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Van Dan Dang
Banking University of Ho Chi Minh City, Vietnam., dandv@buh.edu.vn

Hoang Chung Nguyen
Thu Dau Mot University, Vietnam, chungnh@tdmu.edu.vn

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CREDIT RISK AMID BANKING UNCERTAINTY IN VIETNAM

Van Dan Dang* and Hoang Chung Nguyen**

* Department of Finance, Banking University of Ho Chi Minh City, Vietnam.
Email: dandv@buh.edu.vn
** Corresponding author. Department of Finance and Banking, Business School, Thu Dau Mot University, Viet Nam. Email: chungnh@tdmu.edu.vn

ABSTRACT

Using a new measure of micro uncertainty based on the cross-sectional dispersion of bank-level shocks, we analyze the impact of banking uncertainty on credit risk in Vietnam during the period 2007–2019. We document that a higher level of banking uncertainty may increase credit risk, and this unfavorable impact is mitigated at larger, better capitalized, and more liquid banks. As compared to private-owned banks, state-owned banks experience higher credit risk during periods of uncertainty. Further analysis supports the "search for yield" hypothesis and helps to better understand why credit risk increases amid uncertainty.

Keywords: Bank characteristics; Banking uncertainty; Credit risk; State ownership; Uncertainty.
JEL Classifications: D81; E50; G21; G32.

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I. INTRODUCTION

Uncertainty in economic and financial policies has become a topical issue in the recent literature. Several studies have explored the impacts of uncertainty on the behaviors of firms, households, and governments. In general, these studies document that firms may cancel or delay their investments in response to higher uncertainty (Drobetz *et al.*, 2018; Gulen and Ion, 2016; Wang *et al.*, 2014), households tend to be less willing to spend (Aaberge *et al.*, 2017; Giavazzi and McMahon, 2012), and finally, the total output of countries tends to drop considerably (Bloom *et al.*, 2018; Colombo, 2013). There is a fast-growing strand of literature exploring the effect of uncertainty on financial intermediaries, especially after the introduction of a novel uncertainty proxy by Baker *et al.* (2016) to capture economic policy uncertainty. Within this strand, various studies pay attention to bank lending, which is a key factor fueling economic growth. They find that economic policy uncertainty exerts a strong unfavorable effect on bank credit growth (Bilgin *et al.*, 2021; Bordo *et al.*, 2016; Chi and Li, 2017; Danisman *et al.*, 2020; Hu and Gong, 2019; Lee *et al.*, 2017; Phan *et al.*, 2021; Valencia, 2017). In such a context, apart from credit quantity, the question is how could uncertainty affect banks' credit quality?

This study answers this question by examining the impact of uncertainty on banks' credit risk. Theoretically, how uncertainty shapes bank risk is ambiguous. On the one hand, borrowers may face more financial difficulties in uncertain times, which may boost the likelihood of loan default and increase banks' credit risk profiles (Baum and Wan, 2010; Tang and Yan, 2010). Also, uncertainty could raise bank risk under the "search for yield" hypothesis. Accordingly, less credit demand due to the delay in investment and spending of firms and households during periods of high uncertainty (Bloom, 2009) may result in narrowed interest margins in banks. When the return target of these banks is sticky, they have more incentive to search for yield to offset the lost profits by allocating their assets toward "high-risk and high-return" items (Dell'Ariccia *et al.*, 2014). On the other hand, the literature relies on the "real option" theory to explain that uncertainty can mitigate bank risk. As the level of uncertainty increases, the lack of information may enhance the probability of making wrong choices (McDonald and Siegel, 1986; Pindyck, 1988). Hence, banks may adopt a wait-and-see strategy until uncertainty diminishes, which leads to a restriction in credit granted and a growth in the number of creditworthy borrowers. Due to the theoretical ambiguity, the impact of uncertainty on bank risk remains an interesting empirical question.

To perform our analysis, we employ a panel of commercial banks in Vietnam for the period 2007–2019. Our uncertainty index uses bank-level data, consistent with the measure proposed by Buch *et al.* (2015) to capture uncertainty in banking. We allow for the dynamic nature of bank risk and control potential endogeneity bias by utilizing the dynamic panel Generalized Method of Moments (GMM) estimator. We exploit the heterogeneity in banks' response to uncertainty by looking at a rich set of bank-level characteristics, including bank size, capital, liquidity, and state ownership. The idea here is that some banks may be more affected by uncertainty than others, so their heterogeneous responses amid uncertainty shocks could reveal some potential underlying mechanisms behind the impact. Hence, another essential hypothesis to test is whether the link between banking uncertainty and credit risk varies by bank-specific characteristics. Besides,

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to confirm the "search for yield" motive, we explore whether banks with more "search for yield" incentives take more risks during periods of higher uncertainty.

Our work is motivated by the following research gaps. First, prior studies mainly examine the impact of uncertainty on banks' credit risk in the US or other developed countries, whereas the evidence for emerging markets is rather scarce. Concretely, Danisman *et al.* (2021) and Ng *et al.* (2020) rely on US banks to indicate that banks' credit risk (captured by increased loan loss provisions) tends to increase in times of higher economic policy uncertainty, while Karadima and Louri (2021) exhibit the similar impact (based on non-performing loans to capture credit risk) for the euro area. Implications from these studies may not apply to emerging countries since these countries are featured by immature financial markets and different regulatory backgrounds, thus eliciting distinct impacts of uncertainty on bank credit risk. One exception belongs to Chi and Li (2017), who focus on China for their analysis. However, their work does not delve into the heterogeneity based on bank-specific factors and especially the importance of state ownership.

Second, while prior studies have examined the impact of different uncertainty types on bank risk (Chi and Li, 2017; Danisman *et al.*, 2021; Karadima and Louri, 2021; Ng *et al.*, 2020; Phan *et al.*, 2022), no work has looked at uncertainty in the banking sector and how such uncertainty drives bank credit risk. The banking uncertainty measure contains information reflecting uncertainty explicitly for the banking industry that other uncertainty measures do not have. Importantly, it should be emphasized that each uncertainty metric attempts to capture certain aspects of uncertainty, and its consequences on bank risk should not be identical (Wu *et al.*, 2021). Therefore, it is worth analyzing how this uncertainty directly influences risk-taking behaviors in the banking sector.

Third, we should note that all uncertainty measures created thus far in the literature are common to all banks in the system, so it is of interest to analyze the heterogeneous responses of banks to uncertainty depending on their characteristics. However, the evidence that the strength of banks' balance sheets influences the response of bank risk to uncertainty is limited in the literature. We are only aware of the works by Danisman *et al.* (2021) and Ng *et al.* (2020), which explore the conditioning role of bank capital with mixed results when focusing on the impact of uncertainty on credit risk. A set of studies closely related to ours investigated how uncertainty drives banks' default risk or financial stability using the Z-score index (see e.g., Phan *et al.*, 2021; Phan *et al.*, 2022; Wu *et al.*, 2020). Though sharing a different fundamental interest with us, these studies inspire us significantly in highlighting the conditioning role of many bank-specific factors in the link between uncertainty and bank risk. For example, Wu *et al.* (2020) reveal an increasingly adverse impact of uncertainty on financial stability for larger, less liquid, and domestically state-owned banks.

