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Income Diversification and Financial Performance: The Mediating Effect of Banks' Size, Ownership Structure, and the Financial Crisis in Vietnam

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Abstract:
Research aims: This study focuses on the correlation between income diversification and financial performance, taking into account banks' size, type of ownership, and the financial crisis.
Design/Methodology/Approach: This study uses financial data of 29 commercial banks in Vietnam during the period from 2005 to 2018. This research employs a Generalized Method of Moments (GMM) regression.
Research findings: The results do not find statistical evidence of a direct effect of banks' income diversification on their financial performance. However, when considering the classification factors, such as the bank's size and ownership type, the findings show that big banks and state-owned banks could take advantage of diversification strategies to boost their profitability. Moreover, the study has proven that income diversification generates a significant positive effect on banks' financial performance during the crisis time.
Theoretical contribution/Originality: This study provides a theoretical evidence on the direct effect of income diversification on a bank's financial performance concerning banks' size, ownership type, and the financial crisis.
Practitioner/Policy implication: Further, this research also offers the bank's managers, policymakers, and investors an insight of good banks' financial performance in the context of an unstable economy.
Research limitation/Implication: The limitations still exist in this research, such as (1) the number of banks participating in the research sample was a predictable limitation; (2) this research mainly focused on financial variables but ignored the variables representing the managers' behavior and the banks' organizational structure; (3) the future studies can focus on these aspects to explore further the hidden picture of diversification strategy and banking performance.
Keywords: Income Diversification; Financial Performance; Ownership Structure; Financial Crisis; Commercial Banks; Vietnam.

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Introduction

Commercial banks are considered financial intermediaries to mobilize the excess capital and provide credits to those in need. Therefore, in order to perform these functions properly, commercial banks need to stabilize their present and future financial growth.

Due to the commercial banks' characteristics, their profits usually arrive from two main sources: net interest income and non-interest income. While the former is the main source of income and expected to be significantly affected by the State Bank of Vietnam's (SBV) monetary policy administration, such as interest rates and monetary policy (Nguyen & Phan, 2018a), the latter is considered an income diversification strategy by focusing on non-traditional business activities.

These strategies have recently gained more commercial banks' interests since they promote foreign exchange trading, securities trading, and services. Moreover, in the context of an uncertain and volatile economy, banks' main activities, such as lending, face significant challenges. Figure 1 shows that there was a great interest's fluctuation during the period from 2005 to 2018. Especially from 2011 to 2016, Vietnam's interest rates tended to decline significantly from 18.09% in August 2011 to 6.25% in December 2018, and the downtrend still continued. This situation encourages commercial banks to consider further promotions on non-traditional business activities to increase their financial efficiency and offset the fluctuations in net interest income affected by interest rates. Therefore, income diversification is a critical choice in the context of the downward interest rate as the current period.

