Our approach to risk

Our risk appetite

We recognise the importance of a strong risk culture, which refers to our shared attitudes, values and standards that shape behaviours including those related to risk awareness, risk taking and risk management. All our people are responsible for the management of risk, with the ultimate accountability residing with the Board.

We seek to build our business for the long term by balancing social, environmental and economic considerations in the decisions we make. Our strategic priorities are underpinned by our endeavour to operate in a sustainable way. This helps us to carry out our social responsibility and manage the risk profile of the business. We are committed to managing and mitigating climate-related risks, both physical and transition risks, and continue to incorporate consideration of these into how we manage and oversee risks internally and with our customers.

The following principles guide the Group's overarching appetite for risk and determine how our businesses and risks are managed.

Financial position

- We aim to maintain a strong capital position, defined by regulatory and internal capital ratios.
- We carry out liquidity and funding management for each operating entity, on a stand-alone basis.

Operating model

- We seek to generate returns in line with our risk appetite and strong risk management capability.
- We aim to deliver sustainable and diversified earnings and consistent returns for shareholders.

Business practice

- We have no appetite for deliberately or knowingly causing detriment to consumers, or incurring a breach of the letter or spirit of regulatory requirements.
- We have no appetite for inappropriate market conduct by any member of staff or by any business.
- We are committed to managing the climate risks that have an impact on our financial position, and contributing to HSBC Group's net zero ambition.
- We consider and, where appropriate, mitigate reputational risk that may arise from our business activities and decisions.
- We monitor non-financial risk exposure against risk appetite, including inadequate or failed internal processes, people and systems, or events that impact our customers or can lead to sub-optimal returns to shareholders, censure, or reputational damage.

Enterprise-wide application

Our risk appetite encapsulates the consideration of financial and non-financial risks. We define financial risk as the risk of a financial loss as a result of business activities. We actively take these types of risks to maximise shareholder value and profits. Non-financial risk is the risk to achieving our strategy or objectives as a result of failed internal processes, people and systems or from external events.

Our risk appetite is expressed in both quantitative and qualitative terms. It continues to evolve and expand its scope as part of our regular review process.

The Board reviews and approves the Group's risk appetite twice a year to make sure it remains fit for purpose. The risk appetite is considered, developed and enhanced through:

- an alignment with our strategy, purpose, values and customer needs;
- trends highlighted in other Group risk reports;
- communication with risk stewards on the developing risk landscape;
- strength of our capital, liquidity and balance sheet;
- compliance with applicable laws and regulations;
- effectiveness of the applicable control environment to mitigate risk, informed by risk ratings from risk control assessments;
- functionality, capacity and resilience of available systems to manage risk; and
- the level of available staff with the required competencies to manage risks.

We formally articulate our risk appetite through our risk appetite statement ('RAS'), which is approved by the Board on the recommendation of the Risk Committee ('RC'). Setting out our risk appetite ensures that we agree a suitable level of risk for our strategy. In this way, risk appetite informs our financial planning process and helps senior management to allocate capital to business activities, services and products.

The RAS consists of qualitative statements and quantitative metrics, covering financial and non-financial risks. It is applied to the development of business line strategies, strategic and business planning, and remuneration.

Performance against the RAS is reported to the Risk Management Meeting ('RMM') regularly to support targeted insight and discussion on breaches of risk appetite and any associated mitigating actions. This reporting allows risks to be promptly identified and mitigated, and informs risk-adjusted remuneration to drive a strong risk culture.

Risk Management

We recognise that the primary role of risk management is to protect our customers, business, colleagues, shareholders and the communities that we serve, while ensuring we are able to support our strategy and provide sustainable growth. This is supported through our three lines of defence model.

The implementation of our business strategy remains a key focus. As we implement change initiatives, we actively manage the execution risks. We also perform periodic risk assessments, including against strategies to help ensure retention of key personnel for our continued safe operation.

We aim to use a comprehensive risk management approach across the organisation and across all risk types, underpinned by our culture and values. This is outlined in our risk management framework, including the key principles and practices that we employ in managing material risks, both financial and non-financial.

The framework fosters continual monitoring, promotes risk awareness and encourages a sound operational and strategic decision making and escalation process. It also supports a consistent approach to identify, assess, manage and report the risks we accept and incur in our activities. We continue to enhance our approach to manage risk, through our activities with regard to people and capabilities; governance; reporting and management information; credit risk management models; and data.

Our risk management framework

The following diagram and descriptions summarise key aspects of the risk management framework, including governance and structure, our risk management tools and our risk culture, which together help align employee behaviour with our risk appetite.

Key components of our risk management framework

Our Values and Risk Culture

Risk governance	Non-executive risk governance	The Board approves the risk appetite, plans and performance targets. It sets the 'tone from the top' and is advised by the RC.
	Executive risk governance	Our executive risk governance structure is responsible for the enterprise-wide management of all risks, including key policies and frameworks for the management of risk within the Group.
Roles and responsibilities	Three lines of defence model	Our 'Three lines of defence' model defines roles and responsibilities for risk management. An independent Risk function helps ensure the necessary balance in risk/return decisions.
Processes and tools	Risk appetite	The Group has processes in place to identify/assess, monitor, manage and report risks to help ensure we remain within our risk appetite.
	Enterprise-wide risk management tools	
	Active risk management: identification/assessment, monitoring, management and reporting	
Internal controls	Policies and procedures	Policies and procedures define the minimum requirements for the controls required to manage our risks.
	Control activities	Non-financial risk stewards define the minimum control standards for managing non-financial risks.
	Systems and infrastructure	The Group has systems and/or processes that support the identification, capture and exchange of information to support risk management activities.

Risk governance

The Board has ultimate responsibility for the effective management of risk and approves our risk appetite. It is advised on risk-related matters by the RC.

The Chief Risk Officer, supported by the RMM, holds executive accountability for the ongoing monitoring, assessment and management of the risk environment and the effectiveness of the risk management framework.

The management of regulatory compliance risk and financial crime risk reside with Chief Compliance Officer. Oversight is maintained by the Chief Risk Officer in line with her enterprise risk oversight responsibilities, through the RMM.

Day-to-day responsibility for risk management is delegated to senior managers with individual accountability for decision making. All our people have a role to play in risk management. These roles are defined using the three lines of defence model, which takes into account the Group's business and functional structures.

We use a defined executive risk governance structure to help ensure there is appropriate oversight and accountability of risk, which facilitates reporting and escalation to the RMM.

A Product Oversight Committee reporting to the RMM and comprising senior executives from Risk, Legal, Compliance, Finance, and Operations/IT, is responsible for reviewing and approving the launch of such new products and services. Each new service and product launch is also subject to an operational risk self-assessment process, which includes identification, evaluation and mitigation of risk arising from the new initiative. Internal Audit is consulted on the internal control aspect of new products and services in development prior to implementation.

Our roles and responsibilities

All our people are responsible for identifying and managing risk within the scope of their roles. Roles are defined using the three lines of defence model, which takes into account our business and functional structure.

Three lines of defence

To create a robust control environment to manage risks, we use an activity-based three lines of defence model. This model delineates management accountabilities and responsibilities for risk management and the control environment. This model underpins our approach to risk management by clarifying responsibility and encouraging collaboration, as well as enabling efficient coordination of risk and control activities.

The three lines of defence are summarised below:

- The first line of defence owns the risks and is responsible for identifying, recording, reporting and managing them in line with risk appetite, and ensuring that the right controls and assessments are in place to mitigate them.
- The second line of defence sets the policy and guidelines for managing specific risk areas, provides advice and guidance in relation to the risk, and challenges the first line of defence on effective risk management.
- The third line of defence is our Internal Audit function, which provides independent assurance that our risk management, governance and internal control processes are designed and operating effectively.

Independent risk function

The Group's Risk function, headed by the Chief Risk Officer, is responsible for the Group's risk management framework. This responsibility includes establishing and monitoring of risk profiles, and identifying and managing forward-looking risk. The Group's Risk function is made up of sub-functions covering all risks to our operations and forms part of the second line of defence. It is independent from the businesses, including sales and trading functions, to provide challenge, appropriate oversight and balance in risk/return decisions.

Responsibility for minimising both financial and non-financial risk lies with our people. They are required to manage the risks of the business and operational activities for which they are responsible.

We maintain adequate oversight of our risks through various specialist Risk Stewards, along with our aggregate overview through Chief Risk Officer.

Risk management tools

The Group uses a range of tools to identify, monitor and manage risk. The key tools are summarised below.

Risk appetite

Risk Appetite ('RA') is defined as the level and types of risks that the Group is willing to take to achieve our strategic objectives. RA is articulated through RAS, which consists of qualitative statements and quantitative metrics covering both financial and non-financial risks that are material to the Group.

RA supports senior management in allocating capital, funding, and liquidity optimally to finance strategic growth within acceptable risk levels, while monitoring exposure of non-financial risks which may impact our customers or lead to sub-optimal returns to shareholders, regulatory censure, or reputational damage. The RMM reviews the Group's actual risk appetite profile in which the quantitative metrics have pre-defined Risk Appetite and Risk Tolerance thresholds against which performance is measured and monitored. The actual risk appetite profile is also reported to the RC and the Board by Chief Risk Officer including breach commentary.

Risk map

The Group uses a risk map to provide a point-in-time view of its residual risk profile across both financial and non-financial risks. This highlights the potential for these risks to materially affect our financial results, reputation or business sustainability. Risk stewards assign risk ratings, supported by commentary. Risks that have an 'Amber' or 'Red' risk rating require monitoring and mitigating action plans being either in place or initiated to manage the risk down to acceptable levels.

Top and emerging risks

(unaudited)

We use a top and emerging risks process to provide a forward-looking view of issues with the potential to threaten the execution of our strategy or operations over the medium to long term.

We proactively assess the internal and external risk environment, as well as review the themes identified across our organisation and global businesses, for any risks that may require escalation, updating our top and emerging risks as necessary.

Stress testing and recovery planning

The Group operates a wide-ranging stress testing programme that is a key part of our risk management and capital planning. Stress testing provides management with key insights into the impact of severely adverse events on the Group, and provides confidence to regulators on the Group's financial stability.

Our stress testing programme assesses our capital strength through a rigorous examination of our resilience to external shocks. As well as undertaking regulatory-driven stress tests, we conduct our own internal stress tests, in order to understand the nature and level of all material risks, quantify the impact of such risks and develop plausible business-as-usual mitigating actions.

Internal stress tests

Our internal capital assessment uses a range of stress scenarios that explore risks identified by management. They include potential adverse macroeconomic, geopolitical and operational risk events, as well as other potential events that are specific to the Group.

The selection of scenarios is based upon the output of our top and emerging risks identified and our risk appetite. Stress testing analysis helps management understand the nature and extent of vulnerabilities which the Group is exposed to. Using this information, management decides whether risks can or should be mitigated through management actions or, if they were to crystallise, should be absorbed through capital. This in turn informs decisions about preferred capital levels and allocations.

The Group also participate, as required, in the regulatory stress testing programmes of the jurisdictions in which they operate, and the stress tests of the HKMA. Functions and businesses also perform bespoke stress testing to inform their assessment of risks in potential scenarios.

We also conduct reverse stress tests each year at a group level and, where required, at subsidiary entity level to understand potential extreme conditions that would make our business model non-viable. Reverse stress testing identifies potential stresses and vulnerabilities we might face, and helps inform early warning triggers, management actions and contingency plans designed to mitigate risks.

The Group stress testing programme is overseen by the RC and results are reported, where appropriate, to the RMM, RC and the Board.

Recovery and resolution plans

Recovery and resolution plans form an integral framework in the safeguarding of the Group's financial stability. Together with stress testing, it helps us understand the outcomes of adverse business or economic conditions and the identification of mitigating actions.

Key developments in 2022

We continued to actively manage the risks related to macroeconomic and geopolitical uncertainties, as well as the risks resulting from the COVID-19 pandemic and its impacts on our customers and operations during 2022 as well as other key risks described in this section.

In 2022, we enhanced our risk management in the following areas:

- We continued to improve our risk governance decision making, particularly with regard to the governance of treasury risk to ensure senior executives have appropriate oversight and visibility of macroeconomic trends around inflation and interest rates.
- We continued to develop our approach to emerging risk identification and management, including the use of forward-looking indicators to support our analysis.
- We enhanced our enterprise risk reporting processes to place a greater focus on our emerging risks, including by capturing the materiality, oversight and individual monitoring of these risks.
- We further strengthened our third-party risk policy and processes to improve control and oversight of our material third parties to maintain our operational resilience, and to meet new and evolving regulatory requirements.
- We made progress with our comprehensive regulatory reporting programme to strengthen our global processes, improve consistency, and enhance controls.
- We enhanced, and continued to embed, the governance and oversight around model adjustments and related processes for HKFRS 9 models and Sarbanes-Oxley controls.
- We continued to embed climate considerations throughout the organisation, including expanding the scope of climate related training and developing new climate risk metrics to monitor and manage exposures, and the development of internal climate scenario exercise.
- We continued to improve the effectiveness of our financial crime controls, deploying advanced analytics capabilities. We are refreshing our financial crime policies, ensuring they remain up-to-date and address changing and emerging risks. We continue to monitor regulatory changes.

Areas of special interest

(unaudited)

During 2022, a number of areas were identified and considered as part of our top and emerging risks because of the effect they may have on the Group. We place particular focus in this section on geopolitical and macroeconomic risks, technology and cyber security risk, financial crime risk environment, IBOR transition, risks related to COVID-19 and climate related risks.

Geopolitical and macroeconomic risks

The Russia-Ukraine war has had far-reaching geopolitical and economic implications. The Group is monitoring the impacts of the war and continues to respond to the extensive sanctions and trade restrictions that have been imposed, noting the challenges that arise in implementing the complex, novel and ambiguous aspects of certain of these sanctions. Sanctions were targeted against numerous Russian government officials and politically exposed individuals. Russia has implemented certain countermeasures in response. Further sanctions and counter sanctions in connection with Russia may adversely affect the Group, its customers and the markets in which the Group operates by creating regulatory, reputational and market risks.

Global commodity markets have been significantly impacted by the Russia-Ukraine war and localised COVID-19 outbreaks, leading to continued supply chain disruptions. This has resulted in product shortages appearing across several regions, and increased prices for both energy and non-energy commodities, such as food. We do not expect these to ease significantly in the near term. In turn, this has had a significant impact on global inflation.

Rising global inflation has prompted central banks to tighten monetary policy. The combined pressure of inflation and interest rate rises may lead to pressures on customers and their ability to repay debt. We continue to monitor our risk profile closely in the context of uncertainty over global macroeconomic policies. Higher inflation and interest rate expectations around the world, and the resulting economic uncertainty, have had an impact on Expected Credit Loss ('ECL').

Global tensions over trade, technology and ideology are manifesting themselves in divergent regulatory standards and compliance regimes, presenting long-term strategic challenges for multinational businesses.

The US-China relationship remains complex, with divisions over a number of critical issues. However, the recent meetings between senior officials of the two nations signal an effort to reduce tensions by allowing more working-level discussions and confidence-building measures. The US, the UK, the EU, Canada and other countries have imposed various sanctions and trade restrictions on Chinese persons and companies. These include the freezing of assets of government officials, and the implementation of investment and import/export restrictions targeting certain Chinese companies.

There is a continued risk of additional sanctions being imposed by the US and other governments in relation to human rights and other issues with China, and this could create a more complex operating environment for the Group and its customers.

China has in turn announced a number of its own sanctions and trade restrictions that target, or provide authority to target, foreign individuals and companies. China has also promulgated laws that provide a legal framework for imposing further sanctions. These and any future measures and countermeasures that may be taken by the US, China and other countries may affect the Group, its customers, and the markets in which we operate.

As the geopolitical landscape evolves, compliance by multinational corporations with their legal or regulatory obligations in one jurisdiction may be seen as supporting the law or policy objectives of that jurisdiction over another, creating additional compliance, reputational and political risks for the Group. We maintain dialogue with our regulators in various jurisdictions on the impact of legal and regulatory obligations on our business and customers.

China's expanding data privacy, national security and cybersecurity laws could pose potential challenges to intragroup data sharing. These developments could increase financial institutions' compliance burdens in respect of cross-border transfers of personal information, and degrade our enterprise-wide financial crime risk management capabilities. In Hong Kong, there is also an increasing focus by regulators on the use of big data and artificial intelligence.

Market participants remain concerned about the repercussions for the Chinese domestic economy from instability in its commercial real estate sector, including deteriorating operating performance and challenging liquidity conditions, and China's elevated COVID-19 infections. Despite the announcements of relaxation of 10 COVID-19 controls at end 2022 and the borders reopening on 8 January 2023, we continue to monitor the situation closely, including potential indirect impacts, and take mitigating actions as required.

Mitigation actions

- We closely monitor the economic developments in key markets and sectors and actively manage our credit portfolio through enhanced monitoring, thematic reviews, internal stress tests, etc. We will continue to support our customers and manage risk and exposures as appropriate.
- We regularly review key portfolios to help ensure that individual customer or portfolio risks are understood and our ability to manage the level of facilities offered through any downturn is appropriate.
- We continue to manage sanctions and trade restrictions through the use of, and enhancement to, our existing controls.

Technology and cyber security risk

We operate an extensive and complex technology landscape, which must remain resilient in order to support customers and the Group. Risks arise where technology is not understood, maintained, or developed appropriately. Together with other organisations, we continue to operate in an increasingly hostile cyber threat environment. These threats include potential unauthorised access to customer accounts, attacks on our systems or those of our third-party suppliers and require ongoing investment in business and technical controls to defend against them.

Mitigating actions

- We continue to invest in transforming how software solutions are developed, delivered and maintained. We invest both to improve system resilience and test service continuity. We continue to ensure security is built into our software development life cycle and improve our testing processes and tools.
- We continue to upgrade our IT systems, simplify our service provision and replace older IT infrastructure and publications.
- We continually evaluate threat levels for the most prevalent attack types and their potential outcomes. To further protect the Group and our customers and help ensure the safe expansion of our global businesses, we continue to strengthen our controls to reduce the likelihood and impact of advanced malware, data leakage, exposure through third parties and security vulnerabilities.

- We continue to enhance our cybersecurity capabilities, including Cloud security, identity and access management, metrics and data analytics, and third-party security reviews. An important part of our defence strategy is ensuring our colleagues remain aware of cybersecurity issues and know how to report incidents.
- We report and review cyber risk and control effectiveness at executive and non-executive Board level. We also report across our global businesses, functions and markets to help ensure appropriate visibility and governance of the risk and mitigating actions.
- The Group participates globally in industry bodies and working groups to share information about tactics employed by cybercrime groups and to collaborate in fighting, detecting and preventing cyber-attacks on financial organisations.

Financial crime risk environment

Financial institutions remain under considerable regulatory scrutiny regarding their ability to prevent and detect financial crime which continues to evolve. Challenges include managing conflicting laws and approaches to legal and regulatory regimes, and implementing the unprecedented volume and diverse set of sanctions notably as a result of the Russia-Ukraine war.

Amid rising inflation and increasing cost of living pressures, we face increasing regulatory expectations with respect to increases in internal and external fraud and the abuse of vulnerable customers.

The digitisation of financial services continues to have an impact on the payments ecosystem, including new market entrants and payment mechanisms, not all of which are subject to the same level of regulatory scrutiny or regulations as financial institutions. This presents ongoing challenges in terms of maintaining required levels of payment transparency, notably where financial institutions serve as intermediaries. Developments around digital assets and currencies have continued at pace, with an increasing regulatory and enforcement focus.

Expectations with respect to the intersection of ESG issues and financial crime as our organisation, customers and suppliers transition to net zero, continue to increase, focused on potential 'greenwashing', human rights issues and environmental crimes. In addition, climate change itself could heighten risks linked to vulnerable migrant populations in countries where financial crime is already more prevalent.

We also continue to face increasing challenges presented by national data privacy requirements, which may affect our ability to manage financial crime risks holistically and effectively.

Mitigating actions

- We continue to manage sanctions and trade restrictions through the use of, and enhancements to, our existing controls.
- We are strengthening our fraud controls and investing in next generation capabilities to fight financial crime through the application of advanced analytics and artificial intelligence.
- We are looking at the impact of a rapidly changing payments ecosystem, as well as the risks associated with direct and indirect exposure to digital assets and currencies, in an effort to ensure our financial crime controls remain appropriate.
- We are assessing our existing policies and control framework in an effort to ensure that developments in the ESG space are considered and the risks mitigated.
- We work with jurisdictions and relevant international bodies to address data privacy challenges through international standards, guidance, and legislation.

IBOR transition

Interbank offered rates ('IBORs') have previously been used extensively to set interest rates on different types of financial transactions and for valuation purposes, risk measurement and performance benchmarking.

The publication of sterling, Swiss franc, euro and Japanese yen (JPY) London interbank offered rate ('LIBOR') interest rate benchmarks, as well as Euro Overnight Index Average ('EONIA'), ceased from the end of 2021. Our IBOR transition programme – which is tasked with the development of new near risk-free rate ('RFR') products and the transition of legacy IBOR products – has continued to support the transition of a limited number of remaining contracts in these benchmarks to RFRs, or alternative reference rates.

For the cessation of the publication of US dollar LIBOR from 30 June 2023, we have implemented the majority of required processes, technology and RFR product capabilities in preparation for upcoming market events and continue to transition outstanding legacy contracts through the first half of 2023. We have completed the transition of the majority of our committed lending facilities and continue to make steady progress with the transition of the outstanding legacy committed lending facilities. Transition of our derivatives portfolio is progressing well with most clients reliant on industry mechanisms to transition to RFRs. For certain products and contracts, including syndicated loans, we remain reliant on the continued support of agents and third parties, but we continue to progress those contracts requiring transition. We will continue to monitor contracts that may be potentially more challenging to transition and need to rely upon legislative solutions. Additionally, following the FCA's consultation in November 2022 proposing that US dollar LIBOR is to be published using a 'synthetic' methodology for a defined period, we will continue to work with our clients to support them through the transition of their products if transition is not completed by 30 June 2023.

We remain mindful of the various factors that impact on IBOR remediation strategy for our regulatory capital instruments, including but not limited to timescales for cessation of relevant IBOR rate, constraints relating to the governing law of outstanding instruments, and the potential relevance of legislative solutions and industry best practice guidance. We remain committed in seeking to remediate or mitigate relevant risks relating to IBOR-demise, as appropriate, on our outstanding regulatory capital instruments before the relevant calculation, which may occur post-cessation of the relevant IBOR rate.

For US dollar LIBOR and other demising IBORs, we continue to be exposed to, actively monitor, risks including:

- regulatory compliance and conduct risks, as the transition of legacy contracts to RFRs or alternative rates, or sales of products referencing RFRs, may not deliver fair client outcomes;
- resilience and operational risks, as changes to manual and automated processes, made in support of new RFR methodologies, and the transition of large volumes of IBOR contracts may lead to operational issues;
- legal risk, as issues arising from the use of legislative solutions and from legacy contracts that the Group is unable to transition may result in unintended or unfavourable outcomes for clients and market participants. This could potentially increase the risk of disputes;
- model risk, as there is a risk that changes to our models to replace IBOR-related data, adversely affect the accuracy of model outputs; and
- market risk, because as a result of differences in LIBOR and RFRs interest rates, we are exposed to basis risk resulting from the asymmetric adoption of rates across assets, liabilities and products.

We will monitor these risks through the remainder of the transition of legacy contracts, with a focus on fair client outcomes. The level of risk is diminishing in line with our process implementation and continued transition of contracts. Throughout 2023, we continue to be committed on engaging with our clients and investors to complete an orderly transition of contracts that reference the remaining demising LIBORs.

Mitigating actions

- Our IBOR transition programme, which is overseen by the Chief Risk Officer, will continue to deliver IT and operational processes to meet its objectives.
- We carry out extensive training, communication and client engagement to facilitate appropriate selection of new rates and products.
- We have dedicated teams in place to support the transition.
- We have actively transition legacy contracts and ceased new issuance of LIBOR and demising regional rate based contracts, other than those allowed under regulatory exemptions with associated monitoring and controls.
- We assess, monitor and dynamically manage risks arising from IBOR transition, and implement specific mitigating controls when required.
- We continue to actively engage with regulatory and industry bodies to mitigate risks relating to 'tough legacy' contracts.

Financial instruments impacted by IBOR reform

(audited)

Amendments to HKFRSs issued in October 2020 (Interest Rate Benchmark Reform Phase 2) represents the second phase of the project on the effects of interest rate benchmark reform, addressing issues affecting financial statements when changes are made to contractual cash flows and hedging relationships as a result of reform.

Under these amendments, changes made to a financial instrument measured at other than fair value through profit or loss that are economically equivalent and required by interest rate benchmark reform, do not result in the derecognition or a change in the carrying amount of the financial instrument. Instead, they require the effective interest rate to be updated to reflect the change in the interest rate benchmark. In addition, hedge accounting will not be discontinued solely because of the replacement of the interest rate benchmark if the hedge meets other hedge accounting criteria.

The Group has adopted the amendments from 1 January 2020.