Vietnam provides a favorable setting to conduct our analysis because it is a typical emerging economy example, where the banking sector has offered dominant funding sources to the real economic sectors and banks' credit risk has exhibited a much greater burden on the financial system than in developed economies (Dang and Dang, 2020). Focusing on emerging economies may offer some advantages. The degree of uncertainty in emerging countries is more pronounced than in developed ones (Bloom, 2014), and banks in emerging economies tend to

experience greater vulnerability during uncertain times than their counterparts in advanced economies (Nguyen *et al.*, 2020). It is also worth noting that the banking sector underwent various reforms after Vietnam joined the World Trade Organization in 2007. These reforms caused sharp changes in the banking sector structure and increased the disparity among banks (Huynh and Dang, 2021). Over the past decade, the uncertainty level in Vietnam has significantly increased and fluctuated due to the impacts of various forces, such as the global financial crisis, multiple policy adjustments, and international standards pursued in the banking system (Batten and Vo, 2019). Other key recent problems faced by the Vietnamese banking sector are poor credit quality and a high degree of problematic loans to the extent that banks' capital buffers deteriorated as they engaged in aggressive lending behaviors (Vo, 2018). Additionally, despite many attempts at reform and privatization, the banking system in Vietnam is still dominated by state-owned commercial banks. This raises a need to examine the role of state ownership in shaping the impact of uncertainty on credit risk.

In our setup, we find that banks' credit risk tends to increase in response to a higher level of uncertainty in the banking sector. Further analysis reveals that the detrimental impact of uncertainty on credit risk differs across banks, depending on bank size, capitalization, liquidity, and state ownership. More precisely, when facing periods of higher uncertainty, the increase in credit risk tends to be mitigated for larger, more capitalized, and more liquid banks. In other words, these results lead to a common pattern that weaker banks tend to be more driven by the fluctuation of uncertainty in the banking sector. Looking into bank ownership, we document that state-owned banks' credit risk is more sensitive to uncertainty shocks than that of private banks. Additionally, our work also presents some evidence to support the "search for yield" hypothesis to better understand the increase in credit risk amid uncertainty—i.e., banks having a stronger "search for yield" incentive tend to increase their credit risk as compared with other banks.

This paper contributes to the literature in several ways. First, we explore the impact of uncertainty on the credit risk of banks in an emerging market. As far as we know, existing works analyze the issue from advanced economies, while the research on the link between uncertainty and bank risk in emerging economies is limited. Second, we are the first to employ the new micro uncertainty measure of Buch *et al.* (2015) as a determinant of credit risk. This uncertainty measure could overcome the shortage of data on banking sector uncertainty for emerging countries and captures specific uncertainty information in the banking sector. More precisely, based on bank-level data, particularly easily-computed accounting ratios, our uncertainty measure does not require high-frequency market data, which are limited for most non-listed banks in any emerging market. Also, it does not raise a concern related to the reliability and accuracy of the information in newspapers, unlike the text-based indices (see Ahir *et al.*, 2018; Baker *et al.*, 2016) that have been extensively analyzed recently. Third, we extend the literature by comprehensively investigating the heterogeneity in banks' credit risk in response to uncertainty through a diverse set of bank-level characteristics. While prior empirical models consider only bank capital (Danisman *et al.*, 2021; Ng *et al.*, 2020), our model complements them by using bank size and liquidity, which are essential factors that can change bank behavior in response to adverse shocks,

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as demonstrated in the bank risk-taking channel of monetary policy (Altunbas *et al.*, 2012). We also make our analysis more relevant to emerging markets by paying attention to the heterogeneity caused by state ownership. Additionally, we exhibit some evidence in favor of the "search for yield" incentive to support the underlying mechanism behind the detrimental impact of uncertainty on bank credit risk. Surprisingly, no research has been done on these issues thus far.

The remainder of the paper is structured as follows. Section II illustrates the construction of the uncertainty measure in banking. Section III introduces the methodology and data employed, then Section IV reports and discusses the empirical results. Finally, Section V concludes the study.

II. UNCERTAINTY IN THE BANKING SECTOR

According to Buch *et al.* (2015), uncertainty in the banking sector is directly translated into a greater dispersion of shocks to key bank-level outcomes, including asset growth and funding growth.[1] We now apply their novel procedure to calculate the cross-sectional dispersion of shocks. First, we regress the percentage change in total assets (or short-term funding) on bank-specific and time-fixed effects to obtain bank-year-specific shocks for each bank-level variable as follows:

$$log(X_{i,t}) - log(X_{i,t-1}) = \Delta log(X_{i,t}) = \alpha_i + \beta_t + \varepsilon_{i,t} \quad (1)$$

where $\Delta log(X_{i,t})$ is the percentage change in total assets or short-term funding at bank i in year t. In addition to the dispersion of shocks to these two variables, we will also take into account the shocks to bank profitability for robustness checks. Unlike the two variables (i.e., assets and funding), since the Return On Asset ratio (ROA) is a flow variable, we estimate Eq. (1) using the level of this ratio. The variable α_i captures bank fixed effects, and β_t captures time fixed effects, to eliminate the effect of any bank-specific or time-variant factors on the bank-level variable. Our component of primary interest in this regression, the residual $\varepsilon_{i,t}$, is the indicator of bank shocks to bank-level variables. Hence, it is needed to compute the value of cross-sectional dispersion across all bank-level shocks via the Standard Deviation (SD) approach as follows:

$$Uncertainty_t = SD(\varepsilon_{i,t}) \quad (2)$$

The estimate provides us with the measure for uncertainty in the banking sector based on bank-level data. The larger the dispersion of shocks, the higher the uncertainty in banking. From a technical standpoint, the approach suggested by Buch *et al.* (2015) in the banking field matches well with the one proposed by Bloom *et al.* (2018) for manufacturing firms. These prior studies agree that cross-sectional dispersion based on bank- or firm-level data could be utilized appropriately to capture micro uncertainty.

[1] See the seminal work of Buch *et al.* (2015) for the specific rationale behind choosing these key bank-level variables.

III. METHODOLOGY AND DATA

A. Methodology

We examine the impact of uncertainty on bank credit risk by estimating the following empirical model:

$$Credit\ risk_{i,t} = \alpha_0 + \alpha_1 \times Credit\ risk_{i,t-1} + \alpha_2 \times Uncertainty_{t-1} + \alpha_3 \times X_{i,t-1} + \alpha_4 \times Y_{t-1} + v_i + \varepsilon_{i,t} \quad (3)$$

where i and t capture banks and years, respectively. *Credit risk* is the dependent variable, captured by either loan loss reserves or non-performing loans (as a share of total gross loans). The use of these two variables as accounting-based credit risk measures is in line with the banking literature and to check the robustness of our results. Our motivation to use a dynamic panel model is that bank risk is persistent and highly driven by the risk-taking profiles of the previous year.

