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IMPLEMENTATION OF INTERNAL CAPITAL ADEQUACY AND ASSESSMENT PROCESS IN VIETNAMESE COMMERCIAL BANKS

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ABSTRACT

The internal capital adequacy and assessment process (ICAAP) was first introduced in the second pillar of Basel II in 2004 to offset the deficiencies of Basel I and capital adequacy regulations in the first pillar of Basel II. This process is aimed at identifying and measuring risks generated in banks' activities, and then provides the requirements for internal capital levels and methods to raise capital to deal with these risks. In fact, the implementation of Basel II and ICAAP in Vietnamese commercial banks has attained notable achievements, but it also revealed some major weaknesses. The purpose of this research is to evaluate the implementation of ICAAP in Vietnamese commercial banks in eight components of the ICAAP addressed by Basel II using the survey method and then to simulate the implementation of ICAAP in a Vietnamese commercial bank. From the facts and the simulation of the ICAAP framework in this study, the authors offer some suggestions for Vietnamese commercial banks to implement ICAAP effectively in their banking operations.

Contribution/Originality: This study is one of very few studies which have investigated the current situation of ICAAP implementation in Vietnamese commercial banks and subsequently provides some suggestions for banks to complete the ICAAP in accordance with Basel regulations.

1. INTRODUCTION

In banking, capital is considered as a buffer against risk, therefore, sufficient internal capital is an important issue not only for the banks' managers but also for regulators. One of the fundamental capital requirements is regulated in Basel I, but after its implementation, three drawbacks became evident. First, the ratio of capital requirement is set for all banks rather than considering the distinctive characteristics of each bank Second, some important risks are not reflected in regulatory capital in Basel I. Third, the requirement for risk management in the banking system is not mentioned. The second pillar of Basel II was then introduced with the purposes of overcoming the limits of Basel I and connecting regulatory capital with risk level of each bank (Pilková & Králik, 2011). In this pillar, banks are encouraged to build up an internal method to measure the level of capital adequacy, which is the Internal Capital Adequacy Assessment Process (ICAAP). In the Basel Committee on Banking Supervision (BCBS) (2004), ICAAP is introduced as the process that provides guidelines to banks on evaluating risk

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level, risk appetite, stress testing, internal capital adequacy and other related activities. The main requirement of the ICAAP framework is capital adequacy evaluation in relation to given risks in banks. This process emphasizes on measuring the level of risks and the interlinkage among risks, and then calculates the level of capital a bank needs to reserve to successfully overcome any future risks. The level of capital calculated based on ICAAP is linked with the characteristics of a bank and adapts to the bank's risk profile, so it appropriately reflects any risk the bank would face (Van Laere & Baesens, 2012). In ICAAP, the regulators establish broad principles for banks for capital measurement and risk-bearing capacity. Accordingly, each bank needs to build its own process, in which the model for evaluating risk-bearing capacity is the most essential factor. In Basel II, ICAAP was introduced with the following components (also see Figure 1): (i) Board and senior management oversight, (ii) comprehensive risk identification, (iii) risk assessment and control, (iv) capital assessment, (v) stress testing, (vi) capital planning, (vii) capital adequacy report, (viii) internal control review (Woschnagg, 2008). Following this process, banks will first create a portfolio based on their risk profiles and calculate the capital needed to cover unexpected losses. Types of risks banks should take into account are not limited to credit risk, market risk, and operational risk but also include other important risks such as interest risk in the banking book and reputational risk. The level of capital reserved then accurately reflects risks that banks have to overcome, thus ensuring their risk-bearing capacity (Jackson, Perraudin, & Saporta, 2002).

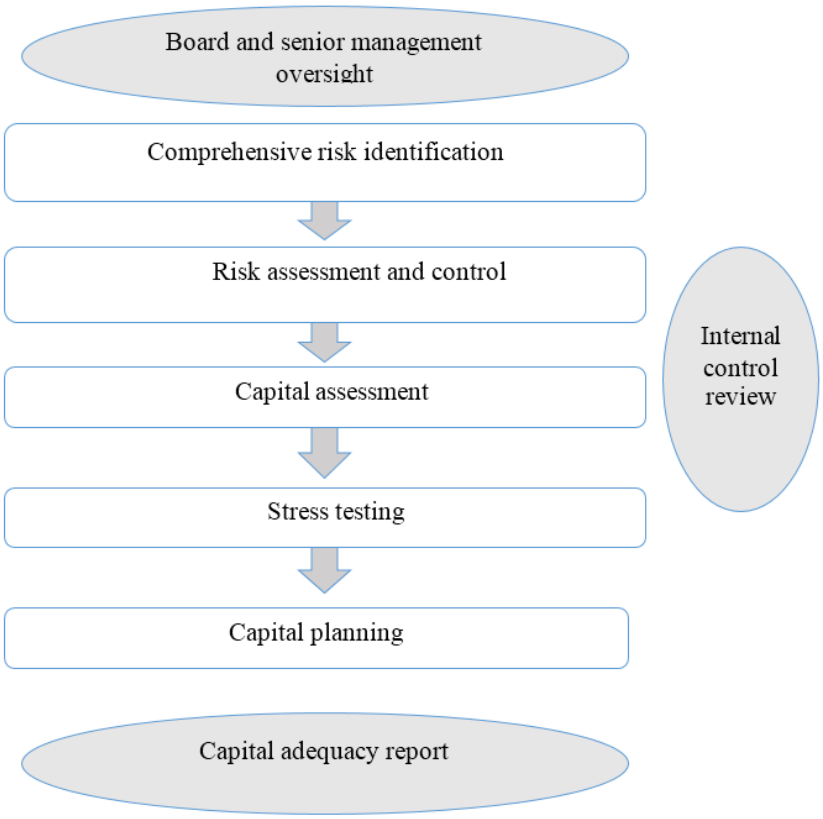

Figure 1. ICAAP components.

In Vietnam, since 2015, all commercial banks are expected to have internal procedures that comply with the regulations issued by the State Bank of Vietnam (SBV) and to increase their risk management capacity. In these procedures, ICAAP is regarded as one of the most essential components and is supervised by the regulators.

2. METHODOLOGY

In this research, the authors employ the survey method to unveil the status quo of the ICAAP implementation

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in Vietnamese commercial banks. The questionnaire was sent to bank staff and bank managers working at Basel departments or relevant divisions in banks to ensure that the reasoners have sufficient knowledge and experience of Basel and ICAAP. The banks were selected to guarantee that the situation of ICAAP implementation is reflected in different characteristics and scales. The banks are divided into two groups as follows:

Group 1: nine commercial banks chosen by SBV to pilot Basel II standards.

Group 2: ten commercial banks which are not in Group 1.

