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IMPACT OF BANK CAPITAL ADEQUACY ON BANK PROFITABILITY UNDER BASEL II ACCORD: EVIDENCE FROM VIETNAM

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This paper explores the impact of capital adequacy on bank profitability in the context of Basel II Accord implementation in Vietnam. In this study, bank profitability is measured by return on assets and return on equity. Apart from capital adequacy ratio, we also control various potential determinants of profitability including bank-specified variables (capital adequacy ratio, net interest margin, non-performing loans, non-interest income, ownership and regulatory variable proxied by the bank's application of Basel standards), and macroeconomic indicators (growth rate of gross domestic product, inflation rate). Using panel data regression analysis with a sample of 22 Vietnamese commercial banks for the period 2010-2018, this paper shows that bank capital adequacy, net interest margin, and non-interest income measures are positively correlated with profitability indicators while non-performing loan indicator and state ownership measure negatively effect on bank profitability. This paper also provides a more in-depth analysis of the impact that bank capital adequacy imposes on profitability by dividing the sample into two subsamples of large-sized banks and small-sized banks. We find that bank capital adequacy has a positive impact on return on assets for small-sized banks meanwhile it has no significant impact on profitability for large-sized banks in Vietnam. In another aspect, the paper also finds that the large-sized banks' return on assets, as well as return on equity, are not significantly correlated with the Basel II implementation meanwhile it is statistically meaningful to the small-sized banks' situation. Based on the outcomes found, this study provides several policy implications. Particularly, the regulatory authority should encourage bank capital reinforcement and continuous bank ownership restructuring.

Keywords: Bank Capital Adequacy, Bank Profitability, Vietnamese Banks
JEL Classification: G2, G21, G28, E51

1. INTRODUCTION

Banks play a significant role in channeling funds and financial resources to the economy as it takes a function of financial intermediation. This role is more meaningful

to countries where the banking system plays a dominant role as the stock and bond markets are still at the initial steps of development (Batten and Vo, 2019; Vo and Nguyen, 2018b). Hoffmann (2011) points out that efficient financial system shows continuous improvement in profitability, a gradual increase in the volume of funds flowing from saver to borrower, and better quality services for consumers. A sound and profitable bank is able to face negative shocks and the banking system will contribute to the stability of the financial system, and hence, accelerate the country's economic growth (Demirguc-Kunt and Huizinga, 1999; Elbannan, 2017; Levine, 1997; Vo, 2018a). Preliminary studies by Demirguc-Kunt and Detragiache (1998), Mishkin (1996), Lee and Hsieh (2013), Vo and Nguyen (2018b), Batten and Vo (2019) also point out that profitability is an important indicator predicting the financial distress and bank crisis. Deyoung et al. (2001) show that profitability proxied by earnings is also one of the indicators in the CAMELS rating system for measuring bank safety and soundness from the bank examiner's point of view. Thus, exploring determinants of bank profitability is considered as the way financial system in general, the banking system in particular, ensure their business prudence and sustainability.

Bank capital is significantly considered as the pivotal factor impacting bank profitability and risk (Batten and Vo, 2019; Lee and Hsieh, 2013; Vo and Nguyen, 2018b). The proposition originated by Modigliani and Miller (1958) on capital structure hence is helpful in explaining banking capital structure. The study by Vo (2017b) shows that the banking capital structure decision is an important corporate behavior that draws strong interest from different stakeholders. It is more important in emerging markets due to their unique legal, cultural and institutional characteristics. Mishkin (2000, p.227) also explains the high cost of holding bank capital since bankers tend to hold less bank capital than the required amount.

Vietnam's economy is playing an increasingly important role in the global economy since it gradually integrated into the global economy and proactively joins the global value chain. As a member of the World Trade Organization (WTO) and the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP), Vietnam's economy and its financial system are likely more fragile and sensitive to any global turbulence. Similar to various problems inherent in developing countries, the Vietnamese economy faces many challenges which potentially deteriorates its economic growth and financial system prudence and soundness prospects. These include economic slowdowns, credit booming, the rise of protectionism around the world, and risk from the greater opening of the domestic markets (Nguyen, Ho and Vo, 2018; Vo and Nguyen, 2018a).