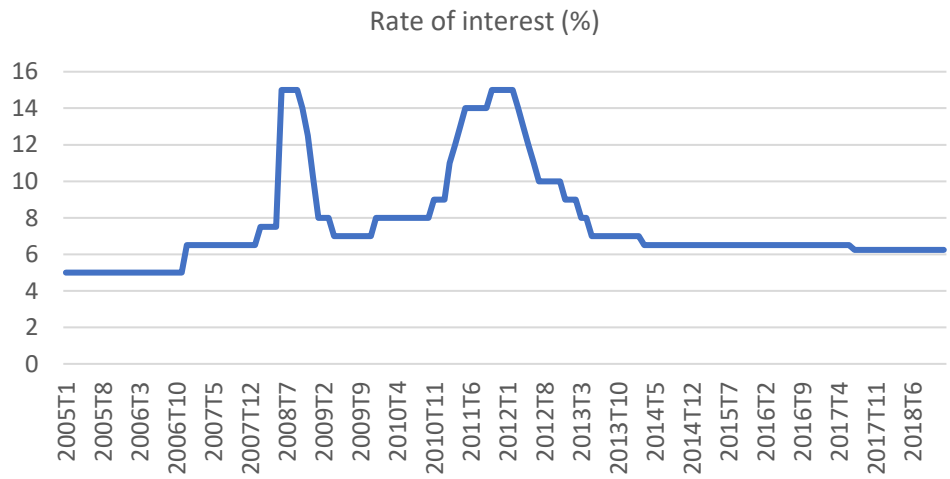

Figure 1 Interest rate movements in Vietnam from 2005 to 2018
Source: IMF, 2019

However, the theoretical and empirical studies on the role of income diversification in banks' financial performance have not come to a truly clear/unified conclusion. On the one hand, some previous studies, such as Baele, De Jonghe, and Vander Vennet (2007), Chiorazzo, Milani, and Salvini (2008), Elsas, Hackethal, and Holzhäuser (2010), Sanya and Wolfe (2010), suggested that income diversification, which was represented by the ratio of non-interest income, could boost banks' profits. On the other hand, the studies of Stiroh and Rumble (2006) and Mercieca, Schaeck, and Wolfe (2007) found the opposite evidence that income diversification reduced banks' financial performance. This variance is still not clarified in prior studies. Moreover, previous studies in Vietnam have ignored the moderating role of size and type of ownership, as well as macroeconomic conditions,

when investigating this relation. The studies of Kristo (2013) and Phan and Daly (2020) stated that big banks could have a scale advantage to foster activities that could increase their profits, while their size could secure them against market risks. This advantage can produce an increase in commercial banks' financial performance through business diversification strategies. Besides, state-owned banks can gain various benefits from state relations in market access, financial resources, and other preferential supports, as the conclusions of Nguyen, Moslehpour, Vo, and Wong (2020) and Nguyen, Vo, Phung, and Le (2019).

Regardless of the above potential benefits, non-traditional business strategies have not been comprehensively explored, especially in the context of transitional markets, such as Vietnam. Firstly, although banks take part as the financial pillar of the whole economy, the financial crisis and global economic recession have brought many difficulties for the banking system, including non-performing loans, losses, and bankruptcy. According to the SBV's report in 2019, the decline of traditional business was followed by the noteworthy reduction of banks' financial performance based on two accounting ratios: return on total assets (ROA) and return on equity (ROE). For example, in 2012, ROE was 4.7%, which was 3.57 times less than the highest value, 16.8% in 2008; ROA was 0.4%, 4.35 times less than the value of 1.74% in 2008. This study notes that the period of 2006 – 2007 and 2008 – 2009 is identified the financial crisis. The report's figures demonstrate that macroeconomic conditions create remarkable effects on commercial banks' main activities, which forces them to take non-traditional business activities into considerations.

Previous studies remain the lack of empirical evidence on the role of income diversification, which comprises the identification of the correlation between banks' income diversification and financial performance based on different measures, and a credible empirical model taking into account bank's size, type of ownership, and financial crisis. This study, thus, directly solves this research gap and examines its importance to the financial system in Vietnam. The research findings are expected to contribute to diversification theory and banks' risk management strategies in emerging markets.

The study is structured as follows: Part 1 focuses on the research's essential role, while part 2 presents a literature review. Part 3 develops empirical models, methods, measurements, and data collection. Part 4 discusses principal results, and finally, part 5 summaries and offers some recommendations.

Literature Review and Hypotheses Development

Diversification theory is about diversifying investments, which is a form of risk management strategy. By combining multiple asset classifications to reduce the overall portfolio risk, banks also concentrate on income diversification strategies to eliminate asymmetric information, thereby lessening financial intermediation costs and achieving a higher financial efficiency level (Hamdi, Hakimi, & Zaghdoudi, 2017). However, these strategies also contain more risks leading to higher chances of failure. Therefore, the

empirical evidence on the role of income diversification strategies in banks' financial performance remains mixed. The supporting views state that income diversification strategy measured by the non-interest income ratio certainly promotes bank's financial performance (Baele et al., 2007; Chiorazzo et al., 2008; Elsas et al., 2010; Sanya & Wolfe, 2010). Froot and Stein (1998) argued that diversification was a bank's "shield" of insolvency risk, diminished financial distresses caused by focusing on undiversified business activities. Furthermore, diversification is a mechanism to promote profitability and efficiency, especially when the scale and scope of operations increase (Landskroner, Ruthenberg, & Zaken, 2005). Operation diversification reinforces banks' supervision, so it is possible to eliminate information asymmetry by using critical information from the lending relationships to boost the provision of other financial services, such as securities underwriting or insurance, and vice versa (Baele et al., 2007). Besides, business diversification promotes non-interest income, which in turn can reduce return's cyclical variation in an unstable economy (Sanya & Wolfe, 2010). Also, diversification creates competitive pressure among banks in many different market segments, encouraging them to increase innovation and efficiency in service delivery, cost management, and operational efficiency (Landskroner et al., 2005).

