% | 44.33% |
| EQUITY | 258 | 10.19% | 5.99% | 0.00% | 46.24% |
| DEPOSIT | 258 | 71.70% | 14.55% | 2.31% | 91.39% |
| LOAN | 258 | 51.50% | 15.43% | 0.47% | 85.17% |
| OVERHEADS | 258 | 7.57% | 2.57% | 0.00% | 14.04% |
| SIZE | 258 | 18.1353 | 1.2312 | 14.8936 | 20.9075 |

Source: Author's computed

The results of the statistical analysis described in Table 2 show the non-interest income ratio of commercial banks in Vietnam in the period of 2008-2017 with an average value of 8.32%. In this period, the large-scale banking group achieved a non-interest income ratio of 10.27%, higher than the group of small-sized banks with an average rate of 6.88%. The non-interest income ratio of Vietnamese commercial banks from 2008 to 2017 increased slightly from 6.65% in 2008 to 10.3% in 2017. There was slight volatility in the growth period of the non-interest income ratio (down to 6.65% in 2008, up to 9.45% in 2010, and once again down to 6.65% in the following year). The ratio continued to rise and reached the mark of 9.44% in 2013, then slightly decreased to 7.98% in 2015, and grew strongly to 10.3% at the end of the study period. Thus, it can be seen that accelerating non-interest income activities has become the growth trend of domestic commercial banks.

**Table 3**
Non-interest income and operational efficiency of commercial banks

| No | Variable Name | ROAA | | ROAE | |
|---|---|---|---|---|---|
| | | Coefficient | P value | Coefficient | P value |
| 1 | ROAA(ROAE)$_{(t-1)}$ | -0.8841 | 27.80% | 0.0568 | 85.30% |
| 2 | NNII | 0.0961 | 3.90%** | 0.5817 | 3.10%** |
| 3 | DEPOSIT | -0.0247 | 57.20% | -0.4939 | 1.90%** |
| 4 | EQUITY | -0.3384 | 2.30%** | -1.7422 | 1.20%** |
| 5 | LOAN | 0.0174 | 54.40% | 0.2557 | 8.30%* |
| 6 | SIZE | -0.0199 | 1.70%** | -0.0278 | 43.30% |
| 7 | OVERHEADS | 0.0642 | 81.80% | 0.7021 | 26.40% |

***,**,* denotes significance at the 1%, 5% and 10% level
Source: Author's computed

### 4.2. The impact of non-interest income on risks and profitability

Net non-interest income (NNII): The results of empirical regression analysis show a positive relationship between the net non-interest income ratio (NNII) and the performance of Vietnamese commercial banks in the Research phase with a regression coefficient of 0.0961 compared with ROAA model and 0.5817 compared with ROAE model and the value of 5%. Regression results are consistent with previous empirical studies of Apergis (2014), Saunders et al. (2016), Lee et al. (2014). Research results reflect that the promotion of non-interest activities will enhance the efficiency of using input resources, thereby increasing the operational efficiency of Vietnamese commercial banks. The positive effect of boosting non-interest

income on banking and financial activities may result from the increase in net income or the reduction in operating costs when banks proceed to diversify their incomes. Income from operations, fee income, and other non-interest income generally lack a complete correlation with interest income, so the diversification of income will reduce volatility in bank earnings. However, the results of the study by Laeven and Levine (2007) suggested that non-interest operation diversification will lead to economic inefficiency, causing negative impacts on profitability. This is due to the fact that banks have little experience in implementing and addressing issues of non-interest operation diversification, which reduces the performance, resulting in the decline in the income and growth of the banks. To ensure the model's regression results are reliable, the study will continue to conduct the planned tests before using the regression results to evaluate. To test the appropriateness of the GMM method in regression, the study applies Sargan and Arellano - Bond tests, which are used to assess the relevance of the model.

Hansen test with the null hypothesis ($H_0$): the instrument variable is an exogenous variable - that is, it does not correlate with errors-in-variables models. Therefore, p-value of the Sargan statistics should be as big as possible. The Arellano - Bond test is proposed by Arellano - Bond (1991) for the autocorrelation of GMM model error variance in the form of second difference. Therefore, the surveyed differential sequence has the first-order autoregressive process, AR(1), so the test results are ignored. The second-order AR process, AR(2), is tested on the differential sequence of error variance to detect the autocorrelation of second-order error, AR (2). The Arellano - Bond test with $H_0$ hypothesis has spatial autocorrelation.

**Table 4**
Results of Sargan and Arellano-Bond testing for 26 banks model

|  | ROAA | ROAE |
|---|---|---|
| Number of groups | 26 | 26 |
| Number of variables | 13 | 26 |
| Sargan test | chi2(5) = 0.41<br>Prob > chi2 = 0.995 | chi2(18) = 10.79<br>Prob > chi2 = 0.903 |
| Difference (null H = exogenous) | chi2(1) = 0.31<br>Prob > chi2 = 0.579 | chi2(1) = 0.00<br>Prob > chi2 = 0.975 |
| Arellano-Bond test AR(1) | z = 1.24<br>Pr > z = 0.217 | z = -0.59<br>Pr > z = 0.554 |
| Arellano-Bond test AR(2) | z = 0.08<br>Pr > z = 0.932 | z = -1.10<br>Pr > z = 0.271 |

Source: Author's computed

Table 4 shows that the p-value of the Sargan test is greater than 0.05, thus rejecting the null hypothesis ($H_0$) stating that the model is appropriate, the instrument variable is an endogenous variable and does not correlate with its error. The Arellano - Bond (AR (2)) test results showed that the p-factor of the model is greater than 0.05, rejecting the assumption that $H_0$ is a model with no autocorrelation at the second-order difference. So, the results in SGMM are all meaningful.

