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# Uncertainty and Banks' Security Holdings

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The paper enriches the existing literature on financial intermediaries' operations in the face of uncertainty by empirically examining the impact of banking uncertainty on banks' security holdings. Using bank-level data in Vietnam during 2007–2019 to compute a micro uncertainty proxy based on the dispersion of bank shocks, we document that banking uncertainty tends to enhance total security holdings at banks. Decomposing aggregate securities into disaggregate components, we find that safer investments (including government bonds and financial institution bonds) dominate the overall impact of banking uncertainty on security holdings, which completely offset a drop in the volume of riskier investments (including corporate bonds and stocks) in times of higher uncertainty. Furthermore, our analysis reveals that the impact of banking uncertainty on all security holdings is stronger at riskier banks, thereby implying that bank behavior is likely attributable to the precautionary motive.

***Keywords:*** *Banking uncertainty; Government bonds; Precautionary motive; Security holdings.*

**JEL Classification:** G21, G32

## Introduction

How could uncertainty in economic and policy decisions drive economic and financial indicators? Many studies show that uncertainty exerts negative consequences on investments of firms (Drobetz, El Ghoul, Guedhami, & Janzen, 2018; Gulen & Ion, 2016; Kang, Lee, & Ratti, 2014), employment of individuals (Caggiano, Castelnuovo, & Figueres, 2017), and total output of the economy (Baker, Bloom, & Davis, 2016; Bloom, Floetotto, Jaimovich, Saporta-Eksten, & Terry, 2018). Focusing on the banking sector, which is a critical core component of the economic system, prior studies also reveal various banking responses to uncertainty. For instance, when facing a higher degree of uncertainty, banks tend to experience more risk (Karadima & Louri, 2021; Wu, Yao, Chen, & Jeon, 2020), raise lending prices (Ashraf & Shen, 2019), drop market values (He & Niu, 2018), mitigate financial leverage (Fu & Luo, 2021), and be less likely to accept new loan applications (Alessandri & Bottero, 2020). Notably, abundant work indicates that uncertainty may dampen bank loan growth (Bilgin, Danisman, Demir, & Tarazi, 2021; Bordo, Duca, & Koch, 2016; Buch, Buchholz, & Tonzer, 2015; Danisman, Ersan, & Demir, 2020; Hu & Gong, 2019; Valencia, 2017).

Completely absent from this literature strand is how uncertainty alters banks' security holdings. Apart from bank loans as mentioned above, the literature has only paid attention to general bank liquidity hoarding (see section 2 for a careful review). Filling such a literature

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gap is the purpose of this paper. Our research task is significant to analyze due to some motivations. Currently, banks are buying an increasing volume of securities, thus turning them into a sizable fraction of bank asset portfolios (Paludkiewicz, 2019). However, there is a conventional warning that holding more securities by banks could wipe out credit granted to the economy (Diamond & Rajan, 2001). Recent work also proves that the potency of monetary policy transmission could be damaged when banks structure their asset portfolios toward a greater buffer of securities (Peydró, Polo, & Sette, 2021). In some cases, policy proposals emerge in restricting banks from trading securities (Peydró et al., 2021).

For empirical analysis of the impact of uncertainty on banks' security holdings, we employ a sample of 31 commercial banks from Vietnam for the period 2007–2019. We perform regressions using fixed-effects techniques with corrected Driscoll-Kraay standard errors and further tackle the potential endogeneity bias through the generalized methods of moments (GMM) estimator. For the measure to capture uncertainty, we use bank-level data to compute the cross-sectional dispersion of shocks to key bank-level variables, as suggested by Buch et al. (2015). This micro uncertainty measure is particularly dedicated to reflecting uncertainty in the banking sector. The key advantages of our micro uncertainty measure are that it applies to all banks in the same system (instead of listed banks only), and it does not cast doubt about the accuracy of the text information in newspapers that need to be collected to produce text-based uncertainty (like economic policy uncertainty proxy). When focusing on a micro measure of uncertainty containing specific information for the banking field, we expect our research results to yield clear and particularistic implications. Notably, for a comprehensive understanding of the security holdings by banks, we are not only interested in how uncertainty drives aggregate securities, but we also pay attention to how uncertainty is associated with different disaggregated components of bank securities. We do this by breaking banks' total securities into multiple items, including government bonds, financial institution bonds, corporate bonds , and stocks.

We also postulate that banks design their security portfolios in uncertain times mainly due to precautionary reasons. To test this postulation, we create an interaction term between uncertainty and bank risk and add it to the regression model. The coefficient on the interaction term justifies whether there is any variation in bank security holdings' reaction to banking uncertainty according to bank risk profiles. On the one hand, our approach is motivated by the former literature, which exhibits that riskier banks tend to accumulate more cash reserves as a precautionary incentive (Acharya, Davydenko, & Strebulaev, 2012); on the other hand, our approach is close in spirit with that of Ashraf (2020), who expects banks with more loan losses to store more liquidity when confronting adverse shocks.

We consider Vietnam since it offers a valuable setting for this research. Vietnam could be treated as a fair representative for emerging economies, where banks declare a major position in the financial system and considerably contribute to regulating the economy (Dang, 2020). During the sample period, commercial banks have quickly enhanced security holdings, thereby making them key members of the security market. However, these security holdings (mainly government bonds) have been limited by banking regulations in recent years (Dang & Huynh, 2020). In principle, performing research on uncertainty in an emerging economy also enjoys several advantages. Concretely, emerging economies are exposed to a higher uncertainty level compared to developed ones (Bloom, 2014), and possibly the consequences of uncertainty on banks in emerging markets may be more pronounced than banks in advanced economies (Nguyen, Le, & Su, 2020). In fact, over the past few years, banking uncertainty in Vietnam has been activated and substantially volatile due to the causes of multiple different forces, such as the 2008 global crisis, the bad debt boom in 2012, and abundant policy reforms for the banking system along with heavy pressure to upgrade international management standards (Batten & Vo, 2019).

This paper contributes to the hot literature stream on the link between uncertainty and bank decisions. We enrich this literature stream by empirically investigating the impact of uncertainty in banking on banks' security holdings. We try to provide comprehensive findings by (i) decomposing aggregate securities into disaggregate items (including government bonds, financial institution bonds, corporate bonds, and stocks), and (ii) checking whether the heterogeneity in the response of banks' security holdings to uncertainty originates from the precautionary motive. These approaches allow us to offer more insight into the issue under research. Besides, unlike all prior related studies exploring banks' asset portfolio reaction to economic policy uncertainty, we rely on the cross-sectional dispersion of bank-level shocks to introduce uncertainty explicitly associated with banking activities. Understanding the impacts of uncertainty at an aggregate level like economic policy uncertainty is not a complete story. Given the variation in nature for different uncertainty measures, it is essential to understand how uncertainty in banking drives banks' investment decisions.