By contrast, other studies have found the negative effect of income diversification on banks' financial performance (Stiroh & Rumble, 2006; Mercieca et al., 2007). There are many reasons that income diversification reduces a bank's financial performance; for example, the potential costs associated with diversification possibly outweigh the benefits; managers are forced to operate beyond their expertise, reducing the bank's comparative advantage (Klein & Saidenberg, 1998). Elsas et al. (2010) pointed out that there existed agency problems related to diversification activities, ineffective resource allocations, information asymmetry caused by the conflicts between headquarter managers and those in branches/transaction offices, and managers' own reckless behaviors in seeking profitability due to shareholders' pressures. The agency problem can arise when managers pursue profit diversification by engaging in activities with a higher risk level than shareholders' acceptance (Goddard, McKillop, & Wilson, 2008). Additionally, Saghi-Zedek (2016) argued that the presence of some dominant shareholder groups generated an impact on a bank's diversification. They found that banks without dominant shareholders or with only a family shareholder and/or a state shareholder operating diversification would lead to financial disadvantages. Due to the prioritized goal of controlling and maintaining stability, public sector banks with higher state ownership levels are less likely to pursue non-interest income (Časni, Badurina, & Sertić, 2014).

Nevertheless, some scholars have focused on analyzing why there is an inconsistency in the relationship between these two factors. In particular, several studies have found the difference between large and small banks in the ability to implement income diversification strategies to improve their financial performance (Mercieca et al., 2007; Kristo, 2013; Phan & Daly, 2020). They argued that large-scale banks had more well-equipped technical infrastructure, higher professional expertise, and higher scale advantages, which could support their financial performance improvement through income diversification without hesitation of costs or risks. For example, using the sample of banks in Italy, Chiorazzo et al. (2008) found a strong relationship between big banks'

diversification and their financial performance. Similarly, Goddard et al. (2008) found out that similar diversification strategies created different effectiveness for small and large financial institutions in the U.S. The authors recommended that small credit institutions should limit business diversification through non-interest income due to the lack of required expertise and the adequate market share to launch business diversification. These findings have proven that the bank's size can explain the difference in the empirical results of the effect of non-interest income on financial performance. Based on these arguments, the first hypothesis was developed as follows:

***H_1**: Bigger banks gain better financial performance through income diversification.*

Another issue is a type of ownership, as Saghi-Zedek (2016) claimed that the presence of dominant shareholders impacted bank's diversification activities. They found that diversification led to banks' financial disadvantages without dominant shareholders or only with a family shareholder or state shareholder. Pennathur, Subrahmanyam, and Vishwasrao (2012) uncovered that banks' type of ownership produced a specific effect on their non-interest income in India. They argued that public banks were less likely to pursue non-interest income, subsequently notably lower risks than private banks. From a legal perspective, it appears that diversification benefits public banks rather than private banks in India, arguing that state-owned banks operate more efficiently than other banks because they are easily linked to the government's sponsored programs, such as public services and preferential supports. Therefore, these banks will have more opportunities to generate more non-interest income from service fees than other private banks. Consequently, it will drive the rate of income diversification and significantly impact the state-owned banks' performance. Based on this argument, the second hypothesis was set:

***H_2**: State-owned banks gain better financial performance through income diversification.*

Moreover, it is believed that financial institutions' diversification benefits the financial system's stability. According to Nguyen and Phan (2018b), banks consent to increased risks under the loose monetary policy, thus exacerbating the banking system's vulnerability and increasing non-performing loans in the future, especially during the period of the financial crisis. Similarly, Elsas et al. (2010) argued that business diversification was one of the banks' strategies to deal with uncertainty and improve future performance. The authors used data from nine countries (Australia, Canada, France, Germany, Italy, the United Kingdom, the United States, Spain, and Switzerland) from 1996 to 2008 to examine the impact of revenue diversification on banks' value and proved that revenue diversification could improve bank's profits, even during the 2007-2008 financial crisis. Following this argument, the study sets the third hypothesis:

