Risk review

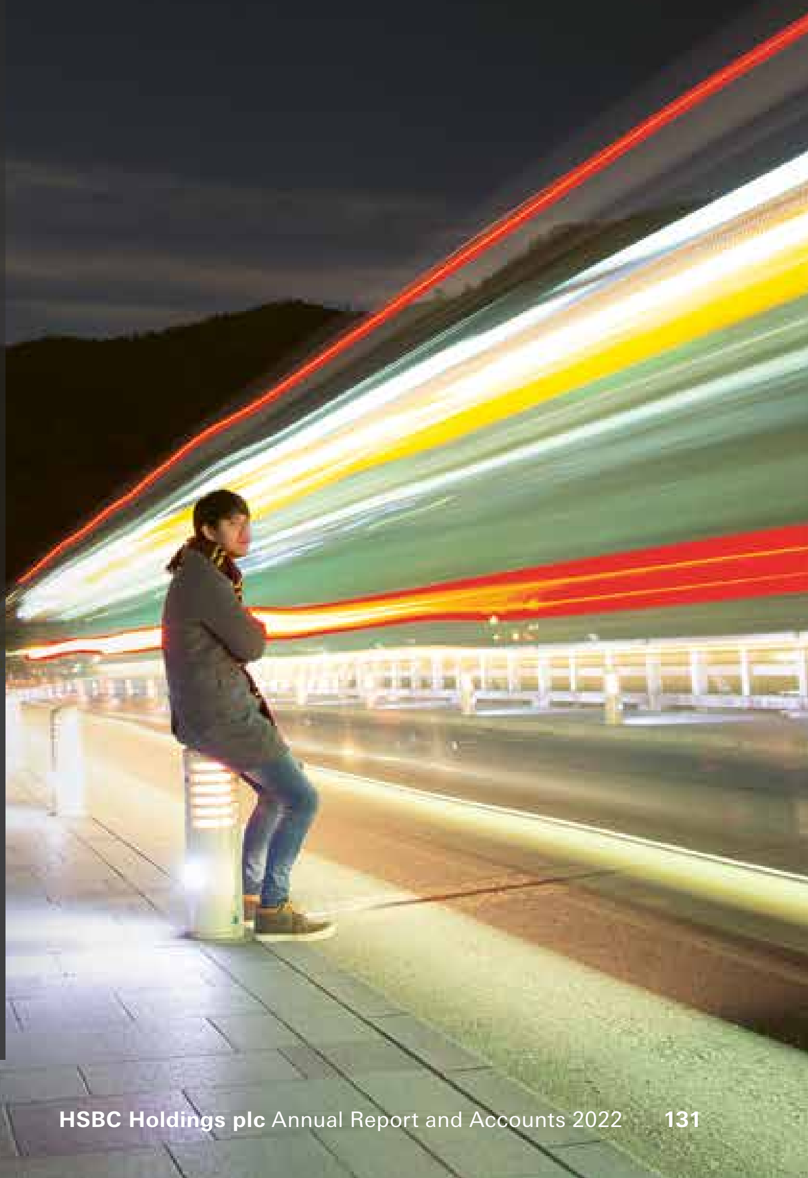
Our risk review outlines our approach to risk management, how we identify and monitor top and emerging risks, and the actions we take to mitigate them. In addition, it explains our material banking risks, including how we manage capital.

Identifying suspicious activities through our award-winning AI tool

We are using the latest artificial intelligence technology to help identify suspicious activities to help prevent financial crime. Our dynamic risk assessment solution brings data together on the Cloud, and uses machine learning to analyse and identify criminal activity by making use of relevant data, with the ability to identify patterns that humans are unlikely to spot.

The tool, which we first developed in November 2021 and is active in several markets including the UK, enables suspicious activity to be identified twice as fast than the previous process and reduces case volumes by 60%.

The solution was recognised at the 2022 Banking Tech Awards, winning 'Best Use of Cloud' and 'Best Use of AI'. We plan to roll it out to other markets throughout 2023.



Our approach to risk

Our risk appetite

We recognise the importance of a strong culture, which refers to our shared attitudes, beliefs, 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 Group business.
- We are committed to managing the climate risks that have an impact on our financial position, and delivering on our 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 exposure related to 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 the result of failed internal processes, people and systems, or from external events.