We structure the remainder of the paper as follows. The second part of the paper offers a concise literature review. The third part exhibits our empirical model specification, data sources, and variable construction. The fourth part of the paper offers estimation results and relevant discussion. The final part concludes our work with policy implications derived from our findings.

## Literature Review

In theory, several mechanisms help predict the effect of uncertainty on bank holdings of securities. A significant decrease in credit demands in times of high uncertainty, due to the postponement in investment and spending from firms and households, may lead to more difficulty for banks to offer credit to the economy (Bloom, 2009). Also, lenders may be more hesitant to lend if they are aware that uncertainty could enormously increase the default likelihood of their borrowers (Mishkin, 1999). As a result, banks might adopt a "wait and see" strategy (McDonald & Siegel, 1986) and choose to invest in securities with appropriate features as an alternative plan (Broner, Erce, Martin, & Ventura, 2014). Additionally, when it comes to banks' own decisions, one could argue that banks might store an optimal amount of liquid assets with a precautionary motive to protect themselves against potential adverse liquidity shocks caused by uncertainty (Allen & Gale, 2004). Accordingly, these liquid assets could be in the form of cash or securities (Berger, Guedhami, Kim, & Li, 2020). Overall, under all these routes, uncertainty is expected to encourage banks to increase security holdings.

Interestingly, the literature also introduces a competing route. Under the pressure of lower credit demands amid greater uncertainty, banks have to cut lending rates (Hartzmark, 2016); in the context of depositors demanding a higher risk premium due to the threat of adverse shocks, banks have to accept higher funding costs (Valencia, 2017). Together, these mechanisms lessen bank profits, thus forcing banks to find ways to compensate for reduced profits since their business goals are often fixed. As a result, banks are more likely to approach "high-risk, high-yield" projects (Dell'Ariccia, Laeven, & Marquez, 2014). If this "search for yield" motive is at work, banks may reduce the holdings of securities, which are often associated with lower returns than loans. As the portfolios held by banks include various types of securities with different risk-return characteristics, it is necessary to decompose these portfolios to produce a more comprehensive assessment. In sum, how uncertainty affects the security holdings of banks is theoretically ambiguous.

We know of two recent studies that are related to ours. Berger et al. (2020) use a novel measure of bank liquidity hoarding (based on the classification of all assets and liabilities banking items) to indicate that US banks build up their liquidity buffers in periods of higher economic policy uncertainty. In a contemporaneous study, Ashraf (2020) focuses on 21 major countries and reaches a similar conclusion but via a different liquidity measure defined by the ratio of cash and reserves to total assets. In general, their core research tasks are related but

distinct from ours. Our paper is interested in the holdings of securities by banks, also broken down into different types of bonds and stocks, which prior works do not specifically investigate. In addition, while both previous papers analyze the aggregate level of economic policy uncertainty using a text-based index, our work explores micro uncertainty particularly associated with the banking sector by utilizing bank-level data.

# Research Methods

### *Model and Variables*

To empirically examine the relationship between uncertainty and banks' security holdings, we begin with the following baseline model (as suggested by a not-reported Hausman test):

$$Sec_{i,t}=\alpha_0+\alpha_1\times Unc_{t-1}+\alpha_2\times X_{i,t-1}+\alpha_3\times Z_{t-1}+v_i+\varepsilon_{i,t} \quad (1)$$

where $i$ and $t$ denote banks and years, respectively. The dependent variable *Sec* is captured by the ratio of total securities to total assets. Aiming at offering a comprehensive understanding, we further decompose total securities into disaggregate ingredients, including government bonds, financial institution bonds, corporate bonds, and stocks. *Unc* is the uncertainty measure for the banking sector of primary interest. $v_i$ is bank fixed effects, and $\varepsilon_{i,t}$ is the error term. $X$ controls bank-level variables, and Z controls macroeconomic variables. When allowing for the macroeconomic environment, we do not incorporate into our model time-fixed effects. We lag all independent variables by one period to reduce the potential problem of reverse causality and reflect the lagged responses of banks to both internal and external impacts.

We regress our baseline model by employing Hoechle (2007)'s procedure to generate Driscoll-Kraay standard errors, bringing us the results robust to general forms of cross-sectional and temporal dependence, heteroskedasticity, and autocorrelation. We are also aware that our fixed effect regressions could face some challenges due to the potential endogeneity concerns, possibly caused by omitted variables or measurement errors. We fully handle this issue by additionally utilizing an alternative econometric methodology — the two-step system GMM estimator in the dynamic panel model (Blundell & Bond, 1998). This widely-applied estimator not only effectively tackles the endogeneity problem but also takes into account the persistence of the bank's security holding behaviors via adding the lagged dependent variable as a critical regressor in the estimation model. While employing the syntax "xtabond2" in Stata, consistent with the extant literature, we treat the lagged dependent variable and bank-level controls as predetermined or endogenous, and the uncertainty and macroeconomic variables are considered as strictly exogenous and instrumented by themselves (Cantero-Saiz et al., 2014; Danisman et al., 2020; Roodman, 2009). To restrict the number of instruments, we limit the lag range used in creating instruments to two. We need some technical assumptions and diagnostic tests to assure the consistency of our dynamic GMM estimator: the AR(1) and AR(2) tests are reported to indicate the first- but not second-order serial correlation in the residuals, and the Hansen test is required to confirm the joint validity of instruments employed.

When selecting bank-level control variables, we first allow for bank size. Following the "too big to fail" hypothesis, large banks may confidently operate with a risky asset portfolio and hold a small buffer of liquid securities (Delechat, Henao Arbelaez, Muthoora, & Vtyurina, 2012). We select bank capital, as inspired by the notion that banks could raise their security trading demands due to regulatory capital requirements (Bonner, 2016). Also, bank risk and return are considered. While a surge in bank credit risk may encourage banks to shift toward security holdings — under the precautionary motive, a drop in bank return may prompt banks to hoard less liquid assets and invest more in "high-risk, high-yield" assets — under the strategic motive (Acharya et al., 2012; Dell'Ariccia et al., 2014). Along with these bank-level variables, we also consider economic growth and refinancing rates as macroeconomic control factors. The reason we select these variables is that in times of economic upturn or relaxed monetary policy, the


