Risk Management

Risk is inherent in the business activities of the Group and managing risks is central to our sustainability. Our overall goal is to manage our businesses and the associated risks in a manner that delivers sustainable value for our customers, employees, shareholders and communities over the long term.

Our risk management framework comprises strong governance, sound policies and methodologies, and professionals, supported by fit-for-purpose technology, infrastructure and data. It is underpinned by a strong corporate culture that emphasises accountability, ownership, integrity, and high ethical standards. We engage in businesses that are consistent with our corporate strategy and risk appetite, are well understood and are appropriately priced to provide us with an adequate return.

While the categorisation of risks can be complex because of their inter-relationships, we generally categorise the risks we take into five principal risk types, described in the table below.

Each principal risk type is governed by an appropriate risk framework that is operationalised through policies and procedures and supported by robust risk management processes that are regularly assessed for their continued effectiveness. Our policies and procedures comply with regulatory standards such as MAS Notice 637 on Risk Based Capital Adequacy Requirements for Banks incorporated in Singapore (MAS Notice 637) that are aligned with the Basel Framework published by the Basel Committee on Banking Supervision. We continue to invest in risk infrastructure and digital technologies to meet regulatory expectations, improve the governance and risk management capabilities of the Group and support our corporate strategy.

We adopt a disciplined risk management approach to identify, assess, measure, control, monitor and report our risk positions at granular and aggregate levels. We regularly review the relevance of the risk drivers and their potential impact on the Group's business to formulate appropriate risk mitigation actions where necessary. Risk drivers can emanate from developments in the economic, business and physical environment, geopolitical shifts, regulatory and social changes, cyber threats, data loss, fraud and human error, as well as Environment, Social and Governance (ESG) issues. These drivers impinge on one or more of the principal

Principal Risks	Definition
Credit Risk	Credit risk is the risk of losing principal and/or income due to the failure of an obligor or counterparty to meet its financial or contractual obligations or an adverse change in the credit profile of an obligor or counterparty.
Market Risk	Market risk is the risk of losing income and/or market value due to fluctuation in factors such as interest rates, foreign exchange rates, credit spreads, equity and commodity prices or changes in volatilities, or correlation of such factors. It also includes interest rate risk in the banking book which is the risk to income and/or capital arising from exposure to adverse changes in the interest rate environment.
Liquidity Risk	Liquidity risk is the risk arising from the inability to meet financial and cash outflow obligations as they fall due without incurring unacceptable costs or losses through fundraising and asset liquidation.
Information Security and Digital Risk	Information security risk is the risk of compromising confidentiality, integrity and/or availability of information (in physical or digital form). Digital risk encompasses cyber and technology risks. Cyber risk is the risk arising from malicious acts perpetrated by threat actors. Technology risk is the risk of disruption, failure or irregularity in essential financial services arising from the use of information and communication technologies.
Operational Risk	Operational risk is the risk of loss resulting from inadequate or failed internal processes and systems, poor management, human error or external events. This is a broad risk category that encompasses fraud risk, money laundering, terrorism financing and sanctions risk, third-party risk, physical and people security risk, conduct risk, business continuity risk, unauthorised trading risk, regulatory risk, legal risk, fiduciary risk and reputational risk.

Please refer to the respective sections for details of our risk management approach for each of the principal risk types.

risk types with consequential impact on earnings and asset quality as well as our reputation, customer franchise and ability to do business.

With respect to ESG issues, we take an integrated and risk-based approach to address their multi-dimensional implications. This entails ensuring ESG risk drivers that impact the Group across credit, market, liquidity, operational and reputational risks are adequately addressed. It also ensures that we deliver on our sustainability commitments to create a positive impact for all stakeholders. We prioritise the management of salient risk issues, such as ESG-related credit and reputational risks that arise from our lending activities within our responsible financing framework. Given the significant and wide-ranging implications of climate risks, we have enhanced our climate risk management framework. This includes embedding ESG and climate risk management within the responsibilities of the relevant risk committees, deepening our climate scenario analysis and stress testing capabilities, and measuring the financed emissions of carbon-intensive sectors in our corporate lending portfolio. We have also established a dedicated Group ESG Risk and Sustainability function to drive the continual enhancement of our ESG risk management framework, processes and capabilities across the Group.

Please refer to our Sustainability Report 2022 for more information on our ESG risk management efforts.

In consultation with Group Risk Management, our banking subsidiaries adapt the Group risk management framework and policies to comply with the Group's risk standards and/or local regulatory requirements, whichever is stricter. Approving authority and limit structures, designed to ensure proper ownership and accountability, are also consistent with that of the Group.

Great Eastern Holdings (GEH) and Bank OCBC NISP are listed companies. Their annual reports contain information on their risk management frameworks and practices. Their risk management frameworks, policies and practices are appropriately aligned with the Group's risk standards. For information on GEH's risk management, please refer to Note 38 in the Group's Financial Statements.

Risk Governance and Organisation

Figure 1 illustrates the risk governance and oversight structure across the Group. The Board of Directors has ultimate responsibility for the effective management of risk. It establishes the corporate strategy and approves the risk appetite within which senior management executes the strategy.

The Board Risk Management Committee (BRMC) is the designated board committee overseeing risk management matters. It ensures that the Group's overall risk management philosophy and principles are aligned with the corporate strategy and within the approved risk appetite. The Committee has oversight of credit, market, liquidity, information security and digital, operational, conduct, money laundering and terrorism financing, legal, regulatory, strategic, ESG and fiduciary risks, as well as any other category of risk that may be delegated by the Board or deemed necessary by the Committee. It also ensures that the necessary overall risk management organisation is in place and effective.