	Financial instruments yet to transition to alternative benchmarks, by main benchmark			
	USD LIBOR (HK$m)	GBP LIBOR (HK$m)	JPY LIBOR (HK$m)	CDOR (HK$m)
At 31 December 2022				
Non-derivative financial assets[1]	**31,224**	**–**	**–**	**1,439**
Non-derivative financial liabilities	**–**	**–**	**–**	**–**
Derivative notional contract amount	**76,489**	**–**	**–**	**–**
At 31 December 2021				
Non-derivative financial assets[1]	33,372	6,422	380	–
Non-derivative financial liabilities	3,119	–	–	–
Derivative notional contract amount	81,944	–	–	–

1 Gross carrying amount excluding allowances for expected credit losses.

The amounts in the above table relate to the Group's main operating entities and provide an indication of the extent of the Group's exposure to the IBOR benchmarks which are due to be replaced. Amounts are in respect of financial instruments that:

- contractually reference an interest rate benchmark that is planned to transition to an alternative benchmark;
- have a contractual maturity date beyond the date by which the reference interest rate benchmark is expected to cease; and
- are recognised on the Group's consolidated balance sheet.

Risks related to COVID-19

COVID-19 remains a risk to our customers and organisation. However, the policy for broad lockdowns and public health restrictions has been eased following successful vaccine rollouts, and as societies have adapted. Countries continue to differ to a degree in their approach, although China has recently reversed many restrictions on activity and mobility.

In China and Hong Kong, adherence to more stringent public health restrictions had adverse economic implications through much of 2022. Government imposed lockdowns of major cities in China and restrictions on travel, adversely affected global tourism and supply chains.

With the relaxation of restrictions in China in December 2022 and also the borders reopening on 8 January 2023, the prospect of a sustained recovery has emerged, given the opportunity for the persistent disruptions to activity to abate and for travel and tourism to resume. There are still short term risks, however, as the recent surge in infections may dampen confidence and activity, while there are also fears that the surge in infections risks given opportunity for the emergence of a new variant of the virus.

Hong Kong Government has deployed extensive measures to support local populations. Measures implemented by the Government included but not limited to consumption voucher scheme and funding support to businesses. As the epidemic situation stablises, the Government has also relaxed inbound control measures aiming at resuming the international connection at end 2022.

We continue to support our personal and business customers through market-specific measures initiated during the COVID-19 pandemic, and by supporting Hong Kong Government schemes that focus on the parts of the economy most impacted by the pandemic. These measures have been well received and we remain responsive to our customers' changing needs.

The rapid introduction and varying nature of the Government support schemes introduced throughout the COVID-19 pandemic has led to increased operational risks, including complex conduct considerations, increased reputational risk and increased risk of fraud. These risks are likely to be heightened further as and when those Government support schemes are unwound.

We continue to monitor the situation closely, and given the continuing uncertainties related to the post-pandemic landscape, additional mitigating actions may be required.

Climate related risk

Focus on climate related risk increased over 2022, owing to the pace and volume of policy and regulatory changes globally particularly on climate risk management, stress testing and scenario analysis and disclosures. If we fail to meet evolving regulatory expectations or requirements on climate risk management, this could have regulatory compliance and reputational impacts.

We could face direct impact owing to the increase in frequency and severity of weather events and chronic shifts in weather patterns, which could impact our ability to conduct our day-to-day operations.

Our customers may find that their business models fail to align to a low carbon economy or face disruption to their operations or deterioration to their assets as a result of extreme weather events.

We face increased reputational, legal and regulatory risk as we make progress towards our carbon neutrality targets, with stakeholders likely to place greater focus on our actions such as the development of climate-related policies, our disclosures and financing and investment decisions relating to our ambition.

We will face additional risks if we are perceived to mislead stakeholders in respect of our climate strategy, the climate impact of a product or service, or the commitments of our customers.

Climate risk will also have an impact on model risk, as the uncertain impacts of climate change and data limitations present challenges to creating reliable and accurate model outputs.

To track and report on progress towards achieving our carbon neutrality targets, we rely on internal and, external data, guided by industry standards. While carbon emissions reporting has improved over time, we are continually enhancing the quality and consistency of the data. The Bank's calculation methodologies of carbon emissions may evolve over time in line with market practice, regulations, and developments in climate science. Any developments in data and methodologies could result in revisions to reported data going forward, meaning that reported figures may not be reconcilable or comparable year-on-year. We may also have to reevaluate our progress towards our climate-related targets in future and this could result in reputational, legal and regulatory risks.

Mitigating actions

- We continue to deepen our understanding of the drivers of climate risk. A dedicated Climate Risk Working Group is responsible for overseeing our climate related risk management.
- We continue to accelerate the development of our climate risk management capabilities across four key pillars – governance and risk appetite, risk management, stress testing and scenario analysis, and disclosures.
- In December 2022, our energy policy and thermal coal phase-out policy has revised and we will leverage on our relationships to partner with customers in this sector to help them transition to cleaner, safer and cheaper energy alternatives.
- Climate stress tests and scenarios are being used to further improve our understanding of our risk exposures for use in risk management and business decision making.
- We continue to engage with our customers, investors and regulators proactively on the management of climate related risks.

Our material banking and insurance risks

The material risk types associated with our banking and insurance manufacturing operations are described in the following tables.

Description of risks – banking operations

Risks	Arising from	Measurement, monitoring and management of risk
Credit risk		
Credit risk is the risk of financial loss if a customer or counterparty fails to meet an obligation under a contract.	Credit risk arises principally from direct lending, trade finance and leasing business, but also from certain other products such as guarantees and derivatives.	Credit risk is: – measured as the amount which could be lost if a customer or counterparty fails to make repayments; – monitored within limits, approved by individuals within a framework of delegated authorities; and – managed through a robust risk control framework which outlines clear and consistent policies, principles and guidance for risk managers.
Treasury risk		
Treasury risk is the risk of having insufficient capital, liquidity or funding resources to meet financial obligations and satisfy regulatory requirements, including the risk of adverse impact on earnings or capital due to structural foreign exchange exposures and changes in market interest rates, and including the financial risks arising from historic and current provision of pensions and other post-employment benefits to staff and their dependants.	Treasury risk arises from changes to the respective resources and risk profiles driven by customer behaviour, management decisions, or pension plan fiduciary decisions. It also arises from the external environment, including changes to market parameters such as interest rates or foreign exchange rates, together with updates to the regulatory requirements.	Treasury risk is: – measured through risk appetite and more granular limits, set to provide an early warning of increasing risk, minimum ratios of relevant regulatory metrics, and metrics to monitor the key risk drivers impacting treasury resources; – monitored and projected against appetites and by using operating plans based on strategic objectives together with stress and scenario testing; and – managed through control of resources in conjunction with risk profiles, strategic objectives and cash flows.
Market risk		
Market risk is the risk that movements in market factors, such as foreign exchange rates, interest rates, credit spreads, equity prices and commodity prices, will reduce our income or the value of our portfolios.	Exposure to market risk is separated into two portfolios: trading and non-trading. Market risk for non-trading portfolios is discussed in the 'Treasury risk' section. Market risk exposures arising from our insurance operations are discussed in 'Insurance manufacturing operation risk' section.	Market risk is: – measured using sensitivities, value at risk ('VaR') and stress testing, giving a detailed picture of potential gains and losses for a range of market movements and scenarios, as well as tail risks over specified time horizons; – monitored using VaR, stress testing and other measures; and – managed using risk limits approved by Chief Risk Officer. These limits are allocated across the Group's legal entities and business lines.
Climate risk		
Climate risk relates to the financial and non-financial impacts that may arise as a result of climate change and the move to a greener economy.	Climate risk is likely to materialise through: – physical risk, which arises from the increased frequency and severity of weather events; – transition risk, which arises from the process of moving to a low-carbon economy; and	Climate risk is: – measured using a variety of risk appetite metrics and Key Management Indicators, which assess the impact of climate risk across the risk taxonomy; – monitored using stress testing; and – managed through adherence to risk appetite thresholds and via specific policies.

Risks	Arising from	Measurement, monitoring and management of risk
Climate risk continued		
	– greenwashing risk, which arises from the act of knowingly or unknowingly misleading stakeholders regarding our strategy relating to climate, the climate impact/benefit of a produce or service, or the climate commitments or performance of our customers.	
Resilience risk		
Resilience risk is the risk that we are unable to provide critical services to our customers, affiliates and counterparties as a result of sustained and significant operational disruption.	Resilience risk arises from failures or inadequacies in processes, people, systems or external events.	Resilience risk is: – measured through a range of metrics with defined maximum acceptable impact tolerances, and against our agreed risk appetite; – monitored through oversight of enterprise processes, risks, controls and strategic change programmes; and – managed by continual monitoring and thematic reviews.
Regulatory compliance risk		
Regulatory compliance risk is the risk associated with breaching our duty to clients and other counterparties, inappropriate market conduct and breaching related financial services regulatory standards.	Regulatory compliance risk arises from the failure to observe the relevant laws, codes, rules and regulations and can manifest itself in poor market or customer outcomes and lead to fines, penalties and reputational damage to our business.	Regulatory compliance risk is: – measured by reference to risk appetite, identified metrics, incident assessments, regulatory feedback and the judgement and assessment of our regulatory compliance teams; – monitored against the first line of defence risk and control assessments, the results of the monitoring and control assurance activities of the second line of defence functions, and the results of internal and external audits and regulatory inspections; and – managed by establishing and communicating appropriate policies and procedures, training employees in them, and monitoring activity to help ensure their observance. Proactive risk control and/or remediation work is undertaken where required.
Financial crime risk		
Financial crime risk is the risk that the Group's products and services will be exploited for criminal activity. This includes fraud, bribery and corruption, tax evasion, sanctions and export control violations, money laundering, terrorist financing and proliferation financing.	Financial crime risk arises from day-to-day banking operations involving customers, third parties and employees.	Financial crime risk is: – measured by reference to risk appetite, identified metrics, incident assessments, regulatory feedback and the judgement and assessment of our financial crime risk teams; – monitored against the first line of defence risk and control assessments, the results of the monitoring and control assurance activities of the second line of defence functions, and the results of internal and external audits and regulatory inspections; and – managed by establishing and communicating appropriate policies and procedures, training employees in them and monitoring activity to help ensure their observance. Proactive risk control and/or remediation work is undertaken where required.

Description of risks – banking operations continued

Risks	Arising from	Measurement, monitoring and management of risk
Model risk		
Model risk is the potential for adverse consequences from business decisions arising from the use of models that have been inadequately designed, implemented or used or that model does not perform in line with expectations and predictions.	Model risk arises in both financial and non-financial contexts whenever business decision making includes reliance on models.	Model risk is: – measured by reference to model performance tracking and the output of detailed technical reviews, with key metrics including model review statuses and findings; – monitored against model risk appetite statements, insight from the independent review function, feedback from internal and external audits, and regulatory reviews; and – managed by creating and communicating appropriate policies, procedures and guidance, training colleagues in their application, and supervising their adoption to ensure operational effectiveness.

Description of risks – insurance manufacturing operations

Our insurance manufacturing subsidiary is separately regulated from our banking operations. Risks in the insurance entities are managed using methodologies and processes appropriate to insurance manufacturing operations, but remain subject to oversight at Group level. Our insurance operations are also subject to some of the same risks as our banking operations, which are covered by the Group's respective risk management processes.

Risks	Arising from	Measurement, monitoring and management of risk
Insurance risk		
Insurance risk is the risk that, over time, the cost of acquiring and administering an insurance contract, and paying claims and benefits may exceed the total amount of premiums received and investment income.	The cost of claims and benefits can be influenced by many factors, including mortality and morbidity experience, as well as lapse and surrender rates.	Insurance risk is: – measured in terms of life insurance liabilities and economic capital allocated to insurance underwriting risk; – monitored through a framework of approved limits and delegated authorities; and – managed through a robust risk control framework which outlines clear and consistent policies, principles and guidance. This includes using product design, underwriting, reinsurance and claims-handling procedures.
Financial risk		

Our ability to effectively match the liabilities arising under insurance contracts with the asset portfolios that back them is contingent on the management of financial risks and the extent to which these risks are borne by the policyholders.	Exposure to financial risks arises from:
	– market risk of changes in the fair values of financial assets or their future cash flows;
	– credit risk; and
	– liquidity risk of entities being unable to make payments to policyholders as they fall due.
		Financial risk is:
		– measured separately for each type of risk:
		  – market risk is measured in terms of economic capital, internal metrics and fluctuations in key financial variables;
		  – credit risk is measured in terms of economic capital and the amount that could be lost if a counterparty fails to make repayments; and
		  – liquidity risk is measured in terms of internal metrics including stressed operational cash flow projections;
		– monitored through a framework of approved limits and delegated authorities; and
		– managed through a robust risk control framework, which outlines clear and consistent policies, principles and guidance. This includes using product design, asset liability matching and bonus rates.

The following information describes the Group's management and control of risks, in particular, those associated with its use of financial instruments ('financial risks'). Major types of risks to which the Group is exposed include credit risk, treasury risk, market risk, climate risk, resilience risk, regulatory compliance risk, financial crime risk, model risk, and insurance risk.

(a) Credit Risk

Overview

Credit risk is the risk of financial loss if a customer or counterparty fails to meet an obligation under a contract. Credit risk arises principally from direct lending, trade finance and leasing business, but also from other products such as guarantees and credit derivatives.

Credit risk management

(audited)

Key developments in 2022

There were no material changes to the policies and practices for the management of credit risk in 2022. We continued to apply the requirements of HKFRS 9 *'Financial Instruments'* within Credit Risk sub-function.

For our Wholesale portfolios, we adopted the EBA 'Guidelines on the application of definition of default' in 2021 and, for our retail portfolios, these guidelines were adopted during 2022. Adoption of these guidelines did not have a material impact on our portfolios and comparative disclosures have not been restated.

We actively managed the risks related to macroeconomic uncertainties, including fiscal and monetary policy, the Russia-Ukraine war, broader geopolitical uncertainties, and the continued risks resulting from the COVID-19 pandemic.

Governance and structure

We have established credit risk management and related HKFRS 9 processes throughout the Group. We continue to assess the impact of economic developments in key markets on specific customers, customer segments or portfolios. As credit conditions change, we take mitigating action, including the revision of risk appetites or limits and tenors, as appropriate. In addition, we continue to evaluate the terms under which we provide credit facilities within the context of individual customer requirements, the quality of the relationship, local regulatory requirements, market practices and our local market position.

Credit risk sub-function

(audited)

With the delegation from the Board, credit approval authorities are further delegated by the Executive Committee to the Chief Executive together with the authority to sub-delegate them. The Credit Risk sub-function is responsible for the key policies and processes for managing credit risk, which include formulating the Group's credit policies and risk rating frameworks, guiding the Group's appetite for credit risk exposures, undertaking independent reviews and objective assessment of credit risk, and monitoring performance and management of portfolios.

The principal objectives of our credit risk management are:

- to maintain across the Group a strong culture of responsible lending, and robust risk policies and control frameworks;
- to both partner and challenge our businesses in defining, implementing and continually re-evaluating our risk appetite under actual and scenario conditions; and
- to ensure there is independent, expert scrutiny of credit risks, their causes and their mitigation.

Key risk management processes

HKFRS 9 'Financial Instruments' process

The HKFRS 9 process comprises three main areas: modelling and data; implementation; and governance.

Modelling and data

We have established HKFRS 9 modelling and data processes in various geographies, which are subject to internal model risk governance including independent review of significant model developments.

Implementation

A centralised impairment engine performs the expected credit losses ('ECL') calculation using data, which is subject to a number of validation checks and enhancements, from a variety of client, finance and risk systems. Where possible, these checks and processes are performed in a globally consistent and centralised manner.

(a) Credit Risk

Credit risk management continued

(audited)

Key risk management processes continued

Governance

Management review forums are established in order to review and approve the impairment results. Management review forums have representatives from Credit Risk and Finance. The approvals are subsequently reported up to the Impairment Committee for final approval of the Group's ECL for the period. Required members of the Impairment Committee are the heads of Wholesale Credit Risk Management and Wealth and Personal Banking Risk, as well as the Chief Risk Officer, the Chief Financial Officer and the Chief Accounting Officer.

Concentration of exposure

(audited)

Concentrations of credit risk arise when a number of counterparties or exposures that have comparable economic characteristics, or such counterparties are engaged in similar activities or operate in the same geographical areas or industry sectors. As such that their collective ability to meet contractual obligations is uniformly affected by changes in economic, political or other conditions. We use a number of controls and measures to minimise undue concentration of exposure in our portfolios across industries, countries and global businesses. These include portfolio and counterparty limits, approval and review controls, and stress testing.

Credit quality of financial instruments

(audited)

Our risk rating system facilitates the internal ratings-based approach under the Basel framework adopted by the Group to support the calculation of our minimum credit regulatory capital requirement.

The five credit quality classifications each encompass a range of granular internal credit rating grades assigned to wholesale and retail customers, and the external ratings attributed by external agencies to debt securities.

For debt securities and certain other financial instruments, external ratings have been aligned to the five quality classifications based upon the mapping of related customer risk rating ('CRR') to external credit rating.

Wholesale lending

A CRR 10-grade scale summarises a more granular underlying 23-grade scale of obligor probability of default ('PD'). All corporate customers are rated using the 10- or 23-grade scale, depending on the degree of sophistication of the Basel approach adopted for the exposure.

Each CRR band is associated with an external rating grade by reference to long-run default rates for that grade, represented by the average of issuer-weighted historical default rates. This mapping between internal and external ratings is indicative and may vary over time.

Retail lending

Retail lending credit quality is based on a 12-month probability-weighted PD.

Credit quarity classification

(unaudited)

	Sovereign debt securities and bills	Other debt securities and bills	Wholesale lending		Retail lending	
Credit quality classification[1,2]	External credit rating	External credit rating	Internal credit rating	12-month Basel probability of default %	Internal credit rating	12-month probability-weighted PD %
Strong	BBB and above	A- and above	CRR 1 to CRR 2	0-0.169	Band 1 and 2	0-0.500
Good	BBB- to BB	BBB+ to BBB-	CRR3	0.170-0.740	Band 3	0.501-1.500
Satisfactory	BB- to B and unrated	BB+ to B and unrated	CRR 4 to CRR 5	0.741-4.914	Band 4 and 5	1.501-20.000
Sub-standard	B- to C	B- to C	CRR 6 to CRR 8	4.915-99.999	Band 6	20.001-99.999
Credit-impaired	Default	Default	CRR 9 to CRR 10	100	Band 7	100

1 Customer risk rating ('CRR').

2 12-month point-in-time ('PIT') probability-weighted probability of default ('PD').

(a) Credit Risk

Credit risk management continued

(audited)

Key risk management processes continued

Quality classification definitions:

– Strong exposures demonstrate a strong capacity to meet financial commitments, with negligible or low probability of default and/or low levels of expected loss.

– Good exposures require closer monitoring and demonstrate a good capacity to meet financial commitments, with low default risk.

– Satisfactory exposures require closer monitoring and demonstrate an average-to-fair capacity to meet financial commitments, with moderate default risk.

– Sub-standard exposures require varying degrees of special attention and default risk is of greater concern.

– Credit-impaired exposures have been assessed as described on note 2(j) on the Consolidated Financial Statements.

Forborne loans and forbearance

(audited)

Forbearance measures consist of concessions towards an obligor that is experiencing or is about to experience difficulties in meeting its financial commitments ('financial difficulties').

Up until the end of 2021, the Group classed loans as forborne when we modified the contractual payment terms where we had significant concerns about the borrowers' ability to meet contractual payments when falling due.

In 2022, our definition of forborne has been expanded to capture non-payment related concessions (e.g. covenant waivers).

The comparative disclosures have been presented under the prior definition of forborne for the wholesale and retail portfolios.

For details of our policy on derecognised renegotiated loans, see note 2(j) on the Consolidated Financial Statements.

Credit quality of renegotiated loans

(unaudited)

On execution of a renegotiation, the loan will also be classified as credit-impaired if it is not already so classified. In wholesale lending, all facilities with a customer, including loans that have not been modified, are considered credit-impaired following the identification of a renegotiated loan under our existing disclosures.

Wholesale and retail lending forborne loans are classified as credit-impaired until there is sufficient evidence to demonstrate a significant reduction in the risk of non-payment of future cash flows, observed over a minimum one-year period, and there are no other indicators of impairment. Any forborne loans not considered credit-impaired will remain forborne for a minimum of two years from the date that credit impairment no longer applies.

Forborne loans and recognition of expected credit losses

(audited)

Forborne loans expected credit loss assessments reflect the higher rates of losses typically experienced with these types of loans such that they are in stage 2 and stage 3. The higher rates are more pronounced in unsecured retail lending requiring further segmentation. For wholesale lending, forborne loans are typically assessed individually. Credit risk ratings are intrinsic to the impairment assessments. The individual impairment assessment takes into account the higher risk of the future non-payment inherent in forborne loans.

Impairment assessment

(audited)

For details of our impairment policies on loans and advances and financial investments, see note 2(j) on the Consolidated Financial Statements.

Write-off of loans and advances

(audited)

For details of our policy on the write-off of loans and advances, see note 2(j) on the Consolidated Financial Statements.

Unsecured personal facilities, including credit cards, are generally written off at 180 days contractually delinquent. Write-off periods may be earlier, e.g. bankruptcy.

For secured personal facilities, write-off should occur upon repossession of collateral, receipt of proceeds via settlement, or determination that recovery of the collateral will not be pursued. In circumstances where the net realisable value of any collateral has been determined and there is no reasonable expectation of further recovery, write off may be earlier.

(a) Credit Risk

Credit risk management continued

(audited)

Key risk management processes continued

Write-off of loans and advances continued

(audited)

Any secured assets maintained on the balance sheet beyond 60 months of consecutive delinquency-driven default require additional monitoring and review to assess the prospect of recovery.

The write-off of wholesale facilities is conducted when all recovery actions (including legal proceedings) have been exhausted with remote chance of further recovery. Write-off, either partially or in full, may be earlier when there is no reasonable expectation of further recovery, for example, in the event of a bankruptcy or equivalent legal proceedings. Collection procedures may continue after write-off.

Summary of credit risk

(audited)

The following tables analyse the financial instruments to which the impairment requirements of HKFRS 9 are applied and the related allowance for ECL.

Summary of financial instruments to which the impairment requirements in HKFRS 9 are applied

	At 31 December 2022		At 31 December 2021	
	Gross carrying/ nominal amount	Allowance for ECL[1]	Gross carrying/ nominal amount	Allowance for ECL[1]
Loans and advances to customers at amortised cost:	944,728	(13,394)	1,004,325	(6,928)
Placings with and advances to banks at amortised cost	62,329	(3)	72,494	(1)
Other financial assets measured at amortised costs:	358,894	(127)	214,623	(167)
– cash and balances at central banks	17,612	(3)	16,896	–
– reverse repurchase agreements – non-trading	42,364	–	18,821	–
– financial investments	261,719	(94)	141,380	(153)
– other assets[2]	37,199	(30)	37,526	(14)
Total gross carrying amount on balance sheet	1,365,951	(13,524)	1,291,442	(7,096)
Loans and other credit related commitments	357,265	(169)	365,054	(162)
Financial guarantee and similar contracts	1,727	(2)	2,431	(3)
Total nominal amount off balance sheet[3]	358,992	(171)	367,485	(165)
Total	1,724,943	(13,695)	1,658,927	(7,261)
	Fair value	Memorandum Allowance for ECL	Fair value	Memorandum Allowance for ECL
Debt instruments measured at Fair Value through Other Comprehensive Income ('FVOCI')[4]	356,058	(6)	353,892	(9)

1 For retail unsecured revolving facilities, e.g. overdrafts and credit cards, the total ECL is recognised against the financial asset unless the total ECL exceeds the gross carrying amount of the financial asset, in which case the ECL is recognised against the loan commitments.

2 Includes only those financial instruments which are subject to the impairment requirements of HKFRS 9. 'Other assets' as presented within the Consolidated Balance Sheet includes both financial and non-financial assets.

3 The figure does not include some loan commitments and financial guarantee contracts not subject to impairment requirements under HKFRS 9. As such, the amount does not agree with the figure shown in note 45 of the Consolidated Financial Statements, which represents the maximum amount at risk should the contracts be fully drawn upon and clients default.

4 Debt instruments measured at FVOCI continue to be measured at fair value with the allowance for ECL as a memorandum item. Change in ECL is recognised in 'Change in expected credit losses and other credit impairment charges' in Consolidated Income Statement.

(a) Credit Risk

The following table provides an overview of the Group's credit risk by stage and the associated ECL coverage. The financial assets recorded in each stage have the following characteristics:

Stage 1: These financial assets are unimpaired and without significant increase in credit risk on which a 12-month allowance for ECL is recognised.

Stage 2: A significant increase in credit risk has been experienced on these financial assets since initial recognition for which a lifetime ECL is recognised.

Stage 3: There is objective evidence of impairment and the financial assets are therefore considered to be in default or otherwise credit-impaired on which a lifetime ECL is recognised.

POCI: Financial assets that are purchased or originated at a deep discount are seen to reflect the incurred credit losses on which a lifetime ECL is recognised.

