Risk Management

Risk Management

The Group operates on prudent commercial principles. The principle of "prudence before profitability" guides the design of the overall risk management framework and disciplines its uses in day-to-day business execution. Over the years, the Group has continuously made refinements to its well-established, robust and time-tested risk management framework to reflect changes in the markets and its business strategies.

The Board is the highest decision-making authority of the Group and holds the ultimate responsibility for risk management. The Board, with the assistance of the Corporate Risk Management Committee (**CRC**), has the primary responsibility of formulating risk management strategies in the risk appetite statement and of ensuring that the Group has an effective risk management system to implement these strategies. The risk appetite statement defines the constraints for all risk-taking activities and these constraints are incorporated into risk limits, risk policies and control procedures that the Group follows to ensure risks are managed properly.

The CRC is responsible for overseeing the Group's various types of risks, reviewing and approving high-level risk-related policies, overseeing their implementation, and monitoring improvement efforts in governance, policies and tools. Regular stress tests are reviewed by the CRC to evaluate the Group's financial capability to weather extreme stress scenarios.

The CRC is chaired by an Executive Director, with members including the Chief Executive Officer, Senior Vice Presidents, General Counsel and senior staff from the Risk Management Department.

The Group manages primarily credit risk, market risk, longevity risk, property risk, operational risk, legal and compliance risk, and leveraging risk arising from its loan assets, guarantee portfolio, infrastructure loans, annuity business and investment portfolio.

In addition to the CRC, the HKMC manages different risks through different management committees such as Infrastructure Financing and Securitisation Investment Committee (**IFSIC**), Credit Committee (**CC**), Transaction Approval Committee (**TAC**), Asset and Liability Committee (**ALCO**), Operational Risk Committee (**ORC**) and Longevity Risk Committee (**LRC**). Other than IFSIC which is chaired by Executive Director, all of these management committees are chaired by Chief Executive Officer with members including the relevant Senior Vice Presidents, General Counsel, and senior staff from the relevant functional departments.

The insurance subsidiaries also have their own Risk Committee (**RC**) to monitor the insurance risk and other relevant risk. The RC is chaired by an Executive Director of the insurance subsidiaries with members including the Chief Executive Officer, the relevant Senior Vice Presidents and senior staff from the relevant functional departments of the insurance subsidiaries. The RC of the HKMCA includes independent and non-executive directors to provide independent risk oversight on its operation.

Credit Risk

Loan Assets and Guarantee Portfolio

The Group maintains loan and guarantee portfolios of retail and commercial loan assets, which primarily comprise mortgage loans. Credit risk is the Group's primary risk exposure. It represents the default risk presented by loan borrowers and counterparties.

(a) *Default risk*

To effectively address default risk, the Group adopts a four-pronged approach to safeguard and maintain the quality of its assets, MIP and SME guarantee portfolios:

- careful selection of counterparties, including Approved Sellers, Servicers, Reinsurers and Lenders
- prudent eligibility criteria for asset purchase, insurance and guarantee application
- effective due diligence processes for mortgage purchase, default loss, insurance and guarantee claims
- enhanced protection for higher-risk transactions.

Losses may arise if there are shortfalls in the recovery amount received for defaulted loans that fall under the Mortgage Purchase Programme (**MPP**). To mitigate this default risk, the Group establishes prudent loan purchasing criteria and conducts effective due diligence reviews as part of the loan purchase process to maintain the credit quality of loans. In addition, depending on the projected risk exposure of each underlying loan portfolio, credit enhancement arrangements are agreed upon with Approved Sellers on a deal-by-deal basis to reduce credit losses that could arise from the borrower's default.

Losses may also arise from default on loans under the MIP's insurance coverage. Each MIP application is underwritten by the Group in accordance with a set of eligibility criteria and each claim from a participating bank is reviewed by the Group to ensure the fulfilment of all MIP coverage conditions. As a result, the default risk for loans with MIP coverage has been greatly reduced. To reduce the risk of possible concentration of this default risk, the Group transfers a portion of the risk-in-force to Approved Reinsurers through reinsurance arrangements.

