

+ RISK FACTORS AND RISK MANAGEMENT

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Bangkok Bank recognizes that effective risk management is fundamental to good banking practice. Accordingly, the Bank has established guidelines for managing risk in each area of its business to ensure that proper risk management mechanisms are in place. Over the past few years, the Bank has been proactively identifying, monitoring and analyzing major risk factors which could affect its financial operations and, where necessary, has adjusted its organizational structure and risk management processes accordingly. This is to ensure that its risk management system is effective and in line with international standards and in accordance with the principles of Basel.

1) Uncertainties in Global and Domestic Conditions

One of the major emerging risks is uncertainties regarding China-US trade policies. Despite the improvement in sentiment after recent negotiations, risks of tension escalation will likely linger, as issues such as transfers of technology from US firms and China's industrial policies remain unresolved. Uncertainties over the prospects of China-US trade policies could trigger financial market volatility and soften global trade and investment.

Countries with elevated debt level are vulnerable to risks from tightening global liquidity. Given a decade of ample global liquidity after the Global Financial Crisis, both public and private debt has risen substantially across many economies. Thus, higher interest rates and tightening global financial conditions may leave these countries with more difficulties in deleveraging and refinancing, which could exert downward pressure on economic activity. Furthermore, emerging markets with large current account deficits, elevated external debt, and low international reserves are more prone to sudden capital flow reversals, which could lead to contagion over other emerging markets.

Uncertainties in the Euro area political landscape pose additional headwinds to global growth. Notably, there is a risk that the transition of the UK out of the European Union (EU) could be accompanied by interruptions in cross-border financial flows and weaker economic activities in the UK and, to some extent, in European countries. In addition, there remain policy uncertainties in Germany and Italy as well as political risks related to the European Parliament election and general elections in other European countries.

Asian emerging markets are exposed to risks from a slower Chinese economy, given that the majority of their exports to China are for Chinese final domestic consumption. The deleveraging process and the trade tensions with the US present downside risks to China's growth, although the adverse effects are partially offset by fiscal and monetary policy stimulus.

The Risk Management Committee, the Board of Executive Directors and the senior management all play significant roles in prescribing and reviewing the sufficiency of the risk management policy and system. They also define the risk management strategy, and monitor and control the Bank's risk to be at an appropriate level, in compliance with the risk management policy approved by the Board of Directors.

The Bank's risk management process comprises the identification of significant risks which may potentially impact the Bank's business operations, the assessment of each type of risk, the monitoring and control of risks to an appropriate level, and the reporting of the status of each type of risk to the relevant parties so as to enable them to manage and/or handle the risks in a timely manner.

The key principle of risk management is based on each business unit being responsible for continuously managing its relevant risk exposures and ensuring each risk remains within the approved limits and is in compliance with the overall risk management policy approved by the Board of Directors, while the Risk Management Division is responsible for monitoring and controlling the overall risks on a regular basis.

The operating environment and major risks that may affect the operations of the Bank, as well as the Bank's management of these risks, are as follows.

Weaker-than-expected private consumption remains a risk to the domestic economy. Uneven increases in income, together with rising household debt level, may continue to have negative repercussions on consumption, particularly among middle- and low-income households, and SME growth.

The Bank recognizes that the uncertain global environment and domestic economy may affect its business operations and those of its customers. The Bank has closely monitored each type of risk so it can make necessary adjustments to its business strategies and support its customers properly and promptly.

2) Regulatory Changes

✦ Principles of the Basel III Framework

The Bank of Thailand (BOT) has enforced its regulatory capital requirements for commercial banks according to the Basel III framework, which covers regulatory capital requirements and liquidity risk management standards, since 2013.



Under this framework the BOT requires banks to preserve additional capital, in both quantitative and qualitative terms, to support losses that may occur in normal times as well as under stressed scenarios in order to support and maintain the stability of the financial system. Significant recent revisions to the requirements include: a new minimum capital ratio, an increase in the quality of capital to an appropriate level, and an expansion of the coverage of risk-weighted assets so that they are more comprehensive and reflect real risks. From January 1, 2016, the BOT has required commercial banks to gradually set aside additional capital as part of the Capital Conservation Buffer of more than 0.625 percent p.a. until completion of the increment to more than 2.50 percent in 2019. The BOT also plans to enforce the Countercyclical Buffer in 2019, which requires commercial banks to maintain additional capital at a maximum of 2.50 percent. Moreover, the BOT requires the Bank, which is classified as a domestic systemically important bank (D-SIB), to have additional capital to meet the Higher Loss Absorbency (HLA) requirement by 1.00 percent, beginning with a 0.50 percent increase from January 1, 2019 followed by a 1.00 percent increase from January 1, 2020 onwards. As at December 31, 2018, the Bank and Group had adequate capital for such buffers.