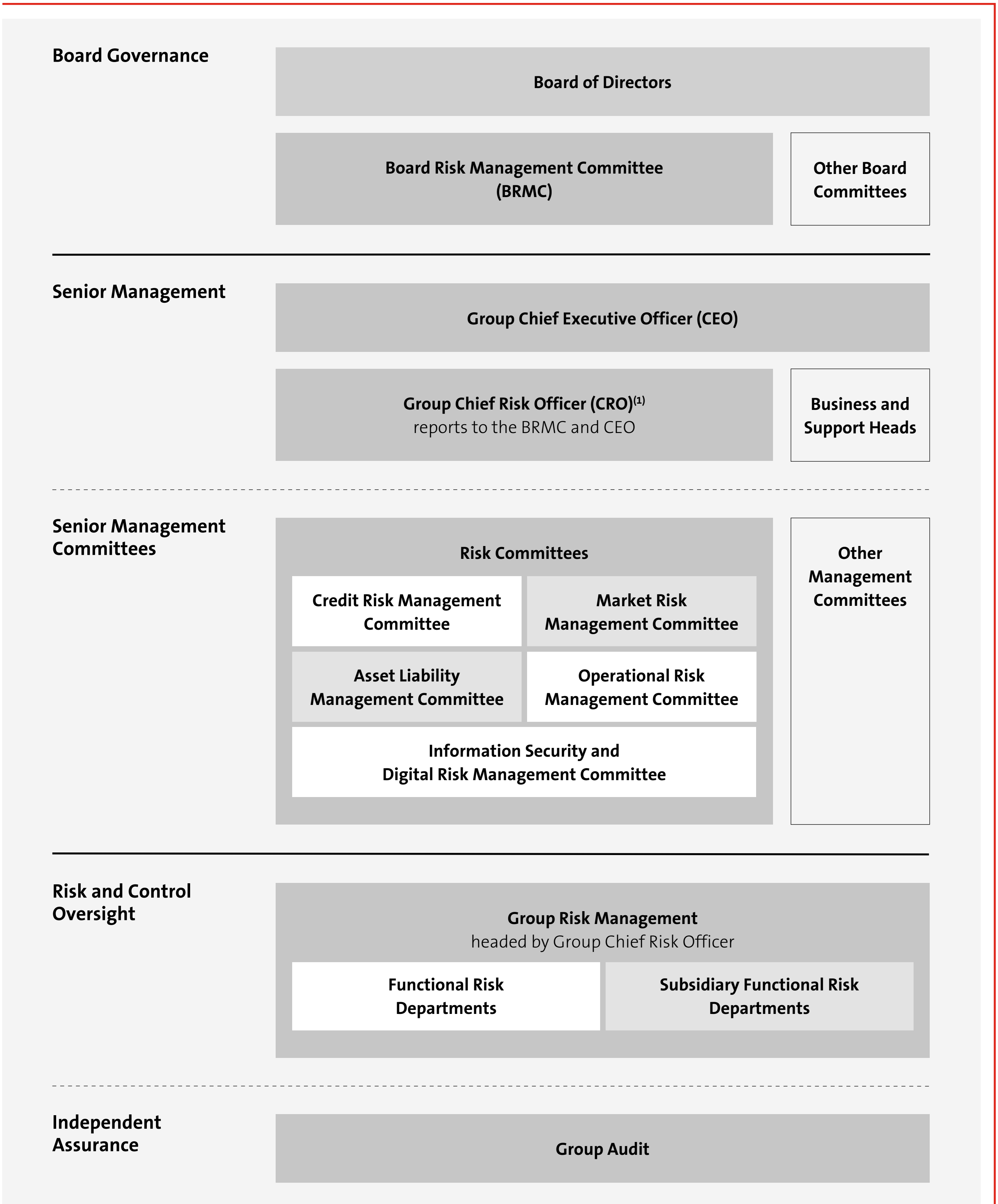
Based on the approved risk appetite, the BRMC provides quantitative and qualitative guidance to major business units and risk functions to guide risk-taking. Senior management, functional risk committees covering principal risk types and the BRMC regularly review our risk drivers, risk profiles across major lines of business and risk types, risk management frameworks and major risk policies, as well as compliance matters. Please refer to the Corporate Governance Chapter for more information on the BRMC.

Dedicated Group risk committees for major risk types have been established to facilitate the BRMC's risk oversight. These committees are supported, where appropriate, by local risk committees that oversee the local risk positions, approve local risk policies and ensure that risk-taking activities remain within the limits set by the Group.

The Group's independent risk management function, the Group Risk Management Division (GRM), is headed by the Group Chief Risk Officer (CRO), who is also the Group Chief Information Security Officer (CISO). The Group CRO is a member of the Group Management Executive Committee and also the functional risk committees. GRM's day-to-day functional responsibility involves providing independent risk control and managing credit, market, liquidity, information security and digital, operational and ESG risks. It provides regular risk reports and updates on developments in material risk drivers and potential vulnerabilities, as well as recommended mitigating actions, to senior management, risk committees, the BRMC and Board. Risk management staff work closely with the business and other support units to ensure that risks are well understood and appropriately managed.

GRM oversees the New Product Approval Process to ensure that risks are properly and comprehensively identified, and adequately addressed before implementation. GRM also oversees the data management framework so that comprehensive, accurate and timely information can support management decisions. With the increasing use of Artificial Intelligence and Data Analytics (AIDA) across the Group, GRM is taking the lead in embedding the principles of Fairness, Ethics, Accountability and Transparency (FEAT) into our data and model governance as we upgrade our digital capabilities in keeping with evolving industry practices.

Figure 1: Risk Governance and Oversight Structure



(1) Group Chief Risk Officer (CRO) is also the Group Chief Information Security Officer (CISO)

Three Lines of Defence

All employees are responsible for identifying and managing risk; their accountability is embedded in our corporate culture and robust internal control environment. This is operationalised through a three-line defence structure, which clearly delineates the roles, responsibilities and accountability of risk ownership.