The questionnaire was distributed to 30 research participants with the response rate reaching 80%, including 19 valid responses and five invalid ones. The 19 valid responses include nine from Group 1 and ten from Group 2. The content of the questionnaire focuses on general information about Basel implementation, the current implementation status of ICAAP, and any difficulties encountered during implementation.

The questionnaire includes open-ended questions and multiple-choice questions. A five-point Likert scale is used to measure the level of implementation of each step in ICAAP, which ranges from no progress to full implementation (*see* Appendix 1). Next, a bank belonging to Group 1 is chosen to simulate the ICAAP implementation. The simulation complies with the current regulations related to ICAAP as well as the bank's internal policies and applies to the real bank's portfolio. The components of ICAAP that will be presented are risk identification, risk assessment and control, capital assessment, and stress testing.

3. ICAAP IMPLEMENTATION IN VIETNAMESE COMMERCIAL BANKS

3.1. Board and Senior Management Oversight

First, in terms of establishing a monitoring structure/organization, according to Circular 13/2018/TT-NHNN issued by the SBV (Circular 13/2018/TT-NHNN), the monitoring structure of the senior management in ICAAP is as follows: (i) Board of Directors and the Board of members of the commercial bank monitor the Chief Executive Officer (CEO); (ii) the CEO of the commercial bank monitors and directly guides individuals and departments based on proposals and advice from the Capital Management Committee. The responses to the questionnaire show that this structure in commercial banks in Group 1 is almost complete. Basically, these banks have established the organizational structure and have clearly determined the functions and responsibilities of the committees to help senior executives supervise the implementation of ICAAP, as prescribed in Circular 13/2018/TT-NHNN.

Moreover, in terms of the development and implementation of monitoring procedures for ICAAP, commercial banks in Group 1 have started to build and implement the processes of monitoring and assessing ICAAP. Figure 2 shows the level of development and implementation of the ICAAP monitoring process.

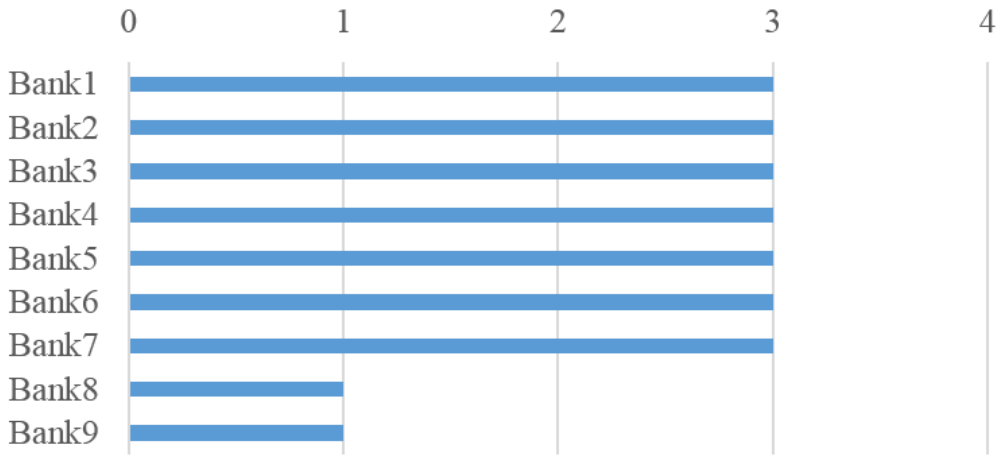

Figure 2. The level of development and implementation of ICAAP monitoring process.

The result from the figure demonstrates that seven out of nine commercial banks have implemented ICAAP at levels of over 50%. In nine banks, two are almost at the point of starting to build the ICAAP monitoring process.

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No banks have reached 100%. For commercial banks in Group 2, only a small number have implemented the ICAAP monitoring process. Most of these banks do not have the orientation to implement the ICAAP from senior management, so they have not yet started implementing their monitoring function.

3.2. Risk Identification

The next step is identifying material risks. First, in terms of identifying material risks in Vietnam, according to Circular 13/2018/TT-NHNN, the material risks that commercial banks need to identify include credit risk, market risk, operational risk, interest rate risk in the bank book, liquidity risk, concentration risk, and other risks arising from key operations[1].

Figure 3. Risk identification in Vietnam commercial banks.

Figure 3 shows the risk percentages identified by the banks. It can be seen that all banks are aware of the importance of the effective management of credit risk, market risk, operational risk, and liquidity risk. In terms of the two other risks recommended by Basel—strategic risk and reputation risk—only 25% of Vietnam's commercial banks have developed a strategy to manage reputation risk management, while strategic risk is still not managed by banks. Second, the level of management implementation varies significantly between banks and between types of risk. Currently, commercial banks in Group 1 have developed a strategy to manage key risks required by Circular 13/2018/TT-NHNN; however, the level of implementation varies for risks. It can be seen in Figure 4 that credit risk, liquidity risk, and market risk are the most fully deployed risks, while concentration risk and interest rate risk in the banking book have been implemented by less than 50% and other risks have not been implemented yet.

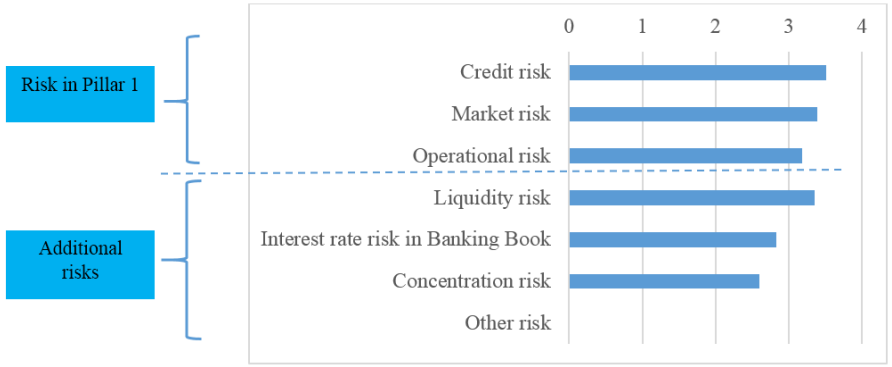

Figure 4. Level of management of material risks in banks in Group 1.

[1]Critical activities are activities determined by commercial banks based on their scale compared to one of the financial indicators (equity, total assets, income, expenses or other financial criteria) according to the banks' internal regulations (Circular 13/2018/TT-NHNN).

