An empirical analysis of macroeconomic and bank-specific factors affecting profitability of Vietnam banks

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C H R O N I C L E	A B S T R A C T
	This article analyzes the impact of macroeconomic and bank-specific factors affecting the profitability of Vietnam banks, which is an emerging economy with the banking industry considered to be young but plays a very important role for the development of the economy. The study data was collected during the period of 2013-2018. The Generalized Method of Moment (GMM) is used to estimate the study model to ensure that the results obtained are of high confidence. The study results show that the bank profitability was positively affected by macroeconomic (such as economic growth and inflation) and bank-specific factors (such as bank capital, bank size, and liquidity risk), which is an interesting finding in Vietnam. The results of this study are important for bank managers and researchers.

1. Introduction

In recent years, Vietnam has actively renewed economic policies to better suit the context of international economic integration. This has boosted Vietnam's banking industry to thrive and become more and more suitable to the market economy. When integrating into the international economy, Vietnamese banking industry will be welcomed with great opportunities. However, the difficulties and challenges which Vietnamese banking industry faces are not small. In order to overcome these difficulties, the Vietnamese banking industry must constantly improve its operational efficiency. It can be said that the profitability is always one of the important criteria that the banks are interested in when they want to improve their operational capacity (Albertazzi & Gambacorta, 2009). Since the profitability shows the bank's ability to endure the economic distress (Aburime, 2009). Moreover, the bank profitability also contributes significantly to stabilizing the financial system (Athanasoglou et al., 2008). In general, the profitability is the subject of much interest in the banking sector, this interest is suitable not only for bank managers but also for researchers. The bank profitability is often affected by the macroeconomic and bank-specific factors (Syafri, 2012; Hasanov et al., 2018). This result is also found in many empirical studies. However, most of these studies have not been consistent about the factors affecting the bank profitability. For Vietnam, this is an emerging country (Bui, 2020a), with a relatively young banking system (Nguyen et al., 2020), and especially a lack of empirical studies on this matter. Therefore, the consideration of factors affecting the bank profitability is an interesting and necessary study topic for Vietnam. With such urgency, the author will conduct this study, which focuses primarily on analyzing the impact of macroeconomic and bank-specific factors on the bank profitability. The results of this study promise to have important implications for the bank managers, as well as researchers.

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2. Literature review and hypothesis development

2.1. Bank-specific factors and bank profitability

- Structure of bank capital and bank profitability

The structure of bank capital is a concept that reflects the bank's level of loans and equity. In terms of measurement, this index is usually measured by dividing total equity by total assets. Therefore, this index shows the bank's ability to withstand the financial distress. Not only that, the structure of bank capital also reflects the bank capital adequacy (Syafri, 2012; Abate & Mesfin, 2019), and the financial health of the bank (Kawshala & Panditharathna, 2017). Accordingly, when the bank's equity ratio increases, the financial health of the bank will be increased, the bank's tolerance to financial distress will be improved, This is an important factor promoting the bank profitability (Ben & Goaied, 2008; Kosmidou, 2008). The positive impact of capital structure on bank profitability is also found in many empirical studies, such as Demirguc-Kunt and Huizinga (1999), Khrawish et al. (2008), San and Heng (2012), Syafri (2012), Shah and Khan (2017), Abate and Mesfin (2019). However, there exists some opinion that the capital structure may negatively impact the bank profitability, such as Gul et al. (2011) and Hoffmann (2011). This implies that if the equity ratio is too high, it can lead to the bank wasting capital and missing out on many business opportunities, which can reduce the bank profitability. In Vietnam, the capital structure of the bank is always closely monitored to ensure the safety of the banking industry. On the other hand, the banking industry in Vietnam has always played a leading role in providing the capital for the economy (Bui, 2019a; Nguyen et al., 2019). Therefore, to the extent permitted, the Vietnam banks often increase their capital mobilization and make the most of this capital to lend, which has contributed significantly to improving the bank profitability. Based on this basis, the author proposes the following:

H_1: Capital structure (CS) has a positive impact on bank profitability (ROA).