***H_3**: Banks gain better financial performance through income diversification during the period of the financial crisis.*

Research Method

This study used annual data from 29 commercial banks' financial statements in Vietnam during the period between 2005 and 2018 aggregated by stoxplus.com. We noted that due to limited data access, extracted data was unbalanced panel data. However, this issue would not influence the results if an appropriate method was employed. Thus, this study developed a quantitative model of a bank's financial performance, including the determinants of banks' profitability that could be affected by three inconsistent problems: continuously increased profits, unobserved/ignored variables, and statistical estimation bias. To ensure consistency, this study proposed the following dynamic model:

$$Perform_{it} = \alpha_0 + \alpha_1 Perform_{it-1} + \alpha_2 Size_{it} + \alpha_3 Creditrisk_{it} + \alpha_4 Equity_{it} + \alpha_5 Liquid_{it} + \alpha_6 Cost_{it} + \alpha_7 Growth_{it} + \alpha_8 Div_{it} + \beta Macro_t + \varepsilon_{it} \quad (1)$$

where $Perform_{it}$ is a bank's financial performance, represented by two ratios: ROA (return on total assets) and ROE (return on equity). $Size_{it}$ is a bank's size calculated by the natural logarithm of total assets. $Creditrisk_{it}$ reflects a bank's credit risk, computed by the ratio of credit risk provision costs to the outstanding balance. In Vietnam, a non-performing loan is classified as debt group 3, 4 and 5, according to Circular no. 08/2017/TT-NHNN dated August 1st, 2017, issued by SBV. $Equity_{it}$ indicates a bank's capitalization, measured by the ratio of total equity to total assets. $Liquid_{it}$ signals the bank's liquidity, calculated by the ratio of liquid assets to total assets; the greater value of this ratio indicates the bank's lower liquidity risk. $Cost_{it}$ represents a bank's cost efficiency, computed by the ratio of operating costs to total assets. $Growth_{it}$ implies a bank's scale progress, measured by the growth of the bank's total assets. Div_{it} reflects a bank's income diversification, denoted by the ratio of non-interest income to total operating income. Lastly, $Macro_t$ is a set of macroeconomic factors in Vietnam, including economic growth, interest, and inflation.

Besides, to investigate the variation of income diversification's effects on banks' profits regarding banks' size and ownership type, the study added the interactive variables between dummy variables of size, type of ownership and financial crisis, and income diversification. The (1) equation is adjusted as follows:

$$Perform_{it} = \alpha_0 + \alpha_1 * Perform_{it-1} + \alpha_2 * Size_{it} + \alpha_3 * Creditrisk_{it} + \alpha_4 * Equity_{it} + \alpha_5 * Liquid_{it} + \alpha_6 * Cost_{it} + \alpha_7 * Growth_{it} + \alpha_8 * Dummy_{it} + \alpha_9 * Div_{it} * Dummy_{it} + \beta * Macro_t + \varepsilon_{it} \quad (2)$$

where $Dummy_{it}$ is the dummy variables of size, type of ownership, and the financial crisis: $Dummy_{it}^{size}$ representing a bank's size is set as 1 if the bank *i*'s total assets at time *t* is greater than the sample's average assets, and 0 if otherwise. $Dummy_{it}^{own}$ reflecting a bank's ownership type is set as 1 if it is a state-owned bank at time *t*, and 0 if otherwise. $Dummy_{it}^{crisis}$ indicating the financial crisis is coded as 1 if the time *t* is classified as the period of the financial crisis, and 0 if otherwise.

Using dummy variables enables categorizing banks into different groups of size, type of ownership, and economic periods, thereby clarifying the income diversification's effects on commercial banks' financial performance, according to the suggestion of Chen and King (2004) . Equation (2) exhibits that the total effects of diversification on banks' profit are dependent on the dummy variable $Dummy_{it}$:

$$\frac{dPerform_{it}}{d\,Dummy_{it}} = \alpha_8 + \alpha_9 * Div_{it}$$

Regression methods, such as the fixed effect model (FEM) and random effect model (REM), cannot fully address endogenous problems, thus causing estimation biases when they are applied to dynamic models (1) and (2). Thereby, this study employed the two-steps System Generalized Method of Moments or 2-step S-GMM to solve the inconsistency, autocorrelations, and endogenous problems, similar to most previous studies on banks' risks (Sharma & Anand, 2018; Nguyen & Phan, 2018a; Nguyen & Phan, 2018b; Moudud-Ul-Huq, Zheng, Gupta, Hossain, & Biswas, 2020).