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Table 1. Descriptive statistics of variables

| | Mean | SD | Min | Max | Definitions |
|---|---|---|---|---|---|
| Total securities | 16.43 | 6.87 | 5.20 | 30.55 | Total securities/Total assets (%) |
| Government bonds | 8.49 | 4.90 | 1.10 | 19.40 | Government bonds/Total assets (%) |
| Institution bonds | 3.63 | 3.22 | 0.00 | 11.06 | Institution bonds/Total assets (%) |
| Corporate bonds | 3.48 | 3.38 | 0.00 | 11.57 | Corporate bonds/Total assets (%) |
| Stocks | 0.37 | 0.51 | 0.00 | 1.88 | Stocks/Total assets (%) |
| Size | 32.01 | 1.22 | 30.02 | 34.27 | Natural logarithm of total assets (in VND millions) |
| Capital | 9.87 | 4.36 | 4.94 | 20.47 | Equity/Total assets (%) |
| Loan loss provisions | 0.95 | 0.67 | 0.12 | 2.51 | Loan loss provisions/Gross loans (%) |
| Return | 1.55 | 0.81 | 0.25 | 3.15 | Return on assets (%) |
| Asset dispersion | 21.94 | 6.75 | 13.43 | 34.09 | Dispersion of shocks to assets |
| Funding dispersion | 24.23 | 7.89 | 16.00 | 40.93 | Dispersion of shocks to funding |
| Profit dispersion | 1.27 | 0.39 | 0.67 | 2.06 | Dispersion of shocks to profitability |
| Economic growth | 6.25 | 0.64 | 5.25 | 7.13 | GDP growth rate (%) |
| Refinancing rates | 8.02 | 2.54 | 6.00 | 15.00 | Refinancing rates (%) |

economic sectors may increase credit demands and banks may have more loanable funds to grant to the market, which potentially stimulate lending and restrain the holdings of securities (Adesina, 2019; Bertay, Demirgüç-Kunt, & Huizinga, 2015). Overall, all control variables in this study are defined in Table 1.

We need to pay more attention to the construction of the uncertainty measure. Following Buch et al. (2015), in this paper, we intend to use the cross-sectional dispersion of fundamental bank-level shocks to percentage changes in total assets, short-term funding, and the level of profitability to capture uncertainty in banking. To this end, a two-step procedure is utilized. In the first step, we estimate the formula as follows to obtain bank-year shocks for each bank-level variable:

$$X_{i,t}=\alpha_i+\beta_t+\varepsilon_{i,t} \quad (2)$$

where $X_{i,t}$ is one of the three separate variables selected for bank $i$ in year $t$, $\alpha_i$ denotes bank fixed effects, and $\beta_t$ reflects time fixed effects. The residuals $\varepsilon_{i,t}$ of the model stand for bank-level shocks,. We then use these residuals to calculate the cross-sectional dispersion of shocks in the second step as follows:

$$Uncertainty_t=SD(\varepsilon_{i,t}) \quad (3)$$

We reach the dispersion of bank shocks by using the standard deviation (*SD*) of residuals, ultimately indicating the banking uncertainty in year $t$ for the whole banking market. A larger dispersion illustrates a higher level of banking uncertainty. It could be seen that this approach to computing the banking uncertainty is a well-adopted application of the literature on firm-level uncertainty. Concretely, Bloom et al. (2018) demonstrate that the cross-sectional dispersion of firm-level shocks could display idiosyncratic deviations in information signals across firms, thus serving as a good proxy for micro uncertainty.

## Data

Our study employs an unbalanced data panel with 383 observations for the period 2007–2019 from Vietnamese commercial banks. Bank-level data is collected from the annual financial reports of 31 commercial banks, making up over 90% of the banking system's total assets. Macroeconomic data is derived from the Global Financial Development Database of the World Bank and the State Bank of Vietnam. We winsorize all bank-level variables at 2.5% and 97.5% to neutralize the impacts of extreme outliers.

We now look at Table 1 for the descriptive statistics of all variables. Vietnamese banks place 16.43% of their total assets in securities during the sample period, on average. Most of the securities are bonds, out of which 8.49% are issued by the government, and 3.63% are issued by financial institutions. With our micro uncertainty measures based on the dispersion of three bank-level shocks, their statistical distribution with large standard deviations and broad ranges

## Table 2. Estimation results for the model of total securities

| | Dependent variable: Total securities | | | | | |
|---|---|---|---|---|---|---|
| | Fixed effect regressions (columns 1–3) | | | System GMM estimator (columns 4–6) | | |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Lagged dependent variable | | | | 0.481*** | 0.549*** | 0.499*** |
| | | | | (0.018) | (0.023) | (0.027) |
| Asset dispersion | 0.199*** | | | 0.150*** | | |
| | (0.052) | | | (0.015) | | |
| Funding dispersion | | 0.084* | | | 0.149*** | |
| | | (0.046) | | | (0.017) | |
| Profit dispersion | | | 2.169*** | | | 0.633** |
| | | | (0.589) | | | (0.309) |
| Size | 0.728 | –0.733 | –2.778*** | –0.790*** | –0.673*** | –1.351*** |
| | (0.880) | (0.944) | (0.749) | (0.277) | (0.232) | (0.446) |
| Capital | 0.306** | 0.055 | 0.051 | –0.187** | –0.147** | –0.213*** |
| | (0.138) | (0.087) | (0.193) | (0.077) | (0.070) | (0.077) |
| Loan loss provisions | 2.065*** | 1.606*** | 1.322*** | 1.268*** | 1.196*** | 1.420*** |
| | (0.425) | (0.235) | (0.223) | (0.178) | (0.151) | (0.286) |
| Return | –1.001** | –0.341 | –0.926* | 0.053 | –0.178 | –0.151 |
| | (0.337) | (0.555) | (0.441) | (0.288) | (0.280) | (0.257) |
| Economic growth | –1.419*** | –1.084* | –0.961* | –0.702*** | –0.364*** | –1.106*** |
| | (0.362) | (0.489) | (0.464) | (0.066) | (0.093) | (0.259) |
| Refinancing rates | –0.067 | –0.099 | 0.024 | –0.100** | –0.081** | 0.293*** |
| | (0.054) | (0.107) | (0.078) | (0.042) | (0.035) | (0.051) |
| Observations | 352 | 352 | 352 | 352 | 352 | 352 |
| Banks | 31 | 31 | 31 | 31 | 31 | 31 |
| R-squared | 0.174 | 0.117 | 0.177 | | | |
| Instruments | | | | 29 | 29 | 29 |
| AR(1) test | | | | 0.001 | 0.001 | 0.002 |
| AR(2) test | | | | 0.685 | 0.691 | 0.579 |
| Hansen test | | | | 0.351 | 0.303 | 0.407 |

Note: *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively. Standard errors are in parentheses. Diagnostic tests are reported with p-values. Please refer to Table 1 for the definitions of variables.