In another aspect, Vietnam witnesses a significant achievement in the financial system in the last few decades. Respectively, the Vietnam financial market has been gradually becoming more integrated into the global market whose stock return and volatility are significantly associated with the global leading markets of the US, Hong Kong and Japan (Vo and Ellis, 2018). Similar to other emerging economies, the integration process poses various challenges for the current institutional and legal framework in the financial system (Vo, 2016a). These contemporary issues seem to be

more serious since the Vietnamese banking system plays the pivotal role channeling funds to the economy, meanwhile, the stock market is not significantly considered to be associated with its economy growth (Batten and Vo, 2019; Vo and Nguyen, 2018b; Vo, Nguyen and Pham, 2016). However, Vietnam witnesses a sharply restructured and reformed banking system after experiencing rapid growth in bank capital, bank credit and assets expansion, cross-ownership taken among Vietnamese banks, and rural banks transformed into urban banks (Vo and Nguyen, 2018b). Accordingly, the upshot of such context is seriously considered because of the signal of financial and banking turmoil occurred, such as high inflation rate, interest rate volatilities, nonperforming loans and unfair competition among Vietnamese banks (Batten and Vo, 2019; Vo, 2018a, 2018b, 2018c; Vo and Nguyen, 2018b; Vu et al., 2018). Similar to banks in other emerging countries, Vietnamese banks' profitability and their lending behavior should be seriously focused as the key determinants of banking prudence and soundness. Albulescu (2015) indicates that particularly in emerging countries, after the financial turbulences, easy access to credits generates a considerable amount of nonperforming loans which subsequently affect banks' profitability. This point of view is consistent with previous studies by Batten and Vo (2016, 2019) and Vo (2018a, 2018b) reporting that Vietnamese banks' profitability, scope of banking business and lending behavior are significantly impacted by its bank-specified characteristics, specifically bank capital, risk aversion, and macroeconomic factors. However, among these determinants, similar to other emerging countries, the need for an increased capitalization is also susceptible of negatively influencing the profitability in the short-run (Albulescu, 2015).

In such a context, Vietnamese financial supervisory authorities as well as bank managers pay much concern on how bank capital adequacy helps bank prudence and soundness in terms of its profitability. Vietnamese bank regulators and managers need to be aware of these contemporary issues to improve those towards international standard practices. Recent research by Batten and Vo (2019) also recommends that Vietnamese bank regulators should be aware of improving the regulations towards international standard practices. It is a fact that the Vietnamese banking system has been continuously restructured and fostered from 2011 to date. Accordingly, the consolidation and merger of weak banks[1], road map for bank capital adequacy improvement, regulations and guidelines on banking safety and soundness towards the Basel II standards, are considered as countermeasures fostering the Vietnamese banking system prudence and enhanced competitiveness in the global integration episode. These topical issues are recommended by research scholars (Vo, 2018a; Vo and Nguyen, 2018b). The

[1] There were 9 poorly performing banks forced to be merged, acquired, or restructured accordingly: Habubank merged with Saigon Hanoi Bank (SHB); Tinnghiabank and Ficombank merged with Saigon Commercial Bank (SCB); 3 poorly performing banks namely PG Bank, Trust bank renamed as Construction Commercial Bank (CB) and Ocean Bank were acquired by SBV at zero dong; Westernbank consolidated with PVFC to be newly named PVcombank; self-restructured Tienphong Bank partnered with DOJI; and solely self-restructured Namviet Bank.

restructuring and fostering progress significantly enhances Vietnam's banking system with a more adaptive scheme toward international liberalization.

Regarding Basel II application, Vietnamese banks are slower than those in other countries to follow the guidelines of Basel II, just applying partially in some banks instead of in a whole system (Dang, 2019). According to the State Bank of Vietnam (SBV)'s roadmap, from 2015 to 2018, ten banks begin piloting capital and risk management according to Basel II standards, including Vietcombank, BIDV, VietinBank, Sacombank, MB, Techcombank, ACB, VIB, Maritime Bank (MSB) and VPBank. After this time the pilot is extended to other banks in the system. Up to now, in 2019, seven out of ten pilot banks[2] have been recognized to meet the requirements of Basel II's pillar 1 on bank capital adequacy.