Our risk appetite is expressed in both quantitative and qualitative terms and applied at the global business level, at the regional level and to material operating entities. Every three years, the Group Risk and Compliance function commissions an external independent firm to review the Group's approach to risk appetite and to help ensure that it remains in line with market best practice and regulatory expectations. This review was last carried out in 2021 and confirmed the Group's risk appetite statement ('RAS') remains aligned to best practices, regulatory expectations and strategic goals. Our risk appetite continues to evolve and expand its scope as part of our regular review process.

The Board reviews and approves the Group's risk appetite regularly to make sure it remains fit for purpose. The Group's 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 RAS. 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 is applied to the development of business line strategies, strategic and business planning and remuneration. At a Group level, performance against the RAS is reported to the Group Risk Management Meeting alongside key risk indicators 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.

Each global business, region and material operating entity is required to have its own RAS, which is monitored to help ensure it remains aligned with the Group's RAS. Each RAS and business activity is guided and underpinned by qualitative principles and/or quantitative metrics.

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 described on page 134.

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 identifying, assessing, managing and reporting the risks we accept and incur in our activities, with clear accountabilities. We actively review and enhance our risk management framework and our approach to managing risk, through our activities with regard to: people and capabilities; governance; reporting and management information; credit risk management models; and data.

Group Risk and Compliance is independent from the global businesses, including our sales and trading functions, to provide challenge, oversight and appropriate balance in risk/return decisions.

Our risk management framework

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

Key components of our risk management framework

HSBC Values and risk culture		
Risk governance	Non-executive risk governance	The Board approves the Group's risk appetite, plans and performance targets. It sets the 'tone from the top' and is advised by the Group Risk Committee (see page 255).
	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 (see pages 134 and 142).
Roles and responsibilities	Three lines of defence model	Our 'three lines of defence' model defines roles and responsibilities for risk management. An independent Group Risk and Compliance function helps ensure the necessary balance in risk/return decisions (see page 134).
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	Operational and resilience risk management defines minimum standards and processes for managing operational risks and internal controls.
	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.

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

The Group Chief Risk and Compliance Officer is also responsible for the oversight of reputational risk, with the support of the Group Reputational Risk Committee. The Group Reputational Risk Committee considers matters arising from customers, transactions and third parties that either present a serious potential reputational risk to the Group or merit a Group-led decision to ensure a consistent risk management approach across the regions, global businesses and global functions. Further details can be found under the 'Reputational risk' section of www.hsbc.com/our-approach/risk-and-responsibility.

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 our business and functional structures as described in the following commentary, 'Our responsibilities'.

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 Group Risk Management Meeting. This structure is summarised in the following table.

Governance structure for the management of risk and compliance

Authority	Membership	Responsibilities include:
Group Risk Management Meeting	Group Chief Risk and Compliance Officer Group Chief Legal Officer Group Chief Executive Group Chief Financial Officer Group Head of Financial Crime and Group Money Laundering Reporting Officer Group Head of Compliance All other Group Executive Committee members	• Supporting the Group Chief Risk and Compliance Officer in exercising Board-delegated risk management authority • Overseeing the implementation of risk appetite and the risk management framework • Forward-looking assessment of the risk environment, analysing possible risk impacts and taking appropriate action • Monitoring all categories of risk and determining appropriate mitigating action • Promoting a supportive Group culture in relation to risk management and conduct
Group Risk and Compliance Executive Committee	Group Chief Risk and Compliance Officer Chief risk officers of HSBC's global businesses and regions Heads of Global Risk and Compliance sub-functions	• Supporting the Group Chief Risk and Compliance Officer in providing strategic direction for the Group Risk and Compliance function, setting priorities and providing oversight • Overseeing a consistent approach to accountability for, and mitigation of, risk and compliance across the Group
Global business/regional risk management meetings	Global business/regional chief risk officer Global business/regional chief executive officer Global business/regional chief financial officer Global business/regional heads of global functions	• Supporting the Group Chief Risk and Compliance Officer in exercising Board-delegated risk management authority • Forward-looking assessment of the risk environment • Implementation of risk appetite and the risk management framework • Monitoring all categories of risk and overseeing appropriate mitigating actions • Embedding a supportive culture in relation to risk management and controls

The Board committees with responsibility for oversight of risk-related matters are set out on page 258.