## Table 3. Estimation results for the model of government bonds

| | Dependent variable: Government bonds | | | | | |
|---|---|---|---|---|---|---|
| | Fixed effect regressions (columns 1–3) | | | System GMM estimator (columns 4–6) | | |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Lagged dependent variable | | | | 0.614*** | 0.517*** | 0.494*** |
| | | | | (0.019) | (0.043) | (0.021) |
| Asset dispersion | 0.134*** | | | 0.095*** | | |
| | (0.021) | | | (0.018) | | |
| Funding dispersion | | 0.086*** | | | 0.047** | |
| | | (0.013) | | | (0.020) | |
| Profit dispersion | | | 4.294*** | | | 3.237*** |
| | | | (1.105) | | | (0.318) |
| Size | –3.265** | 2.499* | 1.013** | 0.403 | –0.768*** | 0.032 |
| | (1.253) | (1.176) | (0.432) | (0.274) | (0.266) | (0.235) |
| Capital | –0.227 | 0.193* | 0.047 | –0.022 | –0.352*** | –0.072* |
| | (0.211) | (0.086) | (0.056) | (0.054) | (0.112) | (0.044) |
| Loan loss provisions | 0.683** | 2.150*** | 1.950*** | 1.218*** | 3.764*** | 1.024*** |
| | (0.240) | (0.280) | (0.379) | (0.192) | (0.609) | (0.157) |
| Return | 0.157 | –2.020*** | –0.948*** | –0.913*** | –1.441*** | –0.262 |
| | (0.507) | (0.446) | (0.232) | (0.175) | (0.362) | (0.188) |
| Economic growth | –0.568 | –1.420*** | –0.871 | –0.100 | –0.260 | –0.409*** |
| | (0.314) | (0.389) | (0.634) | (0.091) | (0.189) | (0.089) |
| Refinancing rates | –0.364*** | –0.001 | –0.302* | 0.178*** | 0.262*** | –0.070 |
| | (0.076) | (0.172) | (0.140) | (0.036) | (0.039) | (0.052) |
| Observations | 352 | 352 | 352 | 352 | 352 | 352 |
| Banks | 31 | 31 | 31 | 31 | 31 | 31 |
| R-squared | 0.218 | 0.208 | 0.227 | | | |
| Instruments | | | | 29 | 29 | 29 |
| AR(1) test | | | | 0.001 | 0.000 | 0.001 |
| AR(2) test | | | | 0.908 | 0.598 | 0.483 |
| Hansen test | | | | 0.287 | 0.640 | 0.364 |

Note: *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively. Standard errors are in parentheses. Diagnostic tests are reported with p-values. Please refer to Table 1 for the definitions of variables.


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of minimum-maximum values suggests remarkable volatility in banking uncertainty. Besides, other control variables reveal a common pattern that bank-specific characteristics are heterogeneous across sample banks, thus ensuring the advantage of using bank-level data to analyze the nature of banks' security holdings under uncertainty. Regarding the correlation coefficients between independent variables (not reported for brevity), severe multicollinearity should not be a major matter due to small correlation coefficients. As a further note, we also perform checks using the variance inflation factor (VIF) to ensure the non-existence of severe multicollinearity.

## Results and Discussions

### *Benchmark estimation results*

Table 2 reports regressions of total securities. In columns 1–3, we run fixed effect regressions with corrected Driscoll-Kraay standard errors. In columns 4–6, we perform regressions based on the dynamic GMM estimator, which is validated by the significance of the lagged dependent variable, the number of instruments created, the AR(1)/AR(2), and Hansen tests (presented underneath the table). In all specifications, the coefficient on uncertainty is statistically significant and positive, regardless of the types of shock dispersion used. This pattern indicates that banks' total security holdings tend to increase in response to higher uncertainty in banking . Our results also justify the economic significance. For example, the coefficient estimates on asset dispersion, funding dispersion, and profit dispersion (of the GMM estimators in columns 4–6) suggest that a one-standard-deviation rise in banking uncertainty may cause an increase of 1.013 (6.75*0.150), 1.176 (7.89*0.149), and 0.247 (0.39*0.633) percentage points in the holdings of total securities relative to total assets, respectively.

Based on the results reported above, we could evaluate the impact of banking uncertainty on security holdings by banks at the aggregate level. To offer more insight into this impact, we now decompose total securities and conduct regressions with disaggregate items. In Tables 3–6, we replace the dependent variable total securities with one of its four components: government bonds, institution bonds, corporate bonds, and stocks.

As all columns of Table 3 display, holdings of government bonds react significantly positively to banking uncertainty. Next, as all regressions of Table 4 show, financial institution bonds held by banks are significantly positively associated with uncertainty. Hence, these results suggest that when the level of banking uncertainty is boosted, banks react by holding more government and financial institution bonds. The estimation results shown in Table 5 reveal that the influence of uncertainty on corporate bonds is significantly negative in most columns. It indicates that banks' corporate bonds may decrease amid greater uncertainty. Similarly, the micro uncertainty index enters negative and significant across all stock regressions in Table 6. This result suggests that banks may reduce the stock investment in response to heightened uncertainty. Overall, the coefficient estimates on all uncertainty measures also support the economic significance of our results, which firmly hold with fixed effect/dynamic GMM regressions and across alternative uncertainty measures based on bank-level data.

The item-by-item examination anatomizes our main findings. A higher level of uncertainty in a key financial market makes banks more cautious with their investment decisions (Allen & Gale, 2004), so they react by holding more securities as a whole. This increase in security holdings is dominated by a surge in safer investments (including government and financial institution bonds), completely offsetting a drop in riskier investments (corporate bonds and stocks). Hence, we gain certain evidence in favor of the precautionary motive for banks in uncertain times when it comes to the holdings of government bonds, which are rated as risk-free assets, and the holdings of financial institution bonds, which are less risky compared to corporate bonds, stocks, and especially loans. With this finding, one could be concerned that banks' shifts towards government and financial institution bonds during uncertain periods may

