# IMPACT OF BANK-SPECIFIC AND MACROECONOMIC DETERMINANTS ON FINANCIAL PERFORMANCE IN COMMERCIAL BANKS – CASE STUDY IN THAILAND AND VIETNAM

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## Abstract

*Understanding the criteria affecting the profitability of commercial banks which are bank-specific and macroeconomic determinants is imperative for forming new strategies and capturing useful procedures to improve financial performance. The current study is to investigate the impact of bank characteristic and macroeconomic factors on financial performances and bank risks of commercial banks in Thailand and Vietnam. The empirical results reveal that non-performing loan ratio, bank capital ratio, total loan to total asset ratio, and GDP growth for medium banks have a significant impact on return on asset, return on equity, and LNZ-SCORE for the case of Thailand while bank capital ratio, total deposit to total asset ratio, GDP growth rate for small banks, and inflation show a significant relationship with return on asset, return on equity, and LNZ-SCORE for the case of Vietnam. Further studies should take other factors such as internal control, operation cost, and industrial factors into consideration for purpose of getting significant and accurate estimation results and also extend more related internal bank-specific variables.*

**Keywords**

ROA, ROE, Financial Performance, LNZ-SCORE

## 1. Introduction

Banking and non-banking institutions in Thailand have updated their financial services and products due to innovation and globalization which cause both positive and negative impacts. Particularly, they make more concerns about supervisory authorities and policymakers about soundness and stability of the banking and financial sectors in Thailand (Bank of Thailand, 2019). By taking a glance at the banking situation in Vietnam, the Vietnamese government revealed an economic reform plan called three-pillar economic reforms which are concentrated on reorganizing the public investment, state-owned enterprise as well as the banking sector. In banking operations, loans and savings are generally related to risk. That risk strongly affects profitability and stability of the banks. It particularly influences the crisis of the bank if the default in the payment of loans lending to clients exists. Of course, credit risk is one of the principal risks that bankers concern about since it causes the possibility of higher non-performing assets resulting in financial losses in banks. In order to prevent the risk of financial loss for commercial banks, both bank-specific and macroeconomic determinants should be strongly taken into consideration by bank management as well as policymakers. Those determinants play a pivotal role in affecting banks' profitability since they can assist policymakers to capture useful procedures to improve financial performance (Yahya, Akhtar, & Tabash, 2014). Therefore, the aim of this study is to examine the effects of bank-specific and macroeconomic determinants on financial performances and bank risks of commercial banks in Thailand and Vietnam.

## 2. Literature Reviews

There are several empirical studies that employed macroeconomic factors or bank-specific factors while other researches utilized both types of factors to examine the banks' financial performance (Yahya et al., 2014).

### 2.1 Reviews of Empirical Literatures

Haron (2004) investigated the effects of external (macroeconomic) and internal (bank-specific) factors on the financial performance of Islamic banks. The study revealed that bank

capital, funds deposited into current accounts, liquidity, and the proportion of profit-sharing between depositors and Islamic banks had a positive effect on financial performance. One more thing, bank size, and inflation rates had a positive effect on the financial performance of Islamic banks too.

Similarly, Trad, Trabelsi, & Goux (2017) used bank characteristics and macroeconomic factors to investigate bank profitability. Their result figured out that the size of bank assets and bank capital are pivotal indicators influencing the increase in banks' profitability. In addition, they determined that macroeconomic factors excluding inflation have a significant remark on enhancing banks' stability and financial performance.

## 2.2 Related Literature Reviews: Case Study in Vietnam and Thailand

Nguyen & Nguyen (2018) studied the effect of globalization on the financial performance of the Vietnamese banking system by utilizing a group of banking and country-specific determinants; and a range of globalization such as political globalization, social globalization, and economic globalization in order to explain bank performance. Statistically, secondary data, an unbalanced dataset of 16 commercial banks with 117 observations, and random effects model were applied in their study. Their result determined that the cultural and political indexes have negative effects while the actual flow index and restriction index showed positive impacts; and hence, banking regulations in Vietnam should extend the openness of the Vietnamese banking sector to strengthen global competitiveness. Also, banks were suggested to enhance credit risk management for purpose of achieving higher efficiency.

In addition, Binh & Thomas (2014) profoundly examined the impact of risk on profitability in commercial banks in Vietnamese in terms of empirical and theoretical frameworks. Their study employed secondary data from eleven banks in Vietnam from 2008 to 2013 to find out the impact of independent variables on banks' capital adequacy. Pooled Regression which is most normal for panel data regression including Fixed Effects and Random Effects Model are conducted in their study. The study declared that consolidation of capital risk, return on equity, and return on assets has an analytically significant impact on the capital adequacy of Vietnamese banks. Commercial banks in Vietnam, on the other hand, were fallen to examine entire kinds of operating risks. Their result showed that the capital adequacy ratio had a positive effect on the capital risk as well as return on assets. However, bank capital had a negative effect to return on equity.

Ratanavararak & Ananchotikul (2018) investigated the link between bank profitability and risk-taking by measuring monetary policy through low-interest rates in Thailand. They studied the effect of interest rate on financial performance as well as bank-risk taking by aggregating four main indicators such as banking level financial indicator, firm-level balance sheet, contract level loan and collateral indicator, and interest rate along with macroeconomic indicator. Methodically, they analyzed by employing the different models for each effect of interest to financial performance as well as risk-taking in banks. Econometrically, the fixed effects model is conducted. Also, the system generalized method of moments (GMM), dynamic panel regression, was complimented for checking the robustness of the result. The bank fixed effects model is suitable to utilize to measure the bank financial performance checking for financial and macroeconomic aspects, and also bank-specific characteristics in different points of time. In terms of bank risk-taking, there was no result of an increase in bank risk once the interest rate was low perhaps because of regulation tightening, good risk management, and conservative position.