The Leverage Ratio guidelines, which will take effect in 2022, aim to control on and off-balance sheet transaction volumes by

ensuring Tier 1 capital as a percentage of total exposures is no lower than 3 percent. The Bank has already prepared for compliance with the guidelines.

With regards to the Basel III Liquidity Framework, the BOT has imposed the guidelines on Liquidity Coverage Ratio (LCR) since January 1, 2016. The minimum requirement for LCR was set at 60 percent for 2016 and mandated to rise in equal annual steps until reaching 100 percent on January 1, 2020. The BOT recently imposed guidelines for the Net Stable Funding Ratio (NSFR) with the minimum requirement of 100 percent, effective on July 1, 2018.

Apart from the guidelines mentioned above, the Bank has closely monitored the revision of other risk management guidelines proposed by the Basel Committee on Banking Supervision (BCBS) and/or any other regulators, including guidelines that BCBS has already announced and which the BOT is considering adopting in Thailand, such as Basel III: Finalizing Post-crisis Reforms, Fundamental Review of the Trading Book, Operational Risk – Revisions to the Simpler Approaches, Interest Rate Risk in the Banking Book, and the Standardised Approach for Measuring Counterparty Credit Risk Exposures. These guidelines may impact the Bank's capital requirements and business strategy. The Bank has therefore closely monitored these revisions and has studied and assessed their impacts, in order to properly prepare for the new guidelines.

✦ New or Revised Financial Reporting Standards

The Bank's financial statements have been, and will be, prepared under the new and revised Thai Financial Reporting Standards (TFRS), which were adopted by the Federation of Accounting Professions (FAP) in accordance with IFRS. The financial reporting standards that relate to the Bank, which will take effect in 2019, are newly issued or amended and will be more current under IFRS; there are no changes to the principles in all material aspects.

However, FAP had issued the Notification of a pack of Thai Financial Reporting Standards No.9, in relation to financial instruments, to be effective in 2020 which widely impact financial institutions, particular in terms of their lending business and risk management, including compliance with the BOT's regulations, which were amended to be in line with the new accounting standards. The Bank has been gradually readying itself for compliance with such accounting standards in terms of its

lending business and risk management, especially risk and information technology, in order to enable effective change management, and enhancement of related policies and processes.

3) Credit Risk

Credit risk is the risk that arises from the inability of borrowers or counterparties to perform their obligations under contractual agreements in relation to the Bank's lending, investment and other contractual commitments – for example, the borrower's failure to repay principal and/or interest as agreed with the Bank. In addition, there are other related risks under credit risk such as credit concentration risk, reflecting large borrower concentration, industry concentration risk, and country and transfer risk. The Portfolio Management Unit is responsible for managing these risks.

Credit risk factors are those factors which may affect the ability of borrowers to fully repay loans, and include factors which may affect the Bank's ability to resolve non-performing loans.

A key credit risk factor in 2019 – 2020 is the uncertainty of global economic expansion resulting from certain factors. These include the trade tension between the US and China which may affect other countries. Furthermore, the enactment of the new Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP) which entered into force on December 30, 2018, and the new United States-Mexico-Canada Agreement (USMCA) to replace the former North America Free Trade Agreement (NAFTA) which is likely to come into force by 2020, may have an impact on Thailand's export and supply chains. Meanwhile, 11 Thai products have been removed from the Generalized System of Preferences (GSP) by the United States. Although the value of those products is relatively small, it will directly impact some Thai exporters. Owing to health and environment concerns, the European Union may ban the import of palm oil which is likely to affect the palm oil price. The impact will worsen if it includes various products with palm oil as an ingredient. The trend of monetary policy normalization, particularly in the United States and some major countries, also presents an additional risk to the global economy as does the uncertainty of Brexit. Other risks such as global political conditions, volatile oil prices and a slackening in agricultural prices may also affect the outlook.

Internally, the major risk to Thailand's economy is low household purchasing power, particularly in agricultural and rural areas,

due to low farm prices and sluggish non-farm earnings, while household debt is still high. In addition, the manufacturing sector faces a shortage of labor due to low labor force participation and a mismatch between the level of skills and manufacturing requirements. Moreover, technological disruption is a risk for traditional businesses unable to incorporate advanced technology and innovation into their operations or create value-added goods and services to suit changing customer demands.

Furthermore, there remain structural problems caused by multi-dimensional inequality between the rich and the poor, urban and rural, and large and small businesses. This could be a significant risk for Thailand's long-term economic development.

Given all these factors, the Bank must therefore closely monitor the risks that might adversely affect debtors and their counterparties, particularly those whose financial status is weak and/or who are vulnerable to the risk factors which will eventually affect their repayment ability.