## Table 4. Estimation results for the model of institution bonds

| | Dependent variable: Institution bonds | | | | | |
|---|---|---|---|---|---|---|
| | Fixed effect regressions (columns 1–3) | | | System GMM estimator (columns 4–6) | | |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Lagged dependent variable | | | | 0.725*** | 0.737*** | 0.781*** |
| | | | | (0.028) | (0.020) | (0.025) |
| Asset dispersion | 0.187*** | | | 0.053*** | | |
| | (0.048) | | | (0.016) | | |
| Funding dispersion | | 0.109** | | | 0.099*** | |
| | | (0.040) | | | (0.009) | |
| Profit dispersion | | | 1.434** | | | 0.743*** |
| | | | (0.458) | | | (0.050) |
| Size | 0.518 | 0.187 | –1.892* | 0.062*** | 0.197 | 0.091 |
| | (0.474) | (0.732) | (0.870) | (0.012) | (0.183) | (0.214) |
| Capital | 0.027 | 0.022 | –0.206* | 0.064*** | 0.063 | 0.080* |
| | (0.071) | (0.094) | (0.098) | (0.024) | (0.039) | (0.048) |
| Loan loss provisions | –0.256* | –0.414*** | –0.630*** | –0.191*** | –0.082 | –0.282*** |
| | (0.124) | (0.117) | (0.180) | (0.070) | (0.117) | (0.085) |
| Return | 0.814** | 0.769** | 1.304*** | 0.461*** | 0.268** | 0.521*** |
| | (0.272) | (0.280) | (0.377) | (0.037) | (0.106) | (0.055) |
| Economic growth | 0.453 | 0.357 | 1.059* | –0.167** | 0.086 | –0.296*** |
| | (0.401) | (0.482) | (0.539) | (0.069) | (0.081) | (0.107) |
| Refinancing rates | –0.147* | –0.076 | –0.117 | –0.285*** | –0.299*** | –0.234*** |
| | (0.079) | (0.062) | (0.083) | (0.019) | (0.024) | (0.020) |
| Observations | 352 | 352 | 352 | 352 | 352 | 352 |
| Banks | 31 | 31 | 31 | 31 | 31 | 31 |
| R-squared | 0.148 | 0.143 | 0.178 | | | |
| Instruments | | | | 29 | 29 | 29 |
| AR(1) test | | | | 0.002 | 0.001 | 0.002 |
| AR(2) test | | | | 0.464 | 0.372 | 0.725 |
| Hansen test | | | | 0.294 | 0.355 | 0.443 |

Note: *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively. Standard errors are in parentheses. Diagnostic tests are reported with p-values. Please refer to Table 1 for the definitions of variables.

## Table 5. Estimation results for the model of corporate bonds

| | Dependent variable: Corporate bonds | | | | | |
|---|---|---|---|---|---|---|
| | Fixed effect regressions (columns 1–3) | | | System GMM estimator (columns 4–6) | | |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Lagged dependent variable | | | | 0.718*** | 0.732*** | 0.630*** |
| | | | | (0.037) | (0.021) | (0.020) |
| Asset dispersion | –0.321*** | | | –0.089*** | | |
| | (0.021) | | | (0.021) | | |
| Funding dispersion | | –0.021* | | | –0.049*** | |
| | | (0.011) | | | (0.009) | |
| Profit dispersion | | | –0.679* | | | –0.512*** |
| | | | (0.364) | | | (0.128) |
| Size | 2.155** | –0.942* | –0.604 | –1.031*** | –0.138 | –0.296* |
| | (0.642) | (0.439) | (0.445) | (0.189) | (0.144) | (0.179) |
| Capital | 0.041 | –0.006 | 0.135** | –0.170*** | –0.011 | –0.066* |
| | (0.040) | (0.122) | (0.053) | (0.043) | (0.035) | (0.037) |
| Loan loss provisions | –0.316* | –0.371** | –0.133 | –0.132 | 0.036 | –0.025 |
| | (0.133) | (0.142) | (0.191) | (0.166) | (0.071) | (0.117) |
| Return | 0.139 | –0.348 | –0.339 | 0.323 | –0.168 | –0.271** |
| | (0.138) | (0.253) | (0.257) | (0.203) | (0.135) | (0.113) |
| Economic growth | –6.212*** | –0.887*** | –0.605* | –0.460*** | –0.686*** | –0.430*** |
| | (0.309) | (0.131) | (0.287) | (0.101) | (0.084) | (0.087) |
| Refinancing rates | –7.575*** | 0.031 | 0.084** | 0.030 | 0.105*** | 0.054** |
| | (0.431) | (0.033) | (0.036) | (0.031) | (0.028) | (0.027) |
| Observations | 352 | 352 | 352 | 352 | 352 | 352 |
| R-squared | 0.223 | 0.169 | 0.200 | | | |
| Banks | | | | 31 | 31 | 31 |
| Instruments | | | | 29 | 29 | 29 |
| AR(1) test | | | | 0.001 | 0.002 | 0.002 |
| AR(2) test | | | | 0.379 | 0.659 | 0.784 |
| Hansen test | | | | 0.173 | 0.147 | 0.128 |

Note: *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively. Standard errors are in parentheses. Diagnostic tests are reported with p-values. Please refer to Table 1 for the definitions of variables.


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Table 6. Estimation results for the model of stocks

| | Dependent variable: Stocks | | | | | |
|---|---|---|---|---|---|---|
| | Fixed effect regressions (columns 1–3) | | | System GMM estimator (columns 4–6) | | |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Lagged dependent variable | | | | 0.539*** | 0.567*** | 0.570*** |
| | | | | (0.008) | (0.006) | (0.008) |
| Asset dispersion | –0.006** | | | –0.004*** | | |
| | (0.002) | | | (0.001) | | |
| Funding dispersion | | –0.005** | | | –0.005*** | |
| | | (0.002) | | | (0.001) | |
| Profit dispersion | | | –0.058* | | | –0.119*** |
| | | | (0.030) | | | (0.013) |
| Size | –0.250*** | –0.253*** | –0.239*** | 0.007 | 0.008 | –0.029*** |
| | (0.038) | (0.037) | (0.047) | (0.012) | (0.015) | (0.006) |
| Capital | –0.017*** | –0.017*** | –0.019* | 0.011*** | 0.011** | –0.006*** |
| | (0.005) | (0.004) | (0.010) | (0.004) | (0.004) | (0.001) |
| Loan loss provisions | –0.057 | –0.056 | –0.040** | –0.095*** | –0.138*** | –0.003 |
| | (0.056) | (0.057) | (0.017) | (0.012) | (0.005) | (0.008) |
| Return | –0.014 | –0.013 | 0.023 | 0.043*** | 0.063*** | 0.031*** |
| | (0.043) | (0.043) | (0.035) | (0.016) | (0.013) | (0.007) |
| Economic growth | –0.093*** | –0.098*** | –0.018 | –0.032*** | –0.049*** | –0.034*** |
| | (0.026) | (0.019) | (0.039) | (0.010) | (0.013) | (0.005) |
| Refinancing rates | –0.007 | –0.010* | –0.011** | –0.003 | –0.010*** | –0.007*** |
| | (0.006) | (0.006) | (0.005) | (0.003) | (0.001) | (0.002) |
| Observations | 352 | 352 | 352 | 352 | 352 | 352 |
| Banks | 31 | 31 | 31 | 31 | 31 | 31 |
| R-squared | 0.161 | 0.163 | 0.143 | | | |
| Instruments | | | | 29 | 29 | 29 |
| AR(1) test | | | | 0.018 | 0.012 | 0.011 |
| AR(2) test | | | | 0.450 | 0.468 | 0.352 |
| Hansen test | | | | 0.170 | 0.176 | 0.153 |

Note: *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively. Standard errors are in parentheses. Diagnostic tests are reported with p-values. Please refer to Table 1 for the definitions of variables.

mitigate the core function of the banking system and then hurt the real economic sectors.