Various previous studies investigate the effect of bank size on profitability (Aladwan, 2015; Redmond et al., 2007). The results of these studies show that the size measured by total assets has a significant effect on profitability ratio. The current Vietnamese banking system comprises a number of large government-controlled banks and a much larger number of smaller privately owned and foreign banks (Batten and Vo, 2019; Vo and Nguyen, 2018b). In terms of asset scale, the top four state-owned banks (BIDV, Agribank, Vietinbank, and Vietcombank), account for 44% of total bank system assets whereas privately owned banks dominate 41%, respectively. Furthermore, in terms of revenue, the above mentioned state-owned banks also dominate the market shares in comparison with privately owned banks of which are small-sized scales.

According to Batten and Vo (2019), most Vietnamese banks are small in comparison with foreign banks whereas small-sized banks seem to grow faster, even at the cost of profitability and riskiness. This is because of that as banks become larger, a lower standard of management quality and other factors could impair bank profitability.

In the empirical literature, much research is focusing on how bank capital adequacy helps improve bank profitability (Athanasoglou, Brissimis and Delis, 2008; Batten and Vo, 2019; Chaudhry, Chatrath and Kamath, 1995; Demirguc-Kunt and Huizinga, 1999; Goddard et al., 2004; Murthy and Rama, 2008). Most studies show that bank capital adequacy plays a significant effect on bank profitability.

Recent researches by Dang (2019), Batten and Vo (2019a), Do and Vu (2019) show that capital adequacy of Vietnamese banks plays an important role in maintaining bank profitability, especially for bank return on assets. A preliminary study by Vu and Nahm (2013) shows that bank specified characteristics of larger size, better management capability and macroeconomics factors as high growth in per capita GDP and a low-inflation rate significantly impact Vietnamese bank profit efficiency. However, such

[2] Accordingly, Vietcombank, as one of the largest state-owned commercial banks, is leading in accomplishment of Basel II application followed by VIBank, ACB, GPBank, MB, Techcombank and MSB respectively. Meanwhile, Vietinbank, BIDV, and Sacombank are currently struggling in capital mobilization in accordance to Circular 41/2016/TT-NHNN issued by State Bank of Vietnam on bank capital adequacy requirements.

research pays few concerns on how bank capital affects profitability across bank size classification, large-sized group versus small-sized group. In this paper, we investigate how bank capital across bank size groups impacts bank profitability in the Vietnamese context. The paper has the following contributions to the literature as the effect of bank capital adequacy on profitability, a comparison between large-sized banks and small sized banks in Vietnam are investigated. We provide several implications towards a safe and sound banking system and efficient bank capitalization.

The rest of the paper is outlined as follows. Section 2 describes the empirical framework in which the dependent variables of bank profitability are measured by controlling variables illustrating bank-specified indicators and macro indicators. Section 3 focuses on the empirical test results and discussions on the effects of bank capital on profitability in the context of Vietnam. The final section, Section 4, is our conclusions.

2. LITERATURE REVIEW

2.1. Research Model

To explore how the bank profitability is impacted by other bank-specific indicators and macro-level determinants, especially by bank capital adequacy, a research model for the Vietnamese banks' profitability is proposed as follows:

$$\begin{aligned} Profitbility_{it} = {} & \alpha_{it} + \beta_1 CAR_{it} + \beta_2 NIM_{it} + \beta_3 NPL_{it} + \beta_4 NOI_{it} \\ & + \beta_5 GDPGROWTH_{it} + \beta_6 INF_{it} + \beta_7 BASEL_{it} \\ & + \beta_8 OWN_{it} + \beta_9 SIZE_{it} + \epsilon_{it}, \end{aligned} \quad (1)$$