Summary of credit risk (excluding debt instruments measured at FVOCI) by stage distribution and ECL coverage

(audited)

	Gross carrying/nominal amount[1]					Allowance for ECL					ECL coverage %				
	Stage 1	Stage 2	Stage 3	POCI[2]	Total	Stage 1	Stage 2	Stage 3	POCI	Total	Stage 1	Stage 2	Stage 3	POCI	Total
Loans and advances to customers at amortised cost:	759,642	160,874	23,911	301	944,728	(755)	(4,818)	(7,802)	(19)	(13,394)	0.10%	2.99%	32.63%	6.31%	1.42%
– personal	365,249	16,568	923	–	382,740	(203)	(1,029)	(141)	–	(1,373)	0.06%	6.21%	15.28%	N/A	0.36%
– corporate and commercial	362,629	142,378	22,988	301	528,296	(420)	(3,785)	(7,661)	(19)	(11,885)	0.12%	2.66%	33.33%	6.31%	2.25%
– non-bank financial institutions	31,764	1,928	–	–	33,692	(132)	(4)	–	–	(136)	0.42%	0.21%	N/A	N/A	0.40%
Placings with and advances to banks at amortised cost	62,135	194	–	–	62,329	(2)	(1)	–	–	(3)	0.00%	0.52%	N/A	N/A	0.00%
Other financial assets measured at amortised cost	353,919	4,975	–	–	358,894	(98)	(29)	–	–	(127)	0.03%	0.58%	N/A	N/A	0.04%
Loans and other credit-related commitments:	339,402	17,835	28	–	357,265	(70)	(99)	–	–	(169)	0.02%	0.56%	0.00%	N/A	0.05%
– personal	239,954	7,260	5	–	247,219	(4)	–	–	–	(4)	0.00%	0.00%	0.00%	N/A	0.00%
– corporate and commercial	86,843	10,071	23	–	96,937	(63)	(99)	–	–	(162)	0.07%	0.98%	0.00%	N/A	0.17%
– non-bank financial institutions	12,605	504	–	–	13,109	(3)	–	–	–	(3)	0.02%	0.00%	N/A	N/A	0.02%
Financial guarantee and similar contracts:	1,029	694	4	–	1,727	–	(2)	–	–	(2)	0.00%	0.29%	0.00%	N/A	0.12%
– personal	2	5	–	–	7	–	–	–	–	–	0.00%	0.00%	N/A	N/A	0.00%
– corporate and commercial	637	689	4	–	1,330	–	(2)	–	–	(2)	0.00%	0.29%	0.00%	N/A	0.15%
– non-bank financial institutions	390	–	–	–	390	–	–	–	–	–	0.00%	N/A	N/A	N/A	0.00%
At 31 December 2022	1,516,127	184,572	23,943	301	1,724,943	(925)	(4,949)	(7,802)	(19)	(13,695)	0.06%	2.68%	32.59%	6.31%	0.79%

1 Represents the maximum amount at risk should the contracts be fully drawn upon and clients default.

2 Purchased or originated credit-impaired ('POCI').

Unless identified at an earlier stage, all financial assets are deemed to have suffered a significant increase in credit risk when they are 30 days past due ('DPD') and are transferred from stage 1 to stage 2. The disclosure below presents the aging of stage 2 loans and advances to customers by those less than 30 and greater than 30 days past due and therefore presents those amounts classified as stage 2 due to aging (30 days past due) and those identified at an earlier stage (less than 30 days past due).

(a) Credit Risk

Summary of credit risk (excluding debt instruments measured at FVOCI) by stage distribution and ECL coverage continued

(audited)

Stage 2 days past due analysis for loans and advances to customers

	At 31 December 2022											
	Gross carrying amount				Allowance for ECL				ECL coverage %			
	Stage 2	Of which: Up-to-date	Of which: 1 to 29 DPD[1]	Of which: 30 and > DPD	Stage 2	Of which: Up-to-date	Of which: 1 to 29 DPD	Of which: 30 and > DPD	Stage 2	Of which: Up-to-date	Of which: 1 to 29 DPD	Of which: 30 and > DPD
Loans and advances to customers at amortised cost												
– personal	**16,568**	**14,210**	**1,614**	**744**	**(1,029)**	**(887)**	**(62)**	**(80)**	**6.21%**	**6.24%**	**3.84%**	**10.75%**
– corporate and commercial	**142,378**	**142,029**	**195**	**154**	**(3,785)**	**(3,774)**	**(10)**	**(1)**	**2.66%**	**2.66%**	**5.13%**	**0.65%**
– non-bank financial institutions	**1,928**	**1,928**	**–**	**–**	**(4)**	**(4)**	**–**	**–**	**0.21%**	**0.21%**	**N/A**	**N/A**
	160,874	**158,167**	**1,809**	**898**	**(4,818)**	**(4,665)**	**(72)**	**(81)**	**2.99%**	**2.95%**	**3.98%**	**9.02%**

1 Days past due ('DPD').

(restated)[1]

	Gross carrying/nominal amount[2]					Allowance for ECL					ECL coverage %				
	Stage 1	Stage 2	Stage 3	POCI[3]	Total	Stage 1	Stage 2	Stage 3	POCI	Total	Stage 1	Stage 2	Stage 3	POCI	Total
Loans and advances to customers at amortised cost:	852,149	141,747	9,457	972	1,004,325	(762)	(3,466)	(2,700)	–	(6,928)	0.09%	2.45%	28.55%	0.00%	0.69%
– personal	358,508	15,358	858	–	374,724	(291)	(833)	(157)	–	(1,281)	0.08%	5.42%	18.30%	N/A	0.34%
– corporate and commercial	463,676	124,606	8,495	972	597,749	(350)	(2,621)	(2,515)	–	(5,486)	0.08%	2.10%	29.61%	0.00%	0.92%
– non-bank financial institutions	29,965	1,783	104	–	31,852	(121)	(12)	(28)	–	(161)	0.40%	0.67%	26.92%	N/A	0.51%
Placings with and advances to banks at amortised cost	72,311	183	–	–	72,494	(1)	–	–	–	(1)	0.00%	0.00%	N/A	N/A	0.00%
Other financial assets measured at amortised cost	210,364	4,259	–	–	214,623	(99)	(68)	–	–	(167)	0.05%	1.60%	N/A	N/A	0.08%
Loans and other credit-related commitments:	357,016	8,038	–	–	365,054	(57)	(105)	–	–	(162)	0.02%	1.31%	N/A	N/A	0.04%
– personal	243,639	–	–	–	243,639	–	–	–	–	–	0.00%	N/A	N/A	N/A	0.00%
– corporate and commercial	98,530	7,035	–	–	105,565	(53)	(105)	–	–	(158)	0.05%	1.49%	N/A	N/A	0.15%
– non-bank financial institutions	14,847	1,003	–	–	15,850	(4)	–	–	–	(4)	0.03%	0.00%	N/A	N/A	0.03%
Financial guarantee and similar contracts:	2,283	148	–	–	2,431	(2)	(1)	–	–	(3)	0.09%	0.68%	N/A	N/A	0.12%
– personal	8	–	–	–	8	–	–	–	–	–	0.00%	N/A	N/A	N/A	0.00%
– corporate and commercial	1,885	148	–	–	2,033	(2)	(1)	–	–	(3)	0.11%	0.68%	N/A	N/A	0.15%
– non-bank financial institutions	390	–	–	–	390	–	–	–	–	–	0.00%	N/A	N/A	N/A	0.00%
At 31 December 2021	1,494,123	154,375	9,457	972	1,658,927	(921)	(3,640)	(2,700)	–	(7,261)	0.06%	2.36%	28.55%	0.00%	0.44%

1 Comparative figures for Loans and advances to customers have been restated to update the counterparty classification for certain facilities from corporate and commerical to non-bank financial institutions.

2 Represents the maximum amount at risk should the contracts be fully drawn upon and clients default.

3 Purchased or originated credit-impaired ('POCI').

(a) Credit Risk

Summary of credit risk (excluding debt instruments measured at FVOCI) by stage distribution and ECL coverage continued

(audited)

Unless identified at an earlier stage, all financial assets are deemed to have suffered a significant increase in credit risk when they are 30 days past due ('DPD') and are transferred from stage 1 to stage 2. The disclosure below presents the aging of stage 2 loans and advances to customers by those less than 30 and greater than 30 days past due and therefore presents those amounts classified as stage 2 due to aging (30 days past due) and those identified at an earlier stage (less than 30 days past due).

Stage 2 days past due analysis for loans and advances to customers

	At 31 December 2021											
	Gross carrying amount				Allowance for ECL				ECL coverage %			
	Stage 2	Of which: Up-to-date	Of which: 1 to 29 DPD[1]	Of which: 30 and > DPD	Stage 2	Of which: Up-to-date	Of which: 1 to 29 DPD	Of which: 30 and > DPD	Stage 2	Of which: Up-to-date	Of which: 1 to 29 DPD	Of which: 30 and > DPD
Loans and advances to customers at amortised cost												
– personal	15,358	13,430	1,391	537	(833)	(711)	(54)	(68)	5.42%	5.29%	3.88%	12.66%
– corporate and commercial	124,606	124,358	243	5	(2,621)	(2,618)	(3)	–	2.10%	2.11%	1.23%	0.00%
– non-bank financial institutions	1,783	1,783	–	–	(12)	(12)	–	–	0.67%	0.67%	N/A	N/A
	141,747	139,571	1,634	542	(3,466)	(3,341)	(57)	(68)	2.45%	2.39%	3.49%	12.55%

1 Days past due ('DPD').

(i) Maximum exposure to credit risk before collateral held or other credit enhancements

(audited)

Our credit exposure is spread across a broad range of asset classes, including derivatives, trading assets, loans and advances to customers, loans and advances to banks and financial investments.

The following table presents the maximum exposure to credit risk from balance sheet and off-balance sheet financial instruments, before taking account of any collateral held or other credit enhancements (unless such credit enhancements meet accounting offsetting requirements). For financial assets recognised on the balance sheet, the maximum exposure to credit risk equals their carrying amount; for financial guarantees and similar contracts granted, it is the maximum amount that we would have to pay if the guarantees were called upon. For loan commitments and other credit-related commitments, it is generally the full amount of the committed facilities.

	2022	2021 (restated)
Cash and balances at central banks	**17,609**	16,896
Trading assets	**47,330**	47,392
Derivative financial instruments	**22,761**	13,224
Financial assets designated and otherwise mandatorily measured at fair value through profit or loss	**866**	1,041
Reverse repurchase agreements – non-trading	**42,364**	18,821
Placings with and advances to banks	**62,326**	72,493
Loans and advances to customers	**931,334**	997,397
Financial investments	**617,683**	495,119
Other assets	**37,386**	37,533
Financial guarantees and other credit related contingent liabilities[1]	**24,943**	28,870
Loan commitments and other credit related commitments[2]	**518,838**	514,920
	2,323,440	2,243,706

1 Performance and other guarantees were included.

2 Comparative figures for Loan commitments and other credit related commitments have been restated to exclude pre-approval loan programmes.

(a) Credit Risk

(ii) Measurement uncertainty and sensitivity analysis of ECL estimates

(audited)

Amid a deterioration in the economic and geopolitical environment, management judgements and estimates continued to be subject to a high degree of uncertainty in relation to assessing economic scenarios for impairment allowances in 2022.

Economic contraction and high interest rates combined with an unstable geopolitical environment and the effects of global supply chain disruption contributed to elevated levels of uncertainty during the year.

At 31 December 2022, as a result of this uncertainty, additional stage 1 and 2 allowances have been recorded while management judgement and estimates continue to reflect a degree of caution both in selection of economic scenarios and their weightings, and in the use of management judgemental adjustments, described in more detail below.

The recognition and measurement of ECL involves the use of significant judgement and estimation. We form multiple economic scenarios based on economic forecasts, apply these assumptions to credit risk models to estimate future credit losses, and probability-weight the results to determine an unbiased ECL estimate. Management judgmental adjustments are used to address late-breaking events, data and model limitations, and expert credit judgements.

Methodology

Four economic scenarios are used to capture the current economic environment and to articulate management's view of the range of potential outcomes. Scenarios produced to calculate ECL are aligned to the Group's Emerging Risks.

Three of the scenarios are drawn from consensus forecasts and distributional estimates. The central scenarios is deemed the 'most likely' scenario, and usually attracts the largest probability weighting, while the outer scenarios represent the tails of the distribution which are less likely to occur. The central scenario is created using the average of a panel of external forecasters. Consensus upside and downside scenarios are created with reference to distributions for select markets that capture forecasters' views of the entire range of outcomes.

In the later years of the scenarios, projections revert to long-term consensus trend expectations. In the consensus outer scenarios, reversion to trend expectations is done mechanically with reference to historically observed quarterly changes in the values of macroeconomic variables.

The fourth scenario, Downside 2, is designed to represent Management's view of severe downside risks. It is a globally consistent, narrative driven, scenario that explores more extreme economic outcomes than those captured by the consensus scenarios. In this scenario, variables do not, by design, revert to long-term trend expectations. They may instead explore alternative states of equilibrium, where economic activity moves permanently away from past trends.

The consensus Downside and the consensus Upside scenarios are each constructed to be consistent with a 20% probability. The Downside 2 is constructed with a 5% probability. The Central Scenario is assigned the remaining 55%. This weighting scheme is deemed appropriate for the unbiased estimation of ECL in light of uncertainties.

Description of Consensus Economic Scenarios

The economic assumptions presented in this section have been formed internally with reference to external forecasts and estimates, specifically for the purpose of calculating ECL.

Economic growth is slow in 2022 and economic forecasts in our key markets deteriorated in the fourth quarter. The effects of higher interest rate expectations and lower growth are also evident in asset price expectations and house prices forecasts, in particular, have been lowered significantly.

In Asia, economic forecasts have also been lowered, with expectations for Hong Kong and mainland China trimmed following weaker than expected Q3 GDP growth and mainland China's adherence to stringent pandemic-related public health policy response. That policy saw an abrupt reversal during December, but amid uncertainty, to both the upside and downside, forecasts are slow to adjust. The uncertainty over the lifting restrictions has been reflected in management's assessment of scenario probabilities.

Economic forecasts remain subject to a high degree of uncertainty. In Q4, risks to the economic outlook included the persistence of inflation and the consequences that has for monetary policy. Rapid changes to public policy also increased forecast uncertainty.

(a) Credit Risk

(ii) Measurement uncertainty and sensitivity analysis of ECL estimates continued

(audited)

Methodology continued

Description of Consensus Economic Scenarios continued

Geopolitical risks also remain significant and include the possibility of a prolonged and escalating Russia-Ukraine war, continued differences between the US and other countries with China over a range of economic and strategic issues.

The scenarios used to calculate ECL in the Annual Report 2022 are described below.

The consensus Central scenario

The Central scenario features a recovery in economic growth after 2022 slowdown as activity and employment gradually return to the levels reached prior to the outbreak of COVID-19.

In Hong Kong and mainland China, GDP growth is expected to be stronger in 2023 relative to 2022 following several quarters of negative GDP growth and the suspension of COVID-19 restrictions. Hong Kong GDP is expected to grow by 2.7% over the five-year forecast period in the Central scenario from 2023. This is above the average growth rate over the five-year period prior to the onset of the pandemic.

The key features of our Central scenario are:

- Economic activity continues its recovery, growing at a moderate rate after 2022.
- Unemployment in mainland China has recovered to pre-pandemic levels. In Hong Kong, unemployment declines to levels only slightly higher than existed pre-pandemic.
- COVID-19 related fiscal spending recedes in 2022 as fewer restrictions on activity allow fiscal support to be withdrawn. Deficits remain high in key markets as they embark on multi-year investment programmes to support recovery, productivity growth and climate transition.
- Policy interest rates in key markets will continue to rise in the near term but at a slower pace. It is expected interest rates will stay elevated.

The Central scenario was first created with forecasts available in November, and reviewed continuously until late December.

The following table describes key macroeconomic variables and the probabilities assigned in the consensus Central scenario.

Central scenario

	Hong Kong %	Mainland China %
GDP growth rate		
2023: Annual average growth rate	2.7	4.6
2024: Annual average growth rate	3.0	4.8
2025: Annual average growth rate	2.7	4.7
5 years average (2023 – 2027)	2.7	4.6
Unemployment rate		
2023: Annual average growth rate	3.7	5.2
2024: Annual average growth rate	3.5	5.1
2025: Annual average growth rate	3.4	5.0
5 years average (2023 – 2027)	3.4	5.0
House price growth		
2023: Annual average growth rate	(10.0)	(0.1)
2024: Annual average growth rate	(3.0)	2.9
2025: Annual average growth rate	1.7	3.5
5 years average (2023 – 2027)	(1.0)	2.9
Probability	55	55

The consensus Upside scenario

Compared with the consensus Central scenario, the consensus Upside scenario features stronger economic activity in the near term, before converging to long-run trend expectations.

The scenario is consistent with a number of key upside risk themes. These include faster resolution of supply chain issues; a rapid conclusion to the Russia-Ukraine war; de-escalation of tensions between the US and China; and relaxation of COVID-19 policies in Asia.

The following table describes key macroeconomic variables and the probabilities assigned in the consensus Upside scenario.

Consensus Upside scenario best outcome

	Hong Kong %	Mainland China %
GDP growth rate	9.0 (3Q23)	10.3 (2Q23)
Unemployment rate	3.0 (4Q23)	4.7 (3Q24)
House price growth	1.4 (4Q24)	6.9 (4Q24)
Probability	20	20

Note: Extreme point in the consensus Upside is 'best outcome' in the scenario, for example the highest GDP growth and the lowest unemployment rate etc, in the first two years of the scenario.

(a) Credit Risk

(ii) Measurement uncertainty and sensitivity analysis of ECL estimates continued

(audited)

Downside scenarios

Downside scenarios explore the intensification and crystallisation of a number of key economic and financial risks.

There also remains a risk that energy and food prices rise further due to the Russia-Ukraine war, exacerbating global inflation and further pressuring household budgets and firm costs.

The risks relating to COVID-19 are centred on the emergence of a new variant with greater vaccine resistance that necessitates the imposition of stringent public health policies. In Asia, despite the re-opening of China in December, management of COVID-19 remains a key source of uncertainty, with the rapid spread of the virus posing a heightened risk of a new variant emerging.

The geopolitical environment also present risks, including:

- a prolonged Russia-Ukraine war with escalation beyond Ukraine's borders;
- continued long-term differences between the US and other countries with China, which could affect sentiment and restrict global economic activity.

The consensus Downside scenario

In the consensus Downside scenario, the economic recovery is considerably weaker compared with the Central scenario. GDP growth is expected to be lower, unemployment rates rise moderately and asset and commodity prices fall before gradually recovering towards their long-run trend expectations. The scenario is consistent with the key downside risks articulated above.

In the consensus Downside scenario, economic activity is considerably weaker compared with the Central scenario. In this scenario, GDP growth weakens below the Central scenario, unemployment rates rise and asset prices fall.

The following table describes key macroeconomic variables and the probabilities assigned in the consensus Downside scenario.

Consensus Downside scenario worst outcome

	Hong Kong %	Mainland China %
GDP growth rate	(2.2) (4Q23)	(1.2) (4Q23)
Unemployment rate	5.2 (3Q24)	5.9 (4Q23)
House price growth	(14.9) (2Q23)	(1.9) (1Q23)
Probability	20	20

Note: Extreme point in the consensus Downside is 'worst outcome' in the scenario, for example the lowest GDP growth and the highest unemployment rate etc, in the first two years of the scenario.

Downside 2 scenario

The Downside 2 scenario features a deep global recession and reflects management's view of the tail of the economic distribution. It incorporates the crystallisation of a number of risks simultaneously, including further escalation of the Russia-Ukraine war, worsening of supply chain disruptions and the emergence of a vaccine-resistant COVID-19 variant that necessitates a stringent public health policy response globally.

This scenario features an initial supply-side shock that pushes interest rates higher. This impulse is expected to prove short lived as a large downside demand pressures causes commodity prices to correct sharply and global price inflation to fall as a severe and prolonged recession takes hold.

The following table describes key macroeconomic variables and the probabilities assigned in the Downside 2 scenario.

Downside 2 scenario worst outcome

	Hong Kong %	Mainland China %
GDP growth rate	(9.2) (4Q23)	(6.9) (4Q23)
Unemployment rate	5.8 (1Q24)	6.8 (4Q24)
House price growth	(18.2) (1Q24)	(18.5) (4Q23)
Probability	5	5

Note: Extreme point in the Downside 2 is 'worst outcome' in the scenario, for example the lowest GDP growth and the highest unemployment rate, in the first two years of the scenario.

(a) Credit Risk

(ii) Measurement uncertainty and sensitivity analysis of ECL estimates continued

(audited)

Scenario weighting

In reviewing the economic conjuncture, the level of uncertainty and risks, management has considered both global and market-specific factors. This has led management to assign scenario probabilities that are tailored to its view of uncertainty in individual markets.

At the balance sheet date, key consideration around uncertainty attached to the Central scenario projections focused on:

- the progression of the COVID-19 pandemic in Asian countries and announcement of removal of COVID-19 measures and travel restrictions in mainland China and Hong Kong;
- further tightening of monetary policy and impact on borrowing costs in interest rate sensitive sectors, such as housing; and
- The ongoing risks to global supply chains.

In mainland China and Hong Kong, there has been recent announcement of relaxation of COVID-19 measures and travel restrictions. It was management's view that easing of policy could increase chance to the upside in form of increased spending and travel. This led management to assign a combined weighting of 75% to the consensus Upside and Central scenarios in both markets.

Critical accounting estimates and judgements

The calculation of ECL under HKFRS 9 involves significant judgements, assumptions and estimates. The level of estimation uncertainty and judgement has remained elevated since 31 December 2021, including significant judgements relating to:

- the selection and weighting of economic scenarios, given rapidly changing economic conditions and a wide distribution of economic forecasts. There is judgement in making assumptions about the effects of interest, global growth, supply chain disruption;
- estimating the economic effects of those scenarios on ECL, particularly as the historical relationship between macroeconomic variables and defaults might not reflect the dynamics of current macroeconomic conditions; and
- determining the management judgmental adjustments for high-risk and vulnerable sectors, including the higher risk China commercial real estate exposures. The identification of higher risk customers and the estimation of the parameters such as default rate and loss severity involve significant uncertainty.

How economic scenarios are reflected in the calculation of ECL calculation

Models are used to reflect economic scenarios on ECL estimates. As described above, modelled assumptions and linkages based on historical information could not alone produce relevant information under the conditions experienced in 2022, and management judgemental adjustments were still required to support modelled outcomes.

The HSBC Group has developed a globally consistent methodology for the application of forward economic guidance into the calculation of ECL for wholesale and retail credit risk. The Group has continued to follow the HSBC Group methodology. These standard approaches are described below, followed by the management judgemental adjustments made, including those to reflect the circumstances experienced in 2022.

For our wholesale portfolios, we estimate the term structure of probability of default ('PD') and loss given default ('LGD'). For PDs, we consider the correlation of forward economic guidance to default rates for a particular industry in a market. For LGD calculations we consider the correlation of forward economic guidance to collateral values and realization rates for a particular market and industry. PDs and LGDs are estimated for the entire term structure of each instrument.

For impaired loans, LGD estimates take into account independent recovery valuations provided by external consultants where available, or internal forecasts corresponding to anticipated economic conditions and individual company conditions. In estimating the ECL on impaired loans that are individually considered not to be significant, we incorporate forward economic guidance proportionate to the probability-weighted outcome and the Central scenario outcome for non-stage 3 populations.

(a) Credit Risk

(ii) Measurement uncertainty and sensitivity analysis of ECL estimates continued

(audited)

How economic scenarios are reflected in the calculation of ECL calculation continued

For retail, the impact of economic scenarios on PD is modelled at a portfolio level. Historical relationships between observed default rates and macroeconomic variables are integrated into HKFRS 9 ECL estimates by using economic response models. The impact of these scenarios on PD is modelled over a period equal to the remaining maturity of the underlying asset or assets. The impact on LGD is modelled for mortgage portfolios by forecasting future loan-to-value ('LTV') profiles for the remaining maturity of the asset by using market level forecasts of the house price index and applying the corresponding LGD expectation.

These models are based largely on historical observations and correlations with default rates. Management judgemental adjustments are described below.

Management judgemental adjustments

In the context of HKFRS 9, management judgemental adjustments are short-term increases or decreases to the ECL at either a customer, segment or portfolio level to account for late breaking events, model and data limitations and deficiencies, and expert credit judgement applied following management review and challenge.

This includes refining model inputs and outputs and using adjustments to ECL based on management judgement and higher level quantitative analysis for impacts that are difficult to model.

The effect of management judgmental adjustments are considered for balances and ECL when determining whether or not a significant increase in credit risk has occurred and are attributed or allocated to a stage as appropriate. This is in accordance with the internal adjustments framework.

Management judgmental adjustments are reviewed under the governance process for HKFRS 9 (as detailed in the section Credit risk management). Review and challenge focus on the rationale and quantum of the adjustments with further review by the second line of defence where significant. For some management judgemental adjustments, internal frameworks establish the conditions under which these adjustments should no longer be required and as such are considered as part of the governance process. This internal governance process allows management judgemental adjustments to be reviewed regularly and, where possible, to reduce the reliance on these through model recalibration or redevelopment, as appropriate.

At 31 December 2022, management judgement adjustments reduced by HK$517m compared with 31 December 2021.

Management judgemental adjustments made in estimating the scenario-weighted reported ECL at 31 December 2022 are set out in the following table.

Management judgemental adjustments to ECL[1]:

	Retail	Wholesale	Total
(HK$m)	31 December 2022		
Low risk counterparties (banks, sovereigns and government entities)	–	(36)	(36)
Corporate lending adjustments	–	1,464	1,464
Macroeconomic-related adjustments	141	–	141
Pandemic-related economic recovery adjustments	–	–	–
Other lending adjustments	3	44	47
Total	144	1,472	1,616

(a) Credit Risk

(ii) Measurement uncertainty and sensitivity analysis of ECL estimates continued

(audited)

Management judgemental adjustments continued

Management judgemental adjustments to ECL[1]: continued

	Retail	Wholesale	Total
(HK$m)		31 December 2021	
Low risk counterparties (banks, sovereigns and government entities)	–	85	85
Corporate lending adjustments	–	2,082	2,082
Macroeconomic-related adjustments	(259)	–	(259)
Pandemic-related economic recovery adjustments	193	–	193
Other lending adjustments	3	29	32
Total	(63)	2,196	2,133

1 Management judgemental adjustments presented in the table reflect Increases or (Decreases) to ECL, respectively.

At 31 December 2022, wholesale management judgemental adjustments to ECL reduced to HK$1,472m, as a result mainly from the decrease in Corporate lending adjustments by HK$618m. These principally reflected the outcome of management judgements for high-risk and vulnerable sectors in our key markets, supported by credit experts' input, portfolio risk metrics, quantitative analyses and benchmarks. Considerations include risk of individual exposures under different macroeconomic scenarios and sub-sector analyses. The largest adjustment in ECL was observed in the real estate sector, including material adjustments to reflect the uncertainty of the higher-risk Chinese commercial real estate exposures.