In addition to the factors of income diversification, remaining factors such as DEPOSIT, EQUITY, LOAN, and BANKSIZE all affect the yearly performance of variable t. Regression results show the proportion of customer deposits on total assets (DEPOSIT), Equity rate (EQUITY), Bank size (SIZE) have negative meanings in the model, while Loan outstanding balance ratio (LOAN) has a positive regression coefficients and reaching 10% significance level, loan outstanding balance ratio has a positive impact on the profitability of commercial banks.

Non-interest income will help commercial banks increase operational efficiency, bring higher profitability and ensure safety. In addition, the increase in credit debt balance will help improve the performance of commercial banks. The results of the study help bank managers review and balance activities to improve and increase the profitability of commercial banks.

*4.3. Discussion*

Based on the results of the regression analysis, we can see the impact of non-interest income, as well as other factors on risk and profitability of Vietnamese commercial banks. The regression results show that non-interest income has a positive impact on the profitability of Vietnam's commercial banking system (Table 3). This is true for the research hypothesis given in Section 2. This means that the higher non-interest income will help commercial banks increase revenue as well as operational efficiency. The positive effect of boosting non-interest income on banking and financial activities may be the result of increasing net income or reducing operating costs when banks proceed to diversify their incomes. Income from operations, fee income, and other non-interest income generally do not have a complete correlation with interest income, so the diversification of income will reduce volatility in bank earnings. Several previous empirical studies of Apergis (2014); Saunders et al. (2016) all about the US banking system also supported this result. However, the results of the study by Laeven and Levine (2007) suggested that diversifying into non-credit activities will lead to economic inefficiency, causing negative impacts on profitability. This is due to the fact that banks have little experience in implementing and addressing issues of non-interest operation diversification, which reduces the performance, resulting in the decline in the income and growth of the banks. Additionally, with positive regression coefficients and reaching the 10% significance level, the ratio of credit loans (LOAN) has a positive impact on the profitability of commercial banks. This can be explained that although commercial banks are studying to expand non-credit activities to improve profitability, credit activity is still the main source of income for banks. Therefore, higher

LOAN with good quality leads to an increase in profitability. This result is also consistent with the researches of Sufian (2009), Elyasiani and Wang (2012) and Alhassan (2015) on the size of credit operations and the bank's performance. The proportion of customer deposits on total assets (DEPOSIT) has the opposite effect of return on average equity (ROAE) at the 5% significance level. This can be explained that the higher the amount of money deposited into the banks, the more expenses the banks will pay for the customers such as deposit interest rates, thus reducing the revenue of commercial banks. Contrary to initial expectations, the regression results show that the equity ratio on total assets (EQUITY) has statistical significance in relation to both ROAA and ROEA dependent variables, but the direction of impact is the opposite of the performance of commercial banks in Vietnam. This can be explained that the extremely high capital adequacy ratio indicates that a bank is more cautious and ignores profitable investment opportunities. Additionally, the results also show that increasing the bank size (SIZE) will further reduce the profitability of commercial banks because they have an inverse correlation. EL Moussawi and Obeid (2011) argued that the increase in the size of banks is a source of additional costs, so this indicator tends to reduce the performance of large commercial banks. However, this result is in contrast to the studies of Almazari (2011) and Bashir (2003). Particularly, these studies show that the bank size is the main factor that helps increase the efficiency of banks' performance. Large-scale banks can take advantage of the economies of scale and investment capacity to improve operations management and build customer trust. The large scale means high safety in difficulties and service network. In addition, the regression model results in Table 3 show that the general cost ratio (OVERHEADS) is not significant in both regression models.

## 5. Conclusion and implications for policy

The study used the net non-interest income (NNII) to measure the impact of non-interest income on the performance of 21 Vietnamese commercial banks in the period of 2008-2017. In addition, the study also measured the interaction of loan outstanding balance ratio, customer deposit ratio, equity ratio, general expense ratio and bank size with the profitability of Vietnamese commercial banks. Estimated results with GMM model show that non-interest income has a positive impact on the profitability of the banks. This is a good signal for banks that want to diversify their income sources, especially non-interest income from non-traditional activities to improve competitiveness, limit risks and increase profits.

The analytical results also show the negative impact of the scale of customer deposits and equity on the profitability of commercial banks, while the loan outstanding balance ratio is positively correlated with the operational efficiency of commercial banks. This is the basis for banks to be more cautious in their capital structure. The results also show that the increase in bank size and expenses will reduce the profitability of the banks.

Research results and descriptive statistics show that Vietnamese commercial banks can reduce risks and improve profitability by (i) Promoting non-interest activities to boost the efficiency of the use of inputs, thus increasing the operational efficiency of Vietnamese commercial banks. (ii) Continuing to improve credit growth in a stable and sustainable manner, simultaneously increase the quality of credit records, and limit potential risks. (iii) Using a reasonable capital structure, and avoiding focusing too much on customer deposits in order to reduce the expenses for deposit interest rates, leading to an increase in income and operational efficiency of commercial banks. (iv) Reducing expenses by considering how much money should be spent to fit their bank's business without negatively affecting profitability.

Although the research has achieved certain results as the initial goal, it still has limitations that other studies can overcome or continue to further implement in order to have more comprehensive contributions. First, although the non-interest income of banks comes from many different sources, this study does not analyze each specific source of non-interest income; instead, it only considers the total of non-interest income. Second, it also examines in detail neither the level of income diversification based on bank size nor the optimal level of diversification between interest income and non-interest income to increase the operational efficiency of the banks. Third, due to the limitations on data sources, the cost sources and cost effectiveness are not analyzed in the study as well.

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