where bank profitability of bank *i* at time *t* is proxied by return on assets (ROA) and return on equity (ROE); CAR_{it} denotes bank capital adequacy ratio of bank *i* at time *t*; NIM_{it} stands for net interest margin ratio of bank *i* at time *t*; NOI_{it} represents the ratio of non-interest income to the interest of bank *i* at time *t*; $GDPGROWTH_{it}$ is the annual growth rate of the gross domestic product of year *t*; INF_{it} is the inflation rate at the time *t*; $BASEL_{it}$ is a dummy variable illustrating the Basel II Accord compliance of bank *i* at time *t*, taking the value of 1 if the bank complies with Basel II Accord and 0 otherwise; OWN_{it} stands for the presence of state ownership of bank *i* at time *t* of which OWN_{it} takes the value of 1 if the bank *i* belongings to state-owned banks (State owns more than 50% bank shares) and 0 otherwise; and $SIZE_{it}$ presents for size of the bank *i* in term of total assets scale at time *t*.

2.2. Data Collection and Analysis

This study is based on the secondary data from a sample of 22 Vietnamese commercial banks. Bank audited financial reports are extracted from Stockplus Joint

Stock Company covering the period of 2014 to 2018. The study also employs the econometrics analysis using static panel data that combine a package of time-series and cross-sessional data. In the framework of panel data analysis, banks are considered heterogeneous, while in time series and cross-sessional analyses it is not the case and this issue can result in biases. Moreover, using panel data model provides both higher variations in data sets and less multicollinearity among the variables. Therefore, this panel data model is recognized as a suitable model for finding the research objectives.

Similar to various studies using panel data (Batten and Vo, 2019a, 2019b; Dang et al., 2019a, 2019b; Vo, 2019a, 2019b, 2019c, 2019d), the Fixed Effects Model (FEM) and Random Effects Model (REM) are used to estimate the regression equation. Hausman test is used to find out the appropriate either FEM or REM models (Hausman (1978)). The Hausman test result shows that the FEM is more appropriate instead of the REM model. However, we find the problems of heteroskedasticity and autocorrelation from the FEM model. Hence, Generalized Method of Moments Model (GMM) (Arellano and Bond, 1991) is used significantly at the level of 5%. Hansen test and Arellano-Bond test (Arellano and Bond, 1990) are applied to test the reliability of GMM model results.

3. DATA AND METHODOLOGY

3.1. Descriptive Statistics

Descriptive statistics show that the average return on equity is at 9.5%, in which the greatest return on equity is at 29.20% and the lowest one is at -56.32%. The average ROA is at 0.8% meanwhile the highest one is at 5.5% and the lowest one is at -5.9%. The CAR mean value is at 11%, in which the highest one is at 40% and the lowest stays at nearly 8%.

Table 1. Summary of Data Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
ROE	198	0.0964	0.0866	-0.5633	0.2920
ROA	198	0.0083	0.0086	-0.0599	0.0557
CAR	181	0.1380	0.0471	0.0798	0.4015
NIM	198	0.0322	0.0138	-0.0089	0.0880
NPL	198	0.0212	0.0158	0.0002	0.1140
NOI	198	0.2452	0.2877	-1.0885	2.2753
GDPGROWTH	198	6.2327	0.5762	5.2474	7.0758
INF	198	6.5684	4.9967	0.8786	18.6755
SIZE	198	32.4691	1.1884	30.1629	34.8111

Accordingly, by selecting 50% quantile of bank assets with the asset median size of

1.40e+14, the group of small-sized banks versus large-sized banks are classified (the small-sized banks have sizes equal or smaller the median size of all commercial banks, vice-versus for the large-sized banks).