Three Lines of Defence

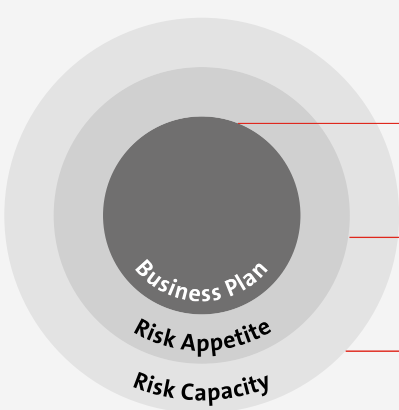
First Line	Second Line	Third Line
Day-to-day Risk Management	**Risk and Control Oversight**	**Independent Assurance**
Business and Support Units: • Own and manage risks arising from their business activities on a day-to-day basis. • Carry out business activities that are consistent with the Group's strategy and risk appetite. • Operate within the approved boundaries of our policies and limits, and comply with applicable laws and regulations.	**Risk and Control Function:** • Independently and objectively assesses the risk-taking activities of the first line. • Establishes relevant risk management frameworks, policies, processes and systems. • Provides independent identification, assessment, monitoring and reporting of the Group's risk profiles, portfolio concentrations and material risk issues.	**Group Audit:** • Independently assures the Group CEO, Audit Committee and Board of the adequacy and effectiveness of our risk management and internal control systems. • Evaluates the overall risk awareness and control consciousness of the management in discharging its supervisory and oversight responsibilities.

Risk Appetite

Our objective is to manage our risks prudently and sustainably for the long-term viability of the Group. To that end, the Board has established the Group's risk appetite, which defines the level and nature of risks that we are willing to take in the conduct of our business on behalf of our shareholders while maintaining our commitments to customers, debt holders, employees, regulators and other stakeholders. Business plans are developed taking into account the forward-looking operating environment and potential downside risks and assessed against our risk appetite, which in turn is a function of our capacity to absorb risks, taking into account capital, funding, and other resources. We operationalise our risk appetite through our policies, processes and limits.

Senior business and risk managers participate in regular forums to review macroeconomic and financial developments and discuss the operating environment, event risks and potential 'dark clouds' that may have a significant impact on our earnings or solvency. These risks are quantified via stress tests as well as segment-specific and ad hoc event-specific portfolio reviews. The results are used to assess the potential impact of alternative scenarios on our earnings and capital, as well as vulnerabilities of material portfolios.

An Internal Capital Adequacy Assessment Process (ICAAP) incorporating the results of stress tests covering various risk types is conducted annually. The objective is to evaluate whether we are able to maintain sound capital levels under a forward-looking operating environment and against severe stress scenarios. Appropriate risk-mitigating actions are taken to manage downside risks.



Business Plan
Demand for Risk and Financial Resources such as Funding and Capital

Risk Appetite
Level and nature of risk deemed acceptable while ensuring a sufficient buffer in the Risk and Financial Resources

Risk Capacity
Supply of Risk and Financial Resources such as Funding and Capital

Credit Risk Management

Credit risk arises from our lending activities to retail, corporate and institutional customers. It also includes counterparty and issuer credit risks arising from our underwriting, trading and investment banking activities.

Credit Risk Management Approach

Our credit risk management framework captures the complete credit risk management cycle. It is operationalised through policies and procedures that cover the identification, assessment, measurement and monitoring – as well as the control and mitigation – of credit risk at the enterprise level.

Our credit risk management approach varies according to the characteristics and nature of the relevant portfolios or customer segments. Specific policies and procedures have been established for major customer segments. Please refer to Table 1 for more information.

Table 1: Credit Risk Management Approach for Major Customer Segments

Consumers and Small Businesses	Corporate and Institutional Customers	Private Banking Customers
• Manage credit risks on a portfolio basis. • Extend credits through credit programmes with predefined acquisition strategies, product structures and portfolio and transaction limits, as well as customer selection, lending and collateral criteria. • Use application models for efficient, objective and consistent credit decisioning. • Use bankruptcy and credit bureau checks, along with systems and processes such as source identification of credit origination and independent verification of documentation for credit screening and fraud detection purposes. • Use comprehensive risk management information systems (MIS), behavioural models and stress testing for monitoring and early identification of potentially weak credits.	• Assess credits individually with robust independent evaluation carried out by experienced credit officers. • Use predefined target market and risk acceptance criteria to guide credit extensions. • Make credit decisions after comprehensive qualitative and quantitative risk assessment, including a thorough understanding of the customer and customer group's interdependencies. • Business and credit risk units to jointly approve credits to ensure objectivity and shared risk ownership. • Conduct regular reviews and forward-looking stress tests at borrower and portfolio levels to monitor credit quality and identify potential weak credits early.	• Assess credits individually with robust independent evaluation carried out by experienced credit officers. • Use predefined risk acceptance criteria, availability of acceptable collateral and stipulated loan advance ratio and margin requirements to guide credit extensions. • Business and credit risk units to jointly approve credits to ensure objectivity and shared risk ownership. • Take prompt remedial actions through timely and disciplined execution of margin calls, top-up provisions, stop-loss and force-selling.

Counterparty Credit Risk Management

Counterparty credit risk, typically arising from our trading and/or banking activities in derivatives and debt securities, is the risk that a counterparty may default on its obligations during the term of the financial contract. The credit exposure to a counterparty is measured as the sum of current mark-to-market value of the transactions plus an appropriate add-on for potential future exposures in response to market price changes. Counterparty credit risk also covers settlement risk, which is the risk of loss during the settlement process due to a counterparty's failure to fulfil its obligation after the Bank has performed its obligation under a contract or agreement at the settlement date.

We have a dedicated risk management function to manage counterparty credit risk on a current and forward-looking basis across multiple dimensions – on the individual counterparty level, country and sector portfolio level, and product level – as guided by established policies and procedures. Each counterparty is subject to robust credit assessment, including the suitability and appropriateness of the product offered. Credit risk mitigation tools are also used to manage counterparty credit risk where appropriate. Please refer to the Credit Risk Mitigation section for details.

We manage our credit exposures independently through daily limit excess monitoring, excess escalation, pre-deal excess approval, and timely risk reporting. In addition, we have an established policy and process to manage wrong-way risk. This risk may occur when the credit exposure to a counterparty is adversely correlated with the credit quality of the same counterparty.