Uncertainty is our measurement of banking uncertainty, captured by the dispersion of bank shocks to assets (*UncAD*) and funding (*UncFD*). We then use the dispersion of bank shocks to profitability (*UncPD*) for robustness checks. The variable X contains bank-level variables that control for bank size (the natural logarithm of total bank assets), capital (the ratio of total equity to total assets), liquidity (the ratio of liquid assets to total assets), and state ownership (a dummy variable that takes a value of one if a bank is owned by the government and 0 otherwise). The variable Y is a set of macroeconomic controls, including economic growth (the growth rate of the gross domestic product) and monetary policy (the short-term lending rates). These controls are key factors that can explain credit risk of banks, consistent with the well-established banking literature (e.g., Chen *et al*., 2017; Dang and Dang, 2020; Delis and Kouretas, 2011, among other studies). The indicator v_i is the bank-specific effect controlling for unobserved heterogeneity, and $\varepsilon_{i,t}$ is the idiosyncratic error term. To alleviate the problems of reverse causality, we lag all independent variables by one year.

To estimate our model, we utilize the system GMM estimator as proposed by Arellano and Bover (1995) and Blundell and Bond (1998). Specifically, we used the two-step estimator with Windmeijer's (2005) finite sample correction to gain more efficient outcomes. We limit the number of instruments generated by following Roodman's (2009) procedure to avoid the "too many instruments" problem. We have to carry out some tests to verify the consistency of the system GMM estimator: the AR(1) and AR(2) tests for the first- and second-order serial correlation in the first-differenced errors, and the Hansen test reports the overidentification feature for the joint validity of instruments employed.

We further extend our baseline model to determine whether the impact of banking uncertainty and credit risk differs across heterogeneous banks. To this end, we rely on the interaction terms of uncertainty with a variety of modifying factors (i.e., bank size, capital, liquidity, and state ownership). The extended model is as follows:

$$Credit\ risk_{i,t} = \alpha_0 + \alpha_1 \times Credit\ risk_{i,t-1} + \alpha_2 \times Uncertainty_{t-1} + \alpha_3 \times Uncertainty_{t-1} \times X_{i,t-1} + \alpha_4 \times X_{i,t-1} + \alpha_5 \times Y_{t-1} + v_i + \varepsilon_{i,t} \quad (4)$$

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The construction of all variables are as previously discussed. The coefficients on the interaction terms may shed some light on the underlying mechanisms that can drive the link between uncertainty in banking and bank credit risk.

B. Data

We use the annual financial data of Vietnamese banks over the period 2007–2019. We only consider commercial banks with at least five consecutive years of data. We exclude banks that are acquired or under special control by the State Bank of Vietnam to ensure comparability since these banks' operation scopes and regulatory constraints considerably differ from other banks. We extract the macroeconomic data from the World Development Indicators and International Financial Statistics databases. After collecting required data and construct the variables, we winsorize all bank-level variables at 2.5% and 97.5% to neutralize the consequences of extreme outliers.

Table 1.
Summary Statistics of Variables

The table reports the summary statistics of the variables employed. All bank-level variables, GDP, and lending rates are obtained from 31 Vietnamese commercial banks' annual financial reports, the World Development Indicators, and the International Financial Statistics, respectively. The sample period spans from 2007 to 2019. Loan loss reserves and Non-performing loans are two measures of credit risk, calculated as a share of total gross loans (%). The variable Size controls for economies of scale, computed by the natural logarithm of total bank assets. Capital denotes the ratio of total equity to total assets (%). Liquidity captures bank liquidity positions, defined by the ratio of liquid assets to total assets (%), in which liquid assets comprise cash and balance dues from depository institutions. State ownership is the dummy variable that takes a value of one if a bank is owned by the government and 0 otherwise. We have three measures of banking uncertainty, including UncAD, UncFD, and UncPD, calculated by the dispersion of shocks in total assets, total funding, and profitability using bank-level data, respectively. Economic growth is reflected by the growth rate of the gross domestic product (GDP) (%). Monetary policy is gauged by the short-term lending rates (%).

	Obs	Mean	SD	Min	Max
Loan loss reserves	383	1.266	0.501	0.543	2.499
Non-performing loans	340	2.158	1.188	0.499	5.188
Size	383	32.008	1.215	30.020	34.269
Capital	383	9.869	4.364	4.939	20.470
Liquidity	383	17.114	9.182	5.570	36.034
State ownership	383	0.136	0.343	0.000	1.000
UncAD	383	21.936	6.747	13.427	34.091
UncFD	383	24.226	7.890	15.995	40.931
UncPD	383	1.273	0.386	0.674	2.058
Economic growth	383	6.245	0.640	5.247	7.130
Monetary policy	383	10.350	3.322	6.960	16.954

Table 1 summarizes all variables based on the unbalanced panel of 31 Vietnamese commercial banks during 2007–2019. The loan loss reserve and non-performing loan ratios are 1.266% and 2.158%, respectively, and they display relatively large standard deviations, meaning that the credit risk of Vietnamese banks is not too high. Both measures have high volatility across banks over the sample period. The average for the state ownership variable is about 0.136, indicating that 13% of the banks in our sample are state-owned, while the rest are private banks. The wide

ranges of distribution and large standard deviations for other bank-level variables indicate a considerable variation in the bank characteristics across banks. Similarly, the mean values and standard deviations of banking uncertainty measures suggest a notable dispersion of bank shocks and relatively high volatility in the level of uncertainty in the banking sector over the sample period.

IV. RESULTS

A. Baseline Results: Credit Risk under Banking Uncertainty

We report the results obtained from our baseline model in Table 2, using loan loss reserves and non-performing loans as the dependent variable. In columns 1–2 and 5–6, we control for only bank characteristics, and then we expand our model by adding macroeconomic factors, as displayed in columns 3–4 and 7–8.

Table 2.
The Impact of Uncertainty on Bank Risk

We estimate all regressions by the system GMM estimator. The dependent variables are loan loss reserves (columns 1–4) and non-performing loans (columns 5–8). Standard errors are in parentheses. *** denotes the 1% significance level, ** 5% significance level, and * 10% significance level.