3.2. Regression Results

3.2.1 Empirical Test Results for the Whole Sample

Table 2. Regression Results - The Dependent Variable is ROA

ROA	(1) FEM	(2) REM	(3) GMM
L.ROA			0.1370***
			(0.0434)
CAR	0.0026	0.0048	0.0177**
	(0.0060)	(0.0057)	(0.0086)
NIM	0.4090***	0.3990***	0.2680***
	(0.0427)	(0.0363)	(0.0584)
NOI	0.0128***	0.0113***	0.0079***
	(0.0019)	(0.0016)	(0.0029)
NPL	-0.1010***	-0.1020***	-0.0757**
	(0.0289)	(0.0270)	(0.0343)
SIZE	0.0011	0.0003	5.9e-05
	(0.0011)	(0.0005)	(0.0007)
BASEL	-0.0011	-0.0007	0.0008
	(0.0014)	(0.0013)	(0.0011)
GDP	0.0005	0.0008	0.0007
	(0.0007)	(0.0007)	(0.0004)
INF	0.0004***	0.0004***	0.0002***
	(8.5e-05)	(7.6e-05)	(8.3e-05)
OWN		-0.0016	-0.0052*
		(0.0012)	(0.0027)
Constant	-0.0472	-0.0211	-0.0093
	(0.0362)	(0.0163)	(0.0212)
Observations	181	181	163
R-squared	0.5590		
Hausman test		0.0000	
AR(2)			0.4130
Hansen test			0.9000

Note: Standard errors in parentheses.

*** p < 0.01, ** p < 0.05, * p < 0.1.

Table 2 reports the results in which bank profitability proxied by return on assets is impacted by controlling variables including bank specified indicators and macro indicators. Table 2 shows that the capital adequacy ratio is positively correlated with

bank profitability indicators as the estimated coefficients are positive and p-value is statistically significant at 5%. In other words, bank capital adequacy has a significantly positive impact on bank profitability. This can be explained that banks with more financial capabilities are more confident in taking part in profitable banking businesses because these resources allow them to countermeasure unexpected losses (Athanasoglou, Brissimis and Delis, 2008).

Accordingly, the estimated coefficients of net interest margin, non-interest income, and Basel II application variables are significantly positive in regressions in which return on assets is the dependent variable. This result is considered whereas the Basel II application pace, the high intermediation spread, and off-balance sheet activities plays a significant part in Vietnamese bank performance. Thereon, countermeasures are taken by authorities that require bank capital adequacy, assets holding restrictions, and information transparency to Vietnamese commercial banks helps banks improve their banking operation system, thus, improve their business performance proxied by return on assets.

Table 3. Regression Results - The Dependent Variable is ROE

	(1)	(2)	(3)
ROE	FEM	REM	GMM
L.ROE			0.1440***
			(0.0232)
CAR	-0.0068	0.0039	0.1760**
	(0.0589)	(0.0567)	(0.0691)
NIM	3.2560***	3.2110***	3.6390***
	(0.4200)	(0.3800)	(0.8390)
NOI	0.0803***	0.0738***	0.1080***
	(0.0186)	(0.0169)	(0.0261)
NPL	-0.5960**	-0.6520**	-2.7770**
	(0.2850)	(0.2720)	(1.1400)
SIZE	0.0306***	0.0275***	0.0198***
	(0.0112)	(0.0060)	(0.0068)
BASEL	-0.0313**	-0.0257*	-0.0179
	(0.0142)	(0.0135)	(0.0168)
GDP	0.0227***	0.0232***	-0.0014
	(0.0072)	(0.0066)	(0.0078)
INF	0.0044***	0.0044***	0.0015**
	(0.0008)	(0.0007)	(0.0007)
OWN		-0.0285*	-0.1420***
		(0.0154)	(0.0262)
Constant	-1.1690***	-1.0590***	-0.6050***
	(0.3560)	(0.1960)	(0.1930)
Observations	181	181	163
R-squared	0.4960		
Hausman test		0.0000	
AR(2)			0.8810
Hansen test			0.4020

Note: Standard errors in parentheses.

*** p < 0.01, ** p < 0.05, * p < 0.1

However, it is interesting to find that the inflation rate coefficient from the regression result is significantly positive in which return on assets is the dependent variable in the whole 22 bank sample. It means that in a high inflation environment, banks keep their goals of net interest margin by setting up the intermediate spread in favor of their business objectives instead of bearing some inflationary costs for their clients, depositors, and borrowers. The study also finds that the non-performing loan ratio and ownership indicators are negatively correlated with return on assets. Higher non-performing loans push bank reserves more resources as loan loss provisions, thus makes the bank cost increases and induces the lower return on assets.

In regard to ownership impact, we find that bank ownership has a significant and negative impact on return on assets. This finding is consistent with the result reported in previous studies (Lin and Zhang, 2009) from China, a country that has similar economic institutional structure and banking operation scheme to that of Vietnam.