For the retail portfolio, management judgemental adjustments mainly relate to macroeconomic conditions and customer support programmes with an ECL overlay of HK$144m as of 31 December 2022. Macroeconomic related adjustments ECL and other retail lending adjustments ECL recorded HK$141m and HK$3m respectively. These were primarily to address areas such as, management view on high debt burden and customer relief.

Economic scenarios sensitivity analysis of ECL estimates

Management considered the sensitivity of the ECL outcome against the economic forecasts as part of the ECL governance process by recalculating the ECL under each scenario described above for selected portfolios, applying a 100% weighting to each scenario in turn. The weighting is reflected in both the determination of a significant increase in credit risk and the measurement of the resulting ECL for loans at the balance sheet date.

The ECL calculated for the Upside and Downside scenarios should not be taken to represent the lower and upper limits of possible ECL outcomes. The impact of defaults that might occur in the future under different economic scenarios is captured by recalculating ECL for loans at the balance sheet date.

There is a particularly high degree of estimation uncertainty in numbers representing more severe risk scenarios when assigned a 100% weighting.

For wholesale credit risk exposures, the sensitivity analysis excludes ECL and financial instruments related to defaulted obligors because the measurement of ECL is relatively more sensitive to credit factors specific to the obligor than future economic scenarios. Therefore, it is impracticable to separate the effect of macroeconomic factors in individual assessments. When compared with the performing portfolio, the defaulted obligors represent a significantly smaller portion of the wholesale exposures, even if accounting for the larger portion of the allowance for ECL.

For retail credit risk exposures, the sensitivity analysis includes ECL for loans and advances to customers related to defaulted obligors.

(a) Credit Risk

(ii) Measurement uncertainty and sensitivity analysis of ECL estimates continued

(audited)

Wholesale and retail sensitivity

The wholesale and retail sensitivity analysis is stated inclusive of management judgemental adjustments, as appropriate to each scenario. The results tables exclude portfolios held by the insurance business and small portfolios and as such cannot be directly compared to personal and wholesale lending presented in other credit risk tables. Additionally in both the wholesale and retail analysis, the comparative period results for additional and alternative Downside scenarios are not directly comparable to the current period, because they reflect different risk profiles relative with the Consensus scenarios for the year end.

Wholesale analysis

HKFRS 9 ECL sensitivity to future economic conditions[1,3]

	Hong Kong	**Mainland China**
ECL of financial instruments subject to significant measurement uncertainty[2]	**31 December 2022**	
Reported ECL	**3,753**	**776**
Consensus scenarios		
Central scenario	**3,447**	**661**
Upside scenario	**2,515**	**421**
Downside scenario	**5,410**	**1,054**
Downside 2 scenario	**8,883**	**3,258**

HKFRS 9 ECL sensitivity to future economic conditions[1,3]

	Hong Kong	Mainland China
ECL of financial instruments subject to significant measurement uncertainty[2]	31 December 2021	
Reported ECL	2,921	370
Consensus scenarios		
Central scenario	2,550	288
Upside scenario	1,769	96
Downside scenario	4,048	508
Downside 2 scenario	7,947	2,234

1 Excludes ECL and financial instruments relating to defaulted obligors because the measurement of ECL is relatively more sensitive to credit factors specific to the obligor than future economic scenarios.

2 Includes off-balance sheet financial instruments that are subject to significant measurement uncertainty.

3 ECL sensitivity is calculated by applying a 100% weighting to each scenario described above, and then applying judgemental overlays where determined appropriate.

(a) Credit Risk

(ii) Measurement uncertainty and sensitivity analysis of ECL estimates continued

(audited)

Wholesale and retail sensitivity continued

Retail analysis

HKFRS 9 ECL sensitivity to future economic conditions[1]

	Hong Kong	**Mainland China**
ECL of loans and advances to customers[2]	**31 December 2022**	
Reported ECL	**1,284**	**23**
Consensus scenarios		
Central scenario	**1,112**	**22**
Upside scenario	**863**	**21**
Downside scenario	**1,987**	**23**
Downside 2 scenario	**3,211**	**44**

HKFRS 9 ECL sensitivity to future economic conditions[1]

	Hong Kong	Mainland China
ECL of loans and advances to customers[2]	31 December 2021	
Reported ECL	1,219	24
Consensus scenarios		
Central scenario	1,138	23
Upside scenario	918	22
Downside scenario	1,352	24
Downside 2 scenario	2,047	49

1 ECL sensitivities exclude portfolios using less complex modelling approaches.

2 ECL sensitivity includes only on-balance sheet financial instruments to which HKFRS 9 impairment requirements are applied.

(a) Credit Risk

(iii) Reconciliation of changes in gross carrying/nominal amount and allowances for placings with and advances to banks and loans and advances to customers

The following disclosure provides a reconciliation by stage of the Group's gross carrying/nominal amount and allowances for placings with and advances to banks and loans and advances to customers, including loan commitments and financial guarantees. Movements are calculated on a year-to-date basis and therefore reflect the opening and closing position of the financial instruments.

The transfers of financial instruments represents the impact of stage transfers upon the gross carrying/nominal amount and associated allowance for ECL.

The net remeasurement of ECL arising from stage transfers represents the increase or decrease due to these transfers, for example, moving from a 12-month (stage 1) to a lifetime (stage 2) ECL measurement basis. Net remeasurement excludes the underlying CRR/PD movements of the financial instruments transferring stage. This is captured, along with other credit quality movements in the 'changes in risk parameters - credit quality' line item.

Changes in 'New financial assets originated and purchased', 'assets derecognised (including final repayments)' and 'changes to risk parameters – further lending/repayments' represent the impact from volume movements within the Group's lending portfolio.

Reconciliation of changes in gross carrying/nominal amount and allowances for placings with and advances to banks and loans and advances to customers, including loan commitments and financial guarantees[2]

(audited)

	Non-credit-impaired				Credit-impaired				Total	
	Stage 1		Stage 2		Stage 3		POCI[1]			
	Gross carrying/ nominal amount	Allowance for ECL	Gross carrying/ nominal amount	Allowance for ECL	Gross carrying/ nominal amount	Allowance for ECL	Gross carrying/ nominal amount	Allowance for ECL	Gross carrying/ nominal amount	Allowance for ECL
At 1 January 2022	1,283,759	(822)	150,116	(3,572)	9,457	(2,700)	972	–	1,444,304	(7,094)
Transfers of financial instruments:										
– transfers from Stage 1 to Stage 2	(108,899)	208	108,899	(208)	–	–	–	–	–	–
– transfers from Stage 2 to Stage 1	17,916	(263)	(17,916)	263	–	–	–	–	–	–
– transfers to Stage 3	(2,803)	5	(16,608)	1,385	19,411	(1,390)	–	–	–	–
– transfers from Stage 3	16	(3)	23	–	(39)	3	–	–	–	–
Net remeasurement of ECL arising from transfer of stage	–	105	–	(361)	–	(18)	–	–	–	(274)
New financial assets originated and purchased	316,455	(232)	18,990	(413)	199	(114)	203	(19)	335,847	(778)
Assets derecognised (including final repayments)	(475,393)	89	(53,559)	298	(1,570)	115	(764)	–	(531,286)	502
Changes to risk parameters – further lending/(repayment)	142,770	76	(9,118)	14	(2,355)	(628)	(109)	–	131,188	(538)
Changes in risk parameters – credit quality	–	8	–	(2,343)	–	(4,055)	–	–	–	(6,390)
Changes to model used for ECL calculation	–	–	–	(2)	–	–	–	–	–	(2)
Assets written off	–	–	–	–	(899)	899	–	–	(899)	899
Credit related modifications that resulted in derecognition	–	–	–	–	(155)	–	–	–	(155)	–
Foreign exchange and others	(11,613)	2	(1,230)	19	(106)	86	(1)	–	(12,950)	107
At 31 December 2022	1,162,208	(827)	179,597	(4,920)	23,943	(7,802)	301	(19)	1,366,049	(13,568)

	Total
Change in ECL in income statement (charge)/release for the year	(7,480)
Add: Recoveries	131
Add/(less): Others	(313)
Total ECL (charge)/release for the year	(7,662)

(a) Credit Risk

(iii) Reconciliation of changes in gross carrying/nominal amount and allowances for placings with and advances to banks and loans and advances to customers continued

Reconciliation of changes in gross carrying/nominal amount and allowances for placings with and advances to banks and loans and advances to customers, including loan commitments and financial guarantees[2] continued

(audited)

	At 31 December 2022		For the year ended 31 December 2022
	Gross carrying/ nominal amount	Allowance for ECL	ECL (charge)/ release
Placings with and advances to banks and loans and advances to customers, including loan commitments and financial guarantees	**1,366,049**	**(13,568)**	**(7,662)**
Other financial assets measured at amortised cost	**358,894**	**(127)**	**34**
Summary of financial instruments to which the impairment requirements in HKFRS 9 are applied	**1,724,943**	**(13,695)**	**(7,628)**
Debt instruments measured at FVOCI[2]	**357,641**	**(6)**	**1**
Performance and other guarantees not considered for HKFRS 9	**23,216**	**(2)**	**1**
Total allowance for ECL/consolidated income statement ECL charge for the year	**2,105,800**	**(13,703)**	**(7,626)**

1 Purchased or originated credit-impaired ('POCI') represented distressed restructuring.

2 For the purposes of this disclosure, gross carrying value is defined as the amortised cost of a financial asset, before adjusting for any loss allowance. As such, the gross carrying value of debt instruments at FVOCI as presented above will not reconcile to the Consolidated Balance Sheet as it excludes fair value gains and losses.

	Non-credit-impaired				Credit-impaired				Total	
	Stage 1		Stage 2		Stage 3		POCI[1]			
	Gross carrying/ nominal amount	Allowance for ECL	Gross carrying/ nominal amount	Allowance for ECL	Gross carrying/ nominal amount	Allowance for ECL	Gross carrying/ nominal amount	Allowance for ECL	Gross carrying/ nominal amount	Allowance for ECL
At 1 January 2021	1,213,008	(1,421)	135,379	(1,896)	5,723	(2,044)	1	–	1,354,111	(5,361)
Transfers of financial instruments:										
– transfers from Stage 1 to Stage 2	(70,798)	237	70,798	(237)	–	–	–	–	–	–
– transfers from Stage 2 to Stage 1	43,558	(302)	(43,558)	302	–	–	–	–	–	–
– transfers to Stage 3	(5,131)	14	(1,302)	54	6,433	(68)	–	–	–	–
– transfers from Stage 3	10	(1)	42	(1)	(52)	2	–	–	–	–
Net remeasurement of ECL arising from transfer of stage	–	144	–	(607)	–	(13)	–	–	–	(476)
New financial assets originated and purchased	256,859	(275)	16,987	(840)	507	(47)	973	–	275,326	(1,162)
Assets derecognised (including final repayments)	(163,501)	127	(32,169)	254	(699)	95	–	–	(196,369)	476
Changes to risk parameters – further lending/(repayment)	5,207	223	4,368	161	(1,070)	46	(2)	–	8,503	430
Changes in risk parameters – credit quality	–	479	–	(757)	–	(1,885)	–	–	–	(2,163)
Changes to model used for ECL calculation	–	(38)	–	(8)	–	–	–	–	–	(46)
Assets written off	–	–	–	–	(1,233)	1,233	–	–	(1,233)	1,233
Credit related modifications that resulted in derecognition	–	–	(768)	6	(208)	–	–	–	(976)	6
Foreign exchange and others	4,547	(9)	339	(3)	56	(19)	–	–	4,942	(31)
At 31 December 2021	1,283,759	(822)	150,116	(3,572)	9,457	(2,700)	972	–	1,444,304	(7,094)

	Total
Change in ECL in income statement (charge)/release for the year	(2,935)
Add: Recoveries	167
Add/(less): Others	(37)
Total ECL (charge)/release for the year	(2,805)

(a) Credit Risk

(iii) Reconciliation of changes in gross carrying/nominal amount and allowances for placings with and advances to banks and loans and advances to customers continued

Reconciliation of changes in gross carrying/nominal amount and allowances for placings with and advances to banks and loans and advances to customers, including loan commitments and financial guarantees[2] continued

(audited)

	At 31 December 2021		For the year ended 31 December 2021
	Gross carrying/ nominal amount	Allowance for ECL	ECL (charge)/ release
Placings with and advances to banks and loans and advances to customers, including loan commitments and financial guarantees	1,444,304	(7,094)	(2,805)
Other financial assets measured at amortised cost	214,623	(167)	(6)
Summary of financial instruments to which the impairment requirements in HKFRS 9 are applied	1,658,927	(7,261)	(2,811)
Debt instruments measured at FVOCI[2]	354,050	(9)	–
Performance and other guarantees not considered for HKFRS 9	26,439	(3)	4
Total allowance for ECL/consolidated income statement ECL charge for the year	2,039,416	(7,273)	(2,807)

1 Purchased or originated credit-impaired ('POCI') represented distressed restructuring.

2 For the purposes of this disclosure, gross carrying value is defined as the amortised cost of a financial asset, before adjusting for any loss allowance. As such, the gross carrying value of debt instruments at FVOCI as presented above will not reconcile to the Consolidated Balance Sheet as it excludes fair value gains and losses.

(iv) Credit quality of financial instruments

(audited)

We assess the credit quality of all financial instruments that are subject to credit risk. The credit quality of financial instruments is a point-in-time assessment of the probability of default of financial instruments, whereas HKFRS 9 stages 1 and 2 are determined based on relative deterioration of credit quality since initial recognition. Accordingly, for non-credit-impaired financial instruments, there is no direct relationship between the credit quality assessments and HKFRS 9 stages 1 and 2, though typically the lowered credit quality bands exhibit a higher proportion in stage 2.

(a) Credit Risk

(iv) Credit quality of financial instruments continued

(audited)

Distribution of financial instruments by credit quality at 31 December 2022

	Gross carrying/notional amount							
	Strong	Good	Satisfactory	Sub-standard	Credit-impaired	Total	Allowance for ECL	Net
In-scope for HKFRS 9 impairment								
Loans and advances to customers at amortised cost	457,044	167,123	256,457	39,892	24,212	944,728	(13,394)	931,334
– personal	353,312	16,917	11,172	416	923	382,740	(1,373)	381,367
– corporate and commercial	95,808	143,049	226,674	39,476	23,289	528,296	(11,885)	516,411
– non-bank financial institutions	7,924	7,157	18,611	–	–	33,692	(136)	33,556
Placings with and advances to banks at amortised cost	62,098	203	28	–	–	62,329	(3)	62,326
Cash and balances at central banks	17,612	–	–	–	–	17,612	(3)	17,609
Reverse repurchase agreements – non-trading	38,438	3,926	–	–	–	42,364	–	42,364
Financial investments measured at amortised cost	228,977	30,444	2,298	–	–	261,719	(94)	261,625
Other assets	21,731	8,276	7,105	87	–	37,199	(30)	37,169
Debt instruments measured at fair value through other comprehensive income[1]	357,407	234	–	–	–	357,641	(6)	357,635
	1,183,307	210,206	265,888	39,979	24,212	1,723,592	(13,530)	1,710,062
Out-of-scope for HKFRS 9 impairment								
Trading assets	46,936	126	268	–	–	47,330	–	47,330
Other financial assets designated and otherwise mandatorily measured at fair value through profit or loss	247	618	1	–	–	866	–	866
Derivative financial instruments	22,183	470	18	90	–	22,761	–	22,761
	69,366	1,214	287	90	–	70,957	–	70,957
	1,252,673	211,420	266,175	40,069	24,212	1,794,549	(13,530)	1,781,019
Percentage of total credit quality	70%	12%	15%	2%	1%	100%		
Loan and other credit related commitments[2]	263,697	53,415	38,414	1,711	28	357,265	(169)	357,096
Financial guarantee and similar contracts[2]	399	627	556	141	4	1,727	(2)	1,725

1 For the purposes of this disclosure, gross carrying value is defined as the amortised cost of a financial asset, before adjusting for any loss allowance. As such, the gross carrying value of debt instruments at FVOCI as presented above will not reconcile to the Consolidated Balance Sheet as it excludes fair value gains and losses.

2 Figures do not include commitments and financial guarantee contracts not subject to impairment requirements under HKFRS 9. As such, the amounts do not agree with the figures shown in note 45 on the Consolidated Financial Statements.

(a) Credit Risk

(iv) Credit quality of financial instruments continued

(audited)

Distribution of financial instruments by credit quality at 31 December 2021

(restated)[1]

	Gross carrying/notional amount							
	Strong	Good	Satisfactory	Sub-standard	Credit-impaired	Total	Allowance for ECL	Net
In-scope for HKFRS 9 impairment								
Loans and advances to customers at amortised cost	473,995	216,803	287,835	15,263	10,429	1,004,325	(6,928)	997,397
– personal	345,528	15,838	12,295	205	858	374,724	(1,281)	373,443
– corporate and commercial	122,080	193,188	257,956	15,058	9,467	597,749	(5,486)	592,263
– non-bank financial institutions	6,387	7,777	17,584	–	104	31,852	(161)	31,691
Placings with and advances to banks at amortised cost	72,243	238	13	–	–	72,494	(1)	72,493
Cash and balances at central banks	16,896	–	–	–	–	16,896	–	16,896
Reverse repurchase agreements – non-trading	14,728	3,100	993	–	–	18,821	–	18,821
Financial investments measured at amortised cost	109,359	28,965	3,056	–	–	141,380	(153)	141,227
Other assets	24,171	7,714	5,631	10	–	37,526	(14)	37,512
Debt instruments measured at fair value through other comprehensive income[2]	353,816	234	–	–	–	354,050	(9)	354,041
	1,065,208	257,054	297,528	15,273	10,429	1,645,492	(7,105)	1,638,387
Out-of-scope for HKFRS 9 impairment								
Trading assets	47,028	165	199	–	–	47,392	–	47,392
Other financial assets designated and otherwise mandatorily measured at fair value through profit or loss	267	771	3	–	–	1,041	–	1,041
Derivative financial instruments	10,267	2,923	27	7	–	13,224	–	13,224
	57,562	3,859	229	7	–	61,657	–	61,657
	1,122,770	260,913	297,757	15,280	10,429	1,707,149	(7,105)	1,700,044
Percentage of total credit quality	66%	15%	17%	1%	1%	100%		
Loan and other credit related commitments[3]	279,705	47,077	38,053	219	–	365,054	(162)	364,892
Financial guarantee and similar contracts[3]	424	893	1,108	6	–	2,431	(3)	2,428

1 Comparative figures for Loans and advances to customers have been restated to update the counterparty classification for certain facilities from corporate and commercial to non-bank financial institutions.

2 For the purposes of this disclosure, gross carrying value is defined as the amortised cost of a financial asset, before adjusting for any loss allowance. As such, the gross carrying value of debt instruments at FVOCI as presented above will not reconcile to the Consolidated Balance Sheet as it excludes fair value gains and losses.

3 Figures do not include commitments and financial guarantee contracts not subject to impairment requirements under HKFRS 9. As such, the amounts do not agree with the figures shown in note 45 on the Consolidated Financial Statements.

(a) Credit Risk

(iv) Credit quality of financial instruments continued

(audited)

Distribution of financial instruments to which the impairment requirements in HKFRS 9 are applied, by credit quality and stage distribution at 31 December 2022

	Gross carrying/notional amount							
	Strong	Good	Satisfactory	Sub-standard	Credit-impaired	Total	Allowance for ECL	Net
Loans and advances to customers at amortised cost	457,044	167,123	256,457	39,892	24,212	944,728	(13,394)	931,334
– stage 1	453,000	148,598	156,787	1,257	–	759,642	(755)	758,887
– stage 2	4,044	18,525	99,670	38,635	–	160,874	(4,818)	156,056
– stage 3	–	–	–	–	23,911	23,911	(7,802)	16,109
– POCI	–	–	–	–	301	301	(19)	282
Placings with and advances to banks at amortised cost	62,098	203	28	–	–	62,329	(3)	62,326
– stage 1	61,977	158	–	–	–	62,135	(2)	62,133
– stage 2	121	45	28	–	–	194	(1)	193
– stage 3	–	–	–	–	–	–	–	–
– POCI	–	–	–	–	–	–	–	–
Other financial assets measured at amortised cost	306,758	42,646	9,403	87	–	358,894	(127)	358,767
– stage 1	305,623	40,012	8,274	10	–	353,919	(98)	353,821
– stage 2	1,135	2,634	1,129	77	–	4,975	(29)	4,946
– stage 3	–	–	–	–	–	–	–	–
– POCI	–	–	–	–	–	–	–	–
Loan and other credit-related commitments[2]	263,697	53,415	38,414	1,711	28	357,265	(169)	357,096
– stage 1	262,015	46,581	30,460	346	–	339,402	(70)	339,332
– stage 2	1,682	6,834	7,954	1,365	–	17,835	(99)	17,736
– stage 3	–	–	–	–	28	28	–	28
– POCI	–	–	–	–	–	–	–	–
Financial guarantees and similar contracts[2]	399	627	556	141	4	1,727	(2)	1,725
– stage 1	399	502	128	–	–	1,029	–	1,029
– stage 2	–	125	428	141	–	694	(2)	692
– stage 3	–	–	–	–	4	4	–	4
– POCI	–	–	–	–	–	–	–	–
	1,089,996	264,014	304,858	41,831	24,244	1,724,943	(13,695)	1,711,248
Debt instruments at FVOCI[1]								
– stage 1	357,407	234	–	–	–	357,641	(6)	357,635
– stage 2	–	–	–	–	–	–	–	–
– stage 3	–	–	–	–	–	–	–	–
– POCI	–	–	–	–	–	–	–	–
	357,407	234	–	–	–	357,641	(6)	357,635

[1] For the purposes of this disclosure, gross carrying value is defined as the amortised cost of a financial asset, before adjusting for any loss allowance. As such, the gross carrying value of debt instruments at FVOCI as presented above will not reconcile to the Consolidated Balance Sheet as it excludes fair value gains and losses.

[2] Figures do not include commitments and financial guarantee contracts not subject to impairment requirements under HKFRS 9. As such, the amounts do not agree with the figures shown in note 45 on the Consolidated Financial Statements.

(a) Credit Risk

(iv) Credit quality of financial instruments continued

(audited)

Distribution of financial instruments to which the impairment requirements in HKFRS 9 are applied, by credit quality and stage distribution at 31 December 2021

	Gross carrying/notional amount							
	Strong	Good	Satisfactory	Sub-standard	Credit-impaired	Total	Allowance for ECL	Net
Loans and advances to customers at amortised cost	473,995	216,803	287,835	15,263	10,429	1,004,325	(6,928)	997,397
– stage 1	460,810	186,463	204,354	522	–	852,149	(762)	851,387
– stage 2	13,185	30,340	83,481	14,741	–	141,747	(3,466)	138,281
– stage 3	–	–	–	–	9,457	9,457	(2,700)	6,757
– POCI	–	–	–	–	972	972	–	972
Placings with and advances to banks at amortised cost	72,243	238	13	–	–	72,494	(1)	72,493
– stage 1	72,204	94	13	–	–	72,311	(1)	72,310
– stage 2	39	144	–	–	–	183	–	183
– stage 3	–	–	–	–	–	–	–	–
– POCI	–	–	–	–	–	–	–	–
Other financial assets measured at amortised cost	165,154	39,779	9,680	10	–	214,623	(167)	214,456
– stage 1	164,041	38,481	7,842	–	–	210,364	(99)	210,265
– stage 2	1,113	1,298	1,838	10	–	4,259	(68)	4,191
– stage 3	–	–	–	–	–	–	–	–
– POCI	–	–	–	–	–	–	–	–
Loan and other credit-related commitments[2]	279,705	47,077	38,053	219	–	365,054	(162)	364,892
– stage 1	279,684	44,406	32,742	184	–	357,016	(57)	356,959
– stage 2	21	2,671	5,311	35	–	8,038	(105)	7,933
– stage 3	–	–	–	–	–	–	–	–
– POCI	–	–	–	–	–	–	–	–
Financial guarantees and similar contracts[2]	424	893	1,108	6	–	2,431	(3)	2,428
– stage 1	422	860	999	2	–	2,283	(2)	2,281
– stage 2	2	33	109	4	–	148	(1)	147
– stage 3	–	–	–	–	–	–	–	–
– POCI	–	–	–	–	–	–	–	–
	991,521	304,790	336,689	15,498	10,429	1,658,927	(7,261)	1,651,666
Debt instruments at FVOCI[1]								
– stage 1	353,816	234	–	–	–	354,050	(9)	354,041
– stage 2	–	–	–	–	–	–	–	–
– stage 3	–	–	–	–	–	–	–	–
– POCI	–	–	–	–	–	–	–	–
	353,816	234	–	–	–	354,050	(9)	354,041

1 For the purposes of this disclosure, gross carrying value is defined as the amortised cost of a financial asset, before adjusting for any loss allowance. As such, the gross carrying value of debt instruments at FVOCI as presented above will not reconcile to the Consolidated Balance Sheet as it excludes fair value gains and losses.