	Dependent Variable: Loan Loss Reserves (Columns 1–4)				**Dependent Variable: Non-performing Loans (Columns 5–8)**			
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
Lagged dependent variable	0.656***	0.684***	0.550***	0.601***	0.459***	0.464***	0.470***	0.505***
	(0.017)	(0.023)	(0.040)	(0.045)	(0.025)	(0.025)	(0.031)	(0.035)
UncAD	0.012***		0.012***		0.029***		0.034***	
	(0.002)		(0.002)		(0.004)		(0.004)	
UncFD		0.006***		0.008***		0.021***		0.033***
		(0.001)		(0.001)		(0.003)		(0.003)
Size	0.020	–0.002	0.032*	0.010	0.111**	0.125**	0.104**	0.115***
	(0.017)	(0.015)	(0.019)	(0.017)	(0.055)	(0.053)	(0.049)	(0.042)
Capital	–0.009***	–0.011***	–0.014***	–0.014***	–0.022**	–0.028***	–0.022***	–0.029***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.010)	(0.011)	(0.008)	(0.009)
Liquidity	0.002	0.003**	–0.001**	–0.001	–0.005	–0.002	–0.016***	–0.014***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.004)	(0.004)	(0.004)	(0.004)
State ownership	0.054	0.084***	0.066	0.105***	0.003	0.048	–0.127	–0.094
	(0.036)	(0.031)	(0.045)	(0.036)	(0.099)	(0.111)	(0.132)	(0.142)
Economic growth			0.069***	0.080***			0.285***	0.372***
			(0.012)	(0.011)			(0.038)	(0.032)
Monetary policy			0.027***	0.027***			0.056***	0.053***
			(0.005)	(0.004)			(0.014)	(0.015)
Observations	352	352	352	352	302	302	302	302
Banks	31	31	31	31	31	31	31	31
Instruments	27	27	29	29	27	27	29	29
AR(1) test	0.000	0.000	0.000	0.000	0.001	0.001	0.000	0.000
AR(2) test	0.310	0.355	0.302	0.375	0.129	0.121	0.171	0.154
Hansen test	0.260	0.265	0.472	0.409	0.134	0.170	0.116	0.120

The coefficients on uncertainty in all specifications are positive and statistically significant, suggesting that a higher level of uncertainty appears to increase credit risk. The result is economically significant as well. For example, a one standard deviation increase in uncertainty by asset dispersion (6.747) leads to a rise in the loan loss reserve ratio of 0.081 percentage points (0.012*6.747, column 3), and a rise in the non-performing loan ratio of 0.229 percentage points (0.034*6.747, column 7). Considering the other uncertainty measure, a one standard deviation increase in funding dispersion (7.890) causes an increase in the loan loss reserve ratio of 0.063 percentage points (0.008*7.890, column 4), and a rise in the non-performing loan ratio of 0.260 percentage points (0.033*7.890, column 8).

Our finding is consistent with the previous evidence (Chi and Li, 2017; Danisman *et al.*, 2021; Karadima and Louri, 2021; Ng *et al.*, 2020), which indicates that in times of higher uncertainty, bank credit risk has a tendency to increase. We expand the existing literature by exploring the dispersion of shocks to key variables using bank-level data to proxy uncertainty in the banking sector, while other studies focus on economic policy uncertainty using a text-based counting mechanism.

B. The Conditional Roles of Bank-specific Characteristics and State Ownership

To offer more insight into how uncertainty affects credit risk, we examine bank-level heterogeneity by focusing on the interaction terms of bank characteristics and uncertainty measures. Table 3 presents our results based on the extended model to explore the conditioning role of bank size. We document that the coefficients on the interaction term are statistically significant in all columns, regardless of the alternative credit risk and uncertainty measures we used. This result suggests that the impact of uncertainty in banking on credit risk varies depending on bank size. The positive coefficients on standalone uncertainty measures and the negative coefficients associated with the interaction term reveal that the impact of banking uncertainty on credit risk tends to drop with an increase in bank size.

Table 3.
The Impact of Uncertainty on Bank Risk and the Conditioning Role of Bank Size

Note: We estimate all regressions by the system GMM estimator. The dependent variables are loan loss reserves (columns 1–2) and non-performing loans (columns 3–4). Standard errors are in parentheses. *** denotes the 1% significance level, ** 5% significance level, and * 10% significance level.

	Dependent Variable: Loan Loss Reserves (Columns 1–2)		**Dependent Variable: Non-performing Loans (Columns 3–4)**	
	(1)	**(2)**	**(3)**	**(4)**
Lagged dependent variable	0.582***	0.586***	0.448***	0.438***
	(0.040)	(0.037)	(0.034)	(0.040)
UncAD	0.105***		0.021***	
	(0.040)		(0.005)	
*UncAD**Size	–0.003**		–0.001***	
	(0.001)		(0.001)	
UncFD		0.085**		0.029***
		(0.036)		(0.003)

Table 3.
The Impact of Uncertainty on Bank Risk and the Conditioning Role of Bank Size (Continued)

	Dependent Variable: Loan Loss Reserves (Columns 1–2)		Dependent Variable: Non-performing Loans (Columns 3–4)	
	(1)	(2)	(3)	(4)
*UncFD**Size		–0.002**		–0.002***
		(0.001)		(0.001)
Size	0.104***	0.063*	0.208***	0.175***
	(0.033)	(0.034)	(0.037)	(0.043)
Capital	–0.013***	–0.018***	–0.028***	–0.033***
	(0.003)	(0.003)	(0.008)	(0.009)
Liquidity	–0.003***	–0.002*	–0.015***	–0.008***
	(0.001)	(0.001)	(0.004)	(0.003)
State ownership	0.021	0.111***	0.055	0.125
	(0.030)	(0.039)	(0.140)	(0.186)
Economic growth	0.069***	0.090***	0.190***	0.329***
	(0.011)	(0.011)	(0.045)	(0.034)
Monetary policy	0.027***	0.031***	0.074***	0.129***
	(0.004)	(0.005)	(0.013)	(0.016)
Observations	352	352	302	302
Banks	31	31	31	31
Instruments	30	30	30	30
AR(1) test	0.000	0.000	0.000	0.001
AR(2) test	0.352	0.358	0.176	0.188
Hansen test	0.493	0.486	0.125	0.178

Several reasons could be used to interpret our results. It is less likely for large banks to take on risky strategies since they have to encounter higher market disciplines (Freixas *et al.*, 2007). Besides, large banks may have more competitive advantages compared to small banks, such as more effective risk management systems (Hughes and Mester, 1998) and more qualified staff (Kamani, 2019). As a result, large banks can mitigate the detrimental impacts of uncertainty than small banks.

Next, Table 4 presents the estimates for the interaction of uncertainty and capital. Columns 1–2 employ loan loss reserves and columns 3–4 utilize non-performing loans as dependent variables, respectively. The adverse impact of banking uncertainty is mitigated for banks with more equity capital and strengthened for banks with less equity capital. This finding is illustrated by significantly negative coefficients on the interaction term in most columns. Turning our attention to Table 5, where we exhibit the results when analyzing the moderating role of bank liquidity, we observe that the coefficients of the interaction term are negative and statistically significant in most specifications. This result implies that the impact of banking uncertainty on credit risk decreases (become less harmful) with the expansion of bank liquidity; in other words, more liquid banks tend to suffer less credit risk than less liquid banks during periods of higher uncertainty.

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Table 4.
The Impact of Uncertainty on Bank Risk and the Conditioning Role of Bank Capital

We estimate all regressions by the system GMM estimator. The dependent variables are loan loss reserves (columns 1–2) and non-performing loans (columns 3–4). Standard errors are in parentheses. *** denotes the 1% significance level, ** 5% significance level, and * 10% significance level.