In managing credit risk, the Bank has established credit underwriting processes which include the formulation of credit policy, credit risk ratings for customers, and the establishment of different levels of delegation of authority for credit approval, depending upon the type of business and/or the size of the credit line. In considering the approval of loans in general, the Bank considers the purpose of the loan and assesses the repayment ability of the applicant, taking into account the applicant's operating cash flows, business feasibility, management capability, and collateral coverage. The Bank performs credit reviews which include reviewing credit risk ratings on a regular basis. In order to effectively monitor and manage its credit risks, the Bank has therefore set up the following divisions:

- **Risk Management Division** is responsible for analyzing and reporting to management on the status of various risks of the Bank, as well as proposing recommendations for the review of the overall risk policy of the Bank in anticipation of, and in compliance with, new rules, regulations and international standards. The division is also responsible for overseeing the management of each type of risk to comply with the Bank's risk management policy.
- **Credit Management Division** is responsible for managing risks related to credit extension by supervising and monitoring credit extensions in accordance with the Bank's credit policies. The Credit Management Division comprises the Credit Policy unit, the Credit Acceptance unit, the

Portfolio Management unit, the Risk Asset Review unit, the Special Asset Management unit, the Loan Recovery and Legal unit, and the Bank Property unit. The functions of each unit are summarized below.

- **Credit Policy unit** oversees the credit policy framework and coordinates the improvement and adjustment of the credit policy. It is also responsible for disseminating the credit policy, credit standards and credit processes; for monitoring and overseeing exceptional cases which are inconsistent with the credit policy; and for gathering various inputs which may be used for improving the credit policy.
- **Credit Acceptance unit** oversees the quality of credit extensions to ensure they are in line with the credit policy and credit underwriting standards, reviews the appropriateness of loan structures as well as the results of customers' credit risk ratings, promotes the development of a good credit culture, and maintains a systematic and reliable credit extension process.
- **Portfolio Management unit** is responsible for analyzing and making recommendations for adjustments to the portfolio structure, recommending the appropriate portfolio composition and the provision of reserves for loan losses at the portfolio level, developing and overseeing credit risk management tools and methodologies, constructing credit databases, and overseeing related management standards.
- **Risk Asset Review unit** is charged with reviewing credit quality and credit management processes, assessing the adequacy of loan loss reserves, and evaluating compliance with credit policy, regulations and credit underwriting standards.
- **Special Asset Management unit** is responsible for managing non-performing loan, and for determining and executing strategies for the resolution and restructuring of troubled loans.
- **Loan Recovery and Legal unit** is responsible for taking legal actions, negotiating loan settlements, and seizing collateral for sale by public auction.

- **Bank Property unit** is responsible for managing and selling foreclosed assets obtained from loan recovery processes and from legal actions.

For the credit process, credit applications are first considered by the business units and then submitted to the Credit Acceptance unit. The unit conducts additional analysis to help mitigate credit risk by ensuring that the proposals comply with the Bank's credit policies in areas such as credit underwriting standards, credit risk rating, and collateral appraisal. In handling non-performing loans, there is a specific unit to manage and resolve such loans. The Bank also has an independent unit to review credit quality and credit management processes; assess the adequacy of loan loss reserves for non-performing loan; evaluate the effectiveness in complying with credit policy, regulations and credit underwriting standards; and assess the appropriateness of portfolio composition, the adequacy of capital and the effectiveness of stress testing as specified by the Bank and the BOT. All the above units report on a regular basis to the senior management, the Board of Executive Directors and the Risk Management Committee.

The Bank has established different measures to control credit risk. For example, the Bank has instituted limits on the amount of total credit extended, contingent liabilities and investment in a group of borrowers, an industry and a country. All of this will limit the loss of capital due to an economic downturn. Moreover, the Bank monitors and reports on these aspects to the senior management, the Board of Executive Directors and the Risk Management Committee to ensure that there will be adequate capital to safeguard the continuity of business operations in difficult times.

In addition, the Bank has established a risk management policy for intra-group¹ transactions, in accordance with the consolidated supervision principles of the BOT, which cover guidelines and limitations for intra-group transactions and their risk management. The intra-group transaction policy stipulates that the companies in the Bank's financial business group shall manage, control and monitor the transaction volumes to be within the intra-group

¹ The Group comprises 10 companies as follows; 1) BANGKOK BANK PUBLIC COMPANY LIMITED (as a parent company) 2) BANGKOK BANK BERHAD (BBB) 3) BANGKOK BANK (CHINA) COMPANY LIMITED (BBC) 4) SINSUPTAWEE ASSET MANAGEMENT CO., LTD. (STAM) 5) BBL ASSET MANAGEMENT CO., LTD. (BBLAM) 6) BUALUANG SECURITIES PCL. (BLS) 7) BBL NOMINEES (TEMPATAN) SDN. BHD. 8) BBL (CAYMAN) LIMITED 9) BANGKOK CAPITAL ASSET MANAGEMENT CO., LTD. and 10) BUALUANG VENTURES LIMITED

transaction policy of the Bank (as a parent company) and to be consistent with the guidelines of the BOT and/or other relevant regulators. The companies in the Bank's financial group shall report intra-group transactions to the Risk Management Committee of the Bank's financial group and to the Bank's Board of Directors on a regular basis so that potential problems can be monitored and pre-empted before serious damage occurs.