2 Figures do not include commitments and financial guarantee contracts not subject to impairment requirements under HKFRS 9. As such, the amounts do not agree with the figures shown in note 45 on the Consolidated Financial Statements.

(a) Credit Risk

(iv) Credit quality of financial instruments continued

Mainland China Commercial Real Estate

(unaudited)

The following table presents the Group's total exposures to mainland China commercial real estate ('CRE') by market and credit quality including allowances for ECL by stage. Mainland China reported CRE exposures comprise exposures booked in mainland China and offshore where ultimate parent and beneficial owner is based in mainland China, and all CRE exposures booked on mainland China balance sheets.

	At 31 December 2022		
	Hong Kong	Mainland China	Total
Loans and advances to customers[1]	37,524	11,821	49,345
Guarantees issued and others[2,3]	180	2,379	2,559
Total mainland China CRE exposure	37,704	14,200	51,904
Distribution of mainland China CRE exposure by credit quality			
– Strong	3,307	2,304	5,611
– Good	2,300	3,076	5,376
– Satisfactory	5,429	6,888	12,317
– Sub-standard	11,834	952	12,786
– Credit-impaired	14,834	980	15,814
	37,704	14,200	51,904
Allowance for ECL by credit quality			
– Strong	–	4	4
– Good	1	14	15
– Satisfactory	13	80	93
– Sub-standard	1,987	247	2,234
– Credit-impaired	4,973	578	5,551
	6,974	923	7,897
Allowance for ECL by stage			
– Stage 1	4	30	34
– Stage 2	1,997	315	2,312
– Stage 3	4,973	578	5,551
	6,974	923	7,897
ECL coverage %	18.5	6.5	15.2

1 Amounts represent gross carrying amount.

2 Amounts represent nominal amount.

3 Guarantees issued and others for Hong Kong and mainland China have been reported considering the nature of the exposures and the elimination impact of standby line of credit within the Group respectively. Comparative figures have been restated on this basis accordingly.

(a) Credit Risk

(iv) Credit quality of financial instruments continued

Mainland China Commercial Real Estate continued

(unaudited)

	At 31 December 2021		
(restated)[3]	Hong Kong	Mainland China	Total
Loans and advances to customers[1]	46,951	18,009	64,960
Guarantees issued and others[2,3]	–	5,297	5,297
Total mainland China CRE exposure	46,951	23,306	70,257
Distribution of mainland China CRE exposure by credit quality			
– Strong	11,461	5,763	17,224
– Good	11,762	8,658	20,420
– Satisfactory	12,069	7,997	20,066
– Sub-standard	8,607	94	8,701
– Credit-impaired	3,052	794	3,846
	46,951	23,306	70,257
Allowance for ECL by credit quality			
– Strong	107	7	114
– Good	139	26	165
– Satisfactory	604	53	657
– Sub-standard	1,139	2	1,141
– Credit-impaired	657	86	743
	2,646	174	2,820
Allowance for ECL by stage			
– Stage 1	13	56	69
– Stage 2	1,976	32	2,008
– Stage 3	657	86	743
	2,646	174	2,820
ECL coverage %	5.6	0.7	4.0

1 Amounts represent gross carrying amount.

2 Amounts represent nominal amount.

3 Guarantees issued and others for Hong Kong and mainland China have been reported considering the nature of the exposures and the elimination impact of standby line of credit within the Group respectively. Comparative figures have been restated on this basis accordingly.

(a) Credit Risk

(iv) Credit quality of financial instruments

continued

Mainland China Commercial Real Estate continued

(unaudited)

CRE refers to lending that focuses on commercial development and investment in real estate, and covers commercial, residential and industrial assets. CRE financing can also be provided to a corporate or financial entity for the purchase or financing of a property which supports overall operations of the business, known as self-use.

The Group's exposures are related to companies whose primary activities are focused on residential, commercial and mixed-use real estate activities. Lending is generally focused on tier 1 and 2 cities.

The mainland China CRE portfolio had 45% (2021: 82%) of exposure booked with a credit quality of 'satisfactory' or above. Following recent policy changes in mainland China in respect of the CRE sector, we expect the sector to stabilise during 2023, assuming that there continues to be sustained liquidity support in the market and an improvement in industry fundamentals especially property sale volumes.

The current credit quality distribution of the non-impaired portfolio reflects active risk management of the mainland China CRE portfolio, resulting in credit rating migration throughout the year.

The comparatively lower ECL allowance for this portfolio is driven by the composition of the book, with over one third exposure to state owned enterprises and much of the remaining to relatively strong privately owned enterprises.

With a range of policy measures announced to boost liquidity and credit supply in the mainland China CRE market coupled with market support in the recent past to the stronger privately owned enterprise names, the negative outlook for the industry has stabilised, specifically related to immediate refinancing challenges. However, we continue to monitor for the prevailing situation closely.

(v) Collateral and other credit enhancements

(audited)

Although collateral can be an important mitigant of credit risk, it is the Group's practice to lend on the basis of the customer's ability to meet their obligations out of their cash flow resources rather than rely on the value of security offered. Depending on the customer's standing and the type of product, facilities may be provided unsecured. However, for certain lending decisions a charge over collateral is usually obtained, and is important for the credit decision and pricing, and it is the Group's practice to obtain that collateral and sell it in the event of default as a source of repayment.

Such collateral has a significant financial effect in mitigating our exposure to credit risk and the objective of the disclosure below is to quantify these forms. We may also manage our risk by employing other types of collateral and credit risk enhancements, such as second charges, other liens and unsupported guarantees, but the valuation of such mitigants is less certain and their financial effect has not been quantified in the loans shown below.

We have quantified below the value of fixed charges we hold over a specific asset (or assets) of a borrower for which we have a practical ability and history of enforcing in satisfying a debt in the event of a borrower failing to meet their contractual obligations and where the asset is cash or can be realised in the form of cash by sale in an established market.

Personal lending

(audited)

For personal lending, the collateral held has been analysed below separately for residential mortgages and other personal lending due to the different nature of collateral held on the portfolios.

(a) Credit Risk

(v) Collateral and other credit enhancements continued

(audited)

Residential mortgages

(audited)

The following table shows residential mortgage lending including off-balance sheet loan commitments by level of collateralisation.

	At 31 December 2022			At 31 December 2021		
	Gross carrying/ nominal amount	ECL	ECL coverage %	Gross carrying/ nominal amount	ECL	ECL coverage %
Stage 1						
Fully collateralised	**291,992**	**(4)**	**0.00**	303,236	(9)	0.00
LTV ratio:						
– Less than 70%	**228,553**	**(4)**	**0.00**	245,906	(9)	0.00
– 71% to 90%	**32,766**	**–**	**–**	48,846	(0)	0.00
– 91% to 100%	**30,673**	**–**	**–**	8,484	(0)	0.00
Partially collateralised (A)	**20,819**	**–**	**–**	42	–	–
Total	**312,811**	**(4)**	**0.00**	303,278	(9)	0.00
– *Collateral value on A*	**19,978**			41		
Stage 2						
Fully collateralised	**4,718**	**–**	**–**	5,636	(0)	0.01
LTV ratio:						
– Less than 70%	**4,194**	**–**	**–**	5,248	(0)	0.01
– 71% to 90%	**344**	**–**	**–**	358	–	–
– 91% to 100%	**180**	**–**	**–**	30	(0)	0.00
Partially collateralised (B)	**187**	**–**	**–**	–	–	–
Total	**4,905**	**–**	**–**	5,636	(0)	0.01
– *Collateral value on B*	**180**			–		
Stage 3						
Fully collateralised	**505**	**(17)**	**3.37**	432	(12)	2.72
LTV ratio:						
– Less than 70%	**485**	**(17)**	**3.51**	414	(12)	2.82
– 71% to 90%	**20**	**–**	**–**	18	(0)	0.52
– 91% to 100%	**–**	**–**	**–**	–	–	–
Partially collateralised (C)	**–**	**–**	**–**	–	–	–
Total	**505**	**(17)**	**3.37**	432	(12)	2.72
– *Collateral value on C*	**–**			–		
POCI						
Fully collateralised	**–**	**–**	**–**	–	–	–
LTV ratio:						
– Less than 70%	**–**	**–**	**–**	–	–	–
– 71% to 90%	**–**	**–**	**–**	–	–	–
– 91% to 100%	**–**	**–**	**–**	–	–	–
Partially collateralised (D)	**–**	**–**	**–**	–	–	–
Total	**–**	**–**	**–**	–	–	–
– *Collateral value on D*	**–**			–		
	318,221	**(21)**	**0.01**	309,346	(21)	0.01

The ECL coverage represents the actual ECL divided by gross carrying/nominal amount.

The collateral included in the table above consists of fixed first charges on residential real estate.

(a) Credit Risk

(v) Collateral and other credit enhancements

continued

(audited)

Residential mortgages continued

(audited)

The loan-to-value ('LTV') ratio in the table above is calculated as the gross on-balance sheet carrying amount of the loan and any off-balance sheet loan commitment at the balance sheet date as a percentage of the current value of collateral. The current value of collateral is determined through a combination of professional valuations, physical inspections or house price indices. Valuations are updated on a regular basis and more frequently when market conditions or portfolio performance are subject to significant change or where a loan is identified and assessed as impaired. The collateral valuation excludes any adjustments for obtaining and selling the collateral.

Other personal lending

(audited)

Other personal lending consists primarily of personal loans, overdrafts and credit cards, all of which are generally unsecured, except lending to private banking customers which are generally secured.

Corporate and commercial and financial (non-bank) lending

(audited)

For corporate and commercial and financial (non-bank) lending, the collateral held has been analysed below separately for commercial real estate and other corporate and commercial and financial (non-bank) lending due to the different nature of collateral held on the portfolios.

Commercial real estate

(audited)

Commercial real estate lending includes the financing of corporate and institutional customers who are investing primarily in income-producing assets and, to a lesser extent, in their construction and development.

(a) Credit Risk

(v) Collateral and other credit enhancements continued

(audited)

Commercial real estate continued

(audited)

The following table shows commercial real estate lending including off-balance sheet loan commitments by level of collateralisation.

	At 31 December 2022			At 31 December 2021		
	Gross carrying/ nominal amount	ECL	ECL coverage %	Gross carrying/ nominal amount	ECL	ECL coverage %
Stage 1						
Not collateralised	62,767	(17)	0.03	75,656	(32)	0.04
Fully collateralised	92,736	(72)	0.08	134,639	(84)	0.06
Partially collateralised (A)	4,789	–	–	4,721	(3)	0.06
Total	160,292	(89)	0.06	215,016	(119)	0.06
– *Collateral value on A*	4,099			2,948		
Stage 2						
Not collateralised	17,384	(2,010)	11.56	32,398	(1,986)	6.13
Fully collateralised	42,635	(661)	1.55	25,433	(175)	0.69
Partially collateralised (B)	2,881	(87)	3.02	778	(10)	1.29
Total	62,900	(2,758)	4.38	58,609	(2,171)	3.70
– *Collateral value on B*	1,810			361		
Stage 3						
Not collateralised	8,497	(4,642)	54.63	1,298	(414)	31.90
Fully collateralised	5,857	(881)	15.04	2,637	(342)	12.97
Partially collateralised (C)	310	(47)	15.16	–	–	–
Total	14,664	(5,570)	37.98	3,935	(756)	19.21
– *Collateral value on C*	298			–		
POCI						
Not collateralised	–	–	–	–	–	–
Fully collateralised	–	–	–	765	–	–
Partially collateralised (D)	145	–	–	–	–	–
Total	145	–	–	765	–	–
– *Collateral value on D*	65			–		
	238,001	(8,417)	3.54	278,325	(3,046)	1.09

The collateral included in the table above consists of fixed first charges on real estate and charges over cash for the commercial real estate sector. The table includes lending to major property developers which is typically secured by guarantees or is unsecured.

(a) Credit Risk

(v) Collateral and other credit enhancements

continued

(audited)

Commercial real estate continued

(audited)

The value of commercial real estate collateral is determined through a combination of professional and internal valuations and physical inspection. Due to the complexity of collateral valuations for commercial real estate, local valuation policies determine the frequency of review based on local market conditions. Revaluations are sought with greater frequency where, as part of the regular credit assessment of the obligor, material concerns arise in relation to the transaction which may reflect on the underlying performance of the collateral, or in circumstances where an obligor's credit quality has declined sufficiently to cause concern that the principal payment source may not fully meet the obligation (i.e. the obligor's credit quality classification indicates it is at the lower end e.g. sub-standard, or approaching impaired).

Commercial real estate lending includes the financing of corporate, institutional and high net worth customers who are investing primarily in income-producing assets and, to a lesser extent, in their construction and development.

Other corporate and commercial and financial (non-bank) lending

(audited)

The following table shows corporate, commercial and financial (non-bank) lending including off-balance sheet loan commitments by level of collateralisation.

	At 31 December 2022			At 31 December 2021		
	Gross carrying/ nominal amount	ECL	ECL coverage %	Gross carrying/ nominal amount	ECL	ECL coverage %
Stage 1						
Not collateralised	**282,001**	**(317)**	**0.11**	321,650	(280)	0.09
Fully collateralised	**120,657**	**(170)**	**0.14**	148,902	(104)	0.07
Partially collateralised (A)	**41,339**	**(42)**	**0.10**	53,498	(25)	0.05
Total	**443,997**	**(529)**	**0.12**	524,050	(409)	0.08
– *Collateral value on A*	**18,852**			23,659		
Stage 2						
Not collateralised	**45,063**	**(240)**	**0.53**	23,596	(204)	0.86
Fully collateralised	**69,599**	**(740)**	**1.06**	53,111	(335)	0.63
Partially collateralised (B)	**16,620**	**(150)**	**0.90**	9,259	(30)	0.32
Total	**131,282**	**(1,130)**	**0.86**	85,966	(569)	0.66
– *Collateral value on B*	**8,111**			3,532		
Stage 3						
Not collateralised	**1,916**	**(1,112)**	**58.04**	1,881	(1,252)	66.56
Fully collateralised	**3,231**	**(154)**	**4.77**	952	(6)	0.63
Partially collateralised (C)	**3,200**	**(825)**	**25.78**	1,831	(529)	28.89
Total	**8,347**	**(2,091)**	**25.05**	4,664	(1,787)	38.31
– *Collateral value on C*	**1,879**			1,159		
POCI						
Not collateralised	**–**	**–**	**–**	–	–	–
Fully collateralised	**–**	**–**	**–**	207	–	–
Partially collateralised (D)	**156**	**(19)**	**12.18**	–	–	–
Total	**156**	**(19)**	**12.18**	207	–	–
– *Collateral value on D*	**–**			–		
	583,782	**(3,769)**	**0.65**	614,887	(2,765)	0.45

(a) Credit Risk

(v) Collateral and other credit enhancements

continued

(audited)

Other corporate and commercial and financial (non-bank) lending continued

(audited)

The collateral used in the assessment of the above primarily includes first legal charges over real estate and charges over cash in the commercial and industrial sector and charges over cash and marketable financial instruments in the financial sector.

It should be noted that the table above excludes other types of collateral which are commonly taken for corporate and commercial lending such as unsupported guarantees and floating charges over the assets of a customer's business. While such mitigants have value, often providing rights in insolvency, their assignable value is insufficiently certain. They are assigned no value for disclosure purposes.

As with commercial real estate the value of real estate collateral included in the table above is generally determined through a combination of professional and internal valuations and physical inspection. The frequency of revaluation is undertaken on a similar basis to commercial real estate loans and advances; however, for financing activities in corporate and commercial lending that are not predominantly commercial real estate-oriented, collateral value is not as strongly correlated to principal repayment performance. Collateral values will generally be refreshed when an obligor's general credit performance deteriorates and it is necessary to assess the likely performance of secondary sources of repayment should reliance upon them prove necessary. For the purposes of the table above, cash is valued at its nominal value and marketable securities at their fair value.

Placings with and advances to banks

(audited)

Placings with and advances to banks are typically unsecured. At 31 December 2022, HK$62,326m (2021: HK$72,493m) of placings with and advances to banks rated CRR 1 to 5, including loan commitments, are uncollateralised.

Derivatives

(audited)

The ISDA Master Agreement is our preferred agreement for documenting derivatives activity. It provides the contractual framework within which dealing activity across a full range of over-the-counter ('OTC') products is conducted, and contractually binds both parties to apply close-out netting across all outstanding transactions covered by an agreement if either party defaults or another pre-agreed termination event occurs. It is common, and the Group's preferred practice, for the parties to execute a Credit Support Annex ('CSA') in conjunction with the ISDA Master Agreement. Under a CSA, collateral is passed between the parties to mitigate the counterparty risk inherent in outstanding positions. The majority of our CSAs are with financial institutional clients. Please refer to note 47 'Offsetting of financial assets and financial liabilities' for further details.

Other credit risk exposures

(audited)

In addition to collateralised lending described above, other credit enhancements are employed and methods used to mitigate credit risk arising from financial assets. These are described in more detail below.

Government, bank and other financial institution-issued securities may benefit from additional credit enhancement, notably through government guarantees that reference these assets. Corporate-issued debt securities are primarily unsecured. Debt securities issued by banks and financial institutions include asset-backed securities ('ABS') and similar instruments, which are supported by underlying pools of financial assets. Credit risk associated with ABS is reduced through the purchase of credit default swap ('CDS') protection.

The Group's maximum exposure to credit risk includes financial guarantees and similar arrangements that it issues or enters into, and loan commitments to which it is irrevocably committed. Depending on the terms of the arrangement, the Group may have recourse to additional credit mitigation in the event that a guarantee is called upon or a loan commitment is drawn and subsequently defaults. The risks and exposures from these are captured and managed in accordance with the Group's overall credit risk management policies and procedures.

Collateral and other credit enhancements obtained

(audited)

The Group obtained assets by taking possession of collateral held as security, or calling other credit enhancement. The nature of these assets held as at 31 December 2022 are residential properties with carrying amount of HK$87m (2021: residential properties of HK$35m).

(b) Treasury Risk

Overview

Treasury risk is the risk of having insufficient capital, liquidity or funding resources to meet financial obligations and satisfy regulatory requirements, including the risk of adverse impact on our earnings or capital due to structural foreign exchange exposures and changes in market interest rates, together with pension and insurance risk.

Treasury risk arises from changes to the respective resources and risk profiles driven by customer behaviour, management decisions or the external environment.

Approach and policy

Main objective in the management of treasury risk is to maintain appropriate levels of capital, liquidity, funding, foreign exchange and market risk to support business strategy, and meet regulatory and stress testing-related requirements.

The approach to treasury management is driven by our strategic and organisational requirements, taking into account the regulatory, economic and commercial environment. We aim to maintain a strong capital and liquidity base to support the risks inherent in our business and invest in accordance with our strategy, meeting both consolidated and local regulatory requirements at all times.

Our policy is underpinned by our risk management framework, our internal capital adequacy assessment process ('ICAAP') and our internal liquidity adequacy assessment process ('ILAAP'). The risk framework incorporates a number of measures aligned to our assessment of risks for both internal and regulatory purposes.

Treasury risk management

Key developments in 2022

- We have rolled out second line of defence for capital risk, providing independent oversight of treasury activities across capital and recovery and resolution planning during 2022.
- The Board approved Risk Appetite for IRRBB was further enhanced in 2022 to include NII sensitivity metric to monitor the impact of 100bps interest rate shock on the forecasted earnings of the Bank over next 1 year against the Board approved Risk Appetite.
- During the periods of high market volatility in 2022, we enhanced the monitoring and forecasting of our capital positions. The mark-to-market movement in financial instruments that impacted our capital ratio arose from the portfolio of high-quality liquid assets ('HQLA') held by our Markets Treasury business as economic hedges of net interest income. This portfolio is largely accounted for at fair value through other comprehensive income ('FVOCI'), together with any derivative hedges held to offset the duration risk of the assets. During the year, we took steps to reduce the duration risk of this portfolio to reduce the capital impact from higher interest rates. The impact of this risk reduction reduced the hold-to-collect-and-sell stressed value at risk ('VaR') exposure from $1.44bn at the end of 2021 to $0.91bn at the end of 2022.
- Our portfolio of hold-to-collect-and-sell assets forms a material part of our liquid asset buffer, and the duration risk of the portfolio acts as a hedge to our structural interest rate risk. We have recently approved a new hold-to-collect business model, which is currently being implemented at legal entity level, and certain new purchases of securities will be booked under this model. In future, this portfolio of assets will also form a more material part of our structural interest rate hedging. This will allow more flexibility in managing the market risk of the current hold-to-collect-and-sell portfolio to optimise returns from market movements while still safeguarding capital and future earnings.

Governance and structure

The Board approves the policy and risk appetite for Liquidity and Capital. It is supported and advised by the RC.

The Asset, Liability and Capital Management ('ALCM') team actively manages capital and liquidity risk on an on-going basis and provides support to the Asset and Liability Management Committee ('ALCO') with risk appetites overseen by the Risk Management Meeting ('RMM'). Markets Treasury has the responsibility for cash and liquidity management. It also manages structural foreign exchange risk including implementing hedging strategies approved by Chief Financial Officer and supported by ALCO.

The ALCM team further manages interest rate risk in the non-trading banking book, maintaining the transfer pricing framework and informing the ALCO the overall banking book interest rate exposure. Banking book interest rate positions may be transferred to be managed by Markets Treasury, within the market risk limits approved by the RMM.

(b) Treasury Risk

Treasury risk management continued

Governance and structure continued

Treasury Risk Management function carries out independent review, challenge and assurance of the appropriateness of the liquidity and IRRBB risk management activities undertaken by ALCM and Markets Treasury.

Internal Audit provides independent assurance that risk is managed effectively.

Capital

Capital Management

(audited)

The Group's objective for managing capital is to maintain a strong capital base to support the development of its business and to meet regulatory capital requirements at all times. The Group recognises the impact of different level of equity capital on shareholder returns and seeks to maintain a prudent balance between advantages and flexibility provided by a strong capital position and higher returns on equity through greater leverage.

The policy on capital management sets out the Group's capital management and ICAAP. The policy incorporates key capital risk appetites for Common Equity Tier 1 ('CET1') capital, Tier 1 ('T1') capital, total capital, loss-absorbing capacity and leverage ratios. Regulatory capital and economic capital are the two primary measures used for monitoring and managing the capital position.

Capital measures:

- regulatory capital is the capital which we are required to hold in accordance with the rules established by regulator; and
- economic capital is the internally calculated capital requirement to support risks to which the Group is exposed to and forms a core part of the ICAAP.

ICAAP is an assessment of the Group's capital position, outlining both regulatory and internal capital resources and requirements resulting from our business model, strategy, risk profile and management, performance and planning, risks to capital, and the implications of stress testing. ICAAP is driven by an assessment of risks, including credit, market, operational, structural foreign exchange, interest rate risk in the banking book. Climate risk is also considered as part of the ICAAP, and the Group is continuing to develop the approach for climate risk management. The ICAAP supports the determination of the capital risk appetites, as well as enables the assessment and determination of capital requirements by regulator.

An annual Group capital plan is prepared and approved by the Board with the objectives of maintaining an optimal amount of capital and a suitable mix between different components of capital. The Group manages its own capital within the context of the approved annual capital plan, which determines the level of risk-weighted asset ('RWA') growth as well as the optimal amount and components of capital required to support planned business growth. Capital and RWA are monitored and managed against the plan, with capital forecasts reported to relevant governance committees. As part of the Group's capital management objectives, subsidiary with capital generated in excess of planned requirement will return to the Bank, normally by way of dividends. The Group also raised subordinated debt in accordance with HSBC Group's guidelines regarding market and investor concentration, cost, market conditions, timing and maturity profile.

The Bank is primarily a provider of equity capital to its subsidiaries. These investments are substantially funded by the Bank's own capital and profit. The Bank seeks to maintain a prudent balance between the composition of its capital and that of its investment in subsidiaries.

The principal forms of capital are included in the following balances on the Consolidated Balance Sheet: share capital, retained profits, other equity instruments and other reserves. Capital also includes impairment allowances and regulatory reserve for general banking risks as allowed under Banking (Capital) Rules.

Externally imposed capital requirements

(audited)

The HKMA supervises the Group on a consolidated and solo-consolidated basis and, as such, receives information on the capital adequacy of, and sets capital requirements for, the Group as a whole. Individual banking subsidiaries are directly regulated by their local banking supervisors, who set and monitor their capital adequacy requirements. Certain non-banking financial subsidiaries are also subject to the supervision and capital requirements of local regulatory authorities.

(b) Treasury Risk

Capital Management continued

(audited)

Externally imposed capital requirements continued

(audited)

The Group uses the advanced internal ratings-based approach ('IRB') to calculate its credit risk for the majority of its non-securitisation exposures. For collective investment scheme exposures, the Group uses the look-through approach to calculate the risk-weighted amount. For counterparty credit risk, the Group uses standardised (counterparty credit risk) approach to calculate its default risk exposures for derivatives, and the comprehensive approach for securities financing transactions. For market risk, the Group uses an internal models approach to calculate its general market risk for the risk categories of interest rate and foreign exchange (including gold) exposures and the standardised (market risk) approach for calculating other market risk positions. For operational risk, the Group uses the standardised (operational risk) approach to calculate its operational risk.

During the year, the Group has complied with all of the externally imposed capital requirements by the HKMA.