	Dependent Variable: Loan Loss Reserves (Columns 1–2)		**Dependent Variable: Non-performing Loans (Columns 3–4)**	
	(1)	**(2)**	**(3)**	**(4)**
Lagged dependent variable	0.552***	0.567***	0.447***	0.524***
	(0.044)	(0.041)	(0.034)	(0.040)
UncAD	0.024***		0.106***	
	(0.004)		(0.034)	
*UncAD**Capital	–0.001***		–0.008**	
	(0.001)		(0.004)	
UncFD		0.012***		0.026***
		(0.003)		(0.003)
*UncFD**Capital		–0.001		–0.002***
		(0.001)		(0.001)
Capital	0.038*	0.016	–0.099	–0.242***
	(0.021)	(0.017)	(0.064)	(0.047)
Size	0.016***	–0.003	0.175**	–0.005
	(0.006)	(0.008)	(0.086)	(0.016)
Liquidity	–0.002**	–0.001	–0.021***	–0.007
	(0.001)	(0.001)	(0.007)	(0.005)
State ownership	0.011	0.126***	–0.206	0.069
	(0.045)	(0.034)	(0.187)	(0.150)
Economic growth	0.061***	0.079***	0.330***	0.405***
	(0.011)	(0.012)	(0.046)	(0.026)
Monetary policy	0.024***	0.027***	0.058***	0.086***
	(0.004)	(0.004)	(0.016)	(0.021)
Observations	352	352	302	302
Banks	31	31	31	31
Instruments	30	30	30	30
AR(1) test	0.000	0.000	0.001	0.001
AR(2) test	0.288	0.376	0.171	0.172
Hansen test	0.458	0.434	0.150	0.169

Table 5.
The Impact of Uncertainty on Bank Risk and the Conditioning Role of Bank Liquidity

We estimate all regressions by the system GMM estimator. The dependent variables are loan loss reserves (columns 1–2) and non-performing loans (columns 3–4). Standard errors are in parentheses. *** denotes the 1% significance level, ** 5% significance level, and * 10% significance level.

	Dependent Variable: Loan Loss Reserves (Columns 1–2)		**Dependent Variable: Non-performing Loans (Columns 3–4)**	
	(1)	**(2)**	**(3)**	**(4)**
Lagged dependent variable	0.537***	0.606***	0.474***	0.460***
	(0.039)	(0.037)	(0.035)	(0.025)
UncAD	0.013***		0.078***	
	(0.002)		(0.007)	
*UncAD**Liquidity	–0.001***		–0.002***	
	(0.001)		(0.001)	
UncFD		0.008***		0.039***
		(0.001)		(0.004)
*UncFD**Liquidity		–0.001		–0.001***
		(0.001)		(0.001)
Liquidity	–0.001	0.002	0.044***	0.004
	(0.001)	(0.003)	(0.012)	(0.004)
Size	0.028	0.007	0.125***	0.209***
	(0.019)	(0.018)	(0.037)	(0.047)
Capital	–0.012***	–0.015***	–0.026***	–0.031**
	(0.003)	(0.002)	(0.008)	(0.012)
State ownership	0.061	0.104***	–0.156	0.115
	(0.048)	(0.031)	(0.155)	(0.162)
Economic growth	0.068***	0.084***	0.333***	0.391***
	(0.012)	(0.011)	(0.042)	(0.033)
Monetary policy	0.028***	0.028***	0.050***	0.091***
	(0.004)	(0.004)	(0.014)	(0.014)
Observations	352	352	302	302
Banks	31	31	31	31
Instruments	30	30	30	30
AR(1) test	0.000	0.000	0.000	0.000
AR(2) test	0.272	0.382	0.125	0.172
Hansen test	0.493	0.379	0.109	0.150

Overall, we document a common pattern that bank capital and liquidity may induce a stabilizing role in the banking system by decreasing bank risk-taking, enhancing risk screening and monitoring, and offering buffers against adverse shocks. In this regard, banks with higher capital and liquidity ratios may be less vulnerable to uncertainty shocks. Our finding complements the work of Ng *et al.* (2020), which reveals that the influence of policy uncertainty on loan loss provisions is less pronounced for more prudent banks. While prior studies imply that more prudent banks are those enhancing the capital adequacy ratio, we add to

these studies by demonstrating that banks with a larger equity capital buffer and liquidity are typically regarded as more prudent.

Apart from the three standard bank-specific characteristics discussed above, the impact of uncertainty on bank credit risk may also vary across different bank ownership types. In fact, banks of different ownership types in Vietnam exhibit different risk appetites, customer structures, and operation strategies. As reported in Table 6, the interaction term of the uncertainty measures and state ownership dummy is significantly positive and remains unchanged across alternative banking uncertainty and credit risk measures. This result suggests that the valid impact of uncertainty on credit risk is amplified at state-owned banks; alternatively speaking, under uncertainty in the banking sector, state-owned banks' lending activities tend to be riskier than those of private banks. A potential explanation for this finding emerges. As widely acknowledged in the prior literature, state-owned banks may gain more risk-taking incentives due to the principal-agent problem or commands by the government to finance its risky enterprises (Berle and Means, 1932; Iannotta *et al.*, 2013). This risky behavior may induce state-owned banks to take more risks in uncertain times.

Table 6.
The Impact of Uncertainty on Bank Risk and the Conditioning Role of Bank Ownership

We estimate all regressions by the system GMM estimator. The dependent variables are loan loss reserves (columns 1–2) and non-performing loans (columns 3–4). Standard errors are in parentheses. *** denotes the 1% significance level, ** 5% significance level, and * 10% significance level.

	Dependent Variable: Loan Loss Reserves (Columns 1–2)		**Dependent Variable: Non-performing Loans (Columns 3–4)**	
	(1)	**(2)**	**(3)**	**(4)**
Lagged dependent variable	0.564***	0.607***	0.473***	0.482***
	(0.043)	(0.040)	(0.027)	(0.036)
UncAD	0.011***		0.024***	
	(0.002)		(0.004)	
*UncAD**State ownership	0.005**		0.037***	
	(0.002)		(0.011)	
UncFD		0.008***		0.014***
		(0.002)		(0.004)
*UncFD**State ownership		0.007***		0.124***
		(0.002)		(0.022)
State ownership	–0.049	–0.057	–0.853***	–4.072***
	(0.064)	(0.038)	(0.123)	(0.745)
Size	0.026	0.007	0.167***	0.055
	(0.019)	(0.016)	(0.043)	(0.042)
Capital	–0.013***	–0.015***	–0.027***	–0.023**
	(0.003)	(0.003)	(0.009)	(0.010)
Liquidity	–0.001	0.001	–0.015***	–0.011***
	(0.001)	(0.001)	(0.003)	(0.004)
Economic growth	0.071***	0.087***	0.276***	0.359***
	(0.014)	(0.015)	(0.035)	(0.044)