- Bank size and bank profitability

The bank size is often measured through its total assets (Demirguc-Kunt & Huizinga, 1999; Athanasoglou et al., 2006, 2008). The large banks often have many advantages when operating in the market and also, they are also big advantages of these banks. Indeed, the large banks will easily attract a large number of customers, and can easily withstand the economy distress, therefore, the profitability will be improved. The positive impact of bank size on the bank profitability is also found in a number of empirical studies, such as: Athanasoglou et al. (2008), Nuriyeva (2014), Petria et al. (2015), and Djalilov and Piesse (2016). Therefore, the study hypothesis is proposed by the author as follows:

H_2: Bank size (BC) has a positive impact on bank profitability (ROA).

- Liquidity risk and bank profitability

The liquidity risk is usually measured by the ratio of total loans/deposits and short term funding. This index is high, which will reflect the high bank risks and vice versa. And also, this index also shows the difference between the main source of income from banks' loans and the costs that banks have to spend to raise capital (Shaha et al., 2018). Therefore, the banks that accept high levels of liquidity risk can achieve big profitability. In other words, the liquidity risk can have a positive impact on bank profitability. This impact is consistent with the statement of Khrawish et al. (2008), Gul et al. (2011), Hoffmann (2011), Syafri (2012), Ibe (2013), Rasul (2013). However, if the liquidity risk is too high, it may cause difficulties for banking operations and the profitability will decrease (Athanasoglou et al., 2006, 2008; Davydenko, 2010; Capraru & Ihnatov, 2014; Petria et al., 2015; Roman & Sargu, 2015; Djalilov & Piesse, 2016). During the study period, the liquidity risk at the Vietnam banks is always well controlled, which has contributed significantly to helping the banking industry develop stably and profitability to be improved. Therefore, the author proposes the following study hypothesis:

H_3: Liquidity risk (LR) has a positive impact on bank profitability (ROA).

2.2. Macroeconomic factors and bank profitability

- Economic growth and bank profitability

The economic growth is an important macroeconomic index that reflects the increase in domestic economic operations and income (Nguyen & Bui, 2019; Nguyen et al., 2019). Not only that, the economic growth also shows the prospects of the economy, therefore, it can have a significant impact on bank profitability. Accordingly, if the economy grows well, the banking industry will have many favorable conditions to operate and improve the profitability (Gul et al., 2011; Zeitun, 2012). Based on this basis, the proposed study hypothesis is as follows:

H_4: Economic growth (EG) has a positive impact on bank profitability (ROA).

- Inflation and bank profitability

The inflation is an important index representing macroeconomics (Bui, 2019b). And also, this index also reflects the level of business risk which the banking industry shall face. However, the moderate inflation can stimulate the development of economy

as well as the banking industry, causing the bank profitability to increase. The positive impact of inflation on bank profitability is also found in empirical studies by Khrawish et al. (2008), Alper and Anbar (2011), San and Heng (2012). Therefore, the author proposes the following study hypothesis:

H_5: Inflation (INF) positively affects bank profitability (ROA).

3. Methodology

This article focuses on the impact of macroeconomic and bank-specific factors on bank profitability. For this purpose, the authors have collected the data in tabular form, from data sources of 26 commercial banks in Vietnam and data of the World Bank, in the period of 2013-2018. For the analytical method, the author has estimated the study model according to the Generalized Method of Moment (GMM). This method allows the author to control potential endogenous and regression hypotheses violated in the study model (Bui, 2020b, 2020c; Doan, 2020a, 2020b; Doan & Bui, 2020). The study model is set up based on the results of previous studies and the study hypotheses that the author has proposed. Accordingly, the dependent variable representing bank profitability (ROA) is measured through the ratio of profit after tax/ total assets. The independent variables are measured through index representing macroeconomic and bank-specific factors. The indicators representing bank-specific factors include: bank capital (BC), bank size (BS), and liquidity risk (LR). In addition, economic growth (EG) and inflation (INF) are indicators representing macroeconomics. The study model proposed by the author has the following equation:

$$ROA_{it} = \beta_0 + \beta_1\, BC_{it} + \beta_2\, BS_{it} + \beta_3\, LR_{it} + \beta_4\, EG_t + \beta_5\, INF_t + \varepsilon_{it}$$

where:
Dependent variable: Bank profitability (ROA).
Independent variables:
Bank capital (BC): Total equity / Total assets;
Bank size (BS): Ln(Total assets);
Liquidity risk (LR): Total loans / Deposits and short term funding;
Economic growth (EG): Annual growth of gross domestic product;
Inflation (INF): Annual growth of consumer price index.