## 3. Research Methodology

Sample data of current research includes 11 out of 14 commercial banks in Thailand and 11 out of 31 Joint-stock commercial banks in Vietnam. There are two types of independent variables which are divided into bank-specific variables and macroeconomic variables. Financial data and macroeconomic data are in quarterly frequencies which are cited from the period of 2000 to 2018. However, there are some missing data in a few years especially in the case of Vietnam due to the availability of the data from both countries. Bank-specific variables are collected from the database of DataStream. After collecting the data, all ratios are calculated using the raw data from that database. Macroeconomic variables are GDP growth rate (GDP growth), inflation (INF), and political stability (PI), and concentration ratios (CR). Those data are extracted from the database of CEIC and the World Bank database.

### 3.1 Model Selection

Econometrically, the Random effect model and GMM are employed in the study. There are three equations to be separately generated in regression models. The purpose of this division is depended on the variables in macroeconomic determinants such as GDP growth rate, Inflation, and political stability excluding concentration ratios. The first equation is presenting the

regression with the GDP growth rate and following by regression with inflation as the second equation. The regression with political stability is classified as the third equation as shown below:

- Equation (1): Regression with GDP growth rate as a macroeconomic determinant

$$PROB_{it} = \beta_0 + \beta_1\,TDTAR_{it} + \beta_2\,NPLR_{it} + \beta_3\,BCR_{it} + \beta_4\,TLTAR_{it} + \beta_5\,HHI_{(rev)it} + \beta_6\,LNTA_{it}$$
$$+ \beta_7\,GDP\,Growth_t + \beta_8\,CR_t + \beta_9\,GDP\,Growth_t * Dummy\,L$$
$$+ \beta_{10}\,GDP\,Growth_t * Dummy\,M + u_{it} \quad (1)$$

- Equation (2): Regression with Inflation as a macroeconomic determinant

$$PROB_{it} = \beta_0 + \beta_1\,TDTAR_{it} + \beta_2\,NPLR_{it} + \beta_3\,BCR_{it} + \beta_4\,TLTAR_{it} + \beta_5\,HHI_{(rev)it} + \beta_6\,LNTA_{it}$$
$$+ \beta_7\,INF_t + \beta_8\,CR_t + u_{it} \quad (2)$$

- Equation (3): Regression with Political Stability as a macroeconomic determinant

$$PROB_{it} = \beta_0 + \beta_1\,TDTAR_{it} + \beta_2\,NPLR_{it} + \beta_3\,BCR_{it} + \beta_4\,TLTAR_{it} + \beta_5\,HHI_{(rev)it} + \beta_6\,LNTA_{it}$$
$$+ \beta_7\,CR_t + \beta8\,PI_t + u_{it} \quad (3)$$

Where $PROB_{it}$ is the proxy of the bank profitability indicators (ROA and ROE), and bank risk-taking (LNZ-SCORE) for bank i at time t; TDTAR is total deposits to total assets ratio; NPLR is non-performing loans ratio; BCR is bank capital ratio; TLTAR is total loans to total assets ratio; HHI (rev) is revenue diversification; LNTA is the natural logarithm of total assets; INF denotes inflation rate which is measured by customer price index; CR is concentration ratio; PI is political stability; GDP Growth refers to the growth rate of GDP; Dummy L= 1 if large banks or = 0 if otherwise; and Dummy M= 1 if medium banks or = 0 if otherwise.

### 3.2 Definitions of Variables

The current research will be strongly focused on the analysis of both internal and external determinants. Return on Equity (ROE), return on asset (ROA), and bank risks (LNZ-SCORE) are dependent variables. DuPont model is useful for evaluating financial performance (Almazari, 2012). This model was used regarding the analysis of return on equity (ROE) and Return on Assets (ROA). The dignity of both ratios is influenced by efficiency measure and measurement of profitability which is used in previous studies. Bank-specific variables such as total deposits to total assets ratio, non-performing loans ratio, total loans to total assets ratio, bank capital ratio, revenue diversification (HHIrev), and the natural logarithm of total assets; and macroeconomic variables consisting of GDP growth rate, inflation, concentration ratio, and political stability are independent variables as illustrated in Table 1.

**Table 1:** *Summary of Definitions and Notations of all Variables*

| Categories | Variables | Descriptions | Expected Relations (+/-) | Notations | Sources |
|---|---|---|---|---|---|
| **Dependent Variables** | Profitability | Net Income / Total Equity | | ROE | Trad, Trabelsi, & Goux (2017) |
| | Profitability | Net Income / Total Assets | | ROA | Yeyati & Micco (2007) |
| | Bank Risks | (ROA+ETA) / SDVROA | | LNZ-SCORE | Mercieca, Schaeck, & Wolfe (2007) |
| **Independent variables (Bank Specific)** | Total Deposit to Total Asset Ratio | Total Deposits / Total Assets | -/ + | TDTAR | Anbar & Alper (2011) |
| | Non-Performance Loan Ratio | Non-performing Loans / Total loans | - | NPLR | Adebisi & Matthew (2015) |
| | Bank Capital Ratio | Total Equity / Total Assets | -/ + | BCR | Petria, Capraru & Ihnatov (2015) |
| | Total Loan to Total Assets Ratio | Total Loan / Total Assets | -/ + | TLTAR | Davydenko (2010) Hassan & Bashir (2003) |
| | Revenue Diversification | $(NON/NETOP)^2 + (NET/NETOP)^2$ | - | $HHI_{(rev)}$ | Ratanavararak & Ananchotikul (2018) |
| | Bank Size | Natural Logarithm of total assets of banks | -/ + | LNTA | Athanasoglou, Brissimis, & Delis (2008) |
| **Independent variables (Macroeconomics)** | Growth Rate of Gross Domestic Product | GDP growth rate | -/ + | GDP Growth | Francis (2013) |
| | Inflation | (ln (CPI)t – (CPI)t-1) x 100 | -/ + | INF | Li (2007) |
| | Concentration Ratio | $C_k = \sum_{i=0}^{k} Si$ | + | CR | Yeyati & Micco (2007) |
| | Political Factor | Political Stability | + | PI | ElGindi, Said, & Salevurakis (2009) |