Table 6.
The Impact of Uncertainty on Bank Risk and the Conditioning Role of Bank Ownership (Continued)

	Dependent Variable: Loan Loss Reserves (Columns 1–2)		Dependent Variable: Non-performing Loans (Columns 3–4)	
	(1)	(2)	(3)	(4)
Monetary policy	0.026***	0.026***	0.056***	0.068***
	(0.005)	(0.004)	(0.013)	(0.014)
Observations	352	352	302	302
Banks	31	31	31	31
Instruments	30	30	30	30
AR(1) test	0.000	0.000	0.001	0.000
AR(2) test	0.307	0.375	0.156	0.124
Hansen test	0.311	0.285	0.118	0.136

C. Robustness Checks

In this subsection, we perform some additional robustness checks to confirm our main findings. First, we modify the econometric approach by dropping the lagged dependent variable and employ a static panel model with fixed effects (as suggested by the Hausman test, not reported for brevity). To yield more efficient results, we follow Hoechle (2007) to conduct fixed effect regressions with Driscoll-Kraay standard errors, thereby overcoming the problems of autocorrelation, heteroscedasticity, and cross-sectional dependence. We re-estimate our models and report the results in Table 7 (loan loss reserves) and Table 8 (non-performing loans). Second, as mentioned earlier in the paper, we use the dispersion of shocks to bank profitability as an alternative measure of banking uncertainty. Results with this profit dispersion variable are manifested in Table 9.

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Table 7.
Robustness Checks with Fixed Effect Regressions in the Function of Loan Loss Reserves

We estimate all regressions by the fixed-effects model with corrected Driscoll-Kraay standard errors. The dependent variable is loan loss reserves. The uncertainty measure is exhibited at the top of each column. Standard errors are in parentheses. *** denotes the 1% significance level, ** 5% significance level, and * 10% significance level. The regressions for the State ownership (time-invariant variable) are dropped since we utilize the fixed effect model. However, the interaction Uncertainty*State ownership regressions remain unchanged while we attempt the random effect model.

	Dependent Variable: Loan Loss Reserves									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	UncAD	*UncFD*	*UncAD*	*UncFD*	*UncAD*	*UncFD*	*UncAD*	*UncFD*	*UncAD*	*UncFD*
Uncertainty	0.023***	0.016**	0.020***	0.013**	0.028***	0.025**	0.033***	0.015**	0.016***	0.013**
	(0.004)	(0.006)	(0.003)	(0.006)	(0.003)	(0.010)	(0.005)	(0.005)	(0.003)	(0.004)
Uncertainty*Size			−0.001	−0.001*						
			(0.001)	(0.001)						
Uncertainty*Capital					−0.001**	−0.001**				
					(0.001)	(0.001)				
Uncertainty*Liquidity							−0.001***	−0.001***		
							(0.001)	(0.001)		
Uncertainty*State ownership									0.022**	0.014*
									(0.008)	(0.007)
Size	0.256***	0.218***	0.269***	0.157***	0.260***	0.201***	0.244***	0.151***	0.224***	0.220***
	(0.022)	(0.037)	(0.031)	(0.050)	(0.015)	(0.053)	(0.028)	(0.040)	(0.016)	(0.036)
Capital	−0.006	−0.008	0.008	−0.014*	0.014***	0.019	0.003	−0.008	0.001	−0.006
	(0.005)	(0.006)	(0.005)	(0.006)	(0.004)	(0.020)	(0.003)	(0.006)	(0.006)	(0.006)
Liquidity	−0.018***	−0.017***	−0.017***	−0.016***	−0.017***	−0.018***	−0.009***	−0.011***	−0.014***	−0.015***
	(0.003)	(0.003)	(0.002)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.002)	(0.003)
Economic growth	−0.001	0.030	0.012	0.043	−0.008	0.048	0.016	0.037	−0.013	0.025
	(0.016)	(0.039)	(0.012)	(0.032)	(0.014)	(0.048)	(0.013)	(0.027)	(0.016)	(0.037)
Monetary policy	0.055***	0.059***	0.046***	0.074***	0.052***	0.060***	0.048***	0.063***	0.042***	0.057***
	(0.006)	(0.005)	(0.005)	(0.006)	(0.005)	(0.006)	(0.007)	(0.004)	(0.007)	(0.006)
Observations	352	352	352	352	352	352	352	352	352	352
Banks	31	31	31	31	31	31	31	31	31	31
R-squared	0.261	0.243	0.251	0.237	0.268	0.237	0.283	0.265	0.264	0.253

Table 8.
Robustness Checks with Fixed Effect Regressions in the Function of Non-performing Loans

We estimate all regressions by the fixed-effects model with corrected Driscoll-Kraay standard errors. The dependent variable is non-performing loans. The uncertainty measure is exhibited at the top of each column. Standard errors are in parentheses. *** denotes the 1% significance level, ** 5% significance level, and * 10% significance level. The regressions for the State ownership (time-invariant variable) are dropped since we utilize the fixed effect model. However, the interaction Uncertainty*State ownership regressions remain unchanged while we attempt the random effect model.

	Dependent Variable: Non-performing Loans									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	UncAD	*UncFD*	*UncAD*	*UncFD*	*UncAD*	*UncFD*	*UncAD*	*UncFD*	*UncAD*	*UncFD*
Uncertainty	0.042**	0.037***	0.043**	0.031***	0.094**	0.088***	0.045**	0.036***	0.032*	0.032***
	(0.017)	(0.010)	(0.017)	(0.009)	(0.031)	(0.022)	(0.015)	(0.008)	(0.016)	(0.009)
Uncertainty*Size			–0.001	–0.002***						
			(0.001)	(0.001)						
Uncertainty*Capital					–0.005**	–0.005***				
					(0.002)	(0.001)				
Uncertainty*Liquidity							–0.001***	–0.001***		
							(0.001)	(0.001)		
Uncertainty*State ownership									0.044***	0.023
									(0.014)	(0.017)
Size	0.336***	0.320**	0.178**	0.094	0.385***	0.377***	0.192*	0.107	0.338***	0.325**
	(0.094)	(0.114)	(0.077)	(0.080)	(0.090)	(0.112)	(0.089)	(0.085)	(0.104)	(0.115)
Capital	0.010	0.007	0.004	–0.007	0.141**	0.150**	0.010	0.005	0.017	0.012
	(0.015)	(0.017)	(0.013)	(0.013)	(0.057)	(0.056)	(0.015)	(0.016)	(0.016)	(0.018)
Liquidity	–0.046***	–0.046***	–0.042***	–0.039***	–0.046***	–0.047***	–0.034***	–0.028***	–0.041***	–0.043***
	(0.008)	(0.008)	(0.007)	(0.006)	(0.007)	(0.007)	(0.007)	(0.008)	(0.007)	(0.007)
Economic growth	0.059	0.140	–0.019	0.169*	0.094	0.167	0.053	0.177	0.045	0.130
	(0.142)	(0.165)	(0.092)	(0.093)	(0.147)	(0.166)	(0.114)	(0.122)	(0.135)	(0.159)
Monetary policy	0.138***	0.143***	0.158***	0.212***	0.132***	0.138***	0.135***	0.153***	0.133***	0.140***
	(0.021)	(0.017)	(0.009)	(0.014)	(0.024)	(0.018)	(0.018)	(0.014)	(0.024)	(0.020)
Observations	317	317	317	317	317	317	317	317	317	317
Banks	31	31	31	31	31	31	31	31	31	31
R-squared	0.201	0.207	0.213	0.236	0.218	0.229	0.217	0.235	0.213	0.212

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Table 9.
Robustness Checks with the Alternative Uncertainty Measure Based on the Dispersion of Profitability Shocks

We estimate all regressions by the system GMM estimator. The dependent variables are loan loss reserves (columns 1–6) and non-performing loans (columns 7–12). Standard errors are in parentheses. *** denotes the 1% significance level, ** 5% significance level, and * 10% significance level.