4. Results

Data of variables in study model are described in Table 1 as follows:

Table 1
Descriptive statistics

Variable	Mean	Min	Max
Bank profitability (ROA)	0.006	0.001	0.026
Bank capital (BC)	0.087	0.033	0.238
Bank size (BS)	14.078	13.167	15.118
Liquidity risk (LR)	0.666	0.265	1.095
Economic growth (EG)	0.064	0.054	0.071
Inflation (INF)	0.037	0.009	0.066

Table 2 shows that the independent variables positively correlate with bank profitability (ROA), which is quite consistent with the study hypothesis proposed by the author.

Table 2
Correlation coefficients among variables

	ROA	BC	BS	LR	EG	INF
ROA	1.000					
BC	0.154	1.000				
BS	0.285	-0.634	1.000			
LR	0.386	0.129	0.231	1.000		
EG	0.121	-0.238	0.210	0.294	1.000	
INF	0.073	0.153	-0.104	-0.155	-0.720	1.000

The author has conducted the F test and the Hausman test to determine the appropriate analytical method, the contents are presented in the following Table 3. Table 3 shows that the F test (F (25, 125) = 11.40) is statistically significant at the 1% significance level. Meanwhile, the Hausman test (Chi2 (5) = 9.01) is not statistically significant. Therefore, the Random Effects Model (REM) analysis method will be more suitable than the remaining analysis methods. In other words, the author will test the study model based on the estimated results by the REM method.

Table 3

Estimation of study model using Pooled OLS, FEM, REM methods

Dependent Variable: Bank profitability (ROA)			
ROA	Pooled OLS	FEM	REM
Constant	-0.104***	-0.217***	-0.142***
BC	0.073***	0.130***	0.110***
BS	0.006***	0.014***	0.008***
LR	0.006**	0.008***	0.007***
EG	0.254***	0.132	0.238***
INF	0.082***	0.063***	0.077***
R-squared	34.37%	53.52%	52.58%
Significance level	$F_{(5, 150)}$ = 15.71 Prob>F = 0.000***	$F_{(5, 125)}$ = 28.78 Prob>F = 0.000***	Wald chi2(5) = 139.15 Prob>chi2 = 0.000***
F test		$F_{(25, 125)}$ = 11.40 Prob>F = 0.000***	
Hausman test		chi2(5) = 9.01 Prob>chi2 = 0.109	

Note: ** and *** indicate significance at the 5% and 1% level, respectively.

Table 4

Test of study model

Multicollinearity test		Breusch and Pagan Lagrangian multiplier test	Wooldridge test
Variable	VIF		
BC	2.07		
BS	2.02		
LR	1.38	chibar2(01) = 131.71	$F_{(1, 25)}$ = 20.886
EG	2.37	Prob>chi2 = 0.000***	Prob>F = 0.000***
INF	2.10		
Mean VIF = 1.99			

Note: *** indicates significance at the 1% level.

Based on Table 4, we see that the multicollinearity is assessed as not serious. However, the study model has heteroscedasticity and autocorrelation at 1% significance level. This shows that the results of the study model estimated by REM method are no longer reliable. To overcome this, the author will conduct estimation of study model by GMM method.
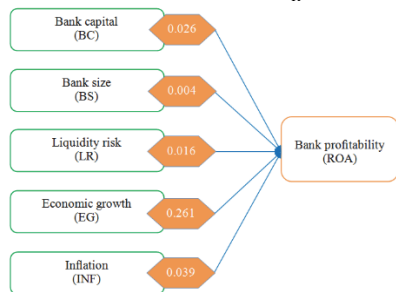
Table 5

Estimation of study model by GMM method

Dependent Variable: Bank profitability (ROA)		
ROA	Coef.	P>|z|
Constant	-0.082***	0.000
BC	0.026*	0.052
BS	0.004***	0.000
LR	0.016**	0.030
EG	0.261***	0.000
INF	0.039*	0.081
Significance level	Wald chi2(4) = 264.63 Prob>chi2 = 0.000***	
Arellano-Bond test for AR(2) in first differences	z = -1.62 Pr>z = 0.106	
Sargan test	chi2(4) = 7.00 Prob>chi2 = 0.136	

Note: *, ** and *** indicate significance at the 10%, 5% and 1% level, respectively.