ESG Risk Management

Managing ESG risks is an integral part of our credit risk management process. We have in place a responsible financing framework that defines our approach and commitment to managing ESG risks associated with our lending activities. The framework is operationalised through supporting policies and procedures that integrate ESG considerations – including the requirements of the Equator Principles and the MAS Environmental Risk Management Guidelines for Banks – within our credit risk evaluation and approval process. Transactions with high ESG risks are subject to enhanced due diligence and approval requirements, including escalation of transactions with significant reputational risks to the Reputational Risk Review Group. We review our framework regularly to reflect the evolving nature of ESG risk management practices.

Please refer to our Sustainability Report 2022 for more information on Responsible Financing.

Credit Portfolio Management

Credit portfolio management focuses on managing the collective or aggregate risk of our credit portfolios, instead of the credit risk of individual borrowers. We have developed and implemented a range of capabilities to better understand, measure and monitor credit risk at the portfolio level. These capabilities include:

- **Portfolio Segmentation:** This is the process of grouping credit exposures that are similar in nature. It involves using attributes that represent common business drivers, such as location, industry and product type, as well as common risk drivers such as exposure to material downside risks like a property bubble.

- **Portfolio Modelling:** This includes using internal rating models to quantify the exposure risk, default risk and potential losses of our borrowers. Please refer to Table 2 for information on our internal rating models. We also use stress test models to simulate the potential increase in our credit losses and Credit Risk Weighted Assets (CRWA) under stressed scenarios.

- **Portfolio Reporting:** This includes internal and external reporting of portfolio risk information to the respective stakeholders. These reports provide a better understanding of how the credit portfolio quality trends are evolving in response to the changing operating environment and downside risks. Regular risk reports covering detailed credit exposures, credit migration, expected losses and risk concentrations by business segment and geography are provided to the Credit Risk Management Committee, Group CEO, BRMC and Board for making timely and better-informed decisions.

With the insights provided by portfolio modelling and reporting, we will allocate appropriate risk and financial resources such as funding and capital to support growth opportunities. We will also use these insights to set credit concentration limits to manage the potential downside risks from adverse changes in the operating environment. The design of such credit concentration limits takes into consideration direct risk drivers, such as economic sector, industry and geographic location, and indirect risk drivers, such as collateral type or credit protection by a single counterparty arising from credit risk mitigation.

Table 2: Internal Rating Models

Internal credit rating models and their parameters – probability of default (PD), loss given default (LGD) and exposure at default (EAD) – are used in limit setting, credit approval, portfolio monitoring and reporting, remedial management, stress testing and the internal assessment of capital adequacy and portfolio allowances.

Our Model Risk Management Framework governs the development, validation, application and maintenance of rating models. Models are developed with the active participation of credit experts from risk taking and risk control units.

They are subject to independent validation before implementation and annually after that to ensure that performance standards, which take into consideration regulatory requirements and industry best practices, are continually met. In addition, Group Audit reviews the robustness of the rating process and the effectiveness of the independent validation process annually. Approval for the adoption and continued use of material models rests with the BRMC. In addition, models that are used in the regulatory capital assessment must be approved by the regulators.

While our internal risk grades are not explicitly mapped to external credit ratings, they may correlate with external credit ratings in terms of the PD ranges because the factors used to rate obligors are similar. As such, an obligor rated poorly by an external credit rating agency is likely to have a weak internal risk rating as well.

The table below describes the approach used to estimate the key parameters for Advanced Internal Ratings-Based (A-IRB) and Foundation Internal Ratings-Based (F-IRB) credit risk models used to calculate the CRWA.

Key Components of Internal Ratings Based (IRB) Models

IRB Models and Portfolios	PD	LGD and EAD
A-IRB approach covers major retail portfolios such as residential mortgages, credit cards, auto loans, small business and margin lending	• Estimated based on the application and behaviour scores of obligors. • PD models are calibrated to reflect the expected long-run average one-year default rate over an economic cycle.	• Product, collateral and geographical characteristics are major factors. • LGD models are calibrated to reflect the economic loss under downturn conditions. • EAD models are calibrated to reflect the default-weighted average and economic downturn conditions.
F-IRB (Non-Supervisory Slotting) approach covers major wholesale portfolios such as sovereigns, banks, non-bank financial institutions, corporate real estate (including income producing real estate) and general corporates	• PD models are statistical based or expert judgement models that use both quantitative and qualitative factors to assess an obligor's repayment capacity and calibrated to reflect the expected long-run average one-year default rate over an economic cycle. • Expert judgement models based on inputs from internal credit experts are typically used for portfolios with low default rates.	• Estimated based on rules prescribed in MAS Notice 637.
F-IRB (Supervisory Slotting) approach covers other specialised lending portfolios such as project finance, object finance and commodities finance	• Obligors are mapped to the five supervisory slotting categories prescribed in MAS Notice 637 based on regulatory loan classifications.	• Estimated based on rules prescribed in MAS Notice 637.

Credit Risk Mitigation

We use a range of credit risk mitigation tools such as requiring collateral, buying credit protection and establishing netting arrangements to reduce credit risk exposures. However, risk mitigation is not a substitute for a proper assessment of the obligor's ability to repay, which should remain the primary repayment source.

Our credit policies set out the key considerations for eligible credit risk mitigants. These criteria include legal certainty and enforceability, correlation, liquidity, marketability, counterparty risk of the credit protection provider and collateral-specific minimum operational requirements. Eligible physical and financial collateral include cash, real estate, marketable securities, standby letters of credit and credit insurance.

We apply appropriate haircuts to the market value of the collateral to reflect its underlying nature, quality, liquidity and volatility and independently value the collateral on a regular basis. We monitor our collateral holdings to ensure diversification across asset classes and markets. Guarantees from individuals, corporates and institutions are accepted as a form of support. Where guarantees are recognised as credit risk mitigants via the PD substitution approach, eligibility criteria and guidelines are in place.