The ratios of the Group's asset quality show the Bank's stability compared to the industry, with adequate reserves for losses from credit risk. The ratios as at December 31, 2018 and December 31, 2017 were as follows:

	Dec 31, 18	Dec 31, 17
Ratio of loan loss reserves to total loans*	7.3%	7.0%
Ratio of loans written off to total loans*	0.4%	0.1%
Ratio of non-performing loan to total loans**	3.4%	3.9%
Ratio of accrued interest to total loans*	0.3%	0.3%
Ratio of loan loss reserve to non-performing loans**	190.9%	160.2%

* Including accrued interest

** As per the Bank of Thailand requirements

Credit Concentration Risk

Credit concentration risk is the risk of the Bank making lending, investment and other contractual commitments to any borrower or any sector at very high volumes. If losses occur, this will affect the status and operations of the Bank. There are 3 types of concentration risks: large borrower concentration, industry concentration, and country and transfer risk.

Large borrower concentration is controlled by limiting the lending, investment and other contractual commitments to any one borrower or any one project to no more than 25 percent of the Bank's total capital. The Bank also sets a limit of three times its total capital on the total sum of lending, investment and other contractual commitments to any group of borrowers that exceeds 10 percent of the Bank's total capital. These two limits are required by the BOT and the Bank is in compliance.

To control industry concentration risk, the Bank aggregates exposures into industry and sub-industry categories based on economic factors, determines the worst-case scenario level of loss in each industry, and then calculates the lending limit to any industry to be at an acceptable level to limit damages to the Bank's capital in the event of a serious incident with major implications on certain sectors. The Bank also monitors, reviews and reports exposures and business conditions of each industry to ensure that the diversification in the portfolio will support the Bank's solid business growth.

For country and transfer risk, the Bank evaluates the riskiness of a counterparty's country with an assumption that their economic, social and political problems are worse than usual conditions. Then, together with business requirements, the Bank determines the country limit with an objective to limit damages to the Bank's capital in case events in a foreign country adversely affect the Bank's financial interests. The Bank also monitors, reviews and reports exposures and business conditions of every major country regularly to ensure the Bank has optimal exposure allocations.

4) Market Risk

Market risk is the risk of losses in on and off-balance sheet positions of the Bank arising from movements in market prices such as interest rates, foreign exchange rates, equity prices and commodity prices.

The Bank's market risk arises from financial services activities provided to customers and/or financial institutions. These involve buying and selling foreign exchange and debt securities, as well as restricted financial derivative transactions, such as foreign exchange forward contracts, cross currency swaps and interest rate swaps. The Bank manages market risk arising from customer-driven transactions to be at acceptable levels by hedging or reducing the risk exposure. Market risk exposures also arise from the Bank's own asset and liability positions.

The primary objective of market risk management is to manage the risks resulting from changes in market factors to be at

acceptable levels and in line with the overall risk management policy of the Bank. The Bank has established a market risk management policy and specified market risk measurement metrics and limits, taking into consideration the nature and complexities of various financial activities. The following committee and units are mainly responsible for managing, monitoring and controlling market risks.

- **Asset-Liability Management Committee** is responsible for establishing and reviewing policies and guidelines for asset and liability management and market risk management, as well as monitoring and controlling these risks to be at acceptable levels and in compliance with the risk management policy set by the Risk Management Committee.
- **Treasury Division** is responsible for executing the trading strategy for the Bank through buying and selling financial products such as foreign exchange, bonds and derivatives instruments, as well as managing the Bank's foreign exchange risk, interest rate risk and liquidity risk to be within the limits set by ALCO's guidelines and at levels acceptable to the Bank.
- **Market Risk unit**, which is part of the Risk Management Division, is accountable for identifying, assessing, monitoring, reporting and controlling risk positions against specified limits. The Market Risk unit reports to ALCO on a regular basis and is responsible for proposing the enhancement of market risk policies, measurement metrics and limits in response to changes in the operating environment, the Bank's business plans, and the complexities of financial activities.

The Bank segregates market risk management into two parts, the trading book and the banking book, which are classified according to the purpose of entering into the transaction.

4.1 Market Risk in the Trading Book

Trading book position includes positions of financial instruments that the Bank holds for a short period with an intention to trade, resell, and benefit from the difference between the buying and selling prices; to benefit from arbitrage opportunities; or to hedge other positions in the trading book. The Bank's main traded market risks are interest rate risk and foreign exchange risk.

Interest rate risk in the trading book arises when the Bank holds interest rate-related financial instruments with an intention to trade, speculate for a short-term profit, or hedge other positions in the trading book. These trading exposures include debt securities, foreign exchange forward contracts, interest rate swaps and currency swaps, etc. Changes in interest rates affect the fair value of these positions and may result in gains or losses for the Bank.