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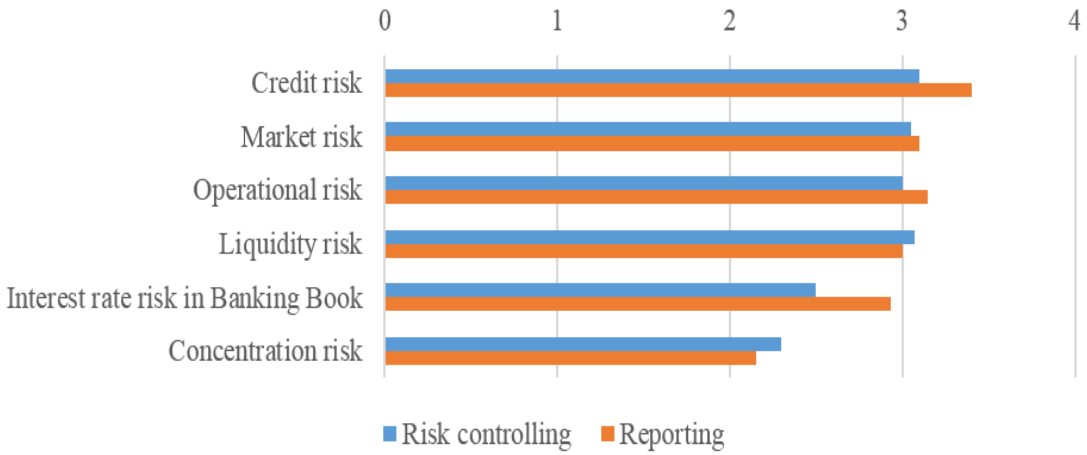

Figure 5. Level of risk controlling and reporting in Vietnamese commercial banks.

3.3. Risk Measurement and Control

Currently, in terms of credit risk, commercial banks mainly use the standard method of risk measurement. There are a number of commercial banks that have applied the foundation internal ratings-based (IRB) approach for credit risk measurement. Only one bank has been able to use the advanced IRB approach, but there is no guidance from the State Bank, so it has not been widely applied. For market risk and operational risk, no banks can apply the internal model method for market risk, or the advanced measurement approach (AMA) for operational risk. For liquidity risk, commercial banks mainly measure based on liquidity ratios and maturity methods required by the State Bank. Interest rate risk in the bank books is assessed through the interest rate gap.

Regarding control and risk reporting, Vietnamese commercial banks have done well to date in controlling and reporting risks. Figure 5 shows the level of risk control and reporting for each type of risk, and it shows that liquidity risk, operational risk, market risk, and credit risk are controlled and reported as they have reached, or almost reached, level 3. That means banks have completed more than 50% of the implementation of the control and reporting process for these types of risks, while the implementation of control and reporting on interest rate risk in the bank books and concentration risk are at a lower level.

3.4. Capital Assessment

In Vietnam, almost all banks are carrying out the first steps in capital adequacy assessment, with the levels of implementation shown in Figure 6.

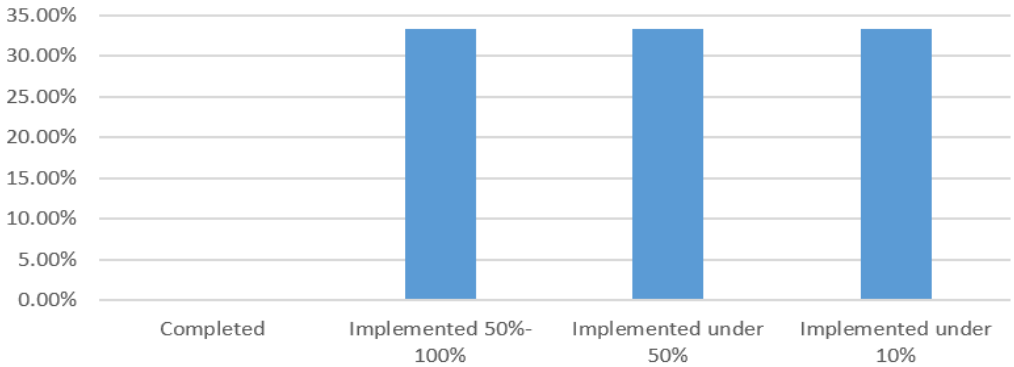

Figure 6. Capital adequacy calculation in Vietnamese commercial banks.

The data above shows that, on average, banks have implemented the capital adequacy calculation by almost 50% (level 2). There is no commercial bank in the system that has fully completed implementation (level 4). Only one-third of the sampled banks have carried out the capital adequacy assessment to level 3 and the rest have only reached the lower levels.

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3.5. Stress Testing

In the second pillar of Basel II, stress testing needs to be completed for all substantial risks. However, in Circular 13/2018/TT-NHNN, the regulators only require banks to do stress tests for changes in credit quality, interest rate, and exchange rate. The stress test data for the banks in Group 1 are described in Table 1.

Table 1. Type of risks stress tested in Group 1 banks.

Stress test:	Credit risk	Market risk	Operational risk	Liquidity risk	Concentration risk	Interest rate risk in the banking book
Bank 1	×	✓	×	×	×	×
Bank 2	×	×	×	×	×	×
Bank 3	×	✓	×	✓	×	✓
Bank 4	×	×	×	×	×	×
Bank 5	×	✓	×	✓	×	×
Bank 6	×	×	×	×	×	×
Bank 7	×	×	×	×	×	×
Bank 8	×	×	×	×	×	×
Bank 9	×	×	×	×	×	×

Based on the results above, among banks in Group 1, only three have carried out stress tests for market risk, interest rate risk in the banking book, and liquidity risk.

3.6. Capital Planning

For this step, Figure 7 shows that most of the banks have completed approximately 30% of capital planning, which stands at level 1.5. Only two out of nine banks in Group 1 have reached level 2 or above for capital planning, but no bank has reached level 4. Moreover, none of the banks in Group 2 has deployed this step.

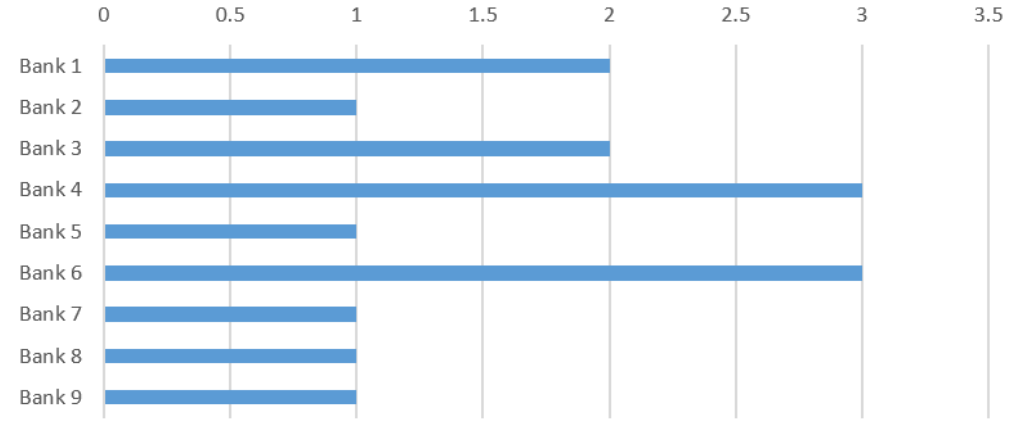

Figure 7. Capital planning in Group 1 banks.