Source: Author's Calculations, Note: ETA (Equity To Total Asset); SDVROA (Standard Deviation of Return On Asset); NON (Non-interest Income); NET(Net Interest Income); NETOP (NON + NET); Si (The market shares of bank i); i (An figure that orders banks from largest to smallest).

## 4. Empirical Results Discussion

Two estimation techniques are discussed in the analysis. They are panel regression and GMM. By employing Return on Assets (ROA), Return on Equity (ROE), Natural logarithm of Z-SCORE (LNZ-SCORE) as dependent variables, the results from the random effect model (RE) and GMM are presented in Table 2, Table 3, and Table 4 for ROA, ROE, and LNZ-SCORE accordingly in case of Thailand, and Table 5, Table 6, and Table 7 for ROA, ROE, and LNZ-SCORE respectively in case of Vietnam. Those tables show the coefficient and level of significances.

### 4.1 Empirical Results of Thailand

Table 2, Table 3, and Table 4 exhibit the regression results of all bank-specific and macroeconomic determinants on financial performance whose variables are ROE, ROA for profitability indicators and LNZ-SCORE for bank risk indicators as dependent variables in commercial banks from 2000 to 2018 in Thailand. The observations are varied among equation (1), (2), and (3). Both models have 11 groups identically.

*Total Deposits to Total Assets Ratio (TDTAR):* It has a negative effect on ROA in for all equations while the rest show negative and insignificant effects (Anbar & Alper, 2011). Similarly, there is a negative and significant relationship between deposit ratio and LNZ-SCORE in equation (1). This negative relationship is consistent with the theory demonstrating that larger deposit ratio causes lower profitability and higher risk because when banks have a greater total deposit to total assets ratios, the banks would have more liabilities to settle; and hence, the banks would take higher risks (Anbar & Alper, 2011).

*Non-performing Loans Ratio (NPLR):* The result of regression reveals a statistically significant and negative effect of non-performing loan ratio to ROA, ROE, and LNZ-SCORE. Adebisi & Matthew (2015) and Dai Thich (2017) pointed out simply that higher non-performing loans in credit portfolios would happen to raise expenses to reserve; and the profit of banks therefore would decline.

*Bank Capital Ratio (BCR):* The finding found that the bank capital ratios have a positive effect on ROA, ROE, and LNZ-SCORE. The positive effect of BCR indicates when banks that hold high capital may survive in the coming period as well as have a higher inspiration to handle borrowers; and hence, investors can take it into consideration by looking through the level of return (Nguyen, Ta & Nguyen, 2018).

*Loans to Total Assets Ratio (TLTAR):* The regression result shows that TLTAR has a positive and significant effect on ROA, ROE, and LNZ-SCORE (Davydenko, 2010 and Dai

Thich, 2017). A loan is a type of asset. Hassan & Bashir (2003) found that the loan to asset ratio has a positive relationship with profitability. The loan is the main source of bank income. This means banks can earn more incomes when they hold a higher ratio of total loans to total assets.

*Revenue Diversification (HHIrev):* Banks diverse their income activities in order to raise profitability. Non-interest income activities are included in this diversification. Non-interest income activities consist of ATM fees, inbound and outbound telegraphic transfers, credit card fees, and others which are not related to interest income activities. When banks hold more non-interest income activities, they seem to confront high risk. One more thing, it will make operating expenses higher since banks try to create innovations to meet customer satisfaction and FinTech era. Therefore, the expected result of revenue diversification is negative (Ratanavararak & Ananchotikul, 2018 and Mercieca et al.,2007). The regression result illustrates that the relationship between HHI(rev) and bank profitability indicators are negative and significant for all equations of empirical results as ROA and ROE are the dependent variables. These results are consistent with the study of Ratanavararak & Ananchotikul (2018) and Mercieca et al. (2007). On contrary, revenue diversifications have no significant effect on LNZ-SCORE for all equations. It means that revenue diversification is not the main effect on bank risk indicators (LNZ-SCORE).

*Natural Logarithm of Total Assets (LNTA):* It has a positive and significant relationship with ROA in equation (1), (2), and (3) and the rest, on the other hand, presents no significant effect. Similarly, LNTA also has a positive and significant relationship with ROE only in equation (2) while the rest have a positive but insignificant relationship. These results are consistent with the study of Anbar & Alper (2011) whose result found that bank size has a positive and significant relationship with profitability. Remarkably, LNTA has a positive and significant effect on LNZ-SCORE in all equations for all regression results of LNTA. This determines that strong bank assets make the bank more stable in the sectors.

*GDP Growth Rate (GDP Growth):* The results reveal that there is a statistically positive and significant effect on ROA in small banks. This means that the GDP growth rate as macroeconomic variables has an important effect on bank performance in Thailand. On the contrary, the GDP growth rate for medium banks is surprised by the negative and significant effect on ROA while that for large banks shows no significant impact. For ROE as the dependent variable, there is no significant relationship between ROE and GDP growth for small and large banks.