Netting, collateral arrangements, early termination options and central clearing mechanisms are common risk mitigation tools for managing counterparty credit risk. Netting agreements, in approved netting jurisdictions, allow us to reduce credit risk exposure by offsetting what we owe a counterparty against what is due from that counterparty in the event of a default. Collateral arrangements are typically covered under market standard documentation such as the International Swaps and Derivatives Association (ISDA) and Credit Support Annexes (CSA) or Global Master Repurchase Agreements (GMRA). Such arrangements will require additional collateral to be posted if the mark-to-market exposures exceed the agreed threshold amount. We apply a haircut to the value of the eligible collateral to cover potential adverse market volatility; the agreed threshold amount may be subject to regulatory margin requirements where applicable. ISDA agreements may also contain rating triggers to allow for termination of transactions or require posting of additional collateral in the event of a rating downgrade. Given our current investment grade rating, there would be a minimal increase in collateral to be posted if there is a one-notch rating downgrade. Where available, we also clear Over-the-Counter (OTC) derivatives transactions through approved central clearing counterparties: The counterparty's credit risk is thereby replaced by that of a highly regulated and relatively better credit rated central clearing counterparty.

Remedial Management

Processes are in place to foster early identification of vulnerable borrowers. The quality of our credit portfolios is proactively monitored and discussed at various risk forums. Action plans to remediate deteriorating trends are worked out and reviewed at such forums.

Relief programs in Singapore and Malaysia have largely ended and portfolio performance has mostly normalised, with customers resuming their regular repayments. In other markets such as Hong Kong and Indonesia, we will continue to monitor and engage the borrowers to ensure a smooth transition after the reliefs expire.

Our categories for credit exposures are "Pass", "Special Mention" or "Non-Performing Asset" (NPA). NPAs are further categorised into "Substandard", "Doubtful" or "Loss" in accordance with MAS Notice 612 on Credit Files, Grading and Provisioning (MAS Notice 612). The categorisation of credit exposures is based on our assessment of borrowers' ability to meet their financial obligations from normal sources of income and their creditworthiness in the long term. We categorise retail borrowers into the respective MAS loan grades at the facility level, in line with MAS Notice 612. An NPA may be upgraded to performing status when there is an established trend of credit improvement, supported by an assessment of the borrower's repayment capability, cash flows and financial position.

We classify our credit exposures as restructured assets when we grant non-commercial concessions to borrowers who are unable to meet their original repayment obligations. We further classify a restructured credit exposure into the appropriate non-performing grade based on our assessment of the borrower's financial condition and ability to repay under the restructured terms. Such credit exposure must comply fully with the restructured terms for a reasonable period before it can be restored to performing status in accordance with MAS Notice 612.

Dedicated remedial management units manage the restructuring, work-out and recovery of NPAs for wholesale portfolios. The objective is to rehabilitate NPAs where possible or maximise recoveries for NPAs that are on an exit strategy. For retail portfolios, we develop appropriate risk-based and time-based collections strategies to maximise recoveries while trying to minimise any non-financial impact to our customers. We use data such as delinquency buckets and adverse status tags for delinquent consumer loans to constantly analyse, fine-tune and prioritise our collection efforts.

Credit Loss Allowances

We maintain sufficient allowances to absorb credit losses inherent in our loan portfolios. Allowance for Expected Credit Losses (ECL) is recognised for credit-impaired and non-credit-impaired exposures in accordance with Singapore Financial Reporting Standard (International) 9: *Financial Instruments* (SFRS(I) 9) and MAS Notice 612 through a forward-looking ECL model.

We assess our ECL allowances on a forward-looking basis and based on the three stages of credit risk below.

Stages of Credit Risk and Expected Credit Losses

Non-Credit-Impaired		Credit-Impaired
Stage 1 Performing exposures with no significant increase in credit risk since initial recognition	**Stage 2** Performing exposures with significant increase in credit risk since initial recognition	**Stage 3** Non-performing exposures
12-month ECL	**Lifetime ECL**	**Lifetime ECL**

Please refer to Note 2.12 in the Group's Financial Statements for more information on impairment allowances.

Market Risk Management

Market risks arise primarily from our trading, client servicing and balance sheet management activities.

Market Risk Management Approach

Our market risk management framework covers the identification, assessment, measurement, monitoring and control of risks. Group-level market risk policies and procedures have been established to provide common guidelines and standards for managing market risks. We regularly review our market risk management strategy and limits – established within our risk appetite and in line with our business strategies – taking into account prevailing macroeconomic and market conditions.

Market Risk Identification

Our internal New Product Approval Process ensures that market risk is properly identified and quantified, allowing us to manage and mitigate such risks.

Market Risk Measurements

Value-At-Risk

Value-at-risk (VaR) is a key metric used to quantify market risk exposures arising from our trading activities. VaR is measured and monitored by individual market risk components, namely interest rate risk, foreign exchange risk, equity risk and credit spread risk, as well as at the consolidated level. Our VaR model is based on the historical simulation approach, calibrated at the 99% confidence level and a one-day holding period. A 99% confidence level means that, statistically, losses on a single trading day may exceed VaR on average, once every 100 days. Table 3 provides a summary of the Group's trading VaR profile by risk types as at 31 December 2022 and 31 December 2021.

Other Risk Measures

As our main market risk arises from interest rate movements, Present Value of a Basis Point (PV01) – which measures the change in value of interest rate-sensitive exposures resulting from a one basis point increase across the entire yield curve – is an important measure that is monitored on a daily basis.

Table 3: VaR by Risk Type – Trading Portfolio

	2022				2021			
SGD Million	**End of the period**	**Average**	**Minimum**	**Maximum**	End of the period	Average	Minimum	Maximum
Interest Rate VaR	**4.89**	**5.25**	**1.43**	**7.96**	4.11	4.38	2.15	12.30
Foreign Exchange VaR	**3.62**	**1.71**	**0.40**	**6.76**	0.63	1.74	0.59	5.75
Equity VaR	**0.97**	**1.99**	**0.61**	**4.91**	1.21	2.05	0.55	6.36
Credit Spread VaR	**5.76**	**3.62**	**1.91**	**6.78**	2.01	2.67	1.42	7.02
Diversification Effect (1)	**(6.92)**	**(5.82)**	**NM (2)**	**NM (2)**	(4.93)	(5.53)	NM (2)	NM (2)
Aggregate VaR	**8.32**	**6.76**	**2.84**	**11.07**	3.03	5.32	2.49	18.14

(1) Diversification effect is computed as the difference between Aggregate VaR and the sum of asset class VaRs.
(2) Not meaningful as the minimum and maximum VaRs may have occurred on different days for different asset classes.