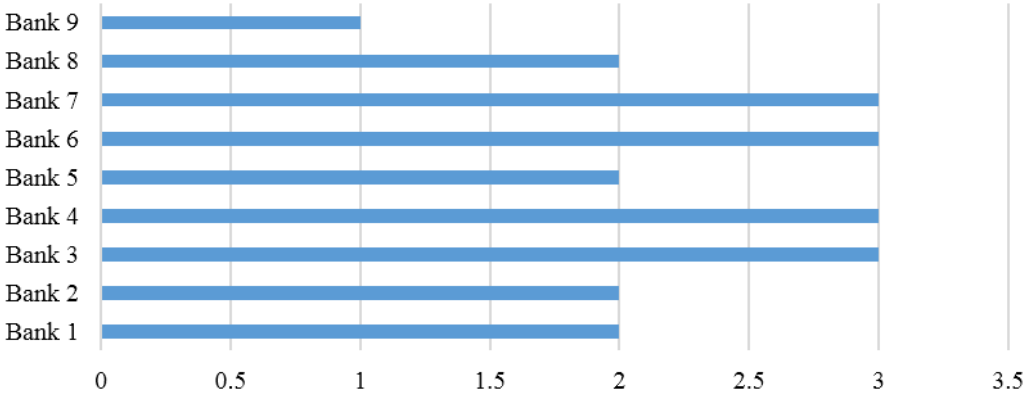

Figure 8. ICAAP reporting in Group 1 banks.

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3.7. Capital Adequacy Report

The result from the authors' survey highlighted that the majority of Vietnamese commercial banks have not completed the ICAAP and have not issued the ICAAP report.

Figure 8 points out that there is no bank that has fully completed the ICAAP report; however, all banks have carried out reporting to at least level 2. Appendix 2 illustrates the rotation of ICAAP report in Vietnamese commercial banks.

3.8. Internal Control Review

Nearly all banks have implemented their internal control system completely. However, the implementation of internal controls in ICAAP is not at high levels, as presented in Figure 9.

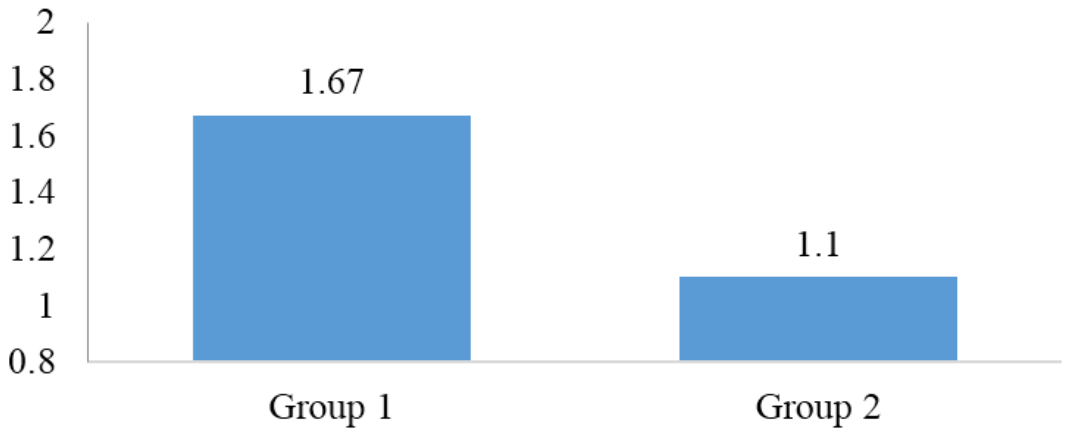

Figure 9. Implementation of internal controls in Group 1 and Group 2 banks.

The average levels of internal control functions in ICAAP in both groups are quite low (just above 1).

4. SIMULATION FOR ICAAP IMPLEMENTATION IN A VIETNAMESE COMMERCIAL BANK

Based on the current regulations in Vietnam related to ICAAP implementation, such as Circular 13/2018/TT-NHNN , Circular 41/2016/TT-NHNN and other internal policies of Vietnamese commercial banks, the simulation for ICAAP implementation in a Vietnamese commercial bank will be undertaken. This bank belongs to a group of ten commercial banks implementing the Basel II pilot. The business indicators of bank X are described in Table 2.

Table 2. Bank X's business indicators.

	Year 201Y
Total assets (billion dong)	221,042
Capital (billion dong)	21,129
Net income (billion dong)	2,513
Return on asset (%)	1.1
Return on equity (%)	11.9

Source: Annual report of Bank X (201Y).

4.1. Risk Identification

According to Circular 13/2018/TT-NHNN, the material risks that commercial banks in Vietnam have to identify include credit risk, operational risk, market risk, interest rate risk in the banking book, liquidity risk, concentration risk, and other risks which the institution are exposed to regarding material activities. Material activity is any activity that commercial and foreign banks undertake based on financial indicators (such as equity, total assets, income, and cost) according to internal policies.

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For Bank X, the material risks to which it is exposed are credit risk, operational risk, market risk, interest rate risk in the banking book, liquidity risk, and concentration risk.

4.2. Risk Assessment and Control

The next step is to measure the identified material risks. Based on the principle of proportionality, Bank X should choose the suitable method in line with each type of risk.

4.2.1. Credit Risk

There are several approaches for evaluating credit risk, including the standardized approach and the internal ratings-based approach (basic and advanced). According to Circular 41/2016/TT-NHNN of the SBV Governor stipulating the capital adequacy ratio for commercial banks and foreign banks' branches, Bank X will apply the standard approach. Risk-weighted assets for credit risk include two parts: Risk-weighted assets for credit risk and risk-weighted assets for counterparty credit risk. In Circular No 41, SBV regulated the credit risk ratios for types of assets, receivables, and the conversion factor to convert items off the balance sheet as well as the additional indicators for each transaction and counterparty credit risk ratios. The way to calculate risk-weighted assets for credit risk is explained in Appendix 3. Then, the total risk-weighted asset for credit risk for Bank X is VND 227,725.89 billion.

4.2.2. Market Risk

Market risk can be measured by standard or internal methods. According to Circular 41/2016/TT-NHNN, Bank X measures market risk for interest rate risk, exchange rate risk, equity risk, commodity risk, and option risk by applying standard methods. SBV regulated methodology and ratios to calculate capital requirement for each type of market risk, and then risk-weighted assets for market risk is equal to 12.5 multiplied by capital requirement for market risk Appendix 4. Therefore, risk-weighted assets for market risk for Bank X is VND 16,357.35 billion.