Treasury risks are the responsibility of the Group Executive Committee and the Group Risk Committee. Global Treasury actively manages these risks, supported by the Holdings Asset and Liability Management Committee ('ALCO') and local ALCOs, overseen by Treasury Risk Management and the Group Risk Management Meeting. Further details on treasury risk management are set out on page 202.

Our 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 structures as described below.

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.

The 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 challenges the first line of defence on effective risk management, and provides advice and guidance in relation to the risk.
- The third line of defence is our Global Internal Audit function, which provides independent assurance as to whether our risk management approach and processes are designed and operating effectively.

Group Risk and Compliance function

Our Group Risk and Compliance function is responsible for the Group's risk management framework. This responsibility includes establishing global policy, monitoring risk profiles, and identifying and managing forward-looking risk. Group Risk and Compliance is made up of sub-functions covering all risks to our business. Forming part of the second line of defence, the Group Risk and Compliance function is independent from the global 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 our various specialist risk stewards and the collective accountability held by our chief risk officers.

We have continued to strengthen the control environment and our approach to the management of non-financial risk, as set out in our risk management framework. The management of non-financial risk focuses on governance and risk appetite, and provides a single view of the non-financial risks that matter the most as well as the associated controls. It incorporates a risk management system designed to enable the active management of non-financial risk. Our ongoing focus is on simplifying our approach to non-financial risk management, while driving more effective oversight and better end-to-end identification and management of non-financial risks. This is overseen by the Operational and Resilience Risk function, headed by the Group Head of Operational and Resilience Risk.

Stress testing and recovery planning

We operate a wide-ranging stress testing programme that is a key part of our risk management and capital and liquidity 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 and liquidity 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 HSBC.

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

In addition to the Group-wide stress testing scenarios, each major subsidiary conducts regular macroeconomic and event-driven scenario analysis specific to its region. They also participate, as required, in the regulatory stress testing programmes of the jurisdictions in which they operate, such as stress tests required by the Bank of England ('BoE') in the UK, the Federal Reserve Board ('FRB') in the US, and the Hong Kong Monetary Authority ('HKMA') in Hong Kong. Global functions and businesses also perform bespoke stress testing to inform their assessment of risks to potential scenarios.

We also conduct reverse stress tests each year at 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.

Recovery and resolution plans

Recovery and resolution plans form part of the integral framework safeguarding the Group's financial stability. The Group recovery plan, together with stress testing, help us understand the likely outcomes of adverse business or economic conditions and in the identification of appropriate risk mitigating actions. The Group is committed to further developing its recovery and resolution capabilities in line with the BoE's Resolvability Assessment Framework requirements.

Key developments in 2022

We actively managed the risks related to macroeconomic uncertainties including inflation, fiscal and monetary policy, the Russia-Ukraine war, broader geopolitical uncertainties and continued risks resulting from the Covid-19 pandemic, as well as other key risks described in this section. In addition, we sought to enhance 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 help ensure senior executives have appropriate oversight and visibility of macroeconomic trends around inflation and interest rates.
- We adapted our interest rate risk management strategy as market and official interest rates increased in reaction to inflationary pressures. This included the Board approving in September a new interest rate risk in the banking book strategy, a managed reduction in the duration risk of our hold-to-collect-and-sell asset portfolio and an increase in net interest income stabilisation.
- We began a process of enhancement of our country credit risk management framework to strengthen our control of risk tolerance and appetite at a country level.
- 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 sought to further strengthen 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 continued to embed the governance and oversight around model adjustments and related processes for IFRS 9 models and Sarbanes-Oxley controls.
- We commenced a programme to enhance our framework for managing the risks associated with machine learning and artificial intelligence ('AI').
- Through our climate risk programme, we continued to embed climate considerations throughout the organisation, including updating the scope of our programme to cover all risk types, expanding the scope of climate-related training, developing new climate risk metrics to monitor and manage exposures, and developing our internal climate scenario exercise.
- We sought to improve the effectiveness of our financial crime controls, deploying advanced analytics capabilities into new markets. We refreshed our financial crime policies to help ensure they remain up to date and address changing and emerging risks. We continue to monitor regulatory changes.