Other than VaR and PV01, we use risk metrics such as notional positions, Profit & Loss (P&L) for One Basis Point Move in Credit Spreads (CS01) and other risk variables for specific exposure types.

Stress Testing and Scenario Analysis

We perform stress testing and scenario analyses to quantify and assess potential losses arising from low-probability but plausible extreme market conditions. We regularly review and fine-tune the stress scenarios to ensure that they remain relevant to our trading activities and risk profile, as well as prevailing and forecasted economic conditions. These analyses determine if potential losses from such extreme market conditions are within our risk tolerance. In addition to regular stress scenarios, we also use ad hoc event-specific stress scenarios to assess the potential impact of specific market conditions on our market risk exposures.

Risk Monitoring and Control

Limits

Trading units may only undertake authorised trading activities for approved products. All trading risk positions are monitored on a daily basis against approved and allocated limits. Trading activities are conducted within approved mandates and dynamically hedged to remain within limits. Hedge effectiveness is enforced through independent limit monitoring to ensure compliance with market risk limits. Limits are approved to reflect available and anticipated trading opportunities, with clearly defined exception escalation procedures. Exceptions, including temporary breaches, are promptly reported and escalated to senior management for resolution. We also manage market risk exposure holistically by using multiple risk limits (VaR and risk sensitivities), P&L stop loss and other measures.

Model Validation

Model validation is an integral part of our risk control process. Financial models are used to price financial instruments and calculate VaR. We ensure that the models used are fit for their intended purposes through periodic independent validation and reviews. To enhance the integrity of the trading P&L and risk measures generated, we source market rates independently for risk measurement and valuation.

Back-testing

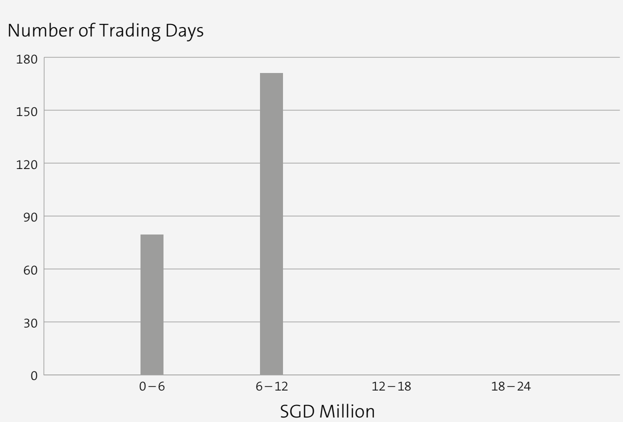
To ensure the continued integrity of our VaR models, we regularly back-test the VaR estimates against actual daily trading P&Ls and hypothetical P&Ls to confirm that the models do not underestimate our market risk exposures. The charts below illustrate the Frequency Distribution of Group Trading Book's Daily Total VaR and P&L.

Interbank Offered Rates (IBOR) Transition

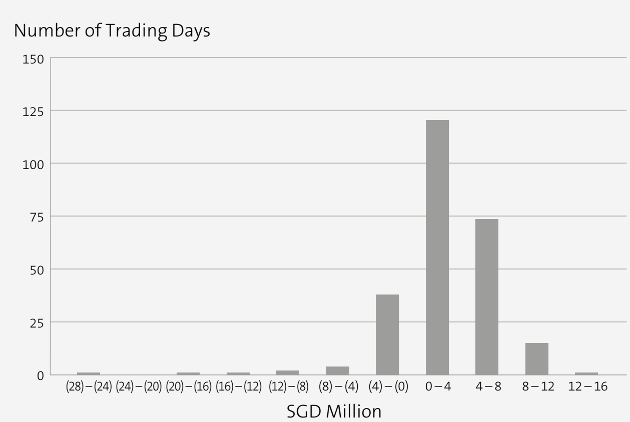
The London Interbank Offered Rate (LIBOR), a key benchmark used in international financial markets, is being phased out and replaced by Risk Free Rates (RFRs). On 5 March 2021, the UK Financial Conduct Authority (FCA) confirmed a two-phase discontinuation approach for LIBOR. All British pound, Euro, Swiss franc and Japanese yen LIBORs, as well as the 1-week and 2-month US dollar LIBOR; have been discontinued since 31 December 2021. All remaining US dollar LIBORs will be discontinued after 30 June 2023.

The expected discontinuation of LIBOR directly impacts the viability of the Singapore Dollar Swap Offer Rate (SOR), which relies on US dollar LIBOR in its computation. Like LIBOR, the Singapore Interbank Offered Rate (SIBOR), a key benchmark widely used in retail loans, is subject to expert judgement due to a lack of underlying transactions. The Singapore Overnight Rate Average (SORA) has been identified as the alternative benchmark to SOR and SIBOR. MAS has established an industry-led Steering Committee for SOR & SIBOR Transition to SORA (SC-STS), to oversee the coordination and implementation of the transition efforts.

Frequency Distribution of Group Trading Book Daily Total VaR (One Day Holding Period) for FY 2022



Frequency Distribution of Group Trading Daily P&L for FY 2022



To ensure a smooth transition from LIBOR to RFRs and SOR and SIBOR to SORA, we have established an internal Steering Committee to coordinate efforts across various business, control and support functions. Clear timelines and deliverables have been established to keep pace with industry transition roadmaps and regulatory timelines.