Similarly, losses may arise from a borrower's default on loans in the SME guarantee portfolio. The borrower's default risk of each guarantee application is assessed by the lender in accordance with their credit policies. In addition, the Group adopts prudent eligibility criteria, conducts administrative vetting and credit reviews to better understand the credit quality of the applications, and carries out a due diligence review on each default claim to ensure the loan's compliance with the Group's eligibility criteria and the lenders' internal credit policies.

In addition, the Group adopts a three-pronged approach to manage the default risk under the MFS, comprising: (a) prudent assessment of borrowers' repayment capability; (b) a vetting panel to consider business viability and approval of the loan applications; and (c) the provision of training and mentoring support to borrowers.

Credit performances of the loan and guarantee portfolios are tracked and reported on a regular basis to provide management with an updated credit profile to monitor the operating environment closely for any emerging risks to the Group, and to implement risk-mitigating measures in a timely way.

(b) Seller/Servicer counterparty risk

Counterparty risks may arise from the failure of a Seller/Servicer of an acquired portfolio to remit scheduled payments to the Group in a timely and accurate manner.

The Approved Sellers/Servicers are subject to a risk-based eligibility review and ongoing monitoring of their loan servicing quality and credit standing.

(c) Reinsurer counterparty risk

Reinsurer counterparty risk refers to the failure of an Approved Reinsurer to make claim payments to the Group. To mitigate reinsurer counterparty risk effectively, the Group has established a framework for the assessment of mortgage reinsurers' eligibility and requested collateral on the risk exposures.

The Group performs annual and ad-hoc reviews of each Approved Reinsurer to determine the eligibility for ongoing business allocation and risk-sharing portions.

(d) Treasury counterparty risk

Treasury counterparty risk arises when there is a delay or failure from treasury counterparties to make payments with respect to treasury instruments transacted with the Group. Treasury counterparties are managed by a ratings-based counterparty assessment framework and a risk-based counterparty limit mechanism. The treasury counterparties are continually monitored and the counterparty limits are adjusted based on the assessment results.

Furthermore, the Group has set up bilateral collateral arrangements with major swap counterparties to mitigate treasury counterparty risk.

(e) *Lender risk*

The Group is exposed to lender risk in SME lending that arises from: (a) a lender's underwriting being non-compliant with its credit policy; (b) a lender's loosely formulated credit policy that is not specific enough or sufficiently defined for compliance; and (c) the moral hazard of a lender being less prudent in underwriting a guarantee-protected application. The Group manages lender risk through the review of the lenders' credit policies and the due diligence reviews on claims.

At the heart of the credit risk management framework are the CC, TAC or the RC as in the case of the insurance subsidiaries.

The CC or RC as appropiate is responsible for setting the credit policies and eligibility criteria. The CC or RC as appropriate is the approval authority for accepting applications to become Approved Sellers/Servicers under the MPP, Approved Reinsurers under the MIP, Approved Lenders under the SFGS and eligible treasury counterparties. It is also responsible for setting risk exposure limits for counterparties. The CC and RC monitor the operating environment closely and put in place timely risk mitigating measures to manage the credit risk.

TAC or the RC as appropriate conducts an in-depth analysis of pricing economics and associated credit risks for business transactions, while taking into consideration the latest market conditions and business strategies approved by the Board.

Infrastructure Loans

The Group acquires infrastructure loans and intends to establish an infrastructure securitisation platform to offload those loans in the form of securitised debt securities.

Infrastructure financing risk mainly arises when the borrower of an infrastructure project fails to meet its repayment obligations. This may typically arise from construction risk, demand risk, political risk and counterparty risk.

Construction risk arises when a project fails to be completed within specifications and schedule; demand risk is the risk that revenue derived from a project falls below expectation; political risk arises when the project is adversely impacted by political actions; counterparty risk arises when key counterparties fail to meet their contractual obligations.

In addition, environmental and social risk arises when a project fails to observe the environmental, social and governance standards which gives rise to adverse financial or reputational issues with the project financier.

Legal and compliance risks arise from uncertainty in the applicability or interpretation of contracts, laws and regulations, and failure to comply with legal, statutory and regulatory obligations when borrowers of the project fail to maintain a robust corporate governance and compliance framework.

The infrastructure financing risk is managed through prudent underwriting criteria, in-depth due diligence reviews conducted by in-house expertise and independent consultants, strong project structures and robust financing documentation, and an ongoing monitoring and review mechanism. A dedicated division, inclusive of an independent risk control unit, is established to perform the day-to-day risk management for infrastructure investments.

IFSIC is the governing forum to manage the infrastructure investments. The IFSIC is responsible for overseeing compliance with rules, guidelines and policies in relation to infrastructure finance, and for approving and monitoring the infrastructure investments.

Market Risk

Market risk arises when the Group's income or the value of its portfolios decreases due to adverse movements in market prices. Market risk consists of interest rate risk, asset-liability maturity mismatch risk, liquidity risk and currency risk.

(a) Interest rate risk

Net interest income is the predominant source of earnings for the Group. It represents the excess of interest income (from the Group's loan portfolio, cash and debt investments) over interest expenses (from debt issuance and other borrowings). Interest rate risk arises when changes in market interest rates affect the interest income associated with the assets and/or interest expenses associated with the liabilities.

The primary objective of interest rate risk management is to limit the potential adverse effects of interest rate movements on interest income/expense while maintaining stable earnings growth. The interest rate risk faced by the Group is two-fold, namely interest rate mismatch risk and basis risk. Interest rate mismatch risk is the most substantial risk affecting the Group's net interest income. It arises mainly as a result of the differences in the timing of interest rate re-pricing for the Group's interest-earning assets and interest-bearing liabilities. Interest rate mismatch risk is most evident in those loan portfolios where the majority of the loans are floating-rate assets (benchmarked against the Prime Rate or HIBOR Rate), while the majority of the Group's liabilities are fixed-rate debt securities. The Group makes prudent use of a range of financial instruments, such as interest rate swaps, interest rate swaptions, basis swaps, forward rate agreements and issuances of MBS, to manage interest rate mismatch risk. The proceeds of the fixed-rate debt securities are generally swapped into HIBOR-based funds via interest rate swaps to better match the floating-rate incomes from mortgage assets.

The Group also uses duration gap as an indicator to monitor, measure and manage interest rate mismatch risk. Duration gap measures the difference in interest rate re-pricing intervals between assets and liabilities. The wider the duration gap, the higher the interest rate mismatch risk. A positive duration gap means the duration of assets is longer than that of the liabilities and, therefore, represents greater risk exposure to rising interest rates. A negative duration gap, in contrast, indicates greater risk exposure to declining interest rates.

Depending on the prevailing interest rate outlook and market conditions, the Group proactively re-balances the duration gap of its asset-liability portfolio under the guidance and supervision of ALCO.

Basis risk represents the difference in benchmark rates between the Group's Prime-based interest-earning assets and its HIBOR-based interest-bearing liabilities. However, there are only limited financial instruments available in the market to fully hedge the Prime-HIBOR basis risk. In general, basis risk can be effectively addressed only when assets are based on HIBOR to match the funding base, or when related risk management instruments become more prevalent or economical. Over the past few years, the Group has consciously adopted a strategy that acquires more HIBOR-based assets. As a result, the Prime-HIBOR basis risk for the Group has been substantially reduced. In addition, the Group has issued Prime-based MBS and used hedging derivatives to mitigate such basis risk.

(b) Asset-liability maturity mismatch risk

The actual average life of a portfolio of mortgage loans and infrastructure loans, which is usually shorter than their contractual maturity, depends on the speed of scheduled repayments and unscheduled prepayments. Higher prepayment rates shorten the average life of a portfolio of mortgage loans. In Hong Kong, prepayment occurs for two main reasons: (i) housing turnover: borrowers repaying their mortgage loans upon the sales of the underlying properties, and (ii) refinancing: borrowers refinancing their mortgage loans to obtain lower mortgage rates.

Asset-liability maturity mismatch risk can be more specifically characterised as reinvestment risk and refinancing risk. Reinvestment risk refers to the risk of a lower return from the reinvestment of proceeds that the Group receives from prepayments and repayments of its loan portfolio. Refinancing risk is the risk of refinancing liabilities at a higher level of interest rate or credit spread. The Group is exposed to refinancing risk (in funding amount and cost of funds) when it uses short-term liabilities to finance long-term, floating-rate loan portfolios. Reinvestment risk is managed through the ongoing purchase of loan assets to replenish the rundown in the retained portfolios and through the investment of surplus cash in debt securities or cash deposits to fine-tune the average life of the overall asset pool. In addition, the Group uses the issuance of callable bonds and transferable loan certificates to mitigate reinvestment risk. The call option embedded in callable bonds and transferable loan certificates allows the Group to adjust the average life of its liabilities to match more closely with that of the overall pool of assets.

The Group manages its refinancing risk through flexible debt securities issuance with a broad spectrum of maturities. This serves to adjust the average life of the overall liability portfolio in a dynamic fashion. In addition, refinancing risk can be mitigated by adjusting the maturities of assets in the investment portfolio, or off-loading loan assets through the securitisation of loans into MBS and securitised debt securities. The Group uses the asset-liability maturity gap ratio to measure, monitor and manage asset-liability maturity mismatch risk to ensure a proper balance between the average life of the Group's assets and liabilities.

(c) *Liquidity risk*

Liquidity risk represents the risk of the Group not being able to repay its obligations, such as the redemption of maturing debt, or to fund the committed purchases of loan portfolios. The Group implements its liquidity risk management framework in response to changes in market conditions. The Group continuously monitors the impact of market events on its liquidity position, and pursues a prudent pre-funding strategy to help contain the impact of any global financial turmoil on its liquidity. Liquidity risk is managed by monitoring the daily inflow and outflow of funds, and by projecting the longer-term inflows and outflows of funds across the full maturity spectrum. The Group uses the liquid asset ratio to measure, monitor and manage liquidity risk.

Given its strong background as a wholly government-owned entity and its solid credit rating, the Group is efficient in raising funds from debt markets with both institutional and retail funding bases. This advantage is supplemented by the Group's portfolio of highly liquid investments, which is held to enable a swift and smooth response to unforeseen liquidity requirements. The HK$30 billion Revolving Credit Facility from the Exchange Fund further provides the Group with a liquidity fallback even if exceptional market strains last for a prolonged period.

The Group manages pre-funding prudently through well-diversified funding sources, so all foreseeable funding commitments are met when they fall due. This supports the growth of its business and the maintenance of a well-balanced liability portfolio. Such diversification allows the Group to pursue a pre-funding strategy at the lowest possible cost, while offering safeguards against the difficulty of raising funds in distorted market conditions. The current funding sources are illustrated in **Table 1** below:

Table 1: Current Funding Sources for the Group

Funding Source	Description
US$6 billion Medium Term Note Programme	An extensive dealer group is appointed to underwrite and distribute local and foreign currency debt to international institutional investors under the programme
HK$40 billion Debt Issuance Programme	Primary Dealers and Selling Group Members underwrite and distribute debt to institutional investors under the DIP. The Transferable Loan Certificate Sub-Programme under the DIP provides further diversification of its funding sources and broadening of its investor base
HK$20 billion Retail Bond Issuance Programme	Placing Banks use their branch networks and telephone and electronic banking facilities to assist the Group in offering retail bonds to investors
US$3 billion Bauhinia Mortgage-Backed Securitisation Programme	This multicurrency, mortgage-backed securitisation programme permits the Group to originate MBS in both the local and international markets
Investment Portfolio	This portfolio comprises mainly cash and bank deposits, commercial paper, high-quality certificates of deposit, and notes that are readily convertible into cash
Money Market Lines	The Group has procured money market lines from a large number of local and international banks for short-term financing
HK$30 billion Revolving Credit Facility	The Exchange Fund commits to providing the Group with HK$30 billion in revolving credit

(d) *Currency risk*

Currency risk arises from the impact of foreign exchange rate fluctuations on the Group's financial position and foreign currency-denominated cash flows. The Group manages its currency risk strictly in accordance with the investment guidelines approved by the Board and under the supervision of the ALCO, which sets daily monitoring limits on currency exposure.

In accordance with this prudent risk-management principle, the net exposure of the foreign currency-denominated debts issued under the MTN Programme is fully hedged by the use of cross-currency swaps.

Transaction execution is segregated among the front, middle and back offices to ensure adequate checks and balances. The Treasury Department, acting as the front office, is responsible for monitoring financial market movements and executing transactions in the cash, derivatives, debt and securitisation markets in accordance with the strategies laid down by ALCO. The Risk Management Department, assuming the middle-office role, monitors compliance with treasury counterparty and market risk limits. The Operations Department, acting as the back office, is responsible for deal verification, confirmation, settlement and the payment process.

ALCO is responsible for the overall management of market risk. It follows the prudent risk management principles and investment guidelines approved by the Board. It is responsible for reviewing and managing the market risk, including interest rate risk, asset-liability maturity mismatch risk, liquidity and funding risk, and currency risk. Regular meetings are held to review the latest financial market developments and formulate relevant asset-liability management strategies.

Longevity Risk

Longevity risk under the RMP and PLIS refers to the heightening risk of longer and larger payouts. The longer the payout and loan period, the larger the loan balance will accrue over time, and the lesser the buffer will be from the sale of the property to cover the outstanding loan balance. A loss may arise if there is a shortfall in the recovery amount after the disposal of the property.

Longevity risk under the HKMC Annuity Plan (**Plan**) is the risk that the actual life expectancies of annuitants are longer than expected, resulting in a longer stream of monthly payouts, which in turn could materially impact the long-term sustainability of the Plan.

The termination rate of the loans under the RMP and PLIS and the annuity policies under the Plan depend largely on the mortality rate (that is, life expectancy) of the borrowers and the annuitants respectively. The Group takes on longevity risk through setting prudent actuarial assumptions in mortality rates as well as future improvement in life expectancy. Annual risk analysis is conducted to assess the potential financial impact of longevity risk, as well as the interaction among the various risk factors under the RMP and PLIS and the Plan. The mortality assumptions are reviewed on a regular basis.

The LRC is the governing forum that manages the longevity risk of the Group. Its duties include approving longevity risk management policies, hedging transactions and reviewing longevity experiences and exposures of the Group. It also monitors and analyses the general trend, technological changes and their implications for human longevity.

Property Risk

Property risk arises from fluctuation in the value of property that acts as collateral for the Group's loan and guarantee portfolios under the MPP, MIP, RMP and PLIS. The Group manages property risk by soliciting valuation from professional surveyor for each property securing a loan purchase or application, setting prudent assumptions in the recoverable value of the collateralised property, restricting maximum loan-to-value ratios of the loans under the relevant programmes and conducting stress tests to examine the impact of adverse market conditions.

The CC and RC are the governing forums that manage the property risk of the Group.

Placements with Exchange Fund

The HKMCA places its annuity premium receipts in the Investment Portfolio (**IP**) and Long Term Growth Portfolio (**LTGP**) of the Exchange Fund to earn interest. Furthermore, the HKMCA places its paid-up capital and retained earnings to the IP to manage the return on capital. The Group is exposed to market risk when the investment return falls short of the expected level. The risk of loss could result from adverse movements in interest rates, equity prices, property prices and foreign exchange rates. The Group actively monitors and reviews the investment portfolio to determine the strategic asset allocation between IP and LTGP.

The RC of the HKMCA is the governing forum for managing all the risks arising from the premium and capital placements.

Operational Risk

Operational risk represents the risk of losses arising from inadequacies, or the failure of internal processes, people or systems, or external interruptions.

The Group adopts a bottom-up approach to identify operational risk by conducting in-depth analyses of new products, business activities, processes, system enhancements and due diligence reviews of new operational flows. Comprehensive validation rules, management information system reports and audit trails are in place to track and report any errors or deficiencies.

The Group actively manages operational risk with its comprehensive system of well-established internal controls, authentication structures and operational procedures. The operational infrastructure is well designed to support the launch of new products in different business areas. Rigorous reviews are conducted before the implementation of operational or system infrastructure to ensure adequate internal controls are in place to mitigate operational risks.

To ensure an efficient and effective discharge of daily operations, the Group pursues advanced technological solutions alongside robust business logistics and controls to carry out its operational activities and business processes. Steps are taken to ensure the accuracy, availability and security of these systems. The Group also takes cautious steps to institute adequate checks and balances to ensure its operations are controlled properly. Effective internal controls help minimise financial risk and safeguard assets against inappropriate use or loss, including the prevention and detection of fraud.