**Table 2:** *Empirical Results of ROA from Random Effect Model and GMM (Thailand)*

| | ROA | | | | | |
|---|---|---|---|---|---|---|
| | **RE** | | | **GMM** | | |
| | Equation (1) | Equation (2) | Equation (3) | Equation (1) | Equation (2) | Equation (3) |
| **Bank-Specific Variables** | | | | | | |
| TDTAR | -0.0173*** | -0.0099** | -0.0116*** | -0.0135 | -0.0093 | -0.0117 |
| NPLR | -0.0218*** | -0.0140** | -0.0085 | -0.0176 | -0.0126 | -0.0083 |
| BCR | 0.1392*** | 0.1369*** | 0.1419*** | 0.1347*** | 0.1607*** | 0.1636*** |
| TLTAR | 0.0146*** | 0.0207*** | 0.0159** | 0.0163 | 0.0222 | 0.0179 |
| HHI$_{(rev)}$ | -0.0032*** | -0.0027*** | -0.0028*** | -0.0030*** | -0.0024*** | -0.0025*** |
| LNTA | 0.0018*** | 0.0022*** | 0.0019** | 0.0021 | 0.0023 | 0.0022 |
| Macroeconomic Variables | | | | | | |
| GDP Growth | 0.0004* | | | 0.0003 | | |
| GDP Growth - M | -0.0019*** | | | -0.0017* | | |
| GDP Growth - L | -0.0002 | | | -0.0002 | | |
| INF | | -0.0005* | | | -0.0005 | |
| CR | -0.1321*** | -0.1521*** | -0.1094*** | -0.1289** | -0.1528* | -0.1165** |
| PI | | | -0.0014 | | | -0.0013 |
| Intercept | 0.0755*** | 0.0745*** | 0.0474** | 0.0647 | 0.0701 | 0.0450 |
| Observation | 732 | 732 | 704 | 732 | 732 | 704 |
| Group | 11 | 11 | 11 | 11 | 11 | 11 |
| AR (2) | | | | z = -1.14 Pr > z = 0.254 | z = -0.53 Pr > z = 0.597 | z = 0.13 Pr > z = 0.893 |
| Hansen | | | | Prob > chi2 = 1.000 | Prob > chi2 = 1.000 | Prob > chi2 = 1.000 |
| Sargan test | | | | Prob > chi2 = 0.000 | Prob > chi2 = 0.000 | Prob > chi2 = 0.000 |

Source: Author's Calculation. Note: ROA (Return on Assets); TDTAR (Total Deposit/Total Assets); NPLR (Non-Performing Loans/ Total Loans); BCR (Total Equity/Total Assets); TLTAR (Total Loans/Total Assets); HHI$_{rev}$ (Revenue Diversification); LNTA (Natural Logarithm of Total Assets); GDP Growth (GDP Growth Rate); INF (Inflation); CR (Concentration Ratio); PI (Political Stability). *; **; *** = Significant at 10%, 5% and 1% level, respectively. Abbreviations of M, L are denoted as medium and large bank size in Thailand.

**Table 3:** *Empirical Results of ROE from Random Effect Model and GMM (Thailand)*

| | RE | | | GMM | | |
|---|---|---|---|---|---|---|
| ROE | | | | | | |
| | Equation (1) | Equation (2) | Equation (3) | Equation (1) | Equation (2) | Equation (3) |
| Bank-Specific Variables | | | | | | |
| TDTAR | -0.0289 | 0.0386 | 0.0517 | -0.0022 | 0.0657 | 0.0904 |
| NPLR | -0.7582*** | -0.5765*** | -0.3509*** | -0.6058 | -0.5204 | -0.2816 |
| BCR | 1.3401*** | 1.7491*** | 1.9374*** | 1.2291* | 1.6531** | 1.8105** |
| TLTAR | 0.2262** | 0.4090*** | 0.3267*** | 0.1269 | 0.2185 | 0.1461 |
| HHI$_{(rev)}$ | -1.3189*** | -1.3120*** | -1.3164*** | -1.3155*** | -1.3050*** | -1.3131*** |
| LNTA | 0.0162 | 0.0278*** | 0.0125 | 0.0254 | 0.0277 | 0.0179 |
| Macroeconomic Variables | | | | | | |
| GDP Growth | 0.0011 | | | 0.0024 | | |
| GDP Growth - M | -0.0261*** | | | -0.0269 | | |
| GDP Growth - L | -0.0008 | | | -0.0034 | | |
| INF | | -0.0060 | | | -0.0040 | |
| CR | -2.5533*** | -2.8932*** | -1.9704*** | -2.5819** | -2.6118** | -1.9044* |
| PI | | | -0.0876*** | | | -0.0988* |
| Intercept | 2.3621*** | 2.1935*** | 1.6428*** | 2.2901** | 2.0916** | 1.6064* |
| Observation | 732 | 732 | 704 | 732 | 732 | 704 |
| Group | 11 | 11 | 11 | 11 | 11 | 11 |
| AR (2) | | | | z = -0.95 Pr > z = 0.341 | z = -0.15 Pr > z = 0.881 | z = -0.61 Pr > z = 0.542 |
| Hansen | | | | Prob > chi2 = 1.000 | Prob > chi2 = 1.000 | Prob > chi2 = 1.000 |
| Sargan test | | | | Prob > chi2 = 0.000 | Prob > chi2 = 0.000 | Prob > chi2 = 0.000 |

Source: Author's Calculation. Note: ROE (Return on Equity); TDTAR (Total Deposit/Total Assets); NPLR (Non-Performing Loans/ Total Loans); BCR (Total Equity/Total Assets); TLTAR (Total Loans/Total Assets); HHI$_{rev}$ (Revenue Diversification); LNTA (Natural Logarithm of Total Assets); GDP Growth (GDP Growth Rate); INF (Inflation); CR (Concentration Ratio); PI (Political Stability). *; **; *** = Significant at 10%, 5% and 1% level, respectively. Abbreviations of M, L are denoted as medium and large bank size in Thailand.