We have implemented the necessary system upgrades and modifications to ensure the readiness of our infrastructure and processes. We have also assessed the adequacy of provisions relating to the permanent discontinuation of benchmarks in loan documentation, derivatives contracts, debt issuances and other relevant contracts. With respect to the transition of SOR contracts, all retail loans referencing SOR have transitioned to SORA, fixed rates or other benchmarks, with the last transition completed on 18 Oct 2022 in line with the industry. As for corporate loans and derivatives referencing SOR, transition is in progress and expected to be completed by the first half of 2023 in line with industry guidelines. Appropriate adjustments will be made as recommended by the industry to reflect the differences between SOR and SORA. For SIBOR, the transition will be completed in 2024 in line with the roadmap established by the industry. No significant impact is expected from the transition of SOR and SIBOR to SORA.

We will continue to engage our customers to help them understand how their existing contracts may be affected by SOR and USD LIBOR cessation, taking reasonable efforts to remediate their legacy SOR/USD LIBOR loans.

Asset Liability Management

Asset liability management is the strategic management of our balance sheet structure and liquidity requirements. It covers liquidity sourcing and diversification, as well as interest rate and structural foreign exchange management.

Asset Liability Management Approach

Our asset liability management framework focuses on managing the exposures arising from the balance sheet. We monitor our liquidity risk, interest rate risk in the banking book (IRRBB) and structural foreign exchange risk profiles against approved risk limits under both business-as-usual and stressed scenarios. These are based on the standards established in our framework, policies and procedures, which are reviewed regularly to ensure that they remain relevant in the context of prevailing market practices and regulatory guidelines.

Liquidity Risk

The objective of liquidity risk management is to ensure that we have sufficient funds to meet the required contractual and regulatory financial obligations and to undertake new transactions.

Liquidity monitoring is performed on daily basis within a framework for projecting cash flows on both contractual and behavioural bases. Indicators such as liquidity and deposit concentration ratios are used to establish the optimal funding mix and asset composition. Funding strategies are established to provide effective diversification and stability in funding sources across tenors, products and geographies. Simulations of liquidity exposures under stressed market scenarios are performed and the results are used to adjust liquidity risk management strategies, policies and positions, as well as to develop contingency funding plans. We maintain liquid assets in excess of regulatory requirements to strengthen our ability to meet liquidity needs during a crisis. These liquid assets comprise central bank reserves and marketable securities.

Interest Rate Risk in the Banking Book

The primary goal of the management of IRRBB is to ensure that interest rate risk exposures are consistent with our risk appetite and maintained within the defined risk tolerances. The material sources of IRRBB are repricing risk, yield curve risk, basis risk and optionality risk.

We use a range of techniques to measure IRRBB from both the earnings and economic value perspectives on a monthly basis. One measure involves the assessment of the impact of various interest rate scenarios on our net interest income and the banking book's Economic Value of Equity (EVE). Other measures include interest rate sensitivity measures such as PV01 and repricing gap profile analysis. We also use behavioural models to assess interest rate risks in relation to loan prepayment, time deposit early redemption and the profile of non-maturity deposits. These measurements facilitate the calibration of appropriate IRRBB management, hedging strategies, policies and positions.

Structural Foreign Exchange Risk

Structural foreign exchange exposure arises primarily from our net investment in overseas branches, subsidiaries and other strategic and property assets. We manage structural foreign exchange risk through hedging instruments, which include the use of derivatives and matched funding for foreign currency investments.

Other Risks

Non-structural foreign exchange exposures in our banking book are largely transferred to our trading book for foreign exchange risk management. In addition, we are exposed to credit spread risk through the holding of high-quality liquid assets (HQLA) in our banking book to comply with the Liquidity Coverage Ratio (LCR). While HQLA have low default risk, their value could be sensitive to changes in credit spreads. This risk is monitored against approved CS01 limits on a daily basis and subject to historical and anticipatory stress testing. The other risk residing in our banking book is non-strategic equity price risk arising from our equity investments in listed and non-listed companies. Non-strategic equity investments form an insignificant portion of our overall securities portfolio, excluding securities held by GEH.

Information Security and Digital Risk Management

Information security and digital risk is a business risk that comprises the risk domains of information, cyber and technology risks. Effective management of information security and digital risk is critical to minimising any impact on our customers and any financial, operational, reputational, legal and/or regulatory impact on the Group.

Information Security and Digital Risk Management Approach

We adopt a whole-of-organisational approach to managing information security and digital risk so as to achieve resilience for the Group. The key components of our risk management approach are:

Framework and Policies

A framework supported by robust policies establishes the governance and oversight structure and defines the roles and responsibilities across the three independent lines of defence. It also sets out the risk management processes to monitor, assess and respond to information security and digital risk, including communication protocols. We regularly update our framework and policies to align with applicable regulatory requirements such as 2021 MAS Technology Risk Management Guidelines, and industry leading practices such as ISO/IEC Information Security, Cybersecurity and Privacy Protection.

Multi-Layered Controls

We have preventive, detective and response capabilities in place to sustain and enhance existing defences against information security and digital risk. A 24-by-7 Cybersecurity Operations Centre and a Technology Command Centre monitor our networks and systems for cyber threats and any disruption of essential financial services. Existing measures are reviewed and tested regularly with new capabilities added where necessary to address evolving threats. Various controls have been implemented to safeguard against data loss and ensure the confidentiality, integrity and availability of our information assets.

Risk Awareness, Training and Testing Programmes

Our mandatory cyber and information security awareness e-learning, regular risk awareness broadcasts and social engineering testing programmes serve to raise the knowledge and vigilance of our staff as a strong defence against cyber threats and information security breaches. In addition to our Cybersecurity Certification Pathway, we have also rolled out an extensive group-wide Cyber Smart Programme for all staff, to improve their vigilance and relevant competencies. We educate our customers through security advisories and enhance cyber risk awareness of selected outsourced services providers by familiarising them with the control expectations of the Group.

Incident Response and Crisis Management

There are robust incident response and crisis management processes to minimise the disruption of essential financial services during times of crisis. We conduct simulation exercises regularly to improve the readiness of our cybersecurity incident response team to handle cybersecurity events. Crisis management exercises based on plausible information security and digital risk-related scenarios are also conducted regularly to enhance the preparedness of senior management. Additionally, to better manage any potential downstream implications for the Bank, we have formalised a process to facilitate prompt triage and responses in the event that relevant third parties suffer cyber-attack or data loss incidents.