	Dependent Variable: Loan Loss Reserves (Columns 1–6)						Dependent Variable: Non-performing Loans (Columns 7–12)					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Lagged dependent variable	0.675***	0.598***	0.597***	0.629***	0.646***	0.671***	0.509***	0.472***	0.416***	0.473***	0.426***	0.442***
	(0.024)	(0.041)	(0.039)	(0.039)	(0.036)	(0.037)	(0.027)	(0.020)	(0.025)	(0.037)	(0.023)	(0.020)
UncPD	0.145***	0.082***	3.037***	0.131	0.194***	0.019	0.234**	0.184**	17.139***	0.865***	0.606***	0.000
	(0.023)	(0.030)	(1.023)	(0.083)	(0.064)	(0.025)	(0.107)	(0.085)	(4.871)	(0.170)	(0.102)	(0.061)
*UncPD**Size			–0.092***						–0.531***			
			(0.032)						(0.149)			
*UncPD**Capital				–0.010						–0.107***		
				(0.011)						(0.018)		
*UncPD**Liquidity					–0.014***						–0.043***	
					(0.005)						(0.007)	
*UncPD**State ownership						0.297***						0.150**
						(0.091)						(0.075)
Size	–0.023	–0.011	0.059**	–0.015	0.032*	–0.013	0.214***	0.183***	0.472**	0.083**	0.292***	0.162***
	(0.014)	(0.016)	(0.030)	(0.015)	(0.018)	(0.017)	(0.049)	(0.038)	(0.204)	(0.032)	(0.041)	(0.039)
Capital	–0.013***	–0.016***	–0.017***	–0.006	–0.015***	–0.014***	–0.030***	–0.027***	–0.015	–0.075***	–0.027***	–0.025***
	(0.003)	(0.003)	(0.003)	(0.009)	(0.003)	(0.003)	(0.010)	(0.009)	(0.012)	(0.008)	(0.008)	(0.007)
Liquidity	0.004***	–0.001	–0.001	0.001	–0.012***	0.001	–0.003	–0.012***	–0.012***	–0.013***	0.008	–0.009***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.004)	(0.001)	(0.004)	(0.004)	(0.004)	(0.004)	(0.006)	(0.003)
State ownership	0.142***	0.123***	0.153***	0.129***	0.168***	–0.277**	0.148	0.077	0.056	–0.006	0.246	–0.110
	(0.022)	(0.025)	(0.033)	(0.024)	(0.026)	(0.117)	(0.109)	(0.140)	(0.152)	(0.146)	(0.172)	(0.228)
Economic growth		0.054***	0.039***	0.055***	0.039***	0.051***		0.242***	0.177***	0.192***	0.232***	0.209***
		(0.011)	(0.012)	(0.010)	(0.010)	(0.011)		(0.033)	(0.033)	(0.037)	(0.026)	(0.035)
Monetary policy		0.026***	0.027***	0.025***	0.019***	0.025***		0.070***	0.052***	0.062***	0.075***	0.078***
		(0.004)	(0.005)	(0.005)	(0.006)	(0.004)		(0.012)	(0.013)	(0.011)	(0.007)	(0.013)
Observations	352	352	352	352	352	352	302	302	302	302	302	302
Banks	31	31	31	31	31	31	31	31	31	31	31	31
Instruments	27	29	30	30	30	30	27	29	30	30	30	30
AR(1) test	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
AR(2) test	0.404	0.427	0.419	0.376	0.391	0.436	0.133	0.161	0.149	0.139	0.158	0.156
Hansen test	0.259	0.270	0.311	0.288	0.279	0.215	0.136	0.122	0.127	0.139	0.256	0.121

Regardless of the changes in model specifications, uncertainty measures, and the regression techniques, the standalone uncertainty measure and the interaction terms between uncertainty and bank characteristics still yield unchanged patterns. The heterogeneity in the impact of uncertainty on credit risk strongly originates from bank size, capital, liquidity, and state ownership. Banking uncertainty is associated with a small increase in credit risk in larger banks, better capitalized banks, and more liquid banks. Our repeated evidence on the role of bank ownership confirms that the adverse influence of uncertainty on credit risk is heightened in state-owned banks.

D. Tests of the Search-for-yield Mechanism

Our finding thus far has consistently indicated that banks' credit risk increases in times of higher uncertainty. A potential mechanism to explain our finding could be attributed to the "search for yield" incentive when banks' return target does not change immediately after a decline in bank profits. To offer more insight into this mechanism, in this subsection we perform an additional test.

In line with Wu *et al.* (2020), we construct a new variable to capture the "search for yield" incentive by taking the gap between banks' current return level and its average level during the past three years. With this setting, banks with a larger return gap can earn higher profits to offset their losses, thus having less incentive to search for yield. We denote bank return by the Return-On-Asset ratio (ROA) and the Return-On-Equity ratio (ROE) to check the sensitivity of our estimates. We conduct our empirical experiments by incorporating the interaction term of uncertainty and (reverse) "search for yield" measures into our baseline model. When bank returns deteriorate in uncertain times, some banks tend to pursue a "search for yield" strategy by assigning their credit toward "high risk, high return" projects, thereby amplifying their risk (Dell'Ariccia *et al.*, 2014). If the "search for yield" incentive is at work, implying that uncertainty might raise bank risk under the "search for yield" hypothesis, we expect that banks experiencing a lower return gap (a higher "search for yield" incentive) would increase their credit risk to a higher extent. In this context, the coefficient on the interaction term should yield a negative sign.

We report our results in Table 10. The standalone uncertainty variable is still significantly positive, implying an increase in credit risk during higher uncertainty. Next, the coefficient on the interaction term is significantly negative in most columns, revealing that the detrimental impact of uncertainty on credit risk is more pronounced in banks with a stronger "search for yield" incentive. Our finding, in this situation, indicates that an increase in bank risk during uncertain times reflects banks' choices to some extent, rather than just the reactions of borrowers.