Basel III

(unaudited)

The Basel III capital rules set out the minimum CET1 capital requirement of 4.5% and total capital requirement of 8%.

At 31 December 2022, the capital buffers applicable to the Group include the Capital Conservation Buffer ('CCB'), the Countercyclical Capital Buffer ('CCyB') and the Higher Loss Absorbency ('HLA') requirements for Domestic Systemically Important Banks ('D-SIB'). The CCB is 2.5% and is designed to ensure banks build up capital outside periods of stress. The CCyB is set on an individual country basis and is built up during periods of excess credit growth to protect against future losses. The CCyB for Hong Kong and the list of D-SIB are regularly reviewed and last announced by the HKMA on 4 November 2022 and 30 December 2022 respectively. In its latest announcement, the HKMA maintained the CCyB for Hong Kong at 1.0% and maintained the D-SIB designation as well as HLA requirement at 1.0% for the Group.

Loss-absorbing capacity requirements

(unaudited)

The HKMA classified the Bank as a material subsidiary of HSBC's Asian resolution group in 2019 and required the Bank to comply with internal loss-absorbing capacity requirements under the Financial Institutions (Resolution) (Loss-absorbing Capacity Requirements – Banking Sector) Rules. During the year, the Bank has issued non-capital loss-absorbing capacity debt instrument of HK$3bn to its immediate holding company.

Leverage ratio

(unaudited)

The leverage ratio was introduced into the Basel III framework as a non-risk-based backstop limit, to supplement risk-based capital requirements. It aims to constrain the build-up of excess leverage in the banking sector, introducing additional safeguards against model risk and measurement errors. The ratio is a volume-based measure calculated as Basel III tier 1 capital divided by total on-balance sheet and off-balance sheet exposures. The minimum leverage ratio requirement in Hong Kong is 3%.

Capital base

(unaudited)

The following tables show the capital base, RWAs and capital ratios as contained in the 'Capital Adequacy Ratio' return required to be submitted to the HKMA by the Bank on consolidated basis as specified by the HKMA under the requirements of section 3C(1) of the Banking (Capital) Rules. The basis is different from that for accounting purposes. Further information on the regulatory consolidation basis is set out in the Banking Disclosure Statement that is available in the Regulatory Disclosures section of our website www.hangseng.com.

The Bank and its subsidiaries may need to maintain a regulatory reserve to satisfy the provisions of the Banking Ordinance and local regulatory requirements for prudential supervision purposes. At 31 December 2022, the Group is not required to restrict any reserves which can be distributed to shareholders (2021: HK$441m) as the impairment allowance for Stage 1 and 2 loans and advances to customers exceeded the expected regulatory reserve balance.

We closely monitor and consider future regulatory change and continue to evaluate the impact upon our capital requirements of regulatory developments. This includes the Basel III final reform package, which is currently scheduled for implementation by the HKMA no earlier than 1 January 2024. We continue to participate in consultations and monitor progress on the implementation. Based on the results of the latest HKMA consultations, we foresee a positive impact on our capital ratios. The RWA output floor under the Basel III final reform package will commence once implemented, with an expected five-year phase-in arrangement. Any impact from the output floor would be towards the end of the phase-in period. We are expecting the issuance of final rules in 2023 which will enable us to better estimate the impact.

(b) Treasury Risk

Capital Management continued

(audited)

Capital base continued

(unaudited)

The following table sets out the composition of the Group's capital base under Basel III at 31 December 2022 and 31 December 2021. A more detailed breakdown of the capital position and a full reconciliation between the Group's accounting and regulatory balance sheets can be viewed in the Banking Disclosure Statement in the Regulatory Disclosures section of our website www.hangseng.com.

	2022	2021
CET1 Capital		
Shareholders' equity	143,883	144,651
– Shareholders' equity per Consolidated Balance Sheet	183,896	184,332
– Additional Tier 1 ('AT1') perpetual capital instruments	(11,744)	(11,744)
– Unconsolidated subsidiaries	(28,269)	(27,937)
Non-controlling interests	–	–
– Non-controlling interests per Consolidated Balance Sheet	65	84
– Non-controlling interests in unconsolidated subsidiaries	(65)	(84)
Regulatory deductions to CET1 capital	(27,461)	(28,052)
– Cash flow hedging reserve	472	2
– Changes in own credit risk on fair valued liabilities	(6)	(6)
– Property revaluation reserves[1]	(24,418)	(24,617)
– Regulatory reserve	–	(441)
– Intangible assets	(3,011)	(2,359)
– Deferred tax assets net of deferred tax liabilities	(346)	(90)
– Valuation adjustments	(152)	(126)
– Excess of total expected loss amount over total eligible provisions under the IRB	–	(415)
Total CET1 Capital	116,422	116,599
AT1 Capital		
Total AT1 capital before and after regulatory deductions	11,744	11,744
– Perpetual capital instruments	11,744	11,744
Total AT1 Capital	11,744	11,744
Total T1 Capital	128,166	128,343
Tier 2 ('T2') Capital		
Total T2 capital before regulatory deductions	11,555	11,460
– Property revaluation reserves[1]	10,988	11,078
– Impairment allowances and regulatory reserve eligible for inclusion in T2 capital	567	382
Regulatory deductions to T2 capital	(1,045)	(1,045)
– Significant capital investments in unconsolidated financial sector entities	(1,045)	(1,045)
Total T2 Capital	10,510	10,415
Total Capital	138,676	138,758

1 Includes the revaluation surplus on investment properties which is reported as part of retained profits and related adjustments made in accordance with the Banking (Capital) Rules issued by the HKMA.

(b) Treasury Risk

Capital Management continued

(audited)

Risk-weighted assets by risk type

(unaudited)

	2022	2021
Credit risk	**687,532**	659,956
Market risk	**19,883**	13,248
Operational risk	**57,311**	60,924
Total	**764,726**	734,128

Capital ratios (as a percentage of risk-weighted assets)

(unaudited)

The capital ratios on consolidated basis calculated in accordance with the Banking (Capital) Rules are as follows:

	2022	2021
CET1 capital ratio	**15.2%**	15.9%
T1 capital ratio	**16.8%**	17.5%
Total capital ratio	**18.1%**	18.9%

In addition, the capital ratios of all tiers as of 31 December 2022 would be reduced by approximately 0.5 percentage point after the prospective fourth interim dividend payment for 2022. The following table shows the pro-forma basis position of the capital ratios after the prospective interim dividend.

	Pro-forma 2022	Pro-forma 2021
CET1 capital ratio	**14.7%**	15.4%
T1 capital ratio	**16.3%**	17.0%
Total capital ratio	**17.6%**	18.4%

Leverage ratio

(unaudited)

	2022	2021
Leverage ratio	**7.3%**	7.5%
T1 capital	**128,166**	128,343
Exposure measure	**1,752,201**	1,704,064

Detailed breakdown of the Group's leverage exposure measure and a summary comparison table reconciling the assets of the Group's accounting balance sheet with the leverage exposure measure using the standard templates as specified by the HKMA can be viewed in the Banking Disclosure Statement in the Regulatory Disclosures section of our website www.hangseng.com.

Dividend policy

Objective

The Bank's medium to long term dividend objective is to maintain steady dividends in light of profitability, regulatory requirements, growth opportunities and the operating environment. Its roadmap is designed to generate increasing shareholders' value through strategic business growth. The Bank would balance solid yields with the longer-term reward of sustained share price appreciation.

Considerations

The declaration of dividends is made at the discretion of the Board, which will take into account all relevant factors including the following:

- regulatory requirements;
- financial results;
- level of distributable reserves;
- general business conditions and strategies;
- strategic business plan and capital plan;
- statutory and regulatory restrictions on dividend payment; and
- any other factors the Board may deem relevant.

Phasing and Timing

Under normal circumstances and if the Board determines to declare a dividend at its discretion, dividends would be declared on a quarterly basis. The phasing of dividends would be planned on a prudent basis to allow for any unforeseen events, which might arise towards the end of an accounting period. Phasing of dividends would also take account of the volatility of the Bank's profits.

Other financial information

Other financial information required under the Banking (Disclosure) Rules and Financial Institutions (Resolution) (Loss-absorbing Capacity Requirements – Banking Sector) Rules can be viewed in the Banking Disclosure Statement that is available in the Regulatory Disclosures section of our website www.hangseng.com.

(b) Treasury Risk

Foreign exchange exposures

(unaudited)

Structural foreign exchange exposures represent net assets or capital investments in subsidiaries, branches or the fair value of the Group's long-term foreign currency equity investments, the functional currencies of which are currencies other than the Hong Kong dollar. An entity's functional currency is normally that of the primary economic environment in which the entity operates.

Exchange differences on structural exposures are recognised in 'Other comprehensive income'. The Group uses Hong Kong dollar as our presentation currency in our consolidated financial statements. Therefore, our consolidated balance sheet is affected by exchange differences between Hong Kong dollar and all the non-Hong Kong dollar functional currencies of underlying subsidiaries.

The Group's structural foreign exchange exposures are managed with the primary objective of ensuring, where practicable, that the Group's consolidated capital ratios and the capital ratios of individual banking subsidiaries are largely protected from the effect of changes in exchange rates.

The Group's foreign exchange exposures are prepared in accordance with the HKMA 'Return of Foreign Currency Position -(MA(BS)6)'.

For details of the Group's non-structural and structural foreign currency positions, please refer to the Banking Disclosure Statement that is available in the 'Regulatory Disclosures' section of the Bank's website.

Liquidity and funding risk

(audited)

Overview

Liquidity risk is the risk that we do not have sufficient financial resources to meet our obligations as they fall due or that we can only do so at an excessive cost. Liquidity risk arises from mismatches in the timing of cash flows. Funding risk is the risk that funding considered to be sustainable, and therefore used to fund assets, is not sustainable over time. Funding risk arises when illiquid asset positions cannot be funded at the expected terms and when required.

Liquidity and funding risk profile

The Group adopt HSBC Group's policies, metrics and controls which aim to allow us to withstand very severe liquidity stresses. The global policies are designed to be adaptable to changing business models, markets and regulations. They are designed to ensure that Group and entity management have oversight of our liquidity and funding risks in order to manage them appropriately.

We manage liquidity and funding risk at an operating entity level to ensure that obligations can be met in the jurisdiction where they fall due, generally without reliance on other parts of the Group. Operating entities are required to meet internal minimum requirements and any applicable regulatory requirements at all times. These requirements are set against the Group's implementation of the LCR and the NSFR. Each operating entity is required to undertake a qualitative and quantitative assessment of the contractual and behavioural profile of its assets and liabilities when setting internal limits in order to reflect their expected behaviour under idiosyncratic, market-wide and combined stress scenarios.

Structure and organisation

ALCM teams are responsible for the application of policies and controls at a local operating entity level. The elements of the Group's policies and controls are underpinned by a robust governance framework, the two major elements of which are:

- ALCOs at the Group and entity level; and
- annual ILAAP used to validate risk tolerance and set risk appetite.

All operating entities are required to prepare an internal liquidity adequacy assessment ('ILAA') document at appropriate frequency. The final objective of the ILAA, approved by the relevant Board of Directors, is to verify that the entity and subsidiaries maintain liquidity resources which are adequate in both amount and quality at all times, there is no significant risk that its liabilities cannot be met as they fall due, and a prudent funding profile is maintained.

The Board is ultimately responsible for determining the types and magnitude of liquidity risk that the Group is able to take and ensuring that there is an appropriate organisation structure for managing this risk. Under authorities delegated by the Executive Committee, the Group ALCO is responsible for managing all Asset, Liability and Capital Management issues including liquidity and funding risk management.

(b) Treasury Risk

Liquidity and funding risk continued

(audited)

Structure and organisation continued

The Group ALCO delegates to the Group Tactical Asset and Liability Management Committee ('TALCO') the task of reviewing various analysis of the Group pertaining to liquidity and funding.

Compliance with liquidity and funding requirements is monitored by the ALCO and is reported to the RMM, Executive Committee, RC and the Board of Directors on a regular basis. This process includes:

- maintaining compliance with relevant regulatory requirements of the reporting entity;
- projecting cash flows under various stress scenarios and considering the level of liquid assets necessary in relation thereto;
- monitoring liquidity and funding ratios against internal and regulatory requirements;
- maintaining a diverse range of funding sources with adequate back-up facilities;
- managing the concentration and profile of term funding;
- managing contingent liquidity commitment exposures within pre-determined limits;
- maintaining debt financing plans;
- monitoring depositor concentration in order to avoid undue reliance on large individual depositors and ensuring a satisfactory overall funding mix; and
- maintaining liquidity contingency plans. These plans identify early indicators of stress conditions and describe actions to be taken in the event of difficulties arising from systemic or other crises, while minimising adverse long-term implications for the business.

Governance

ALCM teams apply the Group's policies and controls at both an individual entity and Group level, and are responsible for the implementation of Group-wide and local regulatory policy at a legal entity level. Markets Treasury has responsibility for cash and liquidity management.

Treasury Risk Management carries out independent review, challenge and assurance of the appropriateness of the risk management activities undertaken by ALCM and Markets Treasury. Their work includes setting control standards, advising on policy implementation, and reviewing and challenging of reporting.

Internal Audit provide independent assurance that risk is managed effectively.

The management of liquidity and funding risk

Funding and liquidity plans form part of the financial resource plan that is approved by the Board. The critical Board risk appetite measures are the LCR and NSFR. An internal liquidity metric ('ILM') is used to supplement these regulatory metrics. An appropriate funding and liquidity profile is managed through a wider set of measures:

- a minimum LCR requirement;
- a minimum NSFR requirement;
- an ILM requirement;
- a depositor concentration limit;
- cumulative term funding maturity concentration limit;
- liquidity metrics to monitor minimum requirement by currency;
- intra-day liquidity;
- the application of liquidity funds transfer pricing; and
- forward-looking funding assessments.

(b) Treasury Risk

Liquidity and funding risk continued

(audited)

The management of liquidity and funding risk continued

Liquidity coverage ratio

(unaudited)

The LCR aims to ensure that a bank has sufficient unencumbered high-quality liquid assets ('HQLA') to meet its liquidity needs in a 30-calendar-day liquidity stress scenario.

At 31 December 2022, the LCR of all the Group's principal operating entities were well above regulatory minimums and above the internally expected levels established by the Board.

Net stable funding ratio

(unaudited)

The Group uses the NSFR as a basis for ensuring operating entities raise sufficient stable funding to support their business activities. The NSFR requires institutions to maintain minimum amount of stable funding based on assumptions of asset liquidity.

At 31 December 2022, the NSFR of all the Group's principal operating entities were above the internally expected levels established by the Board.

Depositor concentration and term funding maturity concentration

(unaudited)

The LCR and NSFR metrics assume a stressed outflow based on a portfolio of depositors within each deposit segment. The validity of these assumptions is challenged if the portfolio of depositors is not large enough to avoid depositor concentration. Operating entities are exposed to term refinancing concentration risk if the current maturity profile results in future maturities being overly concentrated in any defined period.

At 31 December 2022, the depositor concentration and term funding maturity concentration of all the Group's principal operating entities were within the internally expected levels established by the Board.

Sources of funding

(unaudited)

Our primary sources of funding are customer deposits. We issue wholesale securities to supplement our customer deposits and change the currency mix or maturity profile of our liabilities.

Currency mismatch

(unaudited)

Group policy requires all operating entities to monitor material single currency ILM and LCR. Limits are set to ensure that outflows can be met, given assumptions on stressed capacity in the FX swap markets.

Additional contractual obligations

(unaudited)

Under the terms of our current collateral obligations under derivative contracts (which are International Swaps and Derivatives Association ('ISDA') compliant CSA contracts), the additional collateral required to post in the event of one-notch and two-notch downgrade in credit ratings is nil.

(b) Treasury Risk

Liquidity and funding risk continued

(audited)

The management of liquidity and funding risk continued

Liquidity and funding risk in 2022

(unaudited)

The Group is required to calculate its LCR and NSFR on a consolidated basis in accordance with rule 11(1) of The Banking (Liquidity) Rules ('BLR') and is required to maintain both LCR and NSFR of not less than 100%.

The average LCRs for the periods are as follows:

	Quarter ended							
	31 Dec 2022	**30 Sep 2022**	**30 Jun 2022**	**31 Mar 2022**	31 Dec 2021	30 Sep 2021	30 Jun 2021	31 Mar 2021
Average LCR	**275.3%**	**230.5%**	**206.8%**	**188.9%**	191.8%	203.2%	214.4%	204.0%

The liquidity position of the Group remained strong in 2022. The average LCR ranged from 188.9% to 275.3% for the reportable quarters. The LCR at 31 December 2022 was 281.3% (192.7% at 31 December 2021).

The composition of the Group's HQLA as defined under Schedule 2 of the BLR is shown as below. The majority of the HQLA held by the Group are Level 1 assets which consist mainly of government debt securities.

	Weighted value (average) for the quarter ended							
	31 Dec 2022	**30 Sep 2022**	**30 Jun 2022**	**31 Mar 2022**	31 Dec 2021	30 Sep 2021	30 Jun 2021	31 Mar 2021
Level 1 assets	**400,658**	**381,314**	**353,034**	**344,686**	350,120	342,427	355,092	377,648
Level 2A assets	**12,385**	**13,549**	**15,579**	**17,109**	17,013	15,138	15,464	14,301
Level 2B assets	**2,827**	**3,423**	**3,742**	**3,099**	2,321	2,445	3,073	2,169
Total	**415,870**	**398,286**	**372,355**	**364,894**	369,454	360,010	373,629	394,118

In accordance with the Banking (Liquidity) Rules, the Net Stable Funding Ratio ('NSFR') was implemented in Hong Kong with effect from 1 January 2018. The Group is required to calculate NSFR on a consolidated basis and maintain a NSFR of not less than 100%.

The NSFR for the reportable periods are as follows:

	At quarter ended							
	31 Dec 2022	**30 Sep 2022**	**30 Jun 2022**	**31 Mar 2022**	31 Dec 2021	30 Sep 2021	30 Jun 2021	31 Mar 2021
NSFR	**163.8%**	**155.2%**	**155.0%**	**151.3%**	147.4%	146.6%	146.6%	150.5%

The funding position of the Group remained strong and stable in 2022. The NSFR was 163.8% for the quarter ended 31 December 2022 (147.4% as at 31 December 2021), highlighting a surplus of available stable funding relative to the required stable funding requirement.

To comply with the Banking (Disclosure) Rules, the details of liquidity information can be found in the Regulatory Disclosures section of our website www.hangseng.com.

(b) Treasury Risk

Liquidity and funding risk continued

(audited)

Analysis of cash flows payable under financial liabilities by remaining contractual maturities

(audited)

	Within 1 month	Over 1 month but within 3 months	Over 3 months but within 1 year	Over 1 year but within 5 years	Over 5 years	Total
At 31 December 2022						
Deposits from banks	**4,978**	**1**	**229**	**–**	**–**	**5,208**
Current, savings and other deposit accounts	**910,602**	**169,288**	**163,287**	**12,266**	**–**	**1,255,443**
Repurchase agreements – non-trading	**8,525**	**1,074**	**1,722**	**–**	**–**	**11,321**
Trading liabilities	**46,323**	**–**	**–**	**–**	**–**	**46,323**
Derivative financial instruments	**20,587**	**140**	**146**	**113**	**–**	**20,986**
Financial liabilities designated at fair value	**13,972**	**13,979**	**11,744**	**7,024**	**330**	**47,049**
Certificates of deposit and other debt securities in issue	**7,220**	**31,158**	**56,758**	**–**	**–**	**95,136**
Other financial liabilities	**16,134**	**6,931**	**7,823**	**1,205**	**207**	**32,300**
Subordinated liabilities	**–**	**404**	**1,556**	**25,359**	**8,259**	**35,578**
	1,028,341	**222,975**	**243,265**	**45,967**	**8,796**	**1,549,344**
Loan commitments	**518,838**	**–**	**–**	**–**	**–**	**518,838**
Contingent liabilities and financial guarantee contracts	**24,959**	**–**	**–**	**–**	**–**	**24,959**
	543,797	**–**	**–**	**–**	**–**	**543,797**
At 31 December 2021						
Deposits from banks	5,333	–	–	–	–	5,333
Current, savings and other deposit accounts	1,116,989	83,461	27,914	2,362	–	1,230,726
Repurchase agreements – non-trading	13,393	729	1,683	812	–	16,617
Trading liabilities	44,291	–	–	–	–	44,291
Derivative financial instruments	11,889	69	249	106	–	12,313
Financial liabilities designated at fair value	8,160	9,953	9,056	15	377	27,561
Certificates of deposit and other debt securities in issue	19,709	23,018	39,060	–	–	81,787
Other financial liabilities	16,746	6,604	4,911	1,209	271	29,741
Subordinated liabilities	–	100	327	12,664	13,572	26,663
	1,236,510	123,934	83,200	17,168	14,220	1,475,032
Loan commitments	514,920	–	–	–	–	514,920
Contingent liabilities and financial guarantee contracts	28,950	–	–	–	–	28,950
	543,870	–	–	–	–	543,870

(b) Treasury Risk

Liquidity and funding risk continued

(audited)

Analysis of cash flows payable under financial liabilities by remaining contractual maturities continued

(audited)

The balances in the above tables incorporate all cash flows relating to principal and future coupon payments on an undiscounted basis. Trading liabilities and trading derivatives have been included in the 'Within one month' time bucket as they are typically held for short periods of time. The undiscounted cash flows payable under hedging derivative liabilities are classified according to their contractual maturity. Investment contract liabilities have been included in financial liabilities designated at fair value and are reported in the 'Over 5 years' time bucket. The undiscounted cash flows potentially payable under loan commitments and financial guarantee contracts are classified on the basis of the earliest date they can be called. Cash flows payable in respect of customer accounts are primarily contractually repayable on demand or at short notice.

Interest Rate Risk in the Banking Book

(unaudited)

Assessment and risk appetite

Interest rate risk in the banking book is the risk of an adverse impact to earnings or capital due to changes in market interest rates. It is generated by our non-traded assets and liabilities, specifically loans, deposits and financial instruments that are not held for trading intent or held in order to hedge positions held with trading intent. Interest rate risk that can be economically hedged may be transferred to the Markets Treasury business. Hedging is generally executed through interest rate derivatives or fixed-rate government bonds. Any interest rate risk that Markets Treasury cannot economically hedge is not transferred and will remain within the global business where the risks originate.

The ALCM and Markets Treasury functions use a number of measures to monitor and control interest rate risk in the banking book, including:

- net interest income sensitivity;
- economic value of equity sensitivity; and
- hold -to-collect-and-sell value at risk.

Net interest income sensitivity

(audited)

A principal part of our management of non-traded interest rate risk is to monitor the sensitivity of expected net interest income ('NII') under varying interest rate scenarios (i.e. simulation modelling), where all other economic variables are held constant. This monitoring is undertaken at an entity level by local ALCOs, where entities calculate both one-year and five-year NII sensitivities across a range of interest rate scenarios.

The table below sets out the effect on future net interest income of 100 basis points parallel rises or falls in all yield curves at the beginning of year from 1 January 2023 and 25 basis points parallel rises or falls in all yield curves at the beginning of year from 1 January 2023.

Assuming no management actions and all other non-interest rate risk variables remain constant, such a series of parallel rises in all yield curves would increase expected net interest income for the year ended 31 December 2023 by HK$2,659m for 100 basis points case and by HK$696m for 25 basis points case, while such a series of parallel falls in all-in yield curves would decrease expected net interest income by HK$3,218m for 100 basis points case and by HK$776m for 25 basis points case.

(b) Treasury Risk

Interest Rate Risk in the Banking Book continued

(unaudited)

Net interest income sensitivity continued

(audited)

The expected net interest income sensitivity is described as follows:

	100bp parallel increase	100bp parallel decrease	25bp parallel increase	25bp parallel decrease
Change in 2023 expected net interest income				
– HKD	**1,024**	**(1,366)**	**285**	**(330)**
– USD	**493**	**(518)**	**123**	**(128)**
– Other	**1,142**	**(1,334)**	**288**	**(318)**
Total	**2,659**	**(3,218)**	**696**	**(776)**
Change in 2022 expected net interest income				
– HKD	4,422	(3,392)	1,383	(1,394)
– USD	1,110	(870)	302	(290)
– Other	828	(893)	219	(209)
Total	6,360	(5,155)	1,904	(1,893)

NII sensitivity figures set out in the table above represent the effect of pro forma movements in projected yield curves based on a static balance sheet size and structure. The exception to this is where the size of the balances or repricing is deemed interest rate sensitive, for example, non-interest-bearing current account migration and fixed-rate loan early prepayment. These sensitivity calculations do not incorporate actions that would be taken by Markets Treasury or in the business that originates the risk to mitigate the effect of interest rate movements.

The NII sensitivity calculations assume that interest rates of all maturities move by the same amount in the 'up-shock' scenario. The sensitivity calculations in the 'down-shock' scenarios reflect no floors to the shocked market rates. However, customer product-specific interest rate floors are recognised where applicable.

Economic value of equity sensitivity

Economic value of equity ('EVE') represents the present value of the future banking book cash flows that could be distributed to equity holders under a managed run-off scenario. This equates to the current book value of equity plus the present value of future NII in this scenario. EVE can be used to assess the economic capital required to support interest rate risk in the banking book. An EVE sensitivity represents the expected movement in EVE due to pre-specified interest rate shocks, where all other economic variables are held constant. Operating entities are required to monitor EVE sensitivities as a percentage of capital resources.