Top and emerging risks

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 regions and global businesses, for any risks that may require global escalation. We update our top and emerging risks as necessary.

Our current top and emerging risks are as follows.

Externally driven

Geopolitical and macroeconomic risks

The Russia-Ukraine war has had far-reaching geopolitical and economic implications. HSBC is monitoring the impacts of the war and continues to respond to the further economic sanctions and trade restrictions that have been imposed on Russia in response. In particular, significant sanctions and trade restrictions imposed against Russia have been put in place by the UK, the US and the EU, as well as other countries. Such sanctions and restrictions have specifically targeted certain Russian government officials, politically exposed persons, business people, Russian oil imports, energy products, financial institutions and other major Russian companies. In addition, there have been put in place more generally applicable investment, export, and import bans and restrictions. In response to such sanctions and trade restrictions, as well as asset flight, Russia has implemented certain countermeasures.

Further sanctions, trade restrictions and Russian countermeasures may adversely impact the Group, its customers and the markets in which the Group operates by creating regulatory, reputational and market risks. Our business in Russia principally serves multinational corporate clients headquartered in other countries, is not accepting new business or customers and is consequently on a declining trend. Following a strategic review, HSBC Europe BV (a wholly-owned subsidiary of HSBC Bank plc) has entered into an agreement to sell its wholly-owned subsidiary HSBC Bank (RR) (Limited Liability Company), subject to regulatory and governmental approvals.

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. Relatively mild weather, until recently, and diversification of fuel sources have nevertheless helped regions most dependent on Russian supply to substantially reduce risks of rationing over the winter months.

China's policy measures issued at the end of 2022 have increased liquidity and the supply of credit to the mainland China commercial real estate sector. Recovery in the underlying domestic residential demand and improved customer sentiment will be necessary to support the ongoing health of the sector. We will continue to monitor the sector closely, notably the risk of further idiosyncratic real estate defaults and the potential associated impact on wider market, investor and consumer sentiment. Given that parts of the global economy are in, or close to, recession, the demand for Chinese exports may also diminish.

Rising global inflation has prompted central banks to tighten monetary policy. Since the beginning of 2022, the US Federal Reserve Board ('FRB') has delivered a cumulative 450 basis point ('bps') increase in the Federal Funds rate. The European Central Bank lagged the FRB initially, but its benchmark rate has subsequently been increased by 300bps since July 2022. As of mid-February 2023, interest-rate futures suggested market uncertainty as to whether the FRB would begin to ease monetary policy over the 12-month horizon. Should monetary policy rates move materially higher than current expectations, a realignment of market expectations could cause turbulence in financial asset prices.

Financial markets have also shown reduced appetite for expansionary fiscal policies in the context of high debt ratios. Following the fiscal statement of 23 September 2022 by the UK government, there was a fall in the value of sterling and a sharp rise in the yields of UK government securities, known as gilts. Following this, the Bank of England reversed its plan to begin selling its gilt holdings from September 2022, and the UK government reversed most of the previously announced fiscal measures. 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 losses and other credit impairment charges ('ECL'). The combined pressure of higher inflation and interest rates may impact the ability of our customers to repay debt. Our Central scenario, which has the highest probability weighting in our IFRS 9 'Financial Instruments' calculations of ECL, assumes low growth and a higher inflation environment across many of our key markets. However, due to the rapidly changing economic conditions, the potential for forecast dispersion and volatility remain high, impacting the degree of accuracy and certainty of our Central scenario forecast. The level of volatility varies by market, depending on exposure to commodity price increases, supply chain constraints, the monetary policy response to inflation and the public health policy response to the Covid-19 pandemic. As a result, our Central scenario for impairment has not been assigned the same likelihood of occurrence across our key markets. There is also uncertainty with respect to the relationship between the economic drivers and the historical loss experience, which has required adjustments to modelled ECL in cases where we determined that the model was unable to capture the material underlying risks.

For further details of our Central and other scenarios, see 'Measurement uncertainty and sensitivity analysis of ECL estimates' on page 153.