With regard to the impact of bank capital adequacy on return on equity, the regression results shown in Table 3 report that the dependent variable of return on equity is significantly correlated with bank capital adequacy under the GMM test result. The estimated coefficient is positive and the p-value is statistically significant at 10%. Accordingly, net interest margin, non-interest income, bank size, Basel II application, and inflation also have positive impacts on bank return on equity, meanwhile non-performing loans as well bank ownership characteristics have negative impacts on return on equity.

3.2.2. Regression Results for Small-Sized Banks Versus Large-Sized Banks

After testing the impact of bank capital adequacy on bank profitability for sampling Vietnamese commercial banks, this study further examines the link using subsample analysis by categorizing the sample into two groups of small-sized banks versus large-sized banks.

The empirical test results show that, in terms of the bank size perspective, large-size scale versus small size scale, capital adequacy has a significantly different impact on both return on assets and return on equity. Table 4 shows that the bank capital adequacy ratio has no significant relation with return on assets for the case of large-sized banks but it works significantly at 10% in the position of small-sized banks. It can be explained by the banking structure of Vietnam where large-sized banks mostly belonging to state-owned banks dominating the bank markets. Moreover, such state-owned banks are more protected by and have more advantages and preferences from the government in comparison with private-owned banks, mainly small-sized ones. As a result, state-owned banks have favorable conditions to achieve earnings as such banks more easily handle the liquidity problems by accessing the funds either from money markets or from refinancing and discounts from State Bank of Vietnam to fill the liquidity shortage in comparison with small-sized and private-owned banks. As the result, the large-sized and state-owned Vietnamese banks are indifferent in continuous efforts to search for adequate bank capital itinerary and that helps explain the bank capital adequacy so far

does not show statistical significance to bank return on assets. This finding is consistent with several previous studies that bank capital impact significantly on small-sized banks' profitability (Berger and Bouwman, 2013; Do and Vu, 2019). This finding also strongly suggests that the bank capital enhancement following Basel II standards is necessary for Vietnamese small-sized banks.

Table 4. Regression Results for Large-Sized Banks versus Small-Sized Banks
The Dependent Variable is ROA

ROA	Large-sized Banks			Small-sized Banks		
	FEM	REM	GMM	FEM	REM	GMM
L.ROA			0.4510***			0.0763
			(0.1080)			(0.0610)
CAR	-0.0131	-0.0076	0.0046	-0.0028	-7.9e-05	0.0153**
	(0.0122)	(0.0115)	(0.0145)	(0.0086)	(0.0078)	(0.0075)
NIM	0.3210***	0.3070***	0.2170***	0.5870***	0.5260***	0.3360***
	(0.0574)	(0.0443)	(0.0440)	(0.0823)	(0.0666)	(0.0784)
NOI	0.0076***	0.0070***	0.0073**	0.0206***	0.0142***	0.0077**
	(0.0025)	(0.0023)	(0.0031)	(0.0033)	(0.0024)	(0.0039)
NPL	-0.0861*	-0.0906**	-0.1190*	-0.0871*	-0.1310***	-0.0720
	(0.0474)	(0.0415)	(0.0648)	(0.0467)	(0.0398)	(0.0718)
SIZE	-0.0011	-0.0004	-0.0023	0.0028	0.0013	0.0018
	(0.0017)	(0.0015)	(0.0028)	(0.0019)	(0.0011)	(0.0014)
BASEL	0.0019	0.0018	0.0020	-0.0101**	-0.0078**	-0.0118**
	(0.0013)	(0.0013)	(0.0017)	(0.0042)	(0.0036)	(0.0046)
GDP	0.0010	0.0009	0.0018	0.0009	0.0006	0.0004
	(0.0009)	(0.0008)	(0.0011)	(0.0012)	(0.0011)	(0.0009)
INF	0.0003***	0.0003***	0.0001	0.0003**	0.0003**	0.0003***
	(9.6e-05)	(9.2e-05)	(0.0001)	(0.0001)	(0.0001)	(9.4e-05)
OWN		-0.0016	0.0007		-0.0009	-0.0039*
		(0.0024)	(0.0047)		(0.0017)	(0.0023)
Constant	0.0283	0.0052	0.0637	-0.1080*	-0.0549	-0.0668
	(0.0557)	(0.0478)	(0.0866)	(0.0602)	(0.0355)	(0.0423)
Observations	88	88	82	92	92	80
R-squared	0.5780			0.6090		
Hausman test		0.0000			0.0000	
AR(2)			0.8510			0.2200
Hasen test			0.6900			0.1030

Note: Standard errors in parentheses.
*** p < 0.01, ** p < 0.05, * p < 0.1.