**Table 4:** *Empirical Results of LNZ-SCORE from Random Effect Model and GMM (Thailand)*

| | LNZ-SCORE | | | | | |
|---|---|---|---|---|---|---|
| | **RE** | | | **GMM** | | |
| | Equation (1) | Equation (2) | Equation (3) | Equation (1) | Equation (2) | Equation (3) |
| Bank-Specific Variables | | | | | | |
| TDTAR | -1.9250*** | -0.6862 | 0.0251 | -1.1607 | -0.8864 | -0.3493 |
| NPLR | -2.4362*** | -0.4101 | 0.9021 | -1.2045 | -0.8631 | -0.0542 |
| BCR | 9.2249*** | 15.2154*** | 15.7423*** | 12.4835** | 13.8005*** | 13.4219** |
| TLTAR | 2.1885*** | 3.4413*** | 3.5955*** | 2.6481 | 2.7915 | 2.7884 |
| HHI$_{(rev)}$ | -0.1284 | -0.0523 | -0.0776 | -0.0875 | -0.0824 | -0.1086 |
| LNTA | 0.3799*** | 0.4166*** | 0.2761*** | 0.4537*** | 0.5198*** | 0.3867** |
| Macroeconomic Variables | | | | | | |
| GDP Growth | 0.0152 | | | -0.0018 | | |
| GDP Growth - M | -0.0938*** | | | -0.0528 | | |
| GDP Growth - L | 0.0252 | | | 0.0345 | | |
| INF | | 0.0315 | | | 0.0264 | |
| CR | 1.0740 | 3.7111 | 5.4466** | 0.6821 | 1.4191 | 2.9973 |
| PI | | | -0.5196*** | | | -0.4113** |
| Intercept | -5.1814** | -10.5327*** | -10.7095*** | -7.4019 | -9.5892 | -9.2995 |
| Observation | 732 | 732 | 704 | 732 | 732 | 704 |
| Group | 11 | 11 | 11 | 11 | 11 | 11 |
| AR (2) | | | | z = -0.66 Pr > z = 0.511 | z = -0.39 Pr > z = 0.698 | z = -0.07 Pr > z = 0.940 |
| Hansen | | | | Prob > chi2 = 1.000 | Prob > chi2 = 1.000 | Prob > chi2 = 1.000 |
| Sargan test | | | | Prob > chi2 = 0.000 | Prob > chi2 = 0.000 | Prob > chi2 = 0.000 |

Source: Author's Calculation. Note: LNZ-SCORE (Natural Logarithm of Z-SCORE); TDTAR (Total Deposit/Total Assets); NPLR (Non-Performing Loans/ Total Loans); BCR (Total Equity/Total Assets); TLTAR (Total Loans/Total Assets); HHI$_{rev}$ (Revenue Diversification); LNTA (Natural Logarithm of Total Assets); GDP Growth (GDP Growth Rate); INF (Inflation); CR (Concentration Ratio); PI (Political Stability). *; **; *** = Significant at 10%, 5% and 1% level, respectively. Abbreviations of M, L are denoted as medium and large bank size in Thailand.

However, the result shows a negative and significant impact of GDP growth on ROE and LNZ-SCORE for medium banks. As an illustration, the relationship between GDP growth and financial performance in banks can be positive or negative. Furthermore, Sufian & Habibullah (2009) stressed that GDP growth can affect either negatively or positively to profitability. The negative sign is due to the downswing of GDP especially during the financial crisis which causes the bank profitability to go down dramatically. This result is in line with the study of Francis (2013) whose result showed a negative effect of GDP growth on profitability in banks.

*Inflation Rate (INF):* The relationship between INF and ROA in Thai commercial banks is statistically negative and significant while the other one shows insignificant. This negative result implies that the inflation rate is not properly anticipated so banks cannot make proper adjustment of interest rate to expand banks' revenue over costs. These results are not in line with the studies of Hassan & Bashir (2003) that found a positive relationship between profitability and inflation. Nevertheless, they are consistent with the previous researches of Naceur (2003) found that the inflation rate has negative effects on profitability in the Tunisian banking sector from 1983 to 2000. However, there is no relationship between inflation and ROE and LNZ-SCORE.

*Concentration Ratio (CR):* The result of estimation figured out that concentration ratios remarkably have a negative and significant effect on ROA and ROE for all equations in regression results. The negative result is contrary to the study of Anbar & Alper (2011) which mentioned that higher financial performance principally relates to higher market concentrations. However, this ratio shows a positive and significant impact on LNZ-SCORE in equation (3) while the rest presents positive but no significant impact. The positive result reveals that concentration ratio is a part of bank stability. If there is a high concentration ratio, there is safer stability in the baking sectors. Banks also feel safe for their banking operating by looking to the LNZ-SCORE of the banks.

*Political Stability (PI):* Regression results show an insignificant impact on ROA. This implies that politics is not the main macroeconomic determinant of ROA in commercial banks. However, there are negative and significant relationships between political stability and ROE as well as LNZ-SCORE for all equations. These results are not in the line with the study of ElGindi et al. (2009) whose results revealed positive and significant.