Table 10.
Tests of the "Search for Yield" Mechanism

We estimate all regressions by the system GMM estimator. The dependent variables are loan loss reserves (columns 1–3 and 7–9) and non-performing loans (columns 4–6 and 10–12). The uncertainty measure is exhibited at the top of each column. Standard errors are in parentheses. *** denotes the 1% significance level, ** 5% significance level, and * 10% significance level.

	Dependent Variable: Loan Loss Reserves (Columns 1–3)			Dependent Variable: Non-performing Loans (Columns 4–6)			Dependent Variable: Loan Loss Reserves Columns 7–9			Dependent Variable: Non-performing Loans (Columns 10–12)		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	UncAD	*UncFD*	*UncPD*	*UncAD*	*UncFD*	*UncPD*	*UncAD*	*UncFD*	*UncPD*	*UncAD*	*UncFD*	*UncPD*
Lagged dependent variable	0.575***	0.639***	0.711***	0.465***	0.568***	0.426***	0.579***	0.658***	0.693***	0.375***	0.544***	0.447***
	(0.042)	(0.044)	(0.033)	(0.043)	(0.038)	(0.044)	(0.041)	(0.043)	(0.036)	(0.039)	(0.034)	(0.041)
Uncertainty	0.013***	0.009***	0.088**	0.026***	0.037***	0.434**	0.015***	0.010***	0.145***	0.017**	0.036***	1.113***
	(0.002)	(0.002)	(0.041)	(0.007)	(0.004)	(0.190)	(0.002)	(0.002)	(0.048)	(0.008)	(0.003)	(0.294)
Uncertainty*Search-for-yield (ROA)	–0.002	–0.002	–0.945***	–0.007**	–0.033***	–2.588***						
	(0.008)	(0.003)	(0.121)	(0.003)	(0.009)	(0.852)						
Uncertainty*Search-for-yield (ROE)							–0.002***	–0.001	–0.063***	–0.004***	–0.003***	–0.473***
							(0.001)	(0.001)	(0.015)	(0.001)	(0.001)	(0.117)
Search-for-yield (ROA)	0.042	0.066	1.111***	–0.476**	0.479**	2.658***						
	(0.169)	(0.063)	(0.158)	(0.196)	(0.237)	(0.958)						
Search-for-yield (ROE)							0.050***	0.012	0.061***	–0.003	0.035**	0.527***
							(0.018)	(0.009)	(0.013)	(0.005)	(0.018)	(0.141)
Size	0.004	–0.015	0.003	–0.217***	–0.208***	0.054	0.001	–0.014	–0.063**	–0.462***	–0.194***	–0.187*
	(0.012)	(0.013)	(0.014)	(0.076)	(0.078)	(0.115)	(0.014)	(0.012)	(0.027)	(0.112)	(0.052)	(0.108)
Capital	–0.019***	–0.018***	–0.011***	–0.052***	–0.039**	0.001	–0.019***	–0.017***	–0.021***	–0.075***	–0.042***	–0.073***
	(0.002)	(0.002)	(0.003)	(0.014)	(0.018)	(0.018)	(0.002)	(0.002)	(0.005)	(0.016)	(0.015)	(0.024)
Liquidity	–0.001	–0.002*	0.001	–0.012**	–0.012***	0.001	–0.001	–0.001	0.002	–0.010*	–0.005	–0.011
	(0.001)	(0.001)	(0.002)	(0.006)	(0.003)	(0.005)	(0.001)	(0.001)	(0.003)	(0.005)	(0.005)	(0.008)
State ownership	0.103**	0.106**	–0.011	–0.053	0.109	–0.467*	0.117***	0.106**	0.148***	0.270	0.003	–0.315
	(0.049)	(0.042)	(0.043)	(0.159)	(0.145)	(0.247)	(0.041)	(0.042)	(0.056)	(0.181)	(0.128)	(0.220)

Table 10.
Tests of the "Search for Yield" Mechanism (Continued)

	Dependent Variable: Loan Loss Reserves (Columns 1–3)			Dependent Variable: Non-performing Loans (Columns 4–6)			Dependent Variable: Loan Loss Reserves Columns 7–9)			Dependent Variable: Non-performing Loans (Columns 10–12)		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	UncAD	*UncFD*	*UncPD*	*UncAD*	*UncFD*	*UncPD*	*UncAD*	*UncFD*	*UncPD*	*UncAD*	*UncFD*	*UncPD*
Economic growth	0.076***	0.094***	0.135***	0.402***	0.449***	0.402***	0.049**	0.092***	0.136***	0.369***	0.412***	0.384***
	(0.015)	(0.012)	(0.020)	(0.041)	(0.038)	(0.044)	(0.021)	(0.013)	(0.031)	(0.036)	(0.039)	(0.051)
Monetary policy	0.026***	0.027***	0.023***	0.046***	0.042***	0.070***	0.021***	0.024***	0.021***	0.028*	0.037***	0.084***
	(0.005)	(0.005)	(0.005)	(0.014)	(0.014)	(0.013)	(0.005)	(0.005)	(0.005)	(0.014)	(0.014)	(0.021)
Observations	324	324	324	285	285	285	324	324	324	285	285	285
Banks	31	31	31	31	31	31	31	31	31	31	31	31
Instruments	30	30	30	30	30	30	30	30	30	30	30	30
AR(1) test	0.000	0.000	0.000	0.001	0.002	0.000	0.000	0.000	0.000	0.001	0.001	0.000
AR(2) test	0.734	0.789	0.320	0.105	0.154	0.173	0.866	0.923	0.814	0.227	0.182	0.304
Hansen test	0.506	0.357	0.516	0.173	0.132	0.327	0.429	0.284	0.534	0.219	0.164	0.312

V. CONCLUSION

The paper aims at exploring the impact of banking uncertainty on the credit risk of commercial banks in Vietnam during the period 2007–2019. We find that banking uncertainty may increase banks' credit risk. More concretely, the unfavorable impact of banking uncertainty on credit risk is mitigated in larger, better capitalized, and more liquid banks. Compared to their private counterparts, state-owned banks are found to experience higher credit risk during periods of high uncertainty. Additional analysis also presents some evidence in support of the "search for yield" hypothesis and helps to better understand why credit risk increases amid uncertainty. Specifically, banks with a stronger search-for-yield incentive tend to increase their credit risk.

Our findings suggest that uncertainty in the banking sector is an essential factor contributing to banks' credit risk and hence regulators should bear it in mind when evaluating and ensuring bank safety and soundness. Along this line, regulators need to pay careful attention to certain types of banks or utilize complementary strategies to mitigate the detrimental impact of uncertainty on credit risk. For example, in periods of higher uncertainty, the execution of capital and liquidity rules could be strengthened. Since we document that state-owned banks are more vulnerable to uncertainty than private banks, we lend additional evidence in support of further privatization of banks in Vietnam. In addition, when the uncertainty–credit risk link could be attributed to banks' decisions, regulators should also dampen their risk-taking incentives to undermine the adverse consequences of uncertainty.

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