The Group's EVE sensitivity is prepared in accordance with the HKMA 'Return of Interest Rate Risk Exposure -(MA(BS)12A)'. For details of the Group's EVE sensitivity, please refer to the Banking Disclosure Statement that will be available in the 'Regulatory Disclosures' section of the Bank's website.

(b) Treasury Risk

Interest Rate Risk in the Banking Book continued

(unaudited)

Sensitivity of reserves

The Group monitors the sensitivity of reported cash flow hedge reserves to interest rate movements on a quarterly basis by assessing the expected reduction in valuation of cash flow hedge due to parallel movements of plus or minus 100bps in all yield curves. These particular exposures form only a part of the Group's overall interest rate risk exposures.

The following table describes the sensitivity of reported cash flow hedge reserves to the stipulated movements in yield curves. The sensitivities are indicative and based on simplified scenarios.

	At 31 December 2022	**Maximum impact**	**Minimum impact**
+ 100 basis points parallel move in all yield curves	**(364)**	**(372)**	**(134)**
As a percentage of shareholders' equity at 31 December 2022 (%)	**(0.20)**	**(0.20)**	**(0.07)**
- 100 basis points parallel move in all yield curves	**420**	**445**	**177**
As a percentage of shareholders' equity at 31 December 2022 (%)	**0.23**	**0.24**	**0.10**

	At 31 December 2021	Maximum impact	Minimum impact
+ 100 basis points parallel move in all yield curves	(52)	(52)	(35)
As a percentage of shareholders' equity at 31 December 2021(%)	(0.03)	(0.03)	(0.02)
- 100 basis points parallel move in all yield curves	69	71	41
As a percentage of shareholders' equity at 31 December 2021 (%)	0.04	0.04	0.02

(c) Market risk

Overview

Market risk is the risk that movements in market factors, such as foreign exchange rates, interest rates, credit spreads, equity prices and commodity prices, will reduce our income or the value of our portfolios.

Key developments in 2022

There were no material changes to our policies and practices for the management of market risk in 2022.

Governance and structure

The following diagram summarises the main business areas where trading market risks reside and the market risk measures used to monitor and limit exposures.

	Trading Risk
Risk Type	– Foreign exchange & Commodities – Interest rates – Credit spreads – Equities
Risk Measure	Value at risk/Sensitivity/Stress testing

The objective of the Group's risk management policies and measurement techniques is to manage and control market risk exposures to optimise return on risk while maintaining a market profile consistent with the established risk appetite.

(c) Market risk

Market risk governance

(audited)

Market risk is managed and controlled through limits approved by the Group's Board of Directors. These limits are allocated across business lines and to the Group's legal entities.

The Group has an independent market risk management and control sub-function, which is responsible for measuring, monitoring and reporting market risk exposures against limits on a daily basis. Each operating entity is required to assess the market risks arising in its business and to transfer them either to its Global Markets for management, or to separate books managed under the supervision of the ALCO.

The Traded Risk function enforces the controls around trading in permissible instruments approved for each site as well as changes that follow completion of the new product approval process. Traded Risk also restricts trading in the more complex derivatives products to offices with appropriate levels of product expertise and robust control systems.

Key risk management processes

(unaudited)

Monitoring and limiting market risk exposures

The Group's objective is to manage and control market risk exposures while maintaining a market profile consistent with the Group's risk appetite. The Group uses a range of tools to monitor and limit market risk exposures including sensitivity analysis, value at risk ('VaR') and stress testing.

Sensitivity analysis

(unaudited)

Sensitivity analysis measures the impact of individual market factor movements on specific instruments or portfolios including interest rates, foreign exchange rates and equity prices. The Group uses sensitivity measures to monitor the market risk positions within each risk type. Granular sensitivity limits are set for trading desks with consideration of market liquidity, customer demand and capital constraints, among other factors.

Value at risk ('VaR')

VaR is a technique for estimating potential losses on risk positions as a result of movements in market rates and prices over a specified time horizon and to a given level of confidence. The use of VaR is integrated into market risk management and calculated for all trading positions regardless of how the Group capitalises them. Where VaR is not calculated explicitly, the Group uses alternative tools as summarised in the 'Stress testing' section below.

The VaR models used by the Group are predominantly based on historical simulation that incorporates the following features:

- historical market rates and prices, which are calculated with reference to foreign exchange rates, commodity prices, interest rates, equity prices and the associated volatilities;
- potential market movements that are calculated with reference to data from the past two years;
- Standard VaR is calculated to a 99% confidence level and using a one-day holding period; and
- Stressed VaR uses a 10-day holding period and a 99% confidence interval based on a continuous one-year historical significant stress period.

The models also incorporate the effect of the option features on the underlying exposures. The nature of the VaR models means that an increase in observed market volatility will lead to an increase in VaR without any changes in the underlying positions.

VaR model limitations

Although a valuable guide to risk, VaR is used with awareness of its limitations. For example:

- the use of historical data as a proxy for estimating future market moves may not encompass all potential market events, particularly those that are extreme in nature;
- the use of a one-day holding period for risk management purposes of trading books assumes that this short period is sufficient to hedge or liquidate all positions;
- the use of a 99% confidence level by definition does not take into account losses that might occur beyond this level of confidence; and
- VaR is calculated on the basis of exposures outstanding at the close of business and therefore does not reflect intra-day exposures.

(c) Market risk

Key risk management processes continued

(unaudited)

Risk not in VaR ('RNIV') framework

(unaudited)

The risks not in VaR ('RNIV') framework captures and capitalises material market risks that are not adequately covered in the VaR model.

Risk factors are reviewed on a regular basis and are either incorporated directly in the VaR models, where possible, or quantified through either the VaR-based RNIV approach or a stress test approach within the RNIV framework. While VaR-based RNIVs are calculated by using historical scenarios, stress-type RNIVs are estimated on the basis of stress scenarios whose severity is calibrated to be in line with the capital adequacy requirements.

Stress testing

(audited)

Stress testing is an important procedure that is integrated into the Group's market risk management framework to evaluate the potential impact on portfolio values of more extreme, although plausible, events or movements in a set of financial variables. In such scenarios, losses can be much greater than those predicted by VaR modelling.

Stress testing is implemented at legal entity and overall Group levels. A scoring framework is in place for management to effectively assess the severity of the potential stress losses and the likelihood of occurrence of the stress scenarios. The risk appetite around potential stress losses for the Group is set and monitored against a referral limit.

Market risk reverse stress tests are designed to identify vulnerabilities in our portfolios by looking for scenarios that lead to loss levels considered severe for the relevant portfolio. These scenarios may be quite local or idiosyncratic in nature, and complement the systematic top-down stress testing.

Stress testing and reverse stress testing provide senior management with insights regarding the 'tail risk' beyond VaR, for which risk appetite is limited.

Trading portfolios

Trading portfolios comprise positions held for client servicing and market-making, with the intention of short-term resale and/or to hedge risks resulting from such positions.

Market risk in 2022

(unaudited)

During 2022, financial markets were driven by concerns over high inflation and recession risks, against the backdrop of the Russia-Ukraine conflict and continued COVID-19 pandemic restrictions in Asia. Throughout the year, major central banks tightened their monetary policies at a faster pace than previously anticipated in order to counter rising inflation. As a result, bond markets sold off sharply and bond yields rose to multi-year highs. Equity valuations saw pronounced volatility and fell across most market sectors due to recession risks and tighter liquidity conditions. Foreign exchange markets were largely dominated by a strong US dollar, as a result of global geopolitical instability and the relatively fast pace of monetary tightening by the US Federal Reserve. Investors sentiment remained fragile in credit markets, with credit spreads in investment-grade and high-yield debt benchmarks reaching their widest levels since the start of the COVID-19 pandemic. The Chinese property sector was underperforming in 2022, continuing the wave of defaults and debt restructuring from 2021.

The Group continued to manage market risk prudently during 2022. Sensitivity exposures and VaR remained within appetite as the business pursued its core market-making activity in support of our customers. Market risk was managed using a complementary set of risk measures and limits, including stress and scenario analysis.

(c) Market risk

Trading portfolios

(unaudited)

Value at risk of the trading portfolios

The Trading VaR at 31 December 2022 increased when compared against 31 December 2021, mainly driven by interest rate trading positions. In average terms, the VaR level however was lower in 2022.

The Group's trading VaR for the year is shown in the table below.

Trading value at risk, 99% 1 day

(audited)

	At 31 December 2022	Maximum during the year	Average for the year
VaR			
Total	**32**	**43**	**34**
Foreign exchange trading	**2**	**13**	**3**
Interest rate trading	**31**	**42**	**34**
Portfolio diversification	**(1)**	**N/A**	**N/A**

	At 31 December 2021	Maximum during the year	Average for the year
VaR			
Total	31	55	40
Foreign exchange trading	3	28	20
Interest rate trading	31	51	35
Portfolio diversification	(3)	N/A	N/A

1 Trading portfolios comprise positions arising from the market-making and warehousing of customer-derived positions.

2 Portfolio diversification is the market risk dispersion effect of holding a portfolio containing different risk types. It represents the reduction in unsystematic market risk that occurs when combining a number of different risk types, for example, interest rate and foreign exchange, together in one portfolio. It is measured as the difference between the sum of the VaR by individual risk type and the combined total VaR. A negative number represents the benefit of portfolio diversification. As the maximum and minimum occur on different days for different risk types, it is not meaningful to calculate a portfolio diversification benefit for these measures.

Backtesting

(unaudited)

The Group routinely validates the accuracy of the VaR models by back-testing the VaR metric against both actual and hypothetical profit and loss. Hypothetical profit and loss excludes non-modelled items such as fees, commissions and revenue of intra-day transactions.

The number of hypothetical loss back-testing exceptions, together with a number of other indicators, are used to assess model performance and to consider whether enhanced internal monitoring of a VaR model is required.

Equities exposures

(audited)

The Group's equities exposures in 2022 and 2021 are reported as 'Financial assets designated and otherwise mandatorily measured at fair value through profit or loss', 'Financial investments' and 'Trading assets' in the consolidated financial statements. These are subject to trading limit and risk management control procedures and other market risk regime.

(d) Climate risk

(unaudited)

Overview

Climate risk relates to the financial and non-financial impacts that may arise as a result of climate change and the move to a greener economy. Climate change can impact the organisation through a number of channels:

Physical risk can arise through increasing severity and/or frequency of severe weather or other climatic events, such as rising sea levels and flooding.

Transition risk, can arise from the move to a low carbon economy, such as through policy, regulatory and technological changes.

Greenwashing risk is a thematic risk that can materialise from the act of knowingly or unknowingly misleading stakeholders regarding our strategy relating to climate, the climate impact/benefits of a product or service, or regarding the climate commitments or performance of our customers.

Approach and policy

Climate risks may affect us either directly, or through our relationships with our customers, resulting in both financial and non-financial impacts.

We may face direct exposure to the physical impacts of climate change which could negatively affect our day-to-day operations. In addition, if we are perceived to mislead stakeholders on our business activities or if we fail to achieve our stated carbon neutrality ambitions, we could face greenwashing risk resulting in significant reputational damage and potential regulatory fines, impacting the firm's revenue generating ability.

Our customers may find that their business models fail to align to a low carbon economy or that extreme or chronic changes in weather cause disruption to their operations. Any detrimental impact to our customers from climate risk could negatively impact us either through credit losses on our loan book or losses on trading assets. We may also be impacted by reputational concerns related to the climate action or inaction of our customers.

Climate Risk has been integrated into our existing Risk Taxonomy and is being incorporated within the Risk Management Framework through the policies and controls for the existing risks where appropriate.

Our approach to climate risk is aligned to our risk management framework and three lines of defence ('3LOD') model, which sets out how we identify, assess, and manage our risks. This approach ensures the Board and senior management have visibility and oversight of our key climate risks.

The first line of defence has ultimate accountability for managing climate risk in line with risk appetite and owns the related controls.

The second line of defence sets policies and minimum control standards, provides subject matter expertise and review and challenge to first line activities to ensure actions relating to climate are appropriate. Risk Stewards in the existing Risk Taxonomy are responsible for the oversight of climate risk impacts on their risk types.

The third line of defence provides independent assurance to management that climate risk management, governance and control processes are designed and operating effectively.

Our initial approach focused on understanding physical and transition impacts across five priority risk types: wholesale credit risk, retail credit risk, reputational risk, resilience risk and regulatory compliance risk.

We consider Greenwashing to be an important emerging risk which is likely to increase over time, as we look to develop capabilities and products to achieve our carbon neutrality commitments, and work with our clients to help them transition to a low carbon economy. To reflect this, our Climate Risk Approach has been updated to include greenwashing and guidance has been provided to the first and second lines of defence on the key risk indicators, and how it should be managed.

(d) Climate risk

(unaudited)

Overview continued

Approach and policy continued

Climate Risk - Primary Risk

Drivers		Details	Potential Impacts
Physical	Acute	Increased frequency and severity of weather events causing disruption to business operations	• Decreased real estate values • Decreased household income and wealth • Increased costs of legal and compliance • Increased public scrutiny • Decreased profitability • Lower asset performance
	Chronic	Longer-term shifts in climate patterns (e.g. sustained higher temperatures) that may cause sea level rise or chronic heat waves	
Transition	Policy and legal	Mandates on, and regulation of, existing products and services. Litigation from parties who have suffered from the effects of climate change	
	Technology	Replacement of existing products with lower emission options	
	End-demand (market)	Changing consumer behaviour	
	Reputational	Increased scrutiny following a change in stakeholder perceptions of climate-related action or inaction	

Climate Risk - Thematic Risk

Drivers		Details
Greenwashing	Firm Based	Failure to be accurate and transparent in communicating our progress against our carbon neutrality ambition
	Product	Not taking steps to ensure our 'green' and 'sustainable' products are developed and marketed appropriately
	Client	Failing to check our products are being used for 'green' and 'sustainable' business activity and assessing the credibility of our customers' climate commitments and/or progress against KPIs

Climate risk management

Key developments in 2022

We continue to accelerate the development of our climate risk management capabilities. The key achievements in 2022 include:

- Developed new climate risk metrics to cover our retail mortgage portfolio in Hong Kong.
- Enhanced our corporate transition questionnaire and scoring tool to clients in high transition risk sectors.
- Development of our internal climate stress testing and scenarios capability, including model development and delivery regulatory climate stress tests.

Governance and structure

The Board takes overall responsibility for our climate strategy, overseeing executive management in the development of the approach, execution and associated reporting.

The Chief Risk Officer is responsible for the management of climate-related risks. Our Climate Risk Working Group is responsible for overseeing our climate related risk management.

Risk appetite

Our climate risk appetite supports the oversight and management of the financial and non-financial risks from climate change, meets regulatory expectations and supports the business to deliver our climate ambition in a safe and sustainable way. Our initial risk appetite has focused on the oversight and management of climate risks, including metrics relating to our high transition risk sectors in our wholesale portfolio and physical risk exposures in our retail portfolio. We continue to review our risk appetite regularly to ensure that it captures the most material climate risks and will develop appropriate metrics to measure and monitor these risks.

(d) Climate risk

(unaudited)

Climate risk management continued

Policies, processes and controls

We are integrating climate risk into the policies, processes and controls for key areas, and we will continue to update these as our climate risk management capabilities mature over time.

In 2022, we have updated policies and incorporated climate considerations into our new money request processes for our wholesale business. We also adopted the updated Energy Policy, covering oil and gas, power and utilities, hydrogen, renewables, nuclear and biomass, as well as the updated thermal coal phase-out policy after its initial publication in 2021. Our Transition risk scoring tool has been enhanced for our corporate portfolios, which will enable us to assess our customers exposures to climate risk.

Wholesale credit risk

Identification and assessment

We have identified six key sectors where our wholesale credit customers have the highest climate transition risk, based on their carbon emissions. These are oil and gas, building and construction, chemicals, automotive, power and utilities, and metals and mining. We continue to roll out our transition and physical risk questionnaire to our largest customers in high-risk sectors, with the addition of four more sectors: agriculture, industrials, real estate and transportation. The questionnaire helps us to assess and improve our understanding of the impact of climate changes on our customers' business models and any related transition strategies. It also helps us to identify potential business opportunities to support the transition.

Management

In 2022, we updated our credit policy to incorporated climate considerations in credit applications for new money requests. We continued using a scoring tool, which provides a climate risk score for each customer based on questionnaire responses. The scoring tool will be enhanced and refined over time as more data becomes available. The results of the tool have been provided to business and risk management teams. In 2023 we aim to further embed climate risk considerations in our credit risk management processes.

Aggregation and reporting

We internally report our transition risk exposure consumed by the six high transition risk sectors in the wholesale portfolio.

Retail credit risk

Identification and assessment

We continue to enhance our identification and assessment of climate risk, prioritizing our largest portfolios, by increasing our investment in physical risk data and by developing internal capabilities.

In 2022, we undertook an internal climate stress testing exercise to further our understanding and assessment of the potential impact of physical risk to our mortgage portfolios.

Management

We continue to review and update our retail credit risk management policies and processes to further embed climate risk, whilst also monitoring local regulatory developments to ensure compliance.

Aggregation and reporting

We implemented physical risk exposure metric for retail mortgage portfolio in 2022.

Resilience risk

Identification and assessment

Our Operational and Resilience Risk is responsible for overseeing the identification and assessment of physical and transition risks that may impact on the organisation's operational and resilience capabilities.

We are developing a deeper understanding of the risks to which our properties are subject to, and assess the mitigants to ensure ongoing operational resilience.

Management

HSBC Group continue to develop the operational and resilience risk policies and the underlying measurement capability. This embeds climate risk management within our risk management framework.

Aggregation and reporting

With our ambition to achieve net zero in our own operation, we are particularly focused on developing measures to facilitate proactive risk management and assess progress against this strategic target.

Operational and Resilience Risk is represented on the climate risk related committees and working groups.

(d) Climate risk

(unaudited)

Regulatory compliance risk

Identification and assessment

During 2022, key regulatory compliance risks under consideration have evolved to also include Post-sale Servicing, Complaints Handling, and Market Abuse. The priority risk focus remains on greenwashing, namely the development and ongoing governance of new, changed or withdrawn products/services and ensuring sales practices and marketing materials are clear, fair and not misleading.

To support the ongoing management and mitigation of greenwashing risk, the Compliance sub-functions have worked across all business lines to enhance our product controls. This has improved our ability to identify, assess and manage product-related greenwashing risks throughout the product governance lifecycle. Examples of ongoing enhancements include:

- Integrating the consideration and mitigation of climate/ ESG-related risks within the Regulatory Compliance Risk Taxonomy and Control Library ('RTCL') and the existing New and Ongoing Product Management Policy.
- Ensure climate risk is actively considered and documented in the enhanced product templates/forms by the business within product review and creation.
- The HSBC Group's Regulatory Conduct has implemented requirements in the Group Product Governance Enhancement Guide to ensure climate risks are robustly assessed, documented and mitigated, and will be seeking assurance validation and rollout at regionally level covering the Bank.

Management

Our policies continue to set the minimum standards that are required to manage the risk of breaches of our regulatory duty to customers, including those related to climate risk, ensuring fair customer outcomes are achieved. Our product and customer lifecycle policies have been enhanced to ensure consideration of climate risks and are reviewed on a periodic basis to ensure they remain relevant and up-to-date.

The Compliance sub-function continues to focus on improving the capability of Compliance colleagues through the provision of ongoing training, communications and dedicated guidance. An area of particular focus is ensuring Compliance colleagues remain up to date with changes in the evolving regulatory landscape.

Aggregation and reporting

HSBC Group Compliance continues to operate an ESG and Climate Risk Working Group at HSBC Group level to track and monitor the integration and embedding of climate risk within the management of regulatory compliance risks. In addition, the working group continues to monitor ongoing regulatory and legislative changes across the sustainability and climate risk agenda. In Asia-Pacific, a working group was established in February 2022 to coordinate the regional implementation of climate risk-related enhancements across the Compliance Advisory function.

HSBC Group have continued to develop key climate-related metrics and indicators, aligned to the broader focus on regulatory compliance risks, to continually improve the risk monitoring capability. This has included the development of a climate-specific risk profile, which is produced at HSBC Group level and regularly disseminated and reviewed at the Regional level, alongside the development of new and improvements to existing metrics and indicators.

HSBC Group Compliance continues to be represented at HSBC Group's Climate Risk Oversight Forum.

(e) Resilience risk

(unaudited)

Overview

Resilience risk is the risk of sustained and significant business disruption, execution, delivery or physical security or safety events, causing the inability to provide critical services to our customer, affiliates, and counterparties. Resilience risk arises from failures or inadequacies in processes, people, systems or external events.

Resilience risk management

Key developments in 2022

The Operational and Resilience Risk sub-function provides robust Risk Steward oversight of the management of risk by the Group businesses, functions and legal entities. This includes effective and timely independent challenge and expert advice. During the year, we carried out a number of initiatives to keep pace with geopolitical, regulatory and technology changes and to strengthen the management of resilience risk:

- We focused on enhancing our understanding of our risk and control environment, by updating our risk taxonomy and control libraries, and refreshing risk and control assessments.
- We implemented heightened monitoring and reporting of cyber, third party, business continuity and payment/sanctions risks resulting from the Russia/Ukraine war and enhanced controls and key processes where needed.
- We provided analysis and reporting of non-financial risks providing easy-to-access risk and control information and metrics that enable management to focus on non-financial in their decision-making and appetite setting.
- We further strengthened our non-financial risk governance and senior leadership, and improved our coverage and Risk Steward Oversight for data privacy and change execution. We prioritise our efforts on material risks and areas undergoing strategic growth, aligning our location strategy to this need.

Governance and structure

The Operational and Resilience Risk target operating model provides a globally consistent view across resilience risks, strengthening our risk management oversight while operating effectively as part of a simplified non-financial risk structure. We view resilience risk across nine sub-risk types related to: failure to manage third parties; technology and cybersecurity; transaction processing; failure to protect people and places from physical malevolent acts; business interruption and incident risk; data risk; change execution risk; building unavailability; and workplace safety.

Risk appetite and key escalations for resilience risk are reported to the Risk Management Meeting, chaired by the Chief Risk Officer, with an escalation path to the Risk Committee.

Key risk management processes

Operational resilience is our ability to anticipate, prevent, adapt, respond to, recover and learn from operational disruption while minimising customer and market impact. Resilience is determined by assessing whether we are able to continue to provide our most important services, within an agreed level. This is achieved via day-to-day oversight, periodic and ongoing assurance, such as deep dive reviews and controls testing, which may result in challenges being raised to the business by Risk Stewards. Further challenge is also raised in the form of Risk Steward opinion papers to formal governance. We accept we will not be able to prevent all disruption but we prioritise investment to continually improve the response and recovery strategies for our most important business services.

Business operations continuity

We continue to monitor the COVID-19 situation and remain ready for business continuity. Following the announcement of nationwide loosening of COVID-19 restrictions in China, there has been an increase in the number of cases. The situation is closely being monitored. As of now, no impact to the Group's operation has been reported.

(f) Regulatory Compliance Risk

(unaudited)

Overview

Regulatory compliance risk is the risk associated with breaching our duty to clients and other counterparties, inappropriate market conduct and breaching related financial services regulatory standards. Regulatory compliance risk arises from the failure to observe relevant laws, codes, rules and regulations and can manifest itself in poor market or customer outcomes and lead to fines, penalties and reputational damage to our business.

Key developments in 2022

The embedding of our purpose-led conduct approach concluded and is now considered 'business as usual'. The mapping of regulations to our risks and controls continued and will conclude in 2023 alongside new tooling to support enterprise-wide horizon scanning of new regulatory obligations and regulatory reporting inventories. Climate risk has been integrated into regulatory compliance policies and processes, with enhancements made to the Product Governance Framework and Controls in order to ensure the effective consideration of Climate and in particular Greenwashing risks.

The structure of the Compliance function remained substantively unchanged in 2022. The Regulatory Conduct capability and Financial Crime capability both continue to work closely with the Regional Chief Compliance Officer and his respective teams to help them identify and manage regulatory and financial crime compliance risks. They also work together to ensure we achieve good conduct outcomes and provide enterprise-wide support on the Compliance risk agenda in collaboration with the Risk function.

Key risk management processes

The Group Regulatory Conduct capability is responsible for setting global policies, standards and risk appetite to guide the Group's management of regulatory compliance risk. It also devises the required frameworks, support processes and tooling to protect against regulatory compliance risks. The Group capability provides oversight, review and challenge to the local Chief Compliance Officer and his teams to help them identify, assess and mitigate regulatory compliance risks, where required. The Group's regulatory compliance risk policies are regularly reviewed. Global Policies and Procedures require the prompt identification and escalation of actual or potential regulatory breaches, and relevant reportable events are escalated to the Compliance ExCo, RMM and the Risk Committee, as appropriate.

(g) Financial Crime Risk

(unaudited)

Overview

Financial crime risk is the risk that the Group's products and services will be exploited for criminal activity. This includes fraud, bribery and corruption, tax evasion, sanctions and export control violations, money laundering, terrorist financing and proliferation financing. Financial crime risk arises from day-to-day banking operations involving customers, third parties and employees.

Financial crime risk management

Key developments in 2022

We continuously review the effectiveness of our financial crime risk management framework, which includes consideration of the complex and dynamic nature of sanctions compliance risk. In 2022, we adapted our policies, procedures and controls to respond to the unprecedented volume and diverse set of sanctions and trade restrictions imposed against Russia following its invasion of Ukraine.