**4.2 Empirical Result of Vietnam**

In Table 5, Table 6, and Table 7, they show the regression results of all bank-specific and macroeconomic determinants on bank profitability whose indicators include ROE, ROA,

and LNZ-SCORE as dependent variables in Vietnamese commercial banks in the period of 2000 to 2018. There are 11 groups of panel data identically. The observations of this country are different by each equation due to the availability of the dataset.

*Total Deposits to Total Assets Ratio (TDTAR):* Regression result figures out that there is a statistically negative and significant effect between TDTAR and ROA in all equations. These results are similar to the case of Thailand that total deposits to total assets have positive and significant for all equations. One more thing, total deposits to total asset ratios have a negative and significant impact on ROE in all equations. Those results support the study of Anbar & Alper (2011). This result, however, is contrary to the result in the case of Thailand since it shows no significant effect of TDTAR to ROE in commercial banks in Thailand. On the other hand, TDTAR and LNZ-SCORE have a positive and significant relationship for all equations. Commercial banks in Vietnam don't create higher risks implying that they can manage their bank deposits very well. In contrast, TDTAR has a negative and significant impact on LNZ-SCORE in only equation (1). This difference result can be occurred due to the management policy on deposit contributions among all banks in both countries.

*Non-performing Loans Ratio (NPLR):* There is no significant relationship between non-performing loan ratio and ROA in a joint-stock commercial bank in Vietnam whereas NPLR and ROA have a negative and significant relationship in commercial banks in Thailand. However, NPLR has a negative and significant effect on LNZ-SCORE in equation (2) and (3) while the rest shows negative but insignificant. This result is similar to the result in the case of Thailand but just in different equations. In the case of Thailand, NPLR has a negative effect on LNZ-SCORE in equation (1). Surprisingly, NPLR and ROE in Vietnamese banks have a positive and significant relationship in equation (2) and (3) while they have a negative and significant relationship in the Thailand case. This positive result is not consistent with the theory or previous studies of Adebisi & Matthew (2015) and Dai Thich (2017).

*Bank Capital Ratio (BCR):* In the current study, the coefficient of bank capital ratio in Vietnam has positive and significant relations with ROA for all equations. These positive results support the study of Francis (2013), Dai Thich (2017), and Anbar & Alper (2011). One more thing, this ratio in the current study has a positive and significant effect on ROE in equation (1) while the rest remains positive but insignificant effect. The impact of BCR on ROA and ROA in the case of Vietnam is similar to the effect of BCR on ROA and ROE in the case of Thailand since those variables have a positive and significant relationship. Surprisingly, BCR and LNZ-SCORE have a negative and significant impact in all equations

except equation (2) in the Random effect model while is contrary to the result of the Thailand case where BCR and LNZ-SCORE have a positive and significant relationship. The cost of equity was higher than the cost of debt even though Vietnamese banks are forced to increase their capital amount because higher capital adequacy brings safer for banks to cope with the risk of capital (Binh & Thomas, 2014).

*Total Loans to Total Assets Ratio (TLTAR):* Current empirical result finds that TLTAR has a positive and significant effect in equation (3) to ROA while the rest shows an insignificant effect. One more thing, there is a positive and significant relationship between TLTAR and LNZ-SCORE in all equations. The effect of TLTAR on ROA and LNZ-SCORE in Vietnam is similar to the effect of TLTRA on ROA and LNZ-SCORE in Thailand. These results are consistent with the result of previous studies such as Davydenko (2010) and Dai Thich (2017). The loan is the main source of bank income. This means that banks can earn more incomes when they hold a higher ratio of total loans to total assets. However, coefficients of TLTAR have no significant effect on ROE in all equations in Vietnam while those coefficients have a positive and significant effect on ROE in Thailand.

*Revenue Diversification (HHIrev):* The regression result demonstrates that the relationships between HHIrev and ROA in equation (2) and (3) and between HHIrev and ROE in only equation (3) are negative and significant whereas the rest exhibits negative and insignificant relationship. These results are similar to the results in the case of Thailand that HHIrev has a significant effect on ROA and ROE in those equations. Furthermore, coefficients of HHIrev are negative and significant for LNZ-SCORE for equation (2) and (3) while the others present no significance. This implies that higher diversification causes a greater risk of commercial banks (Ngoc Nguyen, 2019). For LNZ-SCORE in the case of Vietnam is different from that in the case of Thailand since HHIrev in the case of Thailand has no significant effect on LNZ-SCORE for equation (2) and (3).

*Natural Logarithm of Total Assets (LNTA):* Depending on the result of the regression, LNTA have a positive and significant impact on ROA in equation (2) and (3) for both methods, and on ROE in equation (2) and (3) for Random effect method in case of Vietnam which are similar to the result in case of Thailand. These results support the theory as well as previous studies (Athanasoglou et al., 2008). Asset sizes of banks increases, it seems to increase bank revenues so larger banks can be used their capital more efficiently than small banks (Ngoc Nguyen, 2019). Yahya et al. (2014) show that the logarithm of the total asset has a positive and significant relationship with bank profitability.

*GDP Growth Rate (GDP Growth):* The result empathizes that there is a statistically positive and significant relationship between GDP Growth and ROA in all bank sizes. One more thing, GDP growth has a positive and significant impact on ROE in equation (1) while the rest has no significant impact. In addition, the growth rate has mixed effects on LNZ-SCORE regarding bank sizes. For instance, there are positive and significant relationships between GDP growth and LNZ-SCORE of medium and large banks while there is a negative and significant relationship between GDP growth and LNZ-SCORE of small banks. The impacts of GDP growth on profitability and bank risk indicators in Vietnam and Thailand look significantly similar which are just varied regarding the size of banks.