The estimation results of the study model by GMM method appear to be suitable and meaningful at 1% (Table 5). Thus, the macroeconomic and bank-specific factors have a significant impact on bank profitability (ROA). Specifically, bank profitability (ROA) is positively affected by the bank-specific factors, such as: BC (β = 0.026, at the 10% significance level), BS (β = 0.004, at the 1% significance level), and LR (β = 0.016, at the 5% significance level). And also, bank profitability (ROA) is also positively affected by macroeconomic factors, such as EG (β = 0.261, at 1% significance level) and INF (β = 0.039, at the 1% significance level). Therefore, the estimation results of the study model have the following equation:

$$ROA_{it} = -0.082 + 0.026\,BC_{it} + 0.004\,BS_{it} + 0.016\,LR_{it} + 0.261\,EG_t + 0.039\,INF_t + \varepsilon_{it}$$

Fig. 1. Study model results

Table 6

Test results of study hypotheses

No	Hypothesis	Result
H_1	BC $\Rightarrow$ ROA	Accepted
H_2	BS $\Rightarrow$ ROA	Accepted
H_3	LR $\Rightarrow$ ROA	Accepted
H_4	EG $\Rightarrow$ ROA	Accepted
H_5	INF $\Rightarrow$ ROA	Accepted

- *Impact of bank capital on bank profitability:* The study results show that bank capital (BC) had a positive impact on bank profitability (ROA). These results are consistent with the previous judgment of Demirguc-Kunt and Huizinga (1999), Khrawish et al. (2008), San and Heng (2012), Syafri (2012), Shah and Khan (2017), Abate and Mesfin (2019). This shows that the increase in the equity ratio will help the bank improve its capital adequacy and financial health, which will also help banks improve their financial distress, whereby the bank profitability will be improved. In Vietnam, the capital structure is one of the strictly controlled indicators of the banking industry, which has contributed significantly to improving the profitability and the stable development of the banking industry.

- *Impact of bank size on bank profitability:* The author has found positive impact of bank size (BS) on bank profitability (ROA). Accordingly, the size is one of the important advantages that help banks expand their market share, improve their competitiveness, and especially improve the profitability. The cumulative impact of bank size on bank profitability is also found in Athanasoglou et al. (2008), Nuriyeva (2014), Petria et al. (2015), Djalilov and Piesse (2016).

- *Impact of liquidity risk on bank profitability:* The results have shown that liquidity risk (LR) positively affects bank profitability (ROA). This impact is also consistent with previous study results of Khrawish et al. (2008), Gul et al. (2011), Hoffmann (2011), Syafri (2012), Ibe (2013), Rasul (2013). In Vietnam, the liquidity risk is always well controlled. With this characteristic, the banking industry in Vietnam has increased lending to the manufacturing sector. With that action, the liquidity risk has been well controlled, the amount of capital from the banking industry into the economy has always been improved, and bank profitability has also increased.

- *Impact of economic growth on bank profitability:* The authors have found positive impacts of economic growth (EG) on bank profitability (ROA). This shows that, when the economy is growing well, the banking industry will have many favorable conditions to improve the profitability. This result is also consistent with the previous judgment of Gul et al. (2011), Zeitun (2012).

- *Impact of inflation on bank profitability:* The results have shown that inflation (INF) positively affects bank profitability (ROA). This impact is also found in previous studies by Khrawish et al. (2008), Alper and Anbar (2011), San and Heng (2012). Accordingly, the moderate inflation may play an important role in improving the bank profitability.

5. Conclusion

This article focuses on analyzing the impact of macroeconomic and bank-specific factors on bank profitability in Vietnam, in the period of 2013-2018. Regarding the analytical method, the author uses the GMM method to ensure the estimation results of the study model with high confidence. The results have shown that the bank profitability are positively affected by macroeconomic factors (such as economic growth and inflation) and bank-specific factors (such as bank capital, bank size, and liquidity risk). Therefore, to improve the profitability, the bank managers need to pay attention to both macroeconomic and bank-specific factors. This is an important policy implication for the managers in banks. Not only that, the results of this study are also a reference for researchers in Vietnam as well as other countries in the world.

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