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. To date, the UK, the US, the EU and other countries have imposed various sanctions and trade restrictions on Chinese persons and companies. Although sanctions and trade restrictions are difficult to predict, increases in diplomatic tensions between China and the US and other countries could result in sanctions that could negatively impact the Group, its customers and the markets in which the Group operates. There is a continued risk of additional sanctions and trade restrictions being imposed by the US and other governments in relation to human rights, technology, 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.

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 the Group operates.

Negotiations between the UK and the EU over the operation of the Northern Ireland Protocol are continuing. While there are signs that differences may be diminishing, failure to reach agreement could have implications for the future operation of the EU-UK Trade and Cooperation Agreement.

In June 2022, the UK government published proposed legislation that seeks to amend the Protocol in a number of respects. In response, the EU launched infringement procedures against the UK, and is evaluating the UK response, received in September 2022. If the proposed legislation were to pass, and infringement procedures progressed, it could further complicate the terms of trade between the UK and the EU and potentially prevent progress in other areas such as financial services. Over the medium to long term, the UK's withdrawal from the EU may impact markets and increase economic risk, particularly in the UK, which could adversely impact our profitability and prospects for growth in this market. We are monitoring the situation closely, including the potential impacts on our customers.

In August 2022, the US Inflation Reduction Act introduced a minimum tax of 15% with effect from 1 January 2023. It is possible that the minimum tax could result in an additional US tax liability over our regular US federal corporate tax liability in a given year, based on the differences between US book and taxable income (including as a result of temporary differences). Given its recent pronouncement, it is unclear at this time what, if any, impact the US Inflation Reduction Act will have on HSBC's US tax rate and US financial results. HSBC will continue to evaluate its impact as further information becomes available. In addition, potential changes to tax legislation and tax rates in the countries and territories in which we operate could increase our effective tax rate in the future.

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.

The financial impact on the Group of geopolitical risks in Asia is heightened due to the region's relatively high contribution to the Group's profitability, particularly in Hong Kong.

While it is the Group's policy to comply with all applicable laws and regulations of all jurisdictions in which it operates, geopolitical risks and tensions, and potential ambiguities in the Group's compliance obligations, will continue to present challenges and risks for the Group and could have a material adverse impact on the Group's business, financial condition, results of operations, prospects and strategy, as well as on the Group's customers.

Expanding data privacy, national security and cybersecurity laws in a number of markets could pose potential challenges to intra-group data sharing. These developments could increase financial institutions' compliance obligations in respect of cross-border transfers of personal information, which may affect our ability to manage financial crime risks across markets.

Mitigating actions

- We closely monitor geopolitical and economic developments in key markets and sectors and undertake scenario analysis where appropriate. This helps us to take portfolio actions where necessary, including through enhanced monitoring, amending our risk appetite and/or reducing limits and exposures.

- We stress test portfolios of particular concern to identify sensitivity to loss under a range of scenarios, with management actions being taken to rebalance exposures and manage risk appetite where necessary.
- We regularly review key portfolios to help ensure that individual customer or portfolio risks are understood and that 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 enhancements to, our existing controls.
- We continue to monitor the UK's relationship with the EU, and assess the potential impact on our people, operations and portfolios.
- We have taken steps, where necessary, to enhance physical security in geographical areas deemed to be at high risk from terrorism and military conflicts.

Technology and cybersecurity risk

Together with other organisations, we operate in an extensive and complex technology landscape, which needs to remain resilient in order to support customers, our organisation and financial markets globally. Risks arise where technology is not understood, maintained, or developed appropriately. We also continue to operate in an increasingly hostile cyber threat environment globally. 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.

Mitigating actions

- We continue to invest in transforming how software solutions are developed, delivered and maintained to improve system resilience. We continue to build security into our software development lifecycle and improve our testing processes and tools.
- We continue to upgrade many of our IT systems, simplify our service provision and replace older IT infrastructure and applications. These enhancements supported global improvements in service availability during 2022 for both our customers and colleagues.
- We continually evaluate threat levels for the most prevalent cyber-attack types and their potential outcomes. To further protect HSBC 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 it across our global businesses, functions and regions to help ensure there is appropriate visibility and governance of the risk and its mitigating actions.
- We participate globally in industry bodies and working groups to collaborate on tactics employed by cyber-crime groups and to work together preventing, detecting and defending against cyber-attacks on financial organisations globally.