4.2.3. Operational Risk

Bank X can apply basic indicator approaches or model-based advanced measurement approaches to measure operational risk. According to Circular 41/2016/TT-NHNN, Bank X can apply a basic indicator approach, in which, capital requirement for operational risk is equal average business indicator multiplied by 15% and, and risk-weighted assets for operational risk is equal to 12.5 multiplied by the capital requirement (see Appendix 5). Therefore, risk-weighted assets for operational risk for Bank X is VND 17,612.28 billion.

4.2.4. Concentration Risk

According to Circular 13/2018/TT-NHNN, the concentration risk refers to the concentration risk in credit activity and other trading activities, and it is Bank X's duty to build a suitable method to evaluate concentration risk. To calculate credit concentration risk, Bank X applies the sectoral concentration index and individual concentration index, which is explained in Appendix 6. Without concentration risk for other trading activities, risk-weighted assets for concentration risk for Bank X is VND 12,980.38 billion.

4.2.5. Interest Rate Risk in the Banking Book

According to Circular 13/2018/TT-NHNN, it is Bank X's duty to build a suitable method to evaluate interest rate risk in the banking book. According to the Australian Prudential Regulation Authority (2018), risk-weighted assets for interest rate risk in the banking book is equal to 0.5% multiplied by risk-weighted assets for the first pillar. Therefore, risk-weighted assets for interest rate risk in the banking book for Bank X is VND 81.79 billion (see Appendix 7).

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4.3. Capital Assessment

The next step is to measure overall bank risk and overall capital requirements for all of the material risks. There are many ways to achieve this, such as the copula approach, correlation matrix, and add-up method (Woschnagg, 2008). Small institutions can apply the add-up method for aggregating risks at institution level (Hungarian Financial Supervisory Authority, 2012). In Circular 13/2018/TT-NHNN, SBV requires Bank X to add up risk-weighted assets for each type of material risk to calculate the overall risk-weighted assets. The risk-weighted assets for Bank X is calculated as represented in Table 3.

Table 3. Risk-weighted assets for Bank X.

RWA	Unit (billion VND)
Credit risk	227,725.89
Operational risk	17,612.28
Market risk	16,357.35
Interest rate risk in the banking book	81.79
Concentration Risk	12,980.38
Sum risk-weighted assets	274,757.69
Minimum capital requirement	21,980.61
Capital supply	24,378.48
Capital adequacy ratio (CAR)	8.87%

4.4. Stress Testing

According to Circular 13/2018/TT-NHNN, Bank X must carry out a stress test for changes in credit quality, interest rate, and exchange rate test to assess the impact of adverse scenarios on capital and estimate the change in risk-weighted assets and capital adequacy ratio (ΔCAR)

4.4.1. Credit Risk Stress Test

It is assumed that non-performing loans increase by 20%, 25%, and 30%, leading the increase in provisioning requirements and reducing the values of the risk-weighted assets and capital requirements (see Table 4).

Table 4. Credit risk stress test.

Unit (billion VND)	Baseline	Change in non-performing loans		
		20%	25%	30%
Change in provision		443	553	664
Capital	24,378	23,935	23,825	23,714
Risk-weighted assets	274,758	274,315	274,205	274,094
CAR	8.87%	8.73%	8.69%	8.65%
ΔCAR		-0.15%	-0.18%	-0.22%

4.4.2. Interest Rate Risk Stress Test

Assets and liabilities are sorted into time-to-repricing buckets and the changes in interest income and interest expenses is calculated from the gap between the flow of interest on the holdings of assets and liabilities in each bucket. Bank X cares about the impact of interest rate changes on the value of bonds held, calculated by using the duration of bonds. The change in interest rate gives rise to the variation in the market-to-market value of bonds, which exerts a direct impact on the capital of Bank X (see Table 5).

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Table 5. Interest rate risk stress test.

Unit (billion VND)	Baseline	Change in interest rate		
		2%	3%	5%
Capital	24,378	22,990	21,797	20,409
Risk-weighted assets	274,758	273,370	272,177	270,789
CAR	0	8.41%	8.01%	7.54%
ΔCAR		-0.46%	-0.86%	-1.34%

4.4.3. Exchange Rate Risk Stress Test

The foreign exchange risk is the risk of exchange rate changes that affect the local currency value of financial institutions' assets, liabilities, and items off the balance sheet. The impact of foreign exchange rate risk can be calculated by using the net open position in foreign exchange, so depreciation in the exchange rate (increase in foreign exchange rate) leads to a proportional decrease in the domestic currency value of the net open position and the value of risk-weighted assets (see Table 6).

Table 6. Exchange rate risk stress test.

Unit (billion VND)	Baseline	Change in foreign exchange rate		
		2%	3%	5%
Capital	24,378	24,280	24,156	23,971
Risk-weighted assets	274,758	274,659	274,535	274,350
CAR	8.87%	8.84%	8.80%	8.74%
ΔCAR		0.03%	0.07%	0.14%

After undertaking a single risk stress test, Bank X builds the scenario (see Table 7) combining various risk factors (credit quality, interest rate, and exchange rate) with respect to the interrelation between risk factors in the macroeconomic context. The methodology used to build stress test scenarios for Bank X is based on guidance by the IMF (Martin, 2007).

Table 7. Stress test for Bank X (unit = %).

CAR baseline	8.87
Impact of	
• Change in non-performing loans	-0.18
• Change in interest rate (2%)	-0.46
• Change in foreign exchange rate (2%)	-0.03
ΔCAR	-0.67
CAR Post-shock	8.2

5. DISCUSSION ON ICAAP IMPLEMENTATION IN THE VIETNAMESE BANKING SYSTEM AND SUGGESTIONS

Based on the analysis of the current situation and difficulties in implementing ICAAP in Vietnamese commercial banks, the study proposes some solutions as follows:

First, the complexity of Basel II in general, and the second pillar in terms of capital in particular, are designed and built based on the experience and infrastructure of the developed financial markets. This has caused many difficulties in implementing ICAAP. In order to successfully implement this process in Vietnamese commercial banks, there must be an adjustment made to the content and schedule in accordance with the characteristics of Vietnam.

Second, it is necessary to raise the awareness of managers, operators about the importance of ICAAP in banking governance. Currently, Vietnamese commercial banks are building risk management systems using a model with three lines of defense. ICAAP requires banks to implement capital management in accordance with the level of risk (including the determination of target capital and economic capital) with risk appetite and with the

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bank's overall business strategy. Therefore, the implementation of ICAAP requires changing the method by which the bank's business plan is developed and implemented because business decisions must be based on risk assessment and its financial capacity to absorb risk. The process of change needs to take place in all units and divisions of the bank, including the business department, the risk management department, the financial accounting department, the information technology department, bank personnel, and senior leaders. Additionally, there needs to be a transition period to change management's perception and build a culture of control and implement adequate risk management practices.