Accordingly, the estimated coefficients of net interest margin, inflation, and non-interest income indicate that the impact of these factors is positively correlated with bank return on assets for both situations of large-sized banks and small-sized banks. This finding is in line with the results found from the initially tested findings for the whole Vietnamese sampling commercial banks. The regression results also show that Basel II

application is effective to the small-sized banks' profitability proxied by return on assets meanwhile the relevance between Basel II application and banks profitability is not found for the case of Vietnamese large-sized banks. This can be explained as the Basel II application are challenges to Vietnamese small-sized banks while they need more financial resources to implement such standards and capital requirements. Therefore, given the current state of core banking businesses, the small-sized banks spend many resources, efforts and costs to mobilize funds to meet Basel II requirements.

Table 5. Regression Results for Large-sized Banks versus Small-sized Banks
The Dependent Variable is ROE

VARIABLES	Large-sized Banks			Small-sized Banks		
	FEM	REM	GMM	FEM	REM	GMM
CAR	-0.1770	-0.0530	-0.0320	0.0286	0.0127	-0.1090*
	(0.1620)	(0.1570)	(0.1560)	(0.0713)	(0.0658)	(0.0647)
NIM	2.4840***	2.9640***	2.5350***	3.9710***	3.7740***	1.6290
	(0.7620)	(0.5430)	(0.4970)	(0.6780)	(0.5910)	(1.1950)
NOI	0.0652*	0.0420	0.0659***	0.1010***	0.0844***	0.0595**
	(0.0329)	(0.0308)	(0.0247)	(0.0268)	(0.0213)	(0.0248)
NPL	-1.4760**	-1.2840**	-0.5290	-0.5990	-0.7340**	-0.5920
	(0.6300)	(0.5460)	(0.3580)	(0.3850)	(0.3390)	(0.5480)
SIZE	0.0003	0.0261	-0.0055***	0.0495***	0.0433***	-0.0008
	(0.0226)	(0.0197)	(0.0020)	(0.0160)	(0.0105)	(0.0012)
BASEL	0.0083	0.0022	0.0168	-0.0929***	-0.0871***	-0.0460**
	(0.0180)	(0.0179)	(0.0136)	(0.0342)	(0.0309)	(0.0209)
GDP	0.0210*	0.0200*	0.0258***	0.0204**	0.0191**	0.0069
	(0.0115)	(0.0114)	(0.0087)	(0.0098)	(0.0091)	(0.0057)
INF	0.0061***	0.0063***	0.0048***	0.0024**	0.0028***	0.0039***
	(0.0013)	(0.0013)	(0.0012)	(0.0012)	(0.0010)	(0.0009)
OWN		-0.0346	0.0063		-0.0145	-0.0347**
		(0.0282)	(0.0109)		(0.0183)	(0.0146)
L.ROE			0.2150			0.0352
			(0.1640)			(0.0952)
Constant	-0.1010	-0.9710		-1.7670***	-1.5410***	
	(0.7400)	(0.6280)		(0.4960)	(0.3360)	
Observations	88	88	82	92	92	80
R-squared	0.5380			0.5160		
Hausman test		0.0000			0.0000	
AR(2)			0.4830			0.3170
Hansen test			0.4030			0.3890

Note: Standard errors in parentheses.

*** p < 0.01, ** p < 0.05, * p < 0.1.

Our finding also states that the state ownership measure is significantly and negatively related to the return on assets for the case of small-sized banks but it is not applied for the case of large-sized bank situations. Thereon, the return on assets of small-sized and private-owned banks is more articulated with bank ownership in comparison with large-sized state-owned banks.