Evolving regulatory environment risk

We aim to keep abreast of the emerging regulatory compliance and conduct agenda, which currently includes, but is not limited to: ESG matters; ensuring good customer outcomes; addressing customer vulnerabilities due to cost of living pressures; regulatory compliance; regulatory reporting; employee compliance, including the use of e-communication channels; and the proposed reforms to the UK financial services sector, known as the Edinburgh Reforms. We monitor regulatory developments closely and engage with regulators, as appropriate, to help ensure new regulatory requirements are implemented effectively and in a timely way. The competitive landscape in which the Group operates may be impacted by future regulatory changes and government intervention.

Mitigating actions

- We monitor for regulatory developments to understand the evolving regulatory landscape and seek to respond with changes in a timely manner.
- We engage with governments and regulators, responding to consultations with a view to help shaping regulations that can be implemented effectively. We hold regular meetings with relevant authorities to discuss strategic contingency plans, including those arising from geopolitical issues.
- Our simplified conduct approach aligns to our purpose and values, in particular the value 'we take responsibility'.

Financial crime risk

Financial institutions remain under considerable regulatory scrutiny regarding their ability to detect and prevent financial crime. These evolving challenges include managing conflicting laws and approaches to legal and regulatory regimes, and implementing an 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 managing internal and external fraud, and protecting vulnerable customers.

The digitisation of financial services continues to have an impact on the payments ecosystem, with an increasing number of new market entrants and payment mechanisms, not all of which are subject to the same level of regulatory scrutiny or regulations as banks. Developments around digital assets and currencies have continued at pace, with an increasing regulatory and enforcement focus on the financial crimes linked to these types of assets.

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. These are particularly 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 across markets.

Mitigating actions

- We continue to manage sanctions and trade restrictions through the use of, and enhancements to, our existing controls.
- We continue to develop our fraud controls and invest in 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 risks associated with direct and indirect exposure to digital assets and currencies, in an effort to maintain appropriate financial crime controls.
- We are assessing our existing policies and control framework so that developments relating to ESG are considered and the risks mitigated.
- We engage with regulators, policymakers and relevant international bodies, seeking to address data privacy challenges through international standards, guidance and legislation.

Ibor transition risk

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.

Following the UK's Financial Conduct Authority ('FCA') announcement in July 2017 that it would no longer continue to persuade or require panel banks to submit rates for the London interbank offered rate ('Libor') after 2021, we have been actively working to transition legacy contracts from Ibors to products linked to near risk-free replacement rates ('RFRs') or alternative reference rates.

The publication of sterling, Swiss franc, euro and Japanese yen 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 RFR products and the transition of legacy Ibor products – has continued to support the transition of a limited number of remaining contracts in sterling and Japanese yen Libor, which were published using a 'synthetic' interest rate methodology during 2022. The remaining 'tough legacy' sterling contracts have required protracted client discussions where contracts are complex or restructuring of facilities is required. The publication of 'synthetic' Japanese yen Libor ceased after 31 December 2022. In addition the FCA announced, in September and November 2022, that one month and six-month 'synthetic' sterling Libor rates will cease to be published from 31 March 2023, and three-month 'synthetic' sterling Libor will cease to be published after 31 March 2024. We have or are prepared to transition or remediate the remaining few contracts relying on 'synthetic' sterling settings, outstanding as at 31 December 2022, in advance of those cessation dates.

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 throughout the Group in preparation for upcoming market events. We will continue to transition outstanding legacy contracts through the first half of 2023. We have completed the transition of the majority of our uncommitted 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 the limited number of bilateral derivatives trades where an alternative transition path is required, client engagement is continuing. For certain products and contracts, including bonds and syndicated loans, we remain reliant on the continued support of agents and third parties, but we continue to progress those contracts requiring transition. We continue to monitor contracts that may be potentially more challenging to transition, and may 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.