Third, the gap between the overall management, administration and control of Vietnamese commercial banks in comparison with the requirements of the Basel accord is still relatively large. Entrofine (2014) said that the difference of Vietnamese commercial banks is currently about 60% to 70%, meaning that Vietnamese commercial banks only meet 30% to 40% of the Basel Committee requirements. This requires banks to make greater efforts to narrow the gap in order to implement ICAAP and Basel II in accordance with the approved roadmap.

Other noted problems are the lack of databases and the status of information technology infrastructure in Vietnam. In order to fully and successfully implement ICAAP and Basel II, the requirements of modernity and integration of information technology are essential. Commercial banks need to build reliable and accurate information and data systems. This requirement needs to be met before a bank begins the project of data collection, cleansing, enrichment, analysis, coupling and collating, and at the same time it must meet data standardization, process design, and system flexibility requirements to be able to modify and upgrade to Basel III when necessary.

Finally, the financial costs of implementing ICAAP and Basel II are significant. The average cost of deploying the application of the Basel II Capital Standard is about 10–15 million USD separately to calculate credit risk (PD, LGD, EAD) (Stephanou & Mendoza, 2005). If adding two types of operational risk and market risk, the total cost of the top ten largest banks in the world is approximately 25–30 million USD. Because Vietnamese commercial banks are mainly retail and small-scale banks, credit risk is their main focus, so the estimated cost will be much lower at about 7.5 million USD, which accounts for 0.42% to 5.25% of the chartered capital of a bank. Therefore, the implementation of the Basel project needs to be approved by senior management, shareholders, and all staff to successfully overcome any difficulties and challenges.

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APPENDICES

Appendix 1. The questionnaire on the implementation of the Internal Capital Adequacy Assessment Process (ICAAP) in Vietnamese commercial banks.

In order to assess the status of ICAAP implementation in Vietnamese commercial banks and suggest ICAAP policy in the future, would you please answer these following questions. Your answers will be confidential and used for academic purposes only and will not be revealed to any third party. Thank you for your cooperation!

Guidance: Answer by writing in the space provided or circle your choice. Date:

Questions

1. Has your bank implemented Basel II?

a. Not yet

b. In process

c. Completed

(If your answer is "Not yet", please move to question 18.)

2. When did your bank implement Basel II?

.....

3. When is your bank going to finish Basel II's projects?

.....

4. Which pillar of Basel II is your bank implementing?

a. Pillar 1

b. Pillar 1 and Pillar 2

c. Pillar 1, Pillar 2, and Pillar 3

d. Others (*Please specify*: .....)

5. Which method of Basel II is your bank applying in capital adequacy measurement?

a. Standardized approach method (SA)

b. Foundation Internal Rating Based method (FIRB)

c. Advanced Internal Rating Based method (AIRB)

d. Others (*Please specify*: .....)

6. Has your bank determined the risk appetite in the whole system?

Based on your bank's current situation, please provide your own assessment on risk appetite following the band scores from 0 to 4:

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- *Score 0:* No answer (0%)
- *Score 1:* No or little risk appetite set (under 10 %)
- *Score 2:* Limited risk appetite set (under 50%)
- *Score 3:* Almost completed risk appetite set (between 50% and 99%)
- *Score 4:* Completed risk appetite set (100%)

Content of risk appetite framework	Score	Answer
- Identification of risk appetite framework Includes: risk appetite statement (qualitative and quantitative determinants), risk bearing capacity in the whole system, key risk indicators, threshold for each key risk indicator.	(0–4)	
- Applying risk appetite in the bank's activities Includes: applying risk appetite in polies, processes of setting limitations; risk appetite is matched with business, risk appetite is controlled and governed.	(0–4)	

7. What kind of material risks has your bank identified?

a. Credit risk

b. Market risk

c. Operational risk

d. Interest rate risk in the banking book

e. Concentration risk

f. Business and strategic risk

g. Reputational risk

h. Liquidity risk

i. Others (*Please specify*: ……)

8. What method is your bank following to measure credit risk?

a. Standardized approach method (SA)

b. Foundation internal ratings-based method (FIRB)

c. Advanced internal ratings-based method (AIRB)

d. Difference (*Please specify*: ……)

(If your answer is "a. Standardized approach method (SA)", please move to question 9)

(If your answer is "b. Foundation internal ratings-based method (FIRB)", please move to question 8.1)

8.1. Which factors have your bank measured?

Factor	Measured/ Not measured	Source		
		Bank's own calculation	Reference from other financial institutions	Advisory
Probability of default - PD				
Loss given default - LGD				
Exposure at default – EAD				
Maturity				

9. What method is your bank following to measure market risk?

a. Basic Indicator Approach (BIA)

b. Standardized Approach (SA)

c. Internal Model Analysis (IMA)

d. Others (*Please specify*: ……)

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10. What method is your bank following to measure operational risk?

a. Basic Indicator Approach (BIA)

b. Standardized Approach (SA)

c. Advanced Measurement Approach (AMA)

d. Others (*Please specify*: ……)

11. What method is your bank following to measure other risks?

No.	Risk type	Measured/Not measured	Method name	Brief description
1	Liquidity risk			
2	Interest rate risk in the banking book			
3	Concentration risk			
4	Business and strategic risk			
5	Reputational risk			
6	Other risks			

12. Has your bank done a stress test in risk measurement?

a. Not yet

b. In the process of research

c. Have done

(If your answer is "Not yet", please move to question 13)

(If your answer is "In the process of research" or "Have done", please move to question 12.1)

12.1. How does your bank set the scenario in stress testing for each type of risk?

No.	Risk type	Method to set scenario	Brief description
1	Credit risk		
2	Market risk		
3	Operational risk		
4	Liquidity risk		
5	Interest rate risk in the banking book		
6	Concentration risk		
7	Reputational risk		
8	Business and strategic risk		
9	Other risks		

(**Note:** Types of scenarios for stress testing include: (i) Historical scenario, (ii) Hypothetical scenario, (iii) Monte Carlo simulation).

12.2. In the stress test, how does your bank measure the effect of macroeconomic scenarios on risks and internal capital?