Table 5 provides results of bank return on equity affected by the independent variables, especially by the bank capital adequacy. On this basis, the same as the above results found from return on assets' determinants and return on equity is realized not to be significantly influenced by bank capital adequacy in the position of large-sized banks meanwhile it exists in the situation of small-sized banks. The large-sized banks' return on equity is positively associated with net interest margin, non-interest income, economic growth rate, and inflation, respectively. This can be interpreted that bank diversification seems meaningful to banking profitability. However, another approach relating to banking diversification, the study by Vo (2017a) shows that investors in the Vietnamese stock market preference for banks focusing on traditional activities as it conducts the empirical test on the relation between Vietnamese stock market valuation and bank diversification.

Moreover, it also finds that small-sized banks' return on equity is positively correlated with the net interest margin and inflation. Regarding the net interest margin impact, three key components of bank operation cost, competitiveness, and loan quality respectively are recognized as the main attributes of bank intermediate spreads that impact on bank profitability (Barajas et al., 1999). Base on this basis, the Vietnamese small-sized bank net interest margin is evidenced to be articulated with bank operation cost (Batten and Vo, 2019). In such a context, the result found from this study implies that Vietnamese bank profits come from higher cost, hence, this can cause Vietnamese banks to suffer income instability and low productivity.

With respect to inflation impact on Vietnamese bank profitability, proxied by both return on assets and return on equity, the results shown in Table 4 and Table 5 indicate that inflation is significantly and positively correlated with Vietnamese bank profitability in terms of both return on assets and return on equity. This implies that Vietnamese banks focally aim at business anchors of profitability instead of considering how they bear the cost for clients, said depositors and borrowers as they pass their cost on to their clients. Based thereon, Vietnamese banks should pay much attention on how to adjust interest rates and to manage operation costs efficiently and productively.

The evidence is found from the empirical test that small-sized banks return on equity are significantly affected by the characteristics of ownership and Basel application meanwhile large-sized banks are not. It can be explained that large-sized banks enjoy advantage of experiencing loan diversification and comprehensive banking products in comparison with small-sized banks (Dietrich and Wanzenried, 2011).

Moreover, it finds that the return on equity of small-sized banks of which are state owned banks is lower in comparison with small-sized of which are non-state-owned banks.

4. CONCLUSIONS

The aim of this paper is to explore the impact of bank capital adequacy on profitability proxied by return on assets and returns on equity in the context of Vietnamese banks under Basel II. We also conduct sub-sample analysis by partitioning the sample into two sub-samples of large-sized banks and small-sized banks. By using panel data regression with the sample of 22 Vietnamese commercial banks for the period 2010-2018, the findings show that bank capital adequacy, net interest margin, and non-interest income are positively correlated with profitability while non-performing loans and state-ownership measure negatively impact on bank profitability. This recommendation is associated with the implication shown by Albulescu (2015) to banks in emerging countries.

Using a sub-sample analysis, we find that bank capital adequacy has a positive impact on return on assets for small-sized banks. However, we cannot establish the link in the subsample of large-sized banks in Vietnam. In such the context of Vietnamese banks under Basel II implementation, return on assets and return on equity of large-sized banks are not significantly correlated with the Basel guideline compliance meanwhile it works for the small-sized banks' circumstances. In other words, Vietnamese small-sized banks can take countermeasures of capitalization to accelerate their profitability. There is a suggestion that banks should count on foreign ownership more from the government since the study by Vo (2016b) evidences that foreign investors help to reduce the corporate risk-taking activities and foreign investors in Vietnam's stock market focus on long-run perspectives rather than short term gain. However, Vietnamese banks should be careful with their diversification strategy since the study by Vo (2017a) shows that investors in the Vietnamese stock market preferences of banks which deploy traditional businesses.

Overall, it is recommended to Vietnamese banks that the capital required to meet in accordance with international practices enhancing banks' profitability should be reconsidered and targeted. Moreover, since the net interest margin and inflation are found to be positively correlated with Vietnamese banks profitability, it suggests that banks should change their long time vision and strategy by sharing and providing benefits to their clients, depositors, and borrowers, as the first priority rather than aiming at bank-own interests only.

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