For the Group's own debt securities issuances, we continue to have instruments in US dollars, sterling, Japanese yen and Singapore dollars where the terms provide for an Ibor benchmark to be used to reset the coupon rate if HSBC chooses not to redeem them on their call dates. We remain mindful of the various factors that have an impact on the Ibor remediation strategy for our regulatory capital and MREL instruments, including – but not limited to – timescales for cessation of relevant Ibor rates, constraints relating to the governing law of outstanding instruments, the potential relevance of legislative solutions and industry best practice guidance. We remain committed to seeking to remediate or mitigate relevant risks relating to Ibor-demise, as appropriate, on our outstanding regulatory capital and MREL instruments before the relevant calculation dates, which may occur post-cessation of the relevant Ibor rate or rates.

For US dollar Libor and other demising Ibors, we continue to be exposed to, and 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, which 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 RFR interest rates, we are exposed to basis risk resulting from the asymmetric adoption of rates across assets, liabilities and products. Additionally the current stage of the Term Secured Overnight Financing Rate ('SOFR') market presents challenges for certain hedge accounting strategies.

While the level of risk is diminishing in line with our process implementation and continued transition of contracts, we will monitor these risks through the remainder of the transition of legacy contracts. Throughout 2023, we plan to continue to engage with our clients and investors to complete an orderly transition of contracts that reference the remaining demising Ibors.

Mitigating actions

- Our global Ibor transition programme, which is overseen by the Group Chief Risk and Compliance 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 transitioned legacy contracts and ceased entering into new contracts based on demised or demising Ibors, other than those allowed under regulatory exemptions, and implemented 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)

Interest Rate Benchmark Reform Phase 2, the amendments to IFRSs issued in August 2020, represents the second phase of the IASB's project on the effects of interest rate benchmark reform. The amendments address issues affecting financial statements when changes are made to contractual cash flows and hedging relationships.

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.

At 31 Dec 2022	**Financial instruments yet to transition to alternative benchmarks, by main benchmark**			
	USD Libor $m	**GBP Libor $m**	**JPY Libor $m**	**Others[1] $m**
Non-derivative financial assets				
Loans and advances to customers	**49,632**	**262**	**—**	**7,912**
Other financial assets	**4,716**	**42**	**—**	**1,562**
Total non-derivative financial assets[2]	**54,348**	**304**	**—**	**9,474**
Non-derivative financial liabilities				
Financial liabilities designated at fair value	**17,224**	**1,804**	**1,179**	**—**
Debt securities in issue	**5,352**	**—**	**—**	**—**
Other financial liabilities	**2,988**	**—**	**—**	**176**
Total non-derivative financial liabilities	**25,564**	**1,804**	**1,179**	**176**
Derivative notional contract amount				
Foreign exchange	**140,223**	**—**	**—**	**7,337**
Interest rate	**2,208,189**	**68**	**—**	**186,952**
Total derivative notional contract amount	**2,348,412**	**68**	**—**	**194,289**

At 31 Dec 2021	Financial instruments yet to transition to alternative benchmarks, by main benchmark			
	USD Libor $m	GBP Libor $m	JPY Libor $m	Others[1] $m
Non-derivative financial assets				
Loans and advances to customers	70,932	18,307	370	8,259
Other financial assets	5,131	1,098	—	2
Total non-derivative financial assets[2]	76,063	19,405	370	8,261
Non-derivative financial liabilities				
Financial liabilities designated at fair value	20,219	4,019	1,399	1
Debt securities in issue	5,255	—	—	—
Other financial liabilities	2,998	78	—	—
Total non-derivative financial liabilities	28,472	4,097	1,399	1
Derivative notional contract amount				
Foreign exchange	137,188	5,157	31,470	9,652
Interest rate	2,318,613	284,898	72,229	133,667
Total derivative notional contract amount	2,455,801	290,055	103,699	143,319

1 *Comprises financial instruments referencing other significant benchmark rates yet to transition to alternative benchmarks (euro Libor, Swiss franc Libor, Eonia, SOR, THBFIX, MIFOR and Sibor). Announcements were made by regulators during 2022 on the cessation of the Canadian dollar offered rate ('CDOR') and Mexican Interbank equilibrium interest rate ('TIIE'), which will eventually transition to the Canadian overnight repo rate average ('CORRA') and a new Mexican overnight fall-back rate, respectively. Therefore, CDOR and TIIE are also included in Others during the current period.*

2 *Gross carrying amount excluding allowances for expected credit losses.*

The amounts in the above table relate to HSBC's main operating entities where HSBC has material exposures impacted by Ibor reform, including in the UK, Hong Kong, France, the US, Mexico, Canada, Singapore, the UAE, Bermuda, Australia, Qatar, Germany, Thailand, India and Japan. The amounts provide an indication of the extent of the Group's exposure to the Ibor benchmarks that 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 HSBC's consolidated balance sheet.