Foreign exchange risk arises when the Bank executes a foreign currency transaction which may lead to an overbought or oversold position in a particular currency. These transactions include foreign currency exchange, investments, loans, borrowings, financial commitments, and foreign exchange-related derivatives. The Bank may incur gains or losses as a result of movements in foreign exchange rates.

Factors which affected the trading book position in the past year and that will need to be monitored going forward include 1) Monetary policies of the US and some major economies are tending towards policy normalization and this is causing global interest rates to rise. 2) Increasing US trade protection measures with China and other countries could limit global trade and economic expansion. 3) There is uncertainty over whether the UK can reach an agreement with the EU on Brexit. 4) There is slower growth in the Chinese economy. These factors may increase the volatility of international fund flows and subsequently cause volatilities in exchange rates, interest rates and commodity prices.

The Bank manages traded market risk primarily through a series of limits, such as VaR Limit, PV01 Limit and Maximum Loss Limit. Risk exposures are monitored and reported to senior management, the Board of Executive Directors and the Risk Management Committee on a regular basis. Value-at-risk (VaR) is a statistical technique for estimating the potential losses on risk exposures as a result of movements in market rates and prices over a specified time horizon and at a given level of confidence.

The Bank also performs market risk stress testing on its trading book position on at least a quarterly basis to determine the potential losses from extreme market movements or crisis events. This stress testing enhances the Bank's understanding of its risk exposures and vulnerability as well as facilitating proactive risk management.

By using the historical simulation approach, the average VaR of the trading book for a one-day holding period, with a 99 percent confidence level, was Baht 72 million in 2018.

4.2 Market Risk in the Banking Book

The Bank's banking book is subject to interest rate risk and equity price risk which can be described as follows:

(1) Interest Rate Risk in the Banking Book

Interest rate risk in the banking book normally arises when the repricing and/or maturity schedule of assets, liabilities and off-balance sheet positions are not matched, or when the movements of reference interest rates on assets and liabilities are not correlated, negatively affecting net interest income (NII) and/or economic value of equity (EVE).

Primary factors affecting the trend and the level of interest rates include macroeconomic conditions and inflation rates, as well as the monetary policies adopted by the BOT and central banks of major countries that may directly affect the trend and level of interest rates or affect the movement of international capital flows and subsequently affect interest rates. Moreover, competition among banks to increase or maintain market share on deposits and loans may also narrow the Bank's net interest margin.

To control interest rate risk in the banking book, the Bank has established a NII Impact Limit (being the Cumulative NII Impact within one year) and an EVE Impact Limit, assuming interest rates rise and decrease immediately by one percent.

The Bank manages interest rate risk by adjusting its asset and liability structure in line with forecast interest rate trends, taking into consideration the changes in NII and EVE. The Bank may deploy plain vanilla derivatives, such as interest rate swaps and

cross currency interest rate swaps, to hedge or mitigate interest rate risks to be within the risk tolerance limit, based on ALCO's risk management guidelines. The Bank also performs stress testing for interest rate risk in the banking book on a quarterly basis in order to understand its vulnerability and potential negative impact on NII under various stress scenarios. Results of the stress testing are used to determine alternative balance sheet strategies more suited to the business environment in order to achieve the business return target under an acceptable level of risk.

The impact of a one percent interest rate increase on the Group's NII as at December 31, 2018 and December 31, 2017 was as follows:

Currency	Million Baht	
	Dec 31, 18	Dec 31, 17
THB	-305.46	-614.06
USD	1,562.64	1,002.53
EUR	275.60	69.72
OTH	577.81	578.89
Total NII Impact	2,110.58	1,037.07

(2) Equity Exposure in the Banking Book

Equity price risk is the risk associated with equity price changes resulting in the deterioration of investment value affecting the Bank's capital.

Objectives of the Bank's equity investment in the banking book are to enhance income in terms of dividends and capital gains under a medium to long-term investment horizon, and to support its core banking business by establishing good relationships with customers and creating networks of strategic investment partners, as well as using securities for debt repayment under debt restructuring agreements. The Bank's equity price risk arises from various types of investments in both domestic and overseas markets in order to diversify risk, to enhance returns, and to support the development of the Thai capital market, such as investments in property funds and infrastructure funds.

The Bank has established an equity investment and risk management policy as a guideline for assessing, monitoring and controlling equity price risk. Risk measurement techniques for the assessment of equity price risk are categorized by equity type. The Bank performs equity price risk stress testing on at least a quarterly basis in order to assess maximum potential losses from extreme market movements or crisis situations, as well as controlling the ratio of equity investment exposures to total capital in accordance with BOT regulations and the Bank's internal guidelines.