## Is the precautionary motive at work? Further evidence

In this part, we aim at offering further evidence to shed light on the mechanism behind our main results obtained thus far. While banks hold more securities in response to more prominent uncertainty, particularly government bonds and financial institution bonds, we conjecture that the precautionary motive could drive bank behaviors. We clarify this mechanism by testing whether the holdings of securities are more pronounced for banks with more risky profiles, and hence these risky banks may increase the holdings of safe securities (or reduce the holdings of risky securities) to a larger extend in periods of higher uncertainty. Our research strategy is similar to Ashraf (2020), who is also interested in investigating the channel through which economic policy uncertainty enhances bank liquid assets.

In this regard, we rely on the modifying factor of bank risk (captured by loan loss provisions as elaborated earlier) and interact it with uncertainty; then, we incorporate the interaction term into the baseline equation to estimate the differential impact. In Table 7, we perform estimations in the extended model of total securities. For a "larger picture", we also run regressions in the function of government bonds (Table 8), institution bonds (Table 9), corporate bonds (Table 10), and stocks (Table 11).

The estimated coefficients on standalone uncertainty measures across different specifications remain significant with the same signs as previously reported, confirming that banks tend to buy more overall securities in times of higher uncertainty, broken down by an increase in government and financial institution bonds and a decrease in corporate bonds and stocks. We now turn to the interaction term of interest. Based on the results in Table 7, we find that the estimated coefficient on the interaction term is significantly positive in most columns. This result implies that when the uncertainty level is

## Table 7. Estimation results for the model of total securities including the interaction term

| | Dependent variable: Total securities | | | | | |
|---|---|---|---|---|---|---|
| | Fixed effect regressions (columns 1–3) | | | System GMM estimator (columns 4–6) | | |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Lagged dependent variable | | | | 0.498*** | 0.624*** | 0.559*** |
| | | | | (0.052) | (0.039) | (0.063) |
| Asset dispersion | 0.254*** | | | 0.171*** | | |
| | (0.076) | | | (0.027) | | |
| Asset dispersion*Loan loss provisions | 0.036* | | | 0.017* | | |
| | (0.016) | | | (0.010) | | |
| Funding dispersion | | 0.064 | | | 0.180*** | |
| | | (0.047) | | | (0.008) | |
| Funding dispersion*Loan loss provisions | | 0.021** | | | 0.018* | |
| | | (0.008) | | | (0.009) | |
| Profit dispersion | | | 1.800** | | | 5.714*** |
| | | | (0.594) | | | (1.694) |
| Profit dispersion*Loan loss provisions | | | 0.389* | | | 4.732*** |
| | | | (0.173) | | | (1.493) |
| Size | 0.414 | –0.882 | –2.890** | –0.703*** | –0.609*** | –0.596 |
| | (0.960) | (0.940) | (0.893) | (0.175) | (0.119) | (0.609) |
| Capital | 0.155 | 0.045 | 0.007 | –0.145*** | –0.112** | –0.034 |
| | (0.108) | (0.082) | (0.204) | (0.054) | (0.047) | (0.118) |
| Loan loss provisions | 1.591*** | 1.463*** | 0.639* | 1.621*** | 1.401*** | 7.347*** |
| | (0.213) | (0.216) | (0.338) | (0.255) | (0.176) | (1.674) |
| Return | –0.849** | –0.347 | –0.820 | –0.354 | –0.591*** | –0.253 |
| | (0.337) | (0.567) | (0.492) | (0.232) | (0.210) | (0.278) |
| Economic growth | –0.616 | –1.002* | –1.320** | –0.440* | 0.010 | –1.023*** |
| | (0.513) | (0.493) | (0.510) | (0.261) | (0.231) | (0.312) |
| Refinancing rates | –0.147 | –0.071 | –0.005 | –0.161** | –0.149* | 0.383*** |
| | (0.090) | (0.112) | (0.100) | (0.079) | (0.087) | (0.078) |
| Observations | 352 | 352 | 352 | 352 | 352 | 352 |
| Banks | 31 | 31 | 31 | 31 | 31 | 31 |
| R-squared | 0.157 | 0.121 | 0.165 | | | |
| Instruments | | | | 30 | 30 | 30 |
| AR(1) test | | | | 0.002 | 0.001 | 0.000 |
| AR(2) test | | | | 0.701 | 0.659 | 0.604 |
| Hansen test | | | | 0.181 | 0.323 | 0.563 |

Note: *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively. Standard errors are in parentheses. Diagnostic tests are reported with p-values. Please refer to Table 1 for the definitions of variables.

## Table 8. Estimation results for the model of government bonds including the interaction term

| | Dependent variable: Government bonds | | | | | |
|---|---|---|---|---|---|---|
| | Fixed effect regressions (columns 1–3) | | | System GMM estimator (columns 4–6) | | |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Lagged dependent variable | | | | 0.638*** | 0.557*** | 0.513*** |
| | | | | (0.025) | (0.036) | (0.038) |
| Asset dispersion | 0.131*** | | | 0.085*** | | |
| | (0.022) | | | (0.020) | | |
| Asset dispersion*Loan loss provisions | 0.066*** | | | 0.028* | | |
| | (0.015) | | | (0.017) | | |
| Funding dispersion | | 0.053** | | | 0.077*** | |
| | | (0.021) | | | (0.021) | |
| Funding dispersion*Loan loss provisions | | 0.052*** | | | 0.041** | |
| | | (0.007) | | | (0.016) | |
| Profit dispersion | | | 3.798* | | | 6.093*** |
| | | | (1.922) | | | (1.768) |
| Profit dispersion*Loan loss provisions | | | 0.907*** | | | 1.950** |
| | | | (0.272) | | | (0.923) |
| Size | –3.355** | 2.318* | 1.648** | 0.523* | –0.186 | –0.231 |
| | (1.214) | (1.172) | (0.651) | (0.285) | (0.378) | (0.171) |
| Capital | –0.190 | 0.218** | 0.030 | –0.001 | –0.207 | –0.178*** |
| | (0.206) | (0.086) | (0.057) | (0.056) | (0.159) | (0.047) |
| Loan loss provisions | 0.267 | 1.814*** | 1.498*** | 0.820** | 1.697*** | –1.159 |
| | (0.183) | (0.231) | (0.252) | (0.324) | (0.227) | (1.144) |
| Return | 0.269 | –1.955*** | –1.513*** | –0.777*** | –2.075*** | –0.172 |
| | (0.525) | (0.447) | (0.231) | (0.202) | (0.348) | (0.143) |
| Economic growth | –0.270 | –1.491*** | –1.089 | –0.208* | –0.164 | –1.009*** |
| | (0.201) | (0.440) | (0.633) | (0.121) | (0.160) | (0.157) |
| Refinancing rates | –0.447*** | –0.093 | 0.122 | 0.138*** | 0.142*** | –0.185*** |
| | (0.067) | (0.163) | (0.169) | (0.043) | (0.047) | (0.060) |
| Observations | 352 | 352 | 352 | 352 | 352 | 352 |
| Banks | 31 | 31 | 31 | 31 | 31 | 31 |
| R-squared | 0.248 | 0.228 | 0.256 | | | |
| Instruments | | | | 30 | 30 | 30 |
| AR(1) test | | | | 0.001 | 0.000 | 0.001 |
| AR(2) test | | | | 0.842 | 0.439 | 0.595 |
| Hansen test | | | | 0.341 | 0.561 | 0.670 |