No.	Risk type	Measured/Not measured	Method
1	Credit risk		
2	Market risk		
3	Operational risk		
4	Liquidity risk		
5	Interest rate risk in the banking book		
6	Concentration risk		
7	Reputational risk		
8	Business and strategic risk		
9	Other risks		

13. What method does your bank use to measure consolidated risk?

a. The bank has not measured consolidated risk

b. Adding up method

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c. Method considering the correlation between risks

d. Others (*Please specify*: ……)

14. Has your bank completed the ICAAP?

Based on your bank's current situation, please provide your own assessment on the ICAAP implementation following the band scores from 0 to 4:

- *Score 0:* No knowledge on ICAAP
- *Score 1:* Not implemented, or under 10% of implementation completed
- *Score 2:* Above 10% and under 50% of implementation completed
- *Score 3:* Above 50% of implementation completed
- *Score 4:* Fully implemented and have applied in business.

15. The target of capital measurement in ICAAP is for your bank to: *(can choose more than one answer)*

No.	Content	Score	Answer
1	- Fully issue internal processes and regulations on ICAAP	(0-4)	
2	- Determine target capital adequacy in risk appetite	(0-4)	
3	- Implement ICAAP:		
3.1	+ Measure material risks	(0-4)	
3.2	+ Set economic capital based on business	(0-4)	
3.3	+ Carry out a stress test to determine buffer capital in bad scenario	(0-4)	
3.4	+ Determine economic capital	(0-4)	
3.5	+ Determine target equity capital	(0-4)	
3.6	+ Plan capital: method of raising capital, capital contribution and capital reserve plan.	(0-4)	
4	- Apply the ICAAP in management and business plans **(Details in Question 15)**	(0-4)	
5	- Implement Board oversight and write internal report on ICAAP	(0-4)	
6	- Carry out a self-assessment for ICAAP	(0-4)	
7	- Apply internal controls for ICAAP	(0-4)	
8	- Adopt suggestions of supervisors and external auditors on ICAAP	(0-4)	

a. Set business decisions, amend business strategies

b. Allocate capital for business lines

c. Assess risk-adjusted profits

d. Report to supervisors

e. Price bank's services

f. Others (*Please specify*: ……)

16. Which department in your bank is responsible for internal capital calculation?

a. ICAAP department

b. Financial and Accounting department

c. Credit risk management department

d. Others (*Please specify*: ……)

17. Which department in your bank is responsible for ICAAP implementation?

a. ICAAP department

b. Financial and Accounting department

c. Credit risk management department

d. Others (*Please specify*: ……)

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18. How do your Board, committee, senior managers, and related departments respond to ICAAP implementation?

No.	Unit	Specific responsibilities
1	Board of managers	
2	Board of supervisors	
3	Board of directors	
4	Business department	
5	Legal department	
6	Risk management department	
7	Financial department	
8	ICAAP department (if applicable)	
9	Technology department	
10	Internal control department	
11	Internal audit department	

19. Who received the ICAAP report?

(Can choose more than one answer)

a. Board of managers

b. Board of directors

c. Business department

d. Compulsory department

e. Risk management department

f. Others (*Please specify*: ……)

20. What are the difficulties of implementing ICAAP in your banks?

(Can have more than one answer)

a. Opinions and preferences of senior managers

b. Data system and technology infrastructure

c. Methods and tools to measure risks and capital

d. Cost of implementation and application

e. Cost of capital response

f. Humanity

g. The State Bank's guidance

h. Others (*Please specify*: ……)

21. In your opinion, how can the State Bank support commercial banks in ICAAP implementation?

(Can have more than one answer)

a. Complete legal framework about ICAAP

b. Support in building models and tools for risk and capital measurement

c. Provide tools for capital calculation for all small banks

d. Provide training on ICAAP

e. Allow commercial banks to have more time for ICAAP implementation

f. Encourage commercial banks to implement ICAAP before the Circular 13/2018/TT-NHNN effectively

g. Others (*Please specify*: ……)

Thank you kindly for your cooperation!

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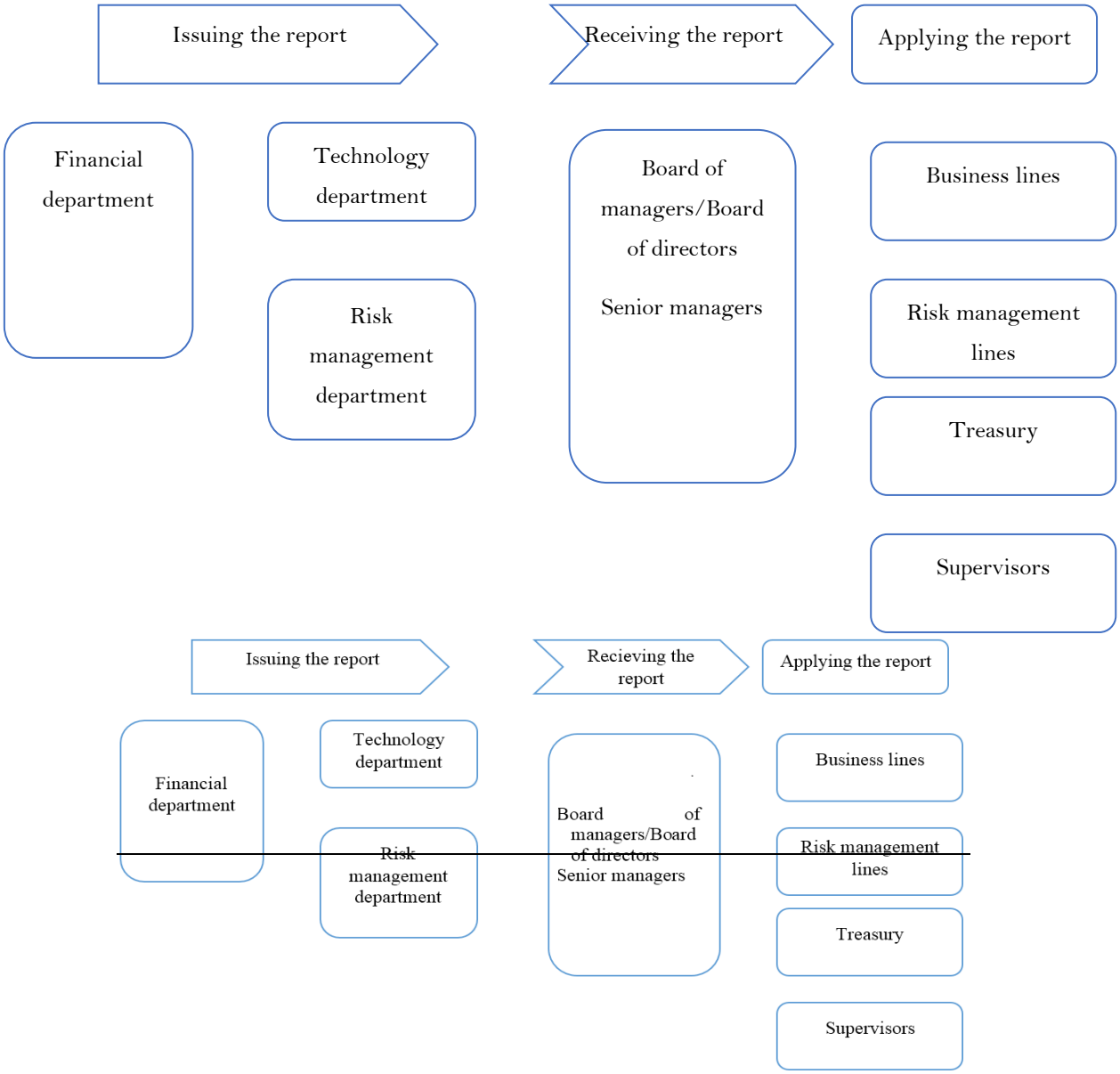

Appendix 2. The rotation of ICAAP report in Vietnamese commercial banks

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Appendix 3. RWA for Credit Risk, Market Risk and Operational Risk

Appendix 3.1. RWA for credit risk.