5) Liquidity Risk

Liquidity risk is the risk that the Bank is not able to meet financial obligations when they fall due. The purpose of the Bank's liquidity risk management is to maintain sufficient funds to meet present and future financial obligations while managing the use of the funds to generate an appropriate return in line with prevailing market conditions.

Liquidity risk factors mainly comprise the structure of the sources and use of funds, competition among banks to increase market share of deposits, especially low-cost deposits, in order to support loan expansion if demand increases due to the government's public infrastructure projects. Additionally, changes in the monetary policy directions of major economies and the rising trend of US interest rates might lead to increased volatility in the international flow of funds and cause money market fluctuations, which may impact the Bank's liquidity and foreign-currency funding costs.

The Bank manages liquidity risk in accordance with policies and principles established internally by ALCO and with relevant regulatory requirements. The Treasury Division is in charge of managing the Bank's day-to-day cash flow and liquidity position, monitoring money market conditions and interest and exchange rate movements and forecasting rate trends, as well as executing liquidity management strategies in accordance with ALCO guidelines. The Market Risk unit of the Risk Management Division is responsible for identifying, assessing, monitoring, reporting and controlling liquidity risks against specified limits. The Market Risk unit reports to ALCO regularly, at least once a month.

The Bank has diversified funding sources. Its major funding source is customer deposits which are well diversified in terms of customer type, deposit type and maturity. Moreover, the Bank manages liquidity in major currencies such as the Thai baht and US dollar by using domestic and international money and capital markets, including swap and repurchase markets. The Bank aims to balance the cost of liquidity against liquidity risks as deemed appropriate, based on market conditions and acceptable risk levels. The Bank also closely manages short-term and long-term liquidity positions, including the consideration of foreign short-term and long-term borrowings to meet customers' foreign currency loan demands in both domestic and overseas operations, as well as planning for capital fundraising as market conditions permit.

In addition to funding diversification, the Bank maintains high-quality liquid assets which can be liquidated or realized as needed in order to meet its financial obligations under both business-as-usual and crisis situations. The Bank maintains a liquidity reserve ratio in accordance with the requirements of the BOT and other regulatory authorities in the countries where it has an international presence, as well as in accordance with the ALCO guidelines.

The Bank assesses, monitors and controls liquidity risk through a variety of measurements such as the loan-to-deposit ratio, cumulative cash flow positions under business-as-usual and crisis scenarios, liquidity coverage ratio (LCR) and net stable funding ratio (NSFR). The Bank's average LCR in the fourth quarter of year 2018 was 288 percent, which was computed from month-end LCR in the quarter. The Bank's LCR is above the regulatory minimum requirement of 100 percent due in 2020.

The Bank also has in place an early warning system which provides alerts of any looming liquidity crisis, from both internal and external factors, that will allow for the prevention of liquidity risk crises and/or for proactive liquidity risk management. The Bank conducts liquidity-risk stress tests whereby the stress scenarios incorporate both internal and external liquidity risk factors. Liquidity-risk stress scenarios can be classified into three categories: (i) bank-specific crisis; (ii) market-wide crisis; and (iii) a combination of both. Under each stress scenario, the assumptions of cash inflows and outflows are specified differently from those under the business-as-usual scenario, such as

abnormal customer deposit withdrawals and overdraft drawdowns, inaccessibility to the money market, sales of the Bank's liquid assets at below-market prices due to the decrease in market liquidity of such assets, and contingent support for companies in the financial group. The results of liquidity-risk stress tests performed in 2018 showed that the Bank has continued to maintain a sufficient amount of excess liquidity under all three crisis scenarios.

The Bank has a liquidity contingency plan that outlines the roles and responsibilities of management and relevant departments, as well as having early-warning indicators and an action plan that enables the Bank to promptly cope with crisis events and successfully restore the situation to normal. In addition, the Bank has its Global Medium Term Notes (GMTN) Program which enables the Bank to access medium and long-term funding from the capital market in a timely and flexible manner.

6) Operational Risk

Operational risk is the risk of loss from failed or inadequate internal processes, people and systems, or from external events. This includes legal risks, but does not include strategic risks and reputation risks.

Operational risk factors are primarily composed of internal factors and external factors.

Internal factors are:

- The efficiency of the Bank's internal processes and internal control systems, including operational processes supporting business operations and processes for taking care of its personnel.
- The adequacy, qualifications and efficiency of the Bank's personnel, including efficiency in the quality of customer service and customer care, understanding of the Bank's products and services that tend to become more complex, and the suitability of products and services sold to customers.
- The Bank's operating systems, in terms of their capability to support the Bank's business operations; and their complexity which may inflict risks.

External factors are:

- Actions by outsiders such as theft or embezzlement of assets or data, money laundering, etc.
- Catastrophes, natural disasters and civil disorders that might cause damage to the Bank's assets.
- New laws and regulations, or changes to laws and regulations, in Thailand and overseas which are likely to become more demanding.