Result and Discussion

Data and Descriptive Statistics

This part provides general statistics of variables, such as means, standard deviations, medians, minimum and maximum values. These results are shown in Table 1.

Table 1 Descriptive statistics

Variables	Means	Std. Dev.	Min	Max	Observations
ROA	0.008638	0.006792	-0.01341	0.059519	329
ROE	0.093712	0.06533	-0.12884	0.305671	329
Size	31.94385	1.276059	28.41987	34.81112	329
Creditrisk	0.005664	0.005109	-0.00485	0.034808	329
Equity	0.087842	0.057037	0.02388	0.442778	329
Liquid	0.381481	0.125273	0.07942	0.815974	329
Cost	0.015978	0.005083	0.003821	0.032893	329
Div	0.218646	0.158829	0.00341	0.989652	329
Growth	0.213953	0.232795	-0.53856	1.4897	329

Source: Stocxplus.com

It is revealed that the means of banks' financial performance (ROA and ROE) were -0.0086 and 0.0937, respectively, while the minimum and maximum values of ROA were -0.0134 and 0.0595 and ROE were -0.1288 and 0.3057. Also, the standard deviations of ROA and ROE were 0.0068 and 0.0653, respectively, implying that commercial banks in the sample had intensive financial performance differences.

Table 2 demonstrates the estimation results on the effects of income diversification, measured by the ratio of non-interest income, on banks' financial performance,

represented by ROA and ROE. Regression results with two-step S-GMM showed that the p-values from AR (2) and Hansen tests were higher than 10%, indicating no autocorrelation was found, and all instrument variables were valid, claiming the regression results were credible, and estimation problems were fixed.

Table 2 Estimation results of the income diversification's effects on commercial banks' financial performance

Independent variables	ROA	ROE
L.ROA	0.5764***	
	(13.25)	
L.ROE		0.7485***
		(21.42)
Size	0.0018***	0.0237***
	(4.30)	(6.31)
Creditrisk	0.3458***	2.0427**
	(4.20)	(2.20)
Equity	0.0015	0.0082
	(0.16)	(0.11)
Liquid	0.0176***	0.1034**
	(3.28)	(2.25)
Cost	0.2772***	2.4551**
	(2.61)	(2.43)
Growth	0.0086***	0.1086***
	(3.97)	(10.26)
Div	-0.0015	0.0066
	(-0.51)	(0.29)
Const.	-0.0707***	-0.8529***
	(-4.45)	(-6.50)
Observations	310	310
Groups	29	29
Instrument variables	24	23
AR(2) test	0.176	0.140
Hansen test	0.275	0.263

Note: *, **, *** respectively show the results at the significance level of 10%, 5% and 1%
( ) is t-test results.

The regression results disclosed that the dependent variable was positively correlated with its lagged value at the significant level of 1%. It indicated that better financial performance in the last period encouraged the financial performance enhancement in the current period. In other words, the last period's performance was the reliable basis for banks to expand their scale, new risky projects, which could increase the performance in the current period. Banks' size had a positive relation with banks' profits at a 1% significance level. Specifically, the bank's size raised 0.0018 of ROA and 0.0237 of ROE, meaning that banks' scale expansion enlarged banks' profits in the sample. Big banks offer their customers many preferential programs such as lower interest rates than small banks because they can access cheaper capital sources. Moreover, big banks usually have a scrupulous operation and supervision mechanisms taking better scale advantages.