Cyber and Network Security Insurance

We have relevant cyber and network security insurance to cover damages arising from specific cyber-attacks and technology disruption scenarios such as cyber extortion and business interruption losses due to a security breach or system failure.

Separately, we continue to actively engage – and share information security and digital risk-related updates with – regulatory agencies in Singapore, Malaysia and Hong Kong. We do so with the ABS Standing Committee on Cyber Security and the Financial Services Information Sharing and Analysis Centre as well.

Operational Risk Management

Operational risk is inherent in all banking products, activities, processes and systems. The effective management of operational risk is a fundamental element of our risk management programme that serves to enhance our corporate culture.

Operational Risk Management Approach

We manage both expected and unexpected losses, including those caused by catastrophic events, through a robust groupwide framework that is aligned with regulatory requirements and industry standards. The framework is supported by a comprehensive suite of policies and procedures to identify, assess, measure, monitor and control the operational risks arising from the Group's business activities and operations. The roles across the three lines of defence are clearly defined in these policies and procedures to ensure clear accountability and responsibility in the fulfilling of control expectations. A comprehensive insurance programme is also part of our risk mitigation strategy.

The Board and senior management exercise robust oversight of operational risk management and set the tone from the top in promoting a strong corporate culture. Our operational risk profile, comprising key risk indicators, operational risk events, material issues and trends, is regularly reported to senior management, the BRMC and Board via risk committees such as the Operational Risk Management Committee.

The Board also receives – through the Group CEO – an annual assurance report on the adequacy and effectiveness of our internal controls and risk management systems. The report highlights any key control deficiencies and accompanying remedial plans.

Various forums and working groups such as the Operational Risk Partners Forum and Emerging Operational Risk Forum are established to foster continuous engagement with internal and external stakeholders, facilitating awareness and understanding of operational risk. Targeted and specialised training, including certified courses recognised by the Institute of Banking and Finance (IBF) and International Compliance Training Academy (ICA), are available to raise staff competency.

Apart from the risk management approach mentioned above, we have put in place additional risk management measures to address the following key subject-specific risks:

Key Risks	Additional Risk Management Measures
Fraud Risk	• Whistleblowing channels and awareness programmes for both employees and customers to build awareness of fraud risks and report suspicious events. • Robust anti-fraud measures utilising transaction monitoring to detect and alert customers to suspicious account activities, with an additional capability to prevent the completion of such transactions. • A comprehensive governance and anti-fraud response model to expedite incident handling through the Dynamic Response Committee (DRC) and Anti-Fraud Standing Committee (AFSC). • Continuous strengthening of surveillance systems in response to changes in fraud/scam typologies and the regulatory landscape. • Independent review by Group Audit of all fraud and whistleblowing cases.
Money Laundering, Financing of Terrorism and Sanctions Risk	• Risk assessment methodologies that leverage existing monitoring and screening platforms to assess customer, product and geographical risks. • Risk surveillance capabilities that leverage artificial intelligence and data analytics for the dynamic monitoring and detection of emerging financial crime trends and typologies.
Third-Party Risk	• Designated functional specialists across various functions within the Bank who provide guidance in their respective areas of expertise throughout the third-party risk management process. • Active engagement with the ABS Outsourcing Advisory Committee as well as continual tracking and assessment of industry developments. • Regular outreach to our service providers to raise their awareness of operational risks.
Physical and People Security Risk	• Active monitoring of external events that may pose a threat to OCBC locations, people and assets. • Advisories and response procedures to better prepare the Bank and our employees to handle risk events, including risks posed to employees undertaking business travel. • Regular physical security and country risk assessments to identify potential physical security risks, associated threats and vulnerabilities.
Conduct Risk	• New initiatives to promote good culture and conduct, effective risk governance and employee accountability. These include peer recognition programmes, the Employee Pulse Survey, the Code of Conduct Annual Assessment and enhancements to the Group Disciplinary Framework. • Active monitoring of culture and conduct-related matters such as customer complaint trends, staff attrition rates, regulatory breaches and whistleblowing investigations. • An Employee Conduct Triggers (ECT) Programme featuring clear and measurable conduct indicators.

Key Risks	Additional Risk Management Measures
Business Continuity Risk	• Robust recovery strategies and business recovery plans that are reviewed and tested annually. • Annual attestation to senior management, the BRMC and Board on the maturity of the business continuity programme, key initiatives and alignment with MAS guidelines.
Unauthorised Trading Risk	• Trade surveillance and investigation by an independent control assurance function to detect and address potential control issues so as to prevent rogue or unauthorised trading.
Regulatory Risk	• A Regulatory Compliance Matrix that provides a central platform to map applicable compliance laws, rules and standards to the relevant units in OCBC Group. • A risk assessment methodology to identify business activities with a higher level of compliance risk. Compliance testing and reviews are performed to determine if the established processes and procedures are effective in managing the risk. • Designated Divisional Compliance Officers at business units to provide insights and perspective on risk mitigation and compliance within their functions.
Legal Risk	• Providing legal advisory services that balance risk and opportunities for businesses to grow sustainably. • Managing litigation or dispute resolution processes as well as the making of trademark filings. • Advisory on data protection and compliance with applicable data privacy regulation.
Fiduciary Risk	• Standards relating to fiduciary or fiduciary-like business activities such as Fair Dealing, Insider Trading and Chinese Wall and Code of Conduct to guide decisions and behaviour throughout the organisation.
Reputational Risk	• Dedicated committees such as the Fair Dealing Committee and Reputational Risk Review Group, helmed by senior management, provide oversight and focus on areas such as fair dealing and responsible financing to manage our responsibilities towards stakeholders and protect our reputation. • Guidelines to advise staff on how to use social media responsibly and appropriately.

For more information on how the Bank is managing the Fraud, Money Laundering and Financing of Terrorism Risks, please refer to our Sustainability Report 2022.