*Inflation Rate (INF):* Inflation in the current study has a positive and significant effect on ROA and ROE but the negative and significant effect on LNZ-SCORE. This positive result reveals that the banks' rate is anticipated by commercial banks. In addition, this result does support the study of Hassan & Bashir (2003).

*Concentration Ratio (CR):* The result of estimation points out that concentration ratio has a negative and significant effect on ROA in equation (1) and (2) while the rest shows an insignificant effect. Risk-taking (LNZ-SCORE) has a negative and significant relationship with CR in equation (1) and (3) whereas others are insignificant. The effects of CR to ROA and LNZ-SCORE in the case of Vietnam are consistent with the effect of CR to ROA and LNZ-SCORE in the case of Thailand. ROE in the case of Vietnam, however, is not significantly affected by concentration ratio while ROE in the case of Thailand is significantly influenced by the concentration ratio in equation (3).

*Political Stability (PI):* The regression result indicates a positive and significant relationship between PI and ROA whereas the other has no significant relationship which supports the theory and literature given. This result also supports ElGindi et al. (2009), Yahya et al. (2014), and Aburime (2008) which figured out that political stability is expected to have a positive relationship with bank profitability. However, PI has no significant impact on ROE for the case of Vietnam while it has a negative impact on ROE for the case of Thailand. On contrary, there are statistically negative and significant relationships between political stability and LNZ-SCORE which is contradict previous studies. This result is similar to the result for the case of Thailand that PI has a negative and significant relationship with LNZ-SCORE.

**Table 5:** *Empirical Results of ROA from Random Effect Model and GMM (Vietnam)*

| | ROA | | | | | |
|---|---|---|---|---|---|---|
| | RE | | | GMM | | |
| | Equation (1) | Equation (2) | Equation (3) | Equation (1) | Equation (2) | Equation (3) |
| Bank-Specific Variables | | | | | | |
| TDTAR | -0.0270*** | -0.0235*** | -0.0252*** | -0.0292*** | -0.0240*** | -0.0242*** |
| NPLR | 0.0005 | 0.0018 | 0.0019 | 0.0007 | 0.0008 | 0.0008 |
| BCR | 0.1698*** | 0.1504*** | 0.1545*** | 0.1624*** | 0.1689*** | 0.1734*** |
| TLTAR | -0.0005 | 0.0014 | 0.0029** | 0.0006 | -0.0003 | 0.0002 |
| HHI$_{rev}$ | -0.0042 | -0.0073** | -0.0082** | -0.0076 | -0.0064 | -0.0062 |
| LNTA | 0.0011 | 0.0018*** | 0.0017** | 0.0011 | 0.0016** | 0.0015* |
| Macroeconomic Variables | | | | | | |
| GDP Growth | 0.0006** | | | 0.0006 | | |
| GDP Growth - M | 0.0004*** | | | 0.0004 | | |
| GDP Growth - L | 0.0003* | | | 0.0002 | | |
| INF | | 0.0002** | | | 0.0002 | |
| CR | -0.0103** | -0.0099** | -0.0016 | -0.0082 | -0.0151 | -0.0076 |
| PI | | | 0.0048** | | | 0.0058 |
| Intercept | 0.0020 | -0.0045 | -0.0094 | 0.0040 | 0.0010 | -0.0034 |
| Observation | 200 | 200 | 200 | 200 | 200 | 200 |
| Group | 11 | 11 | 11 | 11 | 11 | 11 |
| AR (2) | | | | z = -1.84 Pr > z = 0.066 | z = 0.46 Pr > z = 0.649 | z = -0.30 Pr > z = 0.761 |
| Hansen | | | | Prob > chi2 = 1.000 | Prob > chi2 = 1.000 | Prob > chi2 = 1.000 |
| Sargan test | | | | Prob > chi2 = 0.001 | Prob > chi2 = 0.004 | Prob > chi2 = 0.004 |

Source: Author's Calculation. Note: ROA (Return on Assets); TDTAR (Total Deposit/Total Assets); NPLR (Non-Performing Loans/ Total Loans); BCR (Total Equity/Total Assets); TLTAR (Total Loans/Total Assets); HHI$_{rev}$ (Revenue Diversification); LNTA (Natural Logarithm of Total Assets); GDP Growth (GDP Growth Rate); INF (Inflation); CR (Concentration Ratio); PI (Political Stability).  *; **; *** = Significant at 10%, 5% and 1% level, respectively. Abbreviations of M, L are denoted as medium and large bank size in Vietnam.

**Table 6:** *Empirical Results of ROE from Random Effect Model and GMM (Vietnam)*

| | ROE | | | | | |
|---|---|---|---|---|---|---|
| | **RE** | | | **GMM** | | |
| | Equation (1) | Equation (2) | Equation (3) | Equation (1) | Equation (2) | Equation (3) |
| Bank-Specific | | | | | | |
| TDTAR | -0.2999*** | -0.2580*** | -0.2846*** | -0.3198*** | -0.2931*** | -0.2976*** |
| NPLR | 0.0140 | 0.0363* | 0.0372* | 0.0167 | 0.0177 | 0.0179 |
| BCR | 0.4420*** | 0.0817 | 0.1051 | 0.3199 | 0.3844 | 0.4300 |
| TLTAR | -0.0150 | 0.0107 | 0.0218 | -0.0032 | -0.0057 | -0.0006 |
| $HHI_{rev}$ | -0.0363 | -0.0658 | -0.0843* | -0.0808 | -0.0665 | -0.0655 |
| LNTA | 0.0130 | 0.0199** | 0.0197** | 0.0125 | 0.0174 | 0.0164 |
| Macroeconomic | | | | | | |
| GDP Growth | 0.0088** | | | 0.0077 | | |
| GDP Growth - M | 0.0016 | | | 0.0016 | | |
| GDP Growth - L | 0.0030 | | | 0.0020 | | |
| INF | | 0.0026** | | | 0.0021 | |
| CR | -0.0632 | -0.0352 | 0.0580 | -0.0337 | -0.1159 | -0.0368 |
| PI | | | 0.0347 | | | 0.0540 |
| Intercept | 0.0883 | 0.0174 | -0.0175 | 0.1302 | 0.1257 | 0.0816 |
| Observation | 200 | 200 | 200 | 200 | 200 | 200 |
| Group | 11 | 11 | 11 | 11 | 11 | 11 |
| AR (2) | | | | z = -1.62 Pr > z = 0.104 | z = 0.04 Pr > z = 0.966 | z = -0.32 Pr > z = 0.745 |
| Hansen | | | | Prob > chi2 = 1.000 | Prob > chi2 = 1.000 | Prob > chi2 = 1.000 |
| Sargan test | | | | Prob > chi2 = 0.002 | Prob > chi2 = 0.002 | Prob > chi2 = 0.001 |