Environmental, social and governance ('ESG') risk

We are subject to financial and non-financial risks associated with ESG-related matters. Our current areas of focus include climate risk, nature-related risks and human rights risks. These can impact us both directly and indirectly through our business activities and relationships. For details of how we govern ESG, see page 86.

Our assessment of climate risks covers three distinct time periods, comprising: short term, which is up to 2025; medium term, which is between 2026 and 2035; and long term, which is between 2036 and 2050. Focus on climate-related risk continued to increase 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 impacts, owing to the increase in frequency and severity of weather events and chronic shifts in weather patterns, which could affect our ability to conduct our day-to-day operations.

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

We face increased reputational, legal and regulatory risk as we make progress towards our net zero ambition, 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 may also impact on model risk, as the uncertain impacts of climate change and data and methodology limitations present challenges to creating reliable and accurate model outputs.

We also face reporting risk in relation to our climate disclosures, as any data, methodologies and standards we have used may evolve over time in line with market practice, regulation or owing to developments in climate science. While emissions reporting has improved over time, data remains of limited quality and consistency. The use of inconsistent or incomplete data and models could result in sub-optimal decision making. Any changes could result in revisions to our internal frameworks and reported data, and could mean that reported figures are not reconcilable or comparable year on year. We may also have to re-evaluate our progress towards our climate-related targets in future and this could result in reputational, legal and regulatory risks.

There is increasing evidence that a number of nature-related risks beyond climate change, which include risks that can be represented more broadly by impact and dependence on nature, can and will have significant economic impact. These risks arise when the provision of natural services – such as water availability, air quality and soil quality – is compromised by overpopulation, urban development, natural habitat and ecosystem loss, ecosystem degradation arising from economic activity and other environmental stresses beyond climate change. They can show themselves in various ways, including through macroeconomic, market, credit, reputational, legal and regulatory risks, for both HSBC and our customers. We continue to engage with investors, regulators and customers on nature-related risks to evolve our approach and understand best practice risk mitigation.

Regulation and disclosure requirements in relation to human rights, and to modern slavery in particular, are increasing. Businesses are expected to be transparent about their efforts to identify and respond to the risk of negative human rights impacts arising from their business activities and relationships.

Mitigating actions

- We aim to deepen our understanding of the drivers of climate risk. A dedicated Climate Risk Oversight Forum is responsible for shaping and overseeing our approach and providing support in managing climate risk. For further details of the Group's ESG governance structure, see page 86.
- Our climate risk programme continues to support 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. We also aim to enhance our approach to greenwashing risk management.
- In December 2022, we published our updated policy covering the broader energy system including upstream oil and gas, oil and gas power generation, coal, hydrogen, renewables and hydropower, nuclear, biomass and energy from waste. We also expanded our thermal coal phase-out policy, in which we committed to not provide new finance or advisory services for the specific purposes of the conversion of existing coal-to-gas fired power plants, or new metallurgical coal mines (see page 65).
- 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.
- In 2022, we reviewed our salient human rights issues following the methodology set out in the UNGPs. These are the human rights at risk of the most severe potential negative impact through our business activities and relationships. This review built on an earlier review that had identified modern slavery and discrimination as priority human rights issues. For further details, see page 87 of the ESG review.
- In 2021, we joined several industry working groups dedicated to helping us assess and manage nature-related risks, such as the Taskforce on Nature-related Financial Disclosures ('TNFD'). In 2022 our asset management business published its biodiversity policy to publicly explain how our analysts address nature-related issues.
- We continue to engage with our customers, investors and regulators proactively on the management of ESG risks. We also engage with initiatives, including the Climate Financial Risk Forum, Equator Principles, Task Force on Climate-related Financial Disclosures and CDP (formerly the Carbon Disclosure Project) to help drive best practice for climate risk management.

For further details of our approach to climate risk management, see 'Climate risk' on page 221.

For