Note: *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively. Standard errors are in parentheses. Diagnostic tests are reported with p-values. Please refer to Table 1 for the definitions of variables.



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Table 9. Estimation results for the model of institution bonds including the interaction term

| | Dependent variable: Institution bonds | | | | | |
|---|---|---|---|---|---|---|
| | Fixed effect regressions (columns 1–3) | | | System GMM estimator (columns 4–6) | | |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Lagged dependent variable | | | | 0.574*** | 0.738*** | 0.813*** |
| | | | | (0.028) | (0.024) | (0.034) |
| Asset dispersion | 0.140*** | | | 0.038** | | |
| | (0.031) | | | (0.015) | | |
| Asset dispersion*Loan loss provisions | 0.023** | | | 0.060*** | | |
| | (0.008) | | | (0.007) | | |
| Funding dispersion | | 0.094*** | | | 0.110*** | |
| | | (0.027) | | | (0.012) | |
| Funding dispersion*Loan loss provisions | | 0.028*** | | | 0.017*** | |
| | | (0.008) | | | (0.006) | |
| Profit dispersion | | | 1.823** | | | 0.759*** |
| | | | (0.806) | | | (0.051) |
| Profit dispersion*Loan loss provisions | | | 1.042*** | | | 0.247*** |
| | | | (0.130) | | | (0.087) |
| Size | –0.733 | –1.338** | –1.777** | –0.160 | –0.107 | 0.080 |
| | (0.497) | (0.592) | (0.702) | (0.145) | (0.185) | (0.228) |
| Capital | –0.087 | –0.126* | –0.096 | –0.011 | 0.019 | 0.090* |
| | (0.063) | (0.057) | (0.110) | (0.039) | (0.057) | (0.049) |
| Loan loss provisions | –0.385*** | –0.418** | –0.883*** | –0.674*** | –0.357*** | –0.385*** |
| | (0.119) | (0.163) | (0.187) | (0.092) | (0.138) | (0.093) |
| Return | 1.464*** | 1.725*** | 1.544*** | 0.631*** | 0.634*** | 0.517*** |
| | (0.361) | (0.384) | (0.182) | (0.125) | (0.120) | (0.056) |
| Economic growth | 0.681 | 0.726* | 0.784* | 0.095 | 0.457*** | –0.339*** |
| | (0.433) | (0.351) | (0.402) | (0.101) | (0.122) | (0.108) |
| Refinancing rates | –0.229** | –0.255** | –0.280** | –0.311*** | –0.439*** | –0.240*** |
| | (0.082) | (0.105) | (0.110) | (0.027) | (0.042) | (0.019) |
| Observations | 352 | 352 | 352 | 352 | 352 | 352 |
| Banks | 31 | 31 | 31 | 31 | 31 | 31 |
| R-squared | 0.238 | 0.243 | 0.252 | | | |
| Instruments | | | | 30 | 30 | 30 |
| AR(1) test | | | | 0.003 | 0.000 | 0.002 |
| AR(2) test | | | | 0.888 | 0.251 | 0.768 |
| Hansen test | | | | 0.420 | 0.302 | 0.368 |

Note: *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively. Standard errors are in parentheses. Diagnostic tests are reported with p-values. Please refer to Table 1 for the definitions of variables.

higher, banks generally hold more securities, especially banks with more loan loss provisions. Next, for the regressions of decomposed security items, the positive relation between uncertainty and holdings of government and financial institution bonds is strengthened at a greater buffer of loan loss provisions, as displayed by the significantly positive coefficient of the interaction terms in Tables 8–9. Finally, since the interaction terms enter the regressions significantly positive in Tables 10–11, we infer that banks with more loan loss provisions are found to respond more strongly by cutting more corporate bonds and stocks in uncertain times than banks with less loan loss provisions.

All in all, we can confidently conclude that banks hold securities in times of uncertainty due to the precautionary motive since the relationship between uncertainty and banks' security holdings strengthens at a higher level of bank risk. We also employ non-performing loans to reflect bank risk and reach a similar conclusion. For the sake of brevity, we only report the results of loan loss provisions in the paper. The mechanism behind the impact is justified by aggregate data, at the level of total securities that banks hold, and by granular data, when we analyze the response to uncertainty in all specific security items.

# Conclusion

This paper investigates the impact of uncertainty in banking on banks' security holdings. Employing a sample of commercial banks in Vietnam during 2007–2019, we find that uncertainty in banking may enhance banks' security holdings. We perform additional tests to better understand this impact by decomposing aggregate securities into disaggregate items. Our results consistently indicate that banks increase their holdings of government and financial institution bonds in periods of higher uncertainty. However, the opposite happens for riskier security items — banks react to greater uncertainty by reducing the volume of corporate bonds and stocks.