Unit: million VND

Types		Risk indicator	Customer volume	Credit balance	Conversion factor	Off balance sheet items	Provision	RWA
Housing mortgage loan without information related to LTV and/or DSC		200%	481.00	295,360.15	10%	20,331.74	122.67	594,541.30
					20%			
					50%			
					75%			
					100%			
Housing mortgage loans (except Housing mortgage loan and project loan)	LTV < 60%	75%	137.00	96,420.44	10%	1,307.61	2.80	72,411.30
					20%			
					50%			
					75%			
					100%			
	60% ≤ LTV < 75%	100%	79.00	84,073.43	10%	2,076.38	40.27	84,240.80
					20%			
					50%			
					75%			
					100%			
	LTV ≥ 75%	120%	24.00	31,317.79	10%	820.50	23.91	37,651.12

Appendix 3.2. RWA for counterparty credit risk.

Unit: million VND.

Transaction	Underlying assets	Credit derivatives	Time to maturity (days)	Value	Notional principal	Incremental indicator	Future exposure	Valid collateral	Counter party	Risk indicator	RWA
Forwards OTC	Forex (included standard gold)	No	32	2,638.63	21,988.60	1.0%	220	0.00	Business entities	140%	4,001.93
Swaps OTC	Forex (included standard gold)	No	7	803.16	6,693.00	1.0%	67	0.00	Business entities	140%	1,218.13

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Appendix 3.3. RWA for credit risk.

Unit: million VND

1. **Credit risk**	**RWA**
Receivables from government	1,355,161.05
Receivables from financial institutions	38,809,842.24
Receivables from business entities	143,815,557.15
Loans secured by real estate	541,554.45
Housing mortgage loans	793,538.00
Receivables from retail	25,137,925.34
Non-performing loans	1,793,210.54
Other balance sheet items	14,476,390.27
Repo transactions	0.00
Sum	226,723,179.03
2. **Counterparty** credit risk	
Counterparty credit risk	1,002,714.81
Repo transactions	0.00
Sum	1,002,714.81
3. **Total** credit risk	227,725,893.84

Appendix 4. RWA for market risk.

Unit: million VND

	Capital for each type of risk	**RWA**
Interest rate risk	795454.59	9943182.342
Equity risk	184521.66	2306520.81
Exchange rate risk	328611.71	4107646.367
Commodity risk	0.00	0
Option trading risk	0.00	0
Sum	1308587.96	16357349.52

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Appendix 5. RWA for operational risk (unit: million VND).

Period (last 12 quarters at the reporting point of time)	Business indicators											Alpha	Capital requirements
	interest income/interest expense		non-interest income/expense				Net profit from trading				Business indicators		
	Interest income	Interest expense	Fee and commission income	Fee and commission expense	Other activities income	Other activities expense	Net profit from trading securities	Net profit from trading investment securities	Net profit from trading of foreign currencies and gold	Net profit from trading derivatives			
First 4 quarters	13,456,302.65	7,331,931.86	973,962.87	300,240.67	644,355.80	29,462.84		10,616.40	99,313.87		8,182,323.25	15.00%	1,227,348.49
Second 4 quarters	13,148,603.61	6,608,528.89	1,408,192.37	457,790.34	360,644.54	28,359.53		306,297.23	89,835.22		9,191,193.95	15.00%	1,378,679.09
Last 4 quarters	13,537,628.56	6,219,098.32	1,527,970.39	984,131.82	611,261.55	86,522.72		118,665.39	159,047.68		10,806,129.80	15.00%	1,620,919.47
Sum													4,226,947.05
RWA for operational risk													1,408,982.35
RWAOR													17,612,279.37

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Appendix 6. RWA for concentration risk.

Unit: million VND

Sector	loan	loan^2
Agriculture, forestry and aquaculture	2185.70	4777288.86
Mining	3451.90	11915614.99
Manufacturing and processing	24977.29	623864845.90
Electricity, gas, hot water, steam and air-conditioning	5019.58	25196137.20
Water supply and waste and sewage treatment and management	572.80	328104.88
Construction	14938.14	223147901.18
Wholesale and retail trade; repair of motor vehicles & motorcycles	36056.53	1300073326.80
Transport, warehouse	8938.76	79901491.12
Hospitality services	2351.51	5529612.45
Information and communications	2411.81	5816817.83
Finance, banking and insurance	648.17	420128.76
Real estate trading	4416.62	19506562.26
Science and technology	180.89	32719.60
Administrative activities and support services	618.03	381955.89
Education and training	211.03	44535.01
Healthcare and social work	241.18	58168.18
Art, playing and recreation	75.37	5680.49
Other service activities	211.03	44535.01
Households' services	38031.20	1446371975.68
International organizations and bodies	3059.98	9363486.17
Loans at foreign branches	2140.48	4581652.92
SCI		16.553876
RWA for sectoral concentration (= 4% RWA_{CR})		9,109,035.75

The sectoral concentration index (SCI) should be calculated using the formula, where x is the value of risk exposure to each economic sector: $SCI = \Sigma x^2 / (\Sigma x)^2 \times 100$.

The individual concentration index (ICI) should be calculated using the formula $ICI = \Sigma x^2 / (\Sigma y)^2 \times 100$, where x is the total direct investment corresponding to each borrower or group (among the 1,000 largest borrowers of the institution) and $\sum y$ is the amount of the institution's total direct risk exposure (considering the overall loans and receivables).

Appendix 7. RWA for interest rate risk in the banking book.

Unit: million VND

bucket	0–1 month	1–3 months	3–6 months	6–12 months	above 1 year
GAP	-69,324,990	88,306,317	-11,397,212	-12,204,587	19,825,957
GAPw					(3,022,255.50)
ΔNII					(37,778.19)
ΔEVE					(30,222.56)
RWA_{IRRBB} =0.5%*RWA for pillar I)					81,786.75

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