The Bank understands that good operational risk management is vital to sustainable business success, particularly in the current environment where uncertainties, both domestic and international, prevail. The Bank therefore places great importance on effective operational risk management that provides sufficient coverage for all aspects of its operations, and is well prepared to deal promptly with any unpredictable event, including compliance with regulations in Thailand and overseas which has become more demanding.

Furthermore, the Bank pays close attention to quality of customer service and customer care, suitability of products and services sold, reinforcement in system security, information systems, and all electronic/digital channels as well as risk management of fraud related to bank products and services such as credit cards, ATM cards and electronic services to ensure customer confidence. In relation to new product and service launches, the product and service risks must be well analyzed, assessed and controlled to be at the acceptable level, and the appropriate risk control procedures must be in place.

The Bank's operational risk management includes defining, assessing, monitoring, mitigating and controlling risk. Each unit in the Bank is directly responsible for managing its operational risk and for establishing measures to mitigate, monitor and control the risk to the designated level by allocating appropriate resources and establishing an organizational culture for managing operational risk.

A key principle underlying the Bank's operational risk management is to educate staff throughout the Bank by providing them with a consistent understanding of operational risk, and to cultivate a sustainable operational risk culture as part of day-to-day business activities across the Bank through Operational Risk Management Tools, e.g. Risk Control

Self-assessment (RCSA), so that they are able to accurately and completely identify the operational risks, assess the risks, analyze details of the risks, assess the effectiveness of controls, find appropriate solutions to mitigate risks, and implement the selected solutions to minimize risks. This is followed by the systematic monitoring of progress, the measurement of potential risks, e.g. Risk Monitoring Information (RMI) and Loss Data collection, and the use of reporting systems as key elements of compiling and analyzing preventive and control measurements, and/or effectively diminishing the Bank's operational risk, and regular reviews of the entire process.

The Bank has the Operational Risk Management Committee (ORMC), comprising senior executives from various business and support units, which is responsible for supporting and overseeing the functioning of the Bank's operational risk management and business continuity management to comply with the Bank's policy.



The Bank has a dedicated unit for operational risk management under its Risk Management Division, which is responsible for the operational risk management system, such as monitoring and supporting every unit in implementing the operational risk management framework at the unit level, managing operational risk at the organization level, reviewing operational risk management in the process of product and service development, calculating the capital required for operational risk under the Basel framework, and maintaining and analyzing data on the operational risk loss data system. The Operational Risk unit coordinates with the Compliance and Audit and Control Division, by information sharing, and by analyzing and setting controls to enhance the efficiency of operational risk management and the Bank's internal controls.

The Bank has implemented Business Continuity Management (BCM) to enhance its resilience and its capability in responding to unexpected interruptions. The Bank has adopted a BCM Policy which has been approved by the Board of Directors and has also defined standards and a BCM framework for developing a Business Continuity Plan which is reviewed and updated in accordance with potential threats, as well as being tested on a regular basis.

7) Information Technology Risk

Information Technology (IT) Risk is the risk of losses from inadequacy or inefficiency in managing security, confidentiality, integrity, and availability of IT systems, data and IT infrastructure, as well as the management of IT third-party, IT resilience and continuity, and IT projects.

Key IT risk factors of the Bank are composed of internal factors and external factors. Internal factors are the Bank's systems, in terms of their capability and the adoption of technology for the Bank's business operations; their complexity which may inflict risks; the issue of system and data security; the accuracy of data processing; the development of, and changes in, technologies; and the adequacy of the Bank's personnel regarding IT risk awareness and understanding, including malicious and inadvertent insiders. External factors are more diversified, rapid and complex form of cyber risk or IT threat. Moreover, current risks from changes in the business-chain environment relying on technology and data security management in operating businesses become factors for creating business opportunity as well as risk due to the business landscape transforming towards the era of digitalization

The Bank is aware of the risks arising from the use of IT and the importance of information security and cyber security. The Bank has developed an IT Risk Management Policy and updated its Information Security and Cyber Security Policy. Moreover, the Bank has enhanced the readiness of its IT governance and IT risk management in aligning with the operational risk management framework to strengthen capability in proper IT risk management and information security and cyber security throughout the Bank by putting in place a framework for the following areas: Strengthening cyber security to meet the most up-to-date standards; Assessing cyber risk and making appropriate adjustments to the assessment framework according to each situation; Regularly building awareness and understanding of cyber security with its staff and customers; Developing contingency plans to rapidly and effectively handle different forms of cyber risk to reduce its impact; and Collaborating with external organizations to further strengthen the Bank's readiness to both effectively prevent and handle cyber risk.

8) Capital Adequacy Risk

Capital is an important source of funding for any financial business. Therefore, effective capital management reflects the financial strength, and directly affects the reliability, of financial institutions.