Credit risk (Creditrisk) was positively related to banks' profits at the significance level of 1% and 5%. Particularly, credit risk increased 0.3458 of ROA and 2.0427 of ROE. It can be explained that banks that had agreements with higher credit risks expected higher returns. Meanwhile, liquidity (Liquid) was found to positively impact banks' profit at a 1% and 5% significance level. Liquidity plays a vital role in banks' stability. Thus, banks are encouraged to adjust their credit priority and diversify their activities to improve their profits. Moreover, cost ratio (Cost), reflecting banks' cost efficiency, involved financial performance escalation. Lastly, banks' revenue growth (Growth) showed a positive correlation with financial performance at the significant level of 1%, both for ROA and ROE.

The non-interest income ratio (Div), representing the level of income diversification, exposed a negative relation with banks' profits; however, this relation was not statistically significant. The negative coefficient indicated a negative effect on financial performance, but it was not statistically significant. This result implied that income diversification might not be a direct determinant of financial performance. Therefore, the study continued to expand the former model with dummy variables for banks' size and type of ownership to investigate banks' effects with different sizes, state-owned banks, or private banks. The empirical results are shown in Table 3.

Table 3 displays that the dummy variables presented the big-scale size, type of ownership, and the financial crisis, showing the negative effects with the significant statistic. In terms of bank size, Stewart, Matousek, and Nguyen (2016) believe that large and very large banks operate more efficiently than small and medium banks in Vietnam. However, the bigger bank was found to reduce its performance in our study. We argue that the difference was mainly caused by the research approach. Stewart et al. (2016) chose a phased assessment with two methods: constant returns to scale (DEA-CCR) and variable returns to scale (DEA-BCC), allowing to estimate scale efficiency that reflected both management skills and scale effects. However, this method's limitation is that it did not take into account the error term or random noise in comparison with the regression method, so in DEA, there was no factor of significance. Meanwhile, we approached the GMM method and determined each variable's reliability and statistical significance in our model.

Our results provide richer perspectives, confirming that bank size had a positive impact on bank performance. Although the bigger a bank, the reduced performance is. The interactive variable coefficient between size and diversification was positive at 5% and 10% significance level, meaning that big-scale banks could improve their financial performance through diversification strategies. This result is consistent with previous evidence by Mercieca et al. (2007), Chiorazzo et al. (2008), Goddard et al. (2008). Subsequently, we argue that small banks face many challenges when launching diversification strategies due to the lack of expertise, available capital sources, and adequate market share to take advantage of these strategies. Meanwhile, large banks have many advantages in terms of capital and assets to execute different business strategies.

Table 3 Estimation results of the correlations between commercial banks' income diversification and financial performance, taking into account their size, type of ownership, and the financial crisis

Independent variables	ROA	ROE	ROA	ROE	ROA	ROE
L.ROA	0.5645***		0.7577***		0.5075***	
	(12.36)		(13.61)		(10.57)	
L.ROE		0.7001***		0.5723***		0.5469***
		(14.12)		(8.86)		(9.79)
Size	0.0015***	0.0053	0.0010***	0.0070*	0.0016***	0.0136***
	(3.75)	(1.09)	(3.01)	(1.67)	(5.12)	(3.13)
Credit risk	0.3200***	3.7736***	0.2590***	2.6829***	0.3894***	1.4913***
	(4.65)	(3.10)	(6.16)	(3.15)	(7.00)	(2.87)
Equity	-0.0045	-0.2983***	-0.0073	-0.2862**	0.0014	-0.3889***
	(-0.41)	(-2.59)	(-1.06)	(-1.96)	(0.16)	(-3.69)
Liquid	0.0168***	0.0963***	0.0138***	0.1622***	0.0119**	0.0805***
	(5.19)	(3.53)	(3.87)	(3.64)	(2.19)	(3.11)
Cost	0.3541***	2.6563***	0.2441***	3.5125***	0.1526*	3.3250***
	(3.87)	(3.01)	(3.15)	(5.10)	(1.63)	(3.90)
Growth	0.0091***	0.1027***	0.0037***	0.1012***	0.0096***	0.1231***
	(5.09)	(11.88)	(3.50)	(5.35)	(5.11)	(10.10)
Dummy size	-0.0042***	-0.0248***				
	(-4.07)	(-3.14)				
Dummy size*DIV	0.0089***	0.0348**				
	(2.60)	(2.18)				
Dummy own			-0.0097**	-0.0944*		
			(-1.92)	(-1.72)		
Dummy own*DIV			0.0442**	0.5811***		
			(1.95)	(3.32)		
Dummy crisis					-0.0003	-0.0114
					(-0.14)	(-1.17)
Dummy crisis*DIV					0.0096***	0.0785***
					(4.00)	(5.31)
Const.	-0.0599***	-0.2307		-0.3211**	-0.0597***	-0.4838***
	(-4.34)	(-1.40)		(-2.28)	(-5.49)	(-3.41)
Observations	310	310	310	310	310	310
Groups	29	29	29	29	29	29
Inst. variables	26	29	29	27	28	29
AR (2) test	0.211	0.222	0.181	0.236	0.313	0.396
Hansen test	0.256	0.232	0.410	0.504	0.254	0.519