In a further effort to shed light on the mecha-

## Table 10. Estimation results for the model of corporate bonds including the interaction term

| | Dependent variable: Corporate bonds | | | | | |
|---|---|---|---|---|---|---|
| | Fixed effect regressions (columns 1–3) | | | System GMM estimator (columns 4–6) | | |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Lagged dependent variable | | | | 0.729*** | 0.742*** | 0.625*** |
| | | | | (0.036) | (0.023) | (0.025) |
| Asset dispersion | –0.351*** | | | –0.088*** | | |
| | (0.052) | | | (0.024) | | |
| Asset dispersion*Loan loss provisions | –0.052** | | | –0.030*** | | |
| | (0.013) | | | (0.011) | | |
| Funding dispersion | | –0.017 | | | –0.050*** | |
| | | (0.013) | | | (0.010) | |
| Funding dispersion*Loan loss provisions | | –0.021** | | | –0.014** | |
| | | (0.009) | | | (0.006) | |
| Profit dispersion | | | –0.117 | | | –0.734*** |
| | | | (0.254) | | | (0.221) |
| Profit dispersion*Loan loss provisions | | | –0.299** | | | –0.868*** |
| | | | (0.109) | | | (0.118) |
| Size | 1.550* | –0.933* | –1.441*** | –0.879*** | –0.150 | –0.274 |
| | (0.627) | (0.467) | (0.408) | (0.212) | (0.142) | (0.210) |
| Capital | 0.004 | –0.023 | 0.047 | –0.150*** | –0.013 | –0.020 |
| | (0.034) | (0.128) | (0.050) | (0.041) | (0.034) | (0.047) |
| Loan loss provisions | –0.208 | –0.241 | –0.121 | –0.318* | –0.032 | 0.498*** |
| | (0.177) | (0.199) | (0.166) | (0.176) | (0.078) | (0.138) |
| Return | 0.173 | –0.389 | –0.313 | 0.308 | –0.187 | –0.190 |
| | (0.149) | (0.243) | (0.190) | (0.224) | (0.134) | (0.175) |
| Economic growth | –6.822*** | –0.870*** | –0.026 | –0.405*** | –0.708*** | –0.321*** |
| | (0.967) | (0.160) | (0.321) | (0.102) | (0.099) | (0.084) |
| Refinancing rates | –8.259*** | 0.088*** | –0.003 | –0.003 | 0.072** | 0.064** |
| | (0.958) | (0.014) | (0.057) | (0.036) | (0.033) | (0.027) |
| Observations | 352 | 352 | 352 | 352 | 352 | 352 |
| Banks | 31 | 31 | 31 | 31 | 31 | 31 |
| R-squared | 0.281 | 0.182 | 0.186 | | | |
| Instruments | | | | 30 | 30 | 30 |
| AR(1) test | | | | 0.001 | 0.002 | 0.002 |
| AR(2) test | | | | 0.433 | 0.615 | 0.447 |
| Hansen test | | | | 0.104 | 0.152 | 0.126 |

Note: *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively. Standard errors are in parentheses. Diagnostic tests are reported with p-values. Please refer to Table 1 for the definitions of variables.

## Table 11. Estimation results for the model of stocks including the interaction term

| | Dependent variable: Stocks | | | | | |
|---|---|---|---|---|---|---|
| | Fixed effect regressions (columns 1–3) | | | System GMM estimator (columns 4–6) | | |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Lagged dependent variable | | | | 0.446*** | 0.608*** | 0.599*** |
| | | | | (0.014) | (0.008) | (0.020) |
| Asset dispersion | –0.005* | | | –0.032*** | | |
| | (0.002) | | | (0.004) | | |
| Asset dispersion*Loan loss provisions | –0.001 | | | –0.010*** | | |
| | (0.002) | | | (0.002) | | |
| Funding dispersion | | –0.005** | | | –0.008*** | |
| | | (0.002) | | | (0.001) | |
| Funding dispersion*Loan loss provisions | | –0.001 | | | –0.006*** | |
| | | (0.001) | | | (0.001) | |
| Profit dispersion | | | –0.123*** | | | –0.147*** |
| | | | (0.032) | | | (0.033) |
| Profit dispersion*Loan loss provisions | | | –0.049** | | | –0.286*** |
| | | | (0.020) | | | (0.035) |
| Size | –0.249*** | –0.253*** | –0.282*** | –0.061** | –0.006 | –0.015 |
| | (0.039) | (0.038) | (0.035) | (0.027) | (0.009) | (0.014) |
| Capital | –0.018*** | –0.017*** | –0.031*** | 0.027*** | 0.005 | 0.001 |
| | (0.005) | (0.005) | (0.008) | (0.008) | (0.004) | (0.005) |
| Loan loss provisions | –0.055 | –0.055 | –0.049*** | –0.157*** | –0.089*** | –0.172*** |
| | (0.056) | (0.058) | (0.014) | (0.019) | (0.010) | (0.016) |
| Return | –0.017 | –0.016 | 0.068 | 0.116*** | 0.080*** | 0.021** |
| | (0.043) | (0.043) | (0.039) | (0.029) | (0.017) | (0.010) |
| Economic growth | –0.095*** | –0.099*** | 0.021 | –0.056*** | –0.077*** | –0.016 |
| | (0.027) | (0.019) | (0.037) | (0.016) | (0.016) | (0.013) |
| Refinancing rates | –0.006 | –0.007 | –0.014*** | –0.002 | 0.003 | –0.006 |
| | (0.006) | (0.006) | (0.004) | (0.005) | (0.003) | (0.003) |
| Observations | 352 | 352 | 352 | 352 | 352 | 352 |
| Banks | 31 | 31 | 31 | 31 | 31 | 31 |
| R-squared | 0.162 | 0.164 | 0.169 | | | |
| Instruments | | | | 30 | 30 | 30 |
| AR(1) test | | | | 0.022 | 0.010 | 0.002 |
| AR(2) test | | | | 0.429 | 0.256 | 0.637 |
| Hansen test | | | | 0.138 | 0.154 | 0.145 |

Note: *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively. Standard errors are in parentheses. Diagnostic tests are reported with p-values. Please refer to Table 1 for the definitions of variables.



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nism behind bank behaviors, we document that the impact of banking uncertainty on the holdings of securities is more pronounced at riskier banks. Thus, we gain solid evidence in favor of the fact that the precautionary motive could be an essential driver of banks' security holdings due to uncertainty shocks. Our findings indicate, at least to some degree, banks' own efforts to hold more safe securities in periods of higher uncertainty (the supply-side effect), rather than merely the movements of banks' customers (the demand-side effect). All results are robust against the use of (i) different econometric methodologies through corrected Driscoll-Kraay fixed effect regressions and the dynamic GMM estimator, (ii) alternative indicators of uncertainty based on the dispersion of different bank-level shocks, and (iii) both aggregate and disaggregate security data.

Our findings suggest some policy implications. Given that security holdings are harmful to banks' core function and potentially hurt the economy, necessary actions to reduce the level of uncertainty in the banking system should be adopted. Along this line, since the impact of uncertainty on banks' security holdings is more likely attributable to prudent decisions of banks, regulators and policymakers need to depress bank risk profiles to minimize bank vulnerability because of uncertainty.

Bearing in mind that this study examines exclusively the impact of banking uncertainty as a single type of uncertainty, we expect future work to check our results with other uncertainty types. Accordingly, the findings could strengthen or challenge ours, thus expanding the understanding of the hot topic under analysis.

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