Source: Author's Calculation. Note: ROE (Return on Equity); TDTAR (Total Deposit/Total Assets); NPLR (Non-Performing Loans/ Total Loans); BCR (Total Equity/Total Assets); TLTAR (Total Loans/Total Assets); $HHI_{rev}$ (Revenue Diversification); LNTA (Natural Logarithm of Total Assets); GDP Growth (GDP Growth Rate); INF(Inflation); CR (Concentration Ratio); PI (Political Stability ). *; **; *** = Significant at 10%, 5% and 1% level, respectively. Abbreviations of M, L are denoted as medium and large bank size in Vietnam.

**Table 7:** *Empirical Results of LNZ-SCORE from Random Effect Model and GMM (Vietnam)*

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | | **LNZ-SCORE** | | |
| | | **RE** | | | **GMM** | |
| | Equation (1) | Equation (2) | Equation (3) | Equation (1) | Equation (2) | Equation (3) |
| Bank-Specific Variables | | | | | | |
| TDTAR | 2.4737** | 3.6793*** | 3.6973*** | 2.6633 | 3.4317* | 3.2350* |
| NPLR | -0.2550 | -0.9530** | -1.0131** | -0.3290 | -0.4768 | -0.4701 |
| BCR | -15.2671*** | -4.0364 | -7.6198* | -12.4314* | -11.6495* | -13.9113* |
| TLTAR | 1.0228*** | 0.8420** | 0.5698* | 1.0135** | 0.8024* | 0.6392 |
| HHI$_{rev}$ | 0.0597 | -1.9477* | -2.0914* | 0.0430 | -0.6073 | -1.0036 |
| LNTA | -0.0500 | -0.2972 | -0.0199 | -0.0201 | 0.1767 | 0.2203 |
| Macroeconomic Variables | | | | | | |
| GDP Growth | -0.1973** | | | -0.1594 | | |
| GDP Growth - M | 0.1348*** | | | 0.1272 | | |
| GDP Growth - L | 0.1046* | | | 0.0888 | | |
| INF | | -0.0456** | | | -0.0489 | |
| CR | -3.5173** | -1.1759 | -1.6657 | -2.1675 | 0.4494 | -1.8658* |
| PI | | | -1.7075*** | | | -2.5043 |
| Intercept | 5.9291 | 7.6109* | 4.1178 | 4.0221 | -1.3679 | 0.4503 |
| Observation | 200 | 200 | 200 | 200 | 200 | 200 |
| Group | 11 | 11 | 11 | 11 | 11 | 11 |
| AR (2) | | | | z = -1.06 Pr > z = 0.291 | z = 0.54 Pr > z = 0.586 | z = -0.47 Pr > z = 0.639 |
| Hansen | | | | Prob > chi2 = 1.000 | Prob > chi2 = 1.000 | Prob > chi2 = 1.000 |
| Sargan test | | | | Prob > chi2 = 0.000 | Prob > chi2 = 0.000 | Prob > chi2 = 0.000 |

Source: Author's Calculation. Note: LNZ-SCORE (Natural Logarithm of Z-SCORE); TDTAR (Total Deposit/Total Assets); NPLR (Non-Performing Loans/ Total Loans); BCR (Total Equity/Total Assets); TLTAR (Total Loans/Total Assets); HHI$_{rev}$ (Revenue Diversification); LNTA (Natural Logarithm of Total Assets); GDP Growth (GDP Growth Rate); INF (Inflation); CR (Concentration Ratio); PI (Political Stability). *; **; *** = Significant at 10%, 5% and 1% level, respectively. Abbreviations of M, L are denoted as medium and large bank size in Vietnam.

## 5. Conclusions

This research is to investigate the impact of bank-specific and macroeconomic determinants on profitability in commercial banks in Thailand and Vietnam by employing unbalanced quarterly panel data from 11 commercial banks in Thailand and Vietnam in the period of 2000 to 2018. The empirical results reveal that non-performing loan ratio, bank capital ratio, total loan to total asset ratio, and GDP growth for medium banks have a significant impact on return on asset, return on equity, and LNZ-SCORE for the case of Thailand while bank capital ratio, deposit to total asset ratio, GDP growth rate for small banks, and inflation show a significant relationship with return on asset, return on equity, and LNZ-SCORE for the case of Vietnam. Further studies should take other factors such as internal control, operation cost, and industrial factors into consideration for the purpose of getting significant and accurate estimation results and also extend more related internal bank-specific variables in their studies. Further studies should take other factors such as internal control, operation cost, and industrial factors into consideration for the purpose of getting accurate estimation results.

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