Note: *, **, *** respectively show the results at the significance level of 10%, 5% and 1%
( ) is t-test results.

Besides, the interactive variable's coefficient between the type of ownership and diversification was positive at 1% and 10% significance level, while state ownership might inhibit the bank performance due to multi-layered operating mechanisms and the involvement of many agencies. Stewart et al. (2016) also found that non-state commercial banks exhibited higher overall technical efficiency than state-owned commercial banks. Thus, state-owned banks could improve their financial performance through diversification strategies, according to the implications of Pennathur et al. (2012). It can be explained that state-owned banks have more access to the government's services,

such as taxes and facilities payment. Therefore, banks can take advantage of these services to extend their income and performance.

Lastly, the estimated effect of banks' income diversification on financial performance during the financial crisis period was statistically positive. This finding demonstrated that income diversification is one of the banks' effective strategies that can use to face uncertain conditions and enhance future performance. Previous studies have also claimed that banks accepted credit risks and gained benefits through business diversification by interest rates, expenses, and commissions during the financial crisis time 2007-2008 (Elsas et al., 2010). This finding implies the existence of diversification's benefits, although these benefits are trade-off with riskier activities.

Conclusion

The study examines the relationship between income diversification and the financial performance of commercial banks in Vietnam from 2005 to 2018, taking into account the bank's size, type of ownership, and the financial crisis to explain the inconsistency of prior studies. This study employes the GMM estimation method to overcome endogenous problems, autocorrelations, and error variance that might arise in the research model. Although we did not find a direct effect of income diversification on financial performance, the indirect effects were apparent. The results claimed that big banks and state-owned banks should encourage diversification strategies, one of the effective strategies to face uncertain conditions, to boost their financial performance. The study also implies that income diversification is the trade-off with riskier activities (non-traditional activities) to offset the negative impact of the financial crisis. Moreover, this study uncovered evidence that commercial banks' characteristics play a critical role in their performance in Vietnam. In particular, a bank's size, credit risk, liquidity, and growth positively affects its profit. It is principal to identify banks' business strategies in the context of an unstable economy.

Consequently, this study offers some recommendations for banks' managers and policymakers. Firstly, the optimal business model for big banks can be concentrated on primary and extended income; to regulation makers, any regulation restriction or loosening should be carefully considered about its impact on banks' income diversification. Secondly, state-owned banks launching diversification can gain better financial performance, along with more risks if non-traditional activities are not well controlled. Thirdly, diversification creates an overall profit improvement; however, banks should consider the associated credit and liquidity risks. Banks experiencing high scale advantage and growth should be encouraged with diversification to eliminate the overall risks, while small banks and less developed banks should prioritize their stability. In investigating income diversification along with banks' characteristics and economic periods, the study forms the optimal bank's business model in the context of a volatile economy. Thus, banks' managers can consider this study as the scientific evidence for building the optimal operation process.

However, this study still has some limitations. On the one hand, the number of banks participating in the research sample was a predictable limitation due to data collection problems. Besides, the models only focused on financial variables but ignored the variables representing the manager's behavior and the bank's organization structure (for example, the CEO duality, female CEO, and independent CEO) and sustainable aspects (for example, sustainable economic development and sustainable stock exchanges returns) (Thuy Van, Thai Ha, Quyen, Hong Anh, & Loi, 2020 and Darsono, Wong, Ha, Jati, & Dewanti, 2021). According to previous studies, these variables also play a role in shaping bank's performance and diversification strategies. Therefore, future studies can focus on these aspects to further explore the hidden picture of diversification strategy and banking performance.

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