We also continued to make progress with several key financial crime risk management initiatives, including:

- We enhanced our screening and non-screening controls to aid the identification of potential sanctions risk related to Russia, as well as risk arising from export control restrictions.
- The Group has deployed a key component of our intelligence-led, dynamic risk assessment capabilities for customer account monitoring in Singapore for WPB and CMB.
- We have reconfigured our Transaction Screening capability in readiness for the global change to payment systems formatting under ISO20022 requirements, and enhanced transaction screening capabilities by implementing automated alert discounting.
- We continued to strengthen the first party lending fraud framework, reviewed and published an updated fraud policy and associated control library, and continued to develop fraud detection tools.

Governance and structure

The structure of the financial crime sub-function remained substantively unchanged in 2022, although we continued to review the effectiveness of our governance framework to manage financial crime risk. The management of financial crime risk reside with Chief Compliance Officer. Oversight is maintained by the Chief Risk Officer in line with her enterprise risk oversight responsibilities, through the RMM.

Key risk management processes

We will not tolerate knowingly conducting business with individuals or entities believed to be engaged in criminal activity. We require everybody in the Bank to play their role in maintaining effective systems and controls to prevent and detect financial crime. Where we believe we have identified suspected criminal activity or vulnerabilities in our control framework, we will take appropriate mitigating action.

We manage financial crime risk because it is the right thing to do to protect our customers, shareholders, staff, the communities in which we operate, as well as the integrity of the financial system on which we all rely. We operate in a highly regulated industry in which these same policy goals are codified in law and regulation. We are committed to complying with the laws and regulations of all of the markets in which we operate, where we apply a global minimum standard that seeks to promote the highest standards. In cases where material differences exist between the laws and regulations of these markets, our policy adopts the highest standard while acknowledging the primacy of local law.

We continue to assess the effectiveness of our end-to-end financial crime risk management framework on an ongoing basis, and invest in enhancing our operational control capabilities and technology solutions to deter and detect criminal activity. We have simplified our framework by streamlining and de-duplicating policy requirements. We also strengthened our financial crime risk taxonomy and control libraries, improving our investigative and monitoring capabilities through technology deployments, as well as developing more targeted metrics. We have also enhanced governance and reporting.

We are committed to working in partnership with the wider industry and the public sector in managing financial crime risk and we participate in numerous public-private partnerships and information-sharing initiatives. In 2022, our focus remained on measures to improve the overall effectiveness of the financial crime framework.

(h) Model risk

(unaudited)

Overview

Model risk is the risk of inappropriate or incorrect business decisions arising from the use of models that have been inadequately designed, implemented or used, or from models that do not perform in line with expectations and predictions.

Model risk arises in both financial and non-financial contexts whenever business decision making includes reliance on models.

Key developments in 2022

Redeveloped, independently validated and submitted our models to the PRA and HKMA in response to regulatory capital changes, including the internal ratings-based (IRB) approach for credit risk. These new models have been built to enhanced standards using improved data as a result of investment in processes and systems.

Redeveloped and validated models impacted by changes to alternative rate setting mechanisms due to IBOR transition.

Embedded changes to our control framework for Sarbanes-Oxley models. These changes were made to address control weaknesses that emerged as a result of significant increases in adjustments and overlays that were applied to compensate for the impact of COVID-19 pandemic, and the subsequent volatility due to the effects of the rise in global interest rates on the ECL models.

Businesses and Functions continued to be more involved in the development and management of models, and hiring colleagues with strong model risk skills. Enhanced focus was also placed on key model risk drivers such as data quality and model methodology.

Enhanced the reporting that supports the model risk appetite measures, to support our Businesses and Functions in managing model risk more effectively.

Climate Risk, HKFRS17 Insurance models and models using advanced analytics and machine learning, have become critical areas of focus that will grow in importance in 2023 and beyond. The model risk teams were enhanced with specialist skills to manage the increased model risk in these areas.

Governance

Model oversight forums provide oversight of models used in the Group to oversee model risk management activities based on associated model categories and focus on local delivery and requirements.

Key risk management processes

A variety of modelling approaches, including regression, simulation, sampling, machine learning and judgemental scorecards for a range of business applications are used. These activities include customer selection, product pricing, financial crime transaction monitoring, creditworthiness evaluation and financial reporting.

Model risk management policies and procedures are regularly reviewed, and required the First Line of Defence to demonstrate comprehensive and effective controls based on a library of model risk control.

We report on model risk to senior management on a regular basis through the use of the risk map, risk appetite and regular key updates.

The effectiveness of our model oversight structure is regularly reviewed to ensure appropriate understanding and ownership of model risk continued to be embedded in the Businesses and Functions.

(i) Insurance manufacturing operation risk

(audited)

Risk management objectives and policies for management of insurance risk

The majority of the risk in the insurance business derives from manufacturing activities and can be categorised as insurance risk and financial risk. Financial risks include market risk, credit risk and liquidity risk. Insurance risk is the risk, other than financial risk, of loss transferred from the holder of the insurance contract to the insurer.

Group's bancassurance model

We operate an integrated bancassurance model which provides insurance products principally for customers with whom we have a banking relationship. The insurance contracts we sell relate to the underlying needs of our banking customers, which we can identify from our point-of-sale contacts and customer knowledge. For the products we manufacture, the majority of sales are of savings and investment products.

By focusing largely on personal and SME lines of business we are able to optimise volumes and diversify individual insurance risks.

We choose to manufacture these insurance products in a Group subsidiary based on an assessment of operational scale and risk appetite. Manufacturing insurance allows us to retain the risks and rewards associated with writing insurance contracts by keeping part of the underwriting profit and investment income within the Group.

Where we do not have the risk appetite or operational scale to be an effective insurance manufacturer, we engage with a handful of leading external insurance companies in order to provide insurance products to our customers through our banking network and direct channels. These arrangements are generally structured with our exclusive strategic partners and earn the Group a combination of commissions, fees and a share of profits. We distribute insurance products in Hong Kong, China and Macau.

Insurance products are sold through all global businesses, but predominantly by WPB and CMB through our branches and direct channels.

Governance

Insurance risks are managed to a defined risk appetite, which is aligned to the Group's risk appetite and risk management framework (including the three lines of defence model). The Insurance Risk Management Meeting oversees the control framework and is accountable to the Group Risk Management Meeting on risk matters relating to insurance business.

The monitoring of the risks within the insurance operations is carried out by the Insurance Risk teams. Specific risk functions, including wholesale credit & market risk, operational risk, information security risk and compliance, support Insurance Risk teams in their respective areas of expertise.

Measurement

The risk profile of our insurance manufacturing businesses is measured using a risk-based capital approach. Assets and liabilities are measured on a market value basis and a capital requirement is defined to ensure that there is a less than 1 in 200 chance of insolvency over a one year time horizon, given the risks that the businesses are exposed to. The risk-based capital approach is largely aligned to the HSBC Group's economic capital basis as well as upcoming Hong Kong Risky Based Capital Regulation ('HKRBC'). The HKRBC coverage ratio (net asset value under HKRBC basis divided by the related capital requirement) is a key risk appetite measure. Management has set out the risk appetite and tolerance level in which management actions are required. In addition to HKRBC, the existing regulatory solvency requirement is also a metric used to manage risk appetite on an entity basis.

(i) Insurance manufacturing operation risk

(audited)

The following table shows the composition of assets and liabilities by contract type.

Balance sheet of insurance manufacturing subsidiary by type of contract

	Linked contracts[1]	Non-linked contracts[1]	Other assets and liabilities[2]	Total
2022				
Financial assets:				
– financial assets designated and otherwise mandatorily measured at fair value through profit or loss	**138**	**28,584**	**–**	**28,722**
– derivative financial instruments	**–**	**273**	**5**	**278**
– financial investments	**–**	**143,091**	**5,177**	**148,268**
– other financial assets	**41**	**4,688**	**467**	**5,196**
Total financial assets	**179**	**176,636**	**5,649**	**182,464**
Reinsurers' share of liabilities under insurance contracts	**–**	**6,020**	**–**	**6,020**
Present value of in-force long-term insurance contracts	**–**	**–**	**20,620**	**20,620**
Other assets	**–**	**6,398**	**1,209**	**7,607**
Total assets	**179**	**189,054**	**27,478**	**216,711**
Liabilities under investment contracts designated at fair value	**86**	**247**	**–**	**333**
Liabilities under insurance contracts	**58**	**165,536**	**–**	**165,594**
Deferred tax	**–**	**9**	**3,480**	**3,489**
Derivative financial instruments	**–**	**83**	**–**	**83**
Other liabilities	**–**	**–**	**12,648**	**12,648**
Total liabilities	**144**	**165,875**	**16,128**	**182,147**
Shareholders' equity	**–**	**–**	**34,564**	**34,564**
Total liabilities and shareholders' equity	**144**	**165,875**	**50,692**	**216,711**
2021				
Financial assets:				
– financial assets designated and otherwise mandatorily measured at fair value through profit or loss	180	31,043	–	31,223
– derivative financial instruments	–	411	–	411
– financial investments	–	123,381	6,126	129,507
– other financial assets	46	9,786	571	10,403
Total financial assets	226	164,621	6,697	171,544
Reinsurers' share of liabilities under insurance contracts	–	5,848	–	5,848
Present value of in-force long-term insurance contracts	–	–	22,363	22,363
Other assets	–	6,291	1,298	7,589
Total assets	226	176,760	30,358	207,344
Liabilities under investment contracts designated at fair value	114	269	–	383
Liabilities under insurance contracts	71	154,480	–	154,551
Deferred tax	–	9	3,755	3,764
Derivative financial instruments	–	286	–	286
Other liabilities	–	–	13,960	13,960
Total liabilities	185	155,044	17,715	172,944
Shareholders' equity	–	–	34,400	34,400
Total liabilities and shareholders' equity	185	155,044	52,115	207,344

1 Comprises life insurance contracts and investment contracts.

2 Comprises shareholder assets and liabilities.

(i) Insurance manufacturing operation risk

(audited)

Stress and Scenario Testing

Stress testing forms a key part of the risk management framework for the insurance business. We participate in regulatory stress tests, including the Bank of England stress test of the banking system, the Hong Kong Monetary Authority stress test, and Hong Kong Insurance Authority stress test. These have highlighted that a key risk scenario for the insurance business is a prolonged low interest rate environment. In order to mitigate the impact of this scenario, the insurance subsidiary has a range of strategies that could be employed including repricing current products to reflect lower interest rates, moving towards less capital intensive products, and developing investment strategies to optimise the expected returns against the required capital.

Key Risk Types

The key risks for the insurance operations are market risks (in particular interest rate and equity), and credit risks, followed by insurance underwriting risk and operational risks. Liquidity risk, while more significant for the banking business, is minor for our insurance subsidiary.

Market risk (insurance)

Market risk is the risk of changes in market factors affecting the Group's capital or profit. Market factors include interest rates, equity and growth assets, spread risk and foreign exchange rates.

Our exposure varies depending on the type of contract issued. Our most significant life insurance products are contracts with discretionary participating features ('DPF') issued in Hong Kong. These products typically include some form of capital guarantee or guaranteed return, on the sums invested by the policyholders, to which discretionary bonuses are added if allowed by the overall performance of the funds. These funds are primarily invested in bonds with a proportion allocated to other asset classes, to provide customers with the potential for enhanced returns.

DPF products expose the Group to the risk of variation in asset returns, which will impact our participation in the investment performance. In addition, in some scenarios the asset returns can become insufficient to cover the policyholders' financial guarantees, in which case the shortfall has to be met by the Group. Allowances are made against the cost of such guarantees, calculated by stochastic modelling.

For unit-linked contracts, market risk is substantially borne by the policyholders, but some market risk exposure typically remains as fees earned are related to the market value of the linked assets.

Our insurance manufacturing subsidiary has market risk mandates which specify the investment instruments in which they are permitted to invest and the maximum quantum of market risk which they may retain. They manage market risk by using, among others, some or all of the techniques listed below, depending on the nature of the contracts written:

- for products with DPF, adjusting bonus rates to manage the liabilities to policyholders. The effect is that a significant portion of the market risk is borne by the policyholders;
- asset and liability matching where asset portfolios are structured to support projected liability cash flows. The Group manages its assets using an approach that considers asset quality, diversification, cash flow matching, liquidity, volatility and target investment return. It is not always possible to match asset and liability durations, due to several factors such as uncertainty over the receipt of all future premiums and the timing of claims and the forecast payment dates of liabilities may exceed the duration of the longest dated investments available. We use models to assess the effect of a range of future scenarios on the values of financial assets and associated liabilities, and ALCO employs the outcomes in determining how best to structure asset holdings to support liabilities;
- using derivatives to protect against adverse market movements or better support liability cash flows;
- for new products with investment guarantees, considering the cost when determining the level of premiums or the price structure;
- periodically reviewing products identified as higher risk, which contain investment guarantees and embedded optionality features linked to savings and investment products for active management;
- designing new products to mitigate market risk, such as changing the investment return sharing portion between policyholders and the shareholder, using Terminal Bonus feature instead of annual dividend, lower the level of guaranteed returns, etc;
- exiting, to the extent possible, investment portfolios whose risk is considered unacceptable; and
- repricing premiums charged to policyholders.

(i) Insurance manufacturing operation risk

(audited)

The following table illustrates the effects of selected interest rate, equity price and foreign exchange rate scenarios on our profit for the year and the total shareholders' equity of our insurance operation.

	2022	2021
	Impact on profit after tax and shareholders' equity	Impact on profit after tax and shareholders' equity
+ 100 basis points shift in yield curves	(609)	(675)
- 100 basis points shift in yield curves	672	725
10 per cent increase in equity prices	410	551
10 per cent decrease in equity prices	(406)	(533)
10% increase in USD exchange rate compared to all currencies	70	76
10% decrease in USD exchange rate compared to all currencies	(70)	(76)

Where appropriate, the effects of the sensitivity tests on profit after tax and total equity incorporate the impact of the stress on the PVIF. The relationship between the profit and total equity and the risk factors is non-linear and nonsymmetrical, therefore the results disclosed should not be extrapolated to measure sensitivities to different levels of stress. The sensitivities reflect the established risk sharing mechanism with policyholders for participating products, and are stated before allowance for management actions which may mitigate the effect of changes in the market environment. The sensitivities presented do not allow for adverse changes in policyholders' behaviour that may arise in response to changes in market rates.

Credit risk (insurance)

Credit risk is the risk of financial loss if a customer or counterparty fails to meet their obligation under a contract. It arises in two main areas for our insurance manufacturing subsidiary:

- risk associated with credit spread volatility and default by debt security counterparties after investing premiums to generate a return for policyholders and shareholders; and
- risk of default by reinsurance counterparties and non-reimbursement for claims made after ceding insurance risk.

The amounts outstanding at the balance sheet date in respect of these items are mainly reflected as 'Financial investments' and 'Reinsurers' share of liabilities under insurance contracts' in the table of 'Balance sheet of insurance manufacturing subsidiary by type of contract' under 'Insurance manufacturing operation risk' section.

Our insurance manufacturing subsidiary is responsible for the credit risk, quality and performance of their investment portfolios. Our assessment of the creditworthiness of issuers and counterparties is based primarily upon internationally recognised credit ratings and other publicly available information. Investment credit exposures are monitored against limits by our insurance manufacturing subsidiary. Stress testing is performed on the investment credit exposures using credit spread sensitivities and default probabilities is included in the stress and scenario testing as described above.

We use tools to manage and monitor credit risk. These include a credit report which contains a watch-list of investments with current credit concerns to identify investments which may be at risk of future impairment or where high concentrations to counterparties are present in the investment portfolio.

Impairment is calculated in three stages and financial assets are allocated into one of the three stages where the transfer mechanism depends on whether there is a significant increase in credit risk between its initial recognition and the relevant reporting period. After the allocation, the measurement of ECL, which is the product of PD, LGD and EAD, will reflect the risk of default occurring over the remaining life of the instruments. Note 2(j) of the financial statements set out the details on related accounting policy.

Credit risk on assets supporting unit-linked liabilities is predominantly borne by the policyholders; therefore our exposure is primarily assets related to liabilities under non-linked insurance and investment contracts and shareholders' funds.

(i) Insurance manufacturing operation risk

(audited)

Credit risk (insurance) continued

The credit quality of the reinsurers' share of liabilities under insurance contracts is assessed as 'strong' (as defined on 'Credit quality classification' under 'Credit risk' section), with 0% of the exposure being past due nor impaired (2021: 0%). The credit quality of financial assets is included under the Credit Risk section. The risk associated with credit spread volatility is to a large extent migrated by holding debt securities to maturity, and sharing a degree of credit spread experience with policyholders.

Liquidity risk (insurance)

Liquidity risk is the risk that an insurance operation, though solvent, either does not have sufficient financial resources available to meet its obligations when they fall due, or can secure them only at excessive cost.

Risk is managed by cashflow matching and maintaining sufficient cash resources; investing in high-credit-quality investments with deep and liquid markets, monitoring investment concentrations and restricting them where appropriate and establishing committed contingency borrowing facilities.

Our insurance manufacturing subsidiary complete quarterly liquidity risk reports and an annual review of the liquidity risks to which they are exposed.

The following table shows the expected undiscounted cash flows for insurance contract liabilities at 31 December 2022 and 2021.

Expected maturity of insurance contract liabilities

	Expected cash flows (undiscounted)				
	Within 1 year	Over 1 year but within 5 years	Over 5 years but within 15 years	Over 15 years	Total
2022					
Non-linked insurance	**13,965**	**50,029**	**86,255**	**158,678**	**308,927**
Linked insurance	**10**	**35**	**53**	**28**	**126**
	13,975	**50,064**	**86,308**	**158,706**	**309,053**
2021					
Non-linked insurance	14,958	49,836	82,850	122,856	270,500
Linked insurance	12	41	61	32	146
	14,970	49,877	82,911	122,888	270,646

The remaining contractual maturity of investment contract liabilities is included in the table on note 21 of the financial statements.

Insurance risk

Insurance risk is the risk of loss through adverse experience, in either timing or amount, of insurance underwriting parameters (non-economic assumptions). These parameters include mortality, morbidity, longevity, lapses and unit costs. The principal risk we face is that, over time, the cost of the contract, including claims and benefits may exceed the total amount of premiums and investment income received. The table of 'Balance sheet of insurance manufacturing subsidiary by type of contract' under 'Insurance manufacturing operation risk' section analyses our life insurance risk exposures by type of contract under 'liabilities under insurance contracts'.

(i) Insurance manufacturing operation risk

(audited)

Insurance risk continued

The Group's insurance manufacturing subsidiary primarily uses the following techniques to manage and mitigate insurance risk:

- a formalised product approval process covering product design, pricing and overall proposition management (for example, management of lapses by introducing surrender charges);
- underwriting policy;
- claims management processes; and
- reinsurance which cedes risks above our acceptable thresholds to an external reinsurer thereby limiting our exposure.

The following table shows the sensitivity of profit and total equity to reasonably possible changes in non-economic assumptions:

	2022	2021
Effect on profit after tax and total equity at 31 December		
10 per cent increase in mortality and/or morbidity rates	**(89)**	(101)
10 per cent decrease in mortality and/or morbidity rates	**89**	102
10 per cent increase in lapse rates	**(108)**	(99)
10 per cent decrease in lapse rates	**115**	107
10 per cent increase in expense rates	**(47)**	(58)
10 per cent decrease in expense rates	**46**	57

Mortality and morbidity risk is typically associated with life insurance contracts. The effect on profit of an increase in mortality or morbidity depends on the type of business being written.

Sensitivity to lapse rates depends on the type of contracts being written. In general, for life insurance contracts a policy lapse has two offsetting effects on profits, which are the loss of future income on the lapsed policy and the existence of surrender charge recouped at policy lapse. The net impact depends on the relative size of these two effects which varies with the type of contracts.

Expense rate risk is the exposure to a change in the cost of administering insurance contracts. To the extent that increased expenses cannot be passed on to policyholders, an increase in expense rates will have a negative effect on our profits.

Present value of in-force long-term insurance business ('PVIF')

In calculating PVIF, expected cash flows are projected after adjusting for a variety of assumptions made by insurance operation to reflect local market conditions and management's judgement of future trends, and uncertainty in the underlying assumptions is reflected by applying margins (as opposed to a cost of capital methodology). Variations in actual experience and changes to assumptions can contribute to volatility in the results of the insurance business.

Financial Reporting Committee meets on a quarterly basis to review and approve PVIF assumptions. All changes to non-economic assumptions, economic assumptions that are not observable and model methodology must be approved by the Financial Reporting Committee.

Economic assumptions are either set in a way that is consistent with observable market values or, in certain markets is made of long-term economic assumptions. Setting such assumptions involves the projection of long-term interest rates and the time horizon over which observable market rates trend towards these long-term assumptions. The assumptions are informed by relevant historical data and by research and analysis performed by internal and external experts, including regulatory bodies. The valuation of PVIF will be sensitive to any changes in these long-term assumptions in the same way that it is sensitive to observed market movements, and the impact of such changes is included in the sensitivities presented below.

(i) Insurance manufacturing operation risk

(audited)

Present value of in-force long-term insurance business ('PVIF') continued

The Group sets the risk discount rate applied to the PVIF calculation by starting from a risk-free rate curve and adding explicit allowances for risks not reflected in the best estimate cash flow modelling. Where shareholders provide options and guarantees to policyholders the cost of these options and guarantees is an explicit reduction to PVIF.

Economic assumptions

The following table shows the impact on the PVIF at balance sheet date of reasonably possible changes in the main economic and business assumptions:

	2022	2021
+ 100 basis points shift in yield curves	**(772)**	(806)
– 100 basis points shift in yield curves	**789**	902

Non-economic assumptions

PVIF are determined by reference to non-economic assumptions, including mortality and/or morbidity, lapse rates and expense rates. The following table illustrates the impact on the PVIF of the changes in key variables:

	2022	2021
10 per cent increase in mortality and/or morbidity rates	**(139)**	(154)
10 per cent decrease in mortality and/or morbidity rates	**140**	261
10 per cent increase in lapse rates	**(178)**	(191)
10 per cent decrease in lapse rates	**190**	256
10 per cent increase in expense rates	**(80)**	(119)
10 per cent decrease in expense rates	**78**	154

The impact on PVIF shown above is illustrative only and employ simplified scenarios. It should be noted that the effects may not be linear and therefore the results cannot be extrapolated. The sensitivities reflect the established risk sharing mechanism with policyholders for participating products, but do not incorporate other actions that could be taken by management to mitigate effects nor do they take into account the consequential changes in policyholders' behaviour.

Process used to determine assumptions for long-term insurance contracts

The process used to determine the assumptions is intended to result in stable and prudent estimates of future outcome. This is achieved by adopting relatively conservative assumptions which can withstand a reasonable range of fluctuation of actual experience. Annual review of the relevant experience is performed to assess the adequacy of margin between the assumptions adopted and the best estimate of future outcome. The assumptions that are considered include expenses and the probability of claims. Discount rate is determined by the risk free rate for both historical and new reinvestment rates.

For non-linked life business, the policy reserve is generally calculated on a modified net premium basis. The net premium is the level of premium payable over the premium payment period whose discounted value at the outset of the policy would be sufficient to exactly cover the discounted value of the original guaranteed benefits at maturity or at death if earlier. The net premium is then modified to allow for deferral of acquisition costs. The policy reserve is then calculated by subtracting the present value of future modified net premiums from the present value of the benefits guaranteed at maturity or death up to the balance sheet date, subject to a floor of the cash value. The modified net premium basis makes no allowance for voluntary discontinuance by policyholders as this would generally result in a reduced level of policy reserve.

For linked life business, the policy reserve is generally determined as the total account balance of all in-force policies with an additional provision for the unexpired insurance risk.

(i) Insurance manufacturing operation risk

(audited)

Assumptions

The principal assumptions underlying the calculation of the policy reserve are:

(i) Mortality

A base mortality table which is most appropriate for each type of contract is selected. An adjustment is included to reflect the Group's own experience with an annual investigation performed to ascertain the appropriateness of overall assumption.

(ii) Morbidity

The morbidity incidence rates, which mainly cover major illness and disability, are generally derived from the reinsurance costs which also form the pricing basis. A loading is generally added as a provision for adverse deviation. An annual investigation is performed to ascertain the appropriateness with the Group's insurance subsidiary's actual experience.

(iii) Discount rates

Rate of interest

	2022	2021
Policies denominated in HKD	**2.40%**	2.20%
Policies denominated in USD	**3.15%**	3.30%
Policies denominated in RMB	**2.85%**	3.00%

Under the modified net premium method, the long-term business provision is sensitive to the interest rate used for discounting.

Sensitivity to changes in variables

The Group's insurance subsidiary re-runs its valuation models on various bases. An analysis of sensitivity around various scenarios provides an insight to the key risks which the Group's insurance subsidiary is exposed to. The table presented below demonstrates the sensitivity of insured liability estimates to particular movements in assumptions used in the estimation process. Certain variables can be expected to impact on life insurance liabilities more than others, and consequently a greater degree of sensitivity to these variables may be expected.

The following table illustrates the impact on the policy reserves of the changes in key variables:

		2022	2021
	Change in variable	Impact on the policy reserves	Impact on the policy reserves
Discount rate	+100 basis points	**(3,433)**	(5,014)
Discount rate	-100 basis points	**12,260**	14,875
Mortality/Morbidity	+10 per cent	**285**	403
Mortality/Morbidity	-10 per cent	**(202)**	(335)

The analysis above has been prepared for a change in variable with all other assumptions remaining constant and ignores changes in values of the related assets.

For the sensitivity in discount rate, an absolute +/-100 basis points of the discount rate is used. For the Mortality/Morbidity sensitivity, a relative +/-10% (i.e. multiply the assumption by 110% or 90%) is used.