Information Risk Management

The Group has set up the Information System Security Policy to govern the requirements of security standards and establishes controls over the confidentiality, integrity and availability of information assets for observance by all staff. The Group implements various information security measures to minimise its exposure to external attacks. Internally, the Group also implements security controls on its local area network to reduce damage in the event of a malicious intrusion. The Group engages external consultants when appropriate to conduct intrusion vulnerability tests to enhance system security. To ensure a high degree of compliance, the Group's mission-critical systems and processes are subject to regular review by internal auditors.

Furthermore, the Group has stepped up its supervisory efforts to enhance cyber resilience in two areas. First, a designated Information Risk Management Department (**IRM**) has been set up to define and implement the information risk management framework and governance of IT controls. Second, the IRM helps to ensure the Group has adequate awareness of, and compliance with, the information security policies, and to provide support for the investigation of any technology-related fraud and incidents.

Business Continuity Plan

The Group's business recovery plan ensures the maximum possible service levels are maintained at all units to support business continuity and minimise the impact of business disruption from different disaster scenarios. Each business unit regularly assesses the impact of disaster scenarios and updates recovery procedures. To ensure business recovery procedures are practical, an annual corporate-wide business continuity drill is conducted. Daily back-ups and offsite storage of back-up tapes are in place to protect the Group from IT disasters.

Product Sign-off Mechanism

To ensure all risk factors are considered when designing and implementing a new product, the Group has developed a product development management framework, under which a proper sign-off of product specification is conducted prior to the launch of any new product. The product driver is clearly assigned at the start of the product development process and is responsible for instituting the sign-off process. Products can be launched only after all functional departments have signed off and confirmed functional readiness.

Complaint-handling Mechanism

The Group makes a continuous effort to improve its core processes to ensure its products and services meet customers' expectations. To make sure customers' feedback is timely and properly attended to, the Group has a formal complaint-handling mechanism to track, report and handle complaints.

The ORC is responsible for ensuring all line functions in the Group maintain an effective operational risk and internal control framework. The ORC establishes key risk indicators to track the key operational risk items and monitor the effectiveness of the risk mitigating measures. Operational risk incidents that may potentially indicate a control weakness, a failure or non-compliance in internal processes are logged, reported and handled for operational risk management. The ORC is also responsible for providing directions and resolving issues related to policies, controls and the management of operational issues as well as ensuring prompt and appropriate corrective actions in response to audit findings related to operational risks or internal controls.

Legal and Compliance Risk

Legal risk arises from uncertainty in the application or interpretation of laws and regulations, and any unenforceability or ineffectiveness of legal documents in safeguarding the interests of the Group. Compliance risk arises from the failure to comply with laws, regulations, codes of practice and industry practices applicable to the Group.

The Legal Office, headed by the General Counsel, advises the Group on legal matters with a view to controlling legal risk. When new products or business activities are considered, the Legal Office will advise on the relevant laws and the regulatory environment. It will also advise on the necessary legal documentation, and identify possible legal pitfalls with a view to protecting the interests of the Group. Where appropriate, external counsel will be engaged to assist the Legal Office in providing legal support to the Group. The Legal Office works closely with other departments in the Group to advise on legal issues and documentation.

The Compliance Function is part of the Legal Office and is led by the Chief Compliance Officer, who reports to the Chief Executive Officer through the General Counsel. Where appropriate, the Compliance Function will engage external counsel to advise on compliance matters. For a more detailed description of the Compliance Function and its work, please refer to the Compliance Reporting Section of the Corporate Governance Report.

The ORC is the governance committee for legal and compliance risks.

Leveraging Risk

To ensure the Group would not incur excessive risk when expanding its business and balance sheet in proportion to its capital base, the Financial Secretary, in his capacity as the Financial Secretary and not the shareholder, acted as the regulator of the Group, issued the Guidelines on Capital Adequacy Ratio (**CAR**) with reference principally to the Basel II risk-based capital adequacy framework. The minimum CAR is set at 8%. As at 31 December 2018, the Group's CAR was 26.8%.

The prudent use of regulatory capital is monitored closely in accordance with the capital guidelines. The Chief Executive Officer reports the CAR and the daily minimum ratio to the Board of Directors on a quarterly basis. An early warning system is also in place. If the CAR drops to the threshold level of 14%, the Chief Executive Officer will alert the Executive Directors and consider appropriate remedial actions. If the CAR falls to 12% or below, the Board of Directors will be informed and appropriate remedial actions will be taken.