Capital structure, according to the regulations on capital requirements under the principles of the BOT's adoption of Basel III, is revised into Common Equity Tier 1 capital, Additional Tier 1 capital and Tier 2 capital.

- Common Equity Tier 1 capital comprises:
 - 1) Paid-up share capital
 - 2) Premium (discount) on common shares
 - 3) Legal reserves
 - 4) Reserves appropriated from net profit
 - 5) Retained earnings after appropriations
 - 6) Non-controlling interest classified as Common Equity Tier 1
 - 7) Other reserves
 - 8) Deductions such as intangible assets
- Additional Tier 1 capital consists of non-controlling interest classified as Tier 1 capital
- Tier 2 capital consists of:
 - 1) Long-term subordinated debt instruments subordinated to depositors and general creditors
 - 2) General provisions for normal assets not exceeding 1.25 percent of credit risk-weighted assets
 - 3) Non-controlling interest classified as Tier 2

In adopting Basel III, the BOT has relaxed the new requirements by allowing the addition to or deduction from capital at 20 percent p.a. to be implemented in phases from 2014 to 2018. For subordinated debt instruments classified as Tier 2 which do not meet the criteria for qualification under Basel III regarding capability for loss absorbency of the Bank at the point of non-viability, i.e. they are not convertible to common shares or cannot be written off upon the authority's decision to provide financial support to the Bank, the BOT requires capital to be phased out at 10 percent p.a. from 2013 to 2022.

The Group's capital position as at December 31, 2018 and December 31, 2017 was as follows:

	Million Baht	
	Dec 31, 18	Dec 31, 17
Tier 1 capital	390,369	383,942
Common Equity Tier 1 capital	390,309	383,841
Additional Tier 1 capital	60	101
Tier 2 capital	36,194	35,638
Total capital	426,563	419,580

Capital adequacy risk factors cover the type, quantity and quality of the Bank's risk assets as well as the Bank's earnings' capacity. In times of severe economic and financial difficulties, the quality of the Bank's assets, including its investments, may deteriorate. The value of the Bank's assets and/or investments and/or collateral may also decline, thereby increasing the Bank's risk weighted assets. As a consequence, the Bank's earnings may also be affected, resulting in a reduction of capital and leading to a corresponding decline in its capital adequacy ratio.

The objective of the Bank's capital management policy is to maintain an adequate level of capital to support growth strategies within an acceptable risk framework, as well as to meet regulatory requirements and market expectations.

In compliance with the BOT's supervisory review process guidelines, the Bank's capital management process assesses the overall risk and capital adequacy under the Internal Capital Adequacy Assessment Process (ICAAP). The process covers projected assessments of all substantial risks to the Bank's operations, so that the Bank can effectively manage its risks and have a sound capital base for business operations under normal and stress scenarios

The Standardised Approach (SA) is currently used to measure credit risk, market risk and operational risk for computing regulatory capital requirements under the BOT's Basel III.

Under the principles of Basel III, the BOT requires that commercial banks registered in Thailand and their groups must maintain three minimum capital adequacy ratios: a Common Equity Tier 1 capital adequacy ratio of no less than 4.50 percent, a Tier 1 capital adequacy ratio of no less than 6.00 percent, and a total capital adequacy ratio of no less than 8.50 percent. The aforementioned minimum ratios have yet to include the Capital Conservation Buffer which the BOT is phasing in with an additional capital ratio of more than 0.625 percent p.a. that began on January 1, 2016 rising in increments to more than 2.50 percent on January 1, 2019. Moreover, the BOT requires the Bank, which is classified as a D-SIB, to have additional capital to meet the Higher Loss Absorbency (HLA) requirement, which raises the required Common Equity Tier 1 ratio by 1.00 percent, beginning with a 0.50 percent increase from January 1, 2019 followed by a 1.00 percent increase from January 1, 2020 onwards. Consequently, a Common Equity Tier 1 capital adequacy ratio of more than 6.375 percent, a Tier 1 capital adequacy ratio of more than 7.875 percent, and a total capital adequacy ratio of more than 10.375 percent are required to be maintained from January 1, 2018. Effective from January 1, 2019, Common Equity Tier 1 ratio, Tier 1 ratio and total capital ratio

must be more than 7.50, 9.00 and 11.50 percent, respectively, of the total risk-weighted assets. And from January 1, 2020, Common Equity Tier 1 ratio, Tier 1 ratio and total capital ratio must be more than 8.00, 9.50 and 12.00 percent, respectively, of the total risk-weighted assets.

As at December 31, 2018, the Group's Common Equity Tier 1 capital adequacy ratio, its Tier 1 capital adequacy ratio and its total capital adequacy ratio were 16.43 percent, 16.43 percent and 17.96 percent, respectively, whereas at December 31, 2017 the ratios were 16.62 percent, 16.63 percent and 18.17 percent, respectively. Consequently, the Bank's capital is at a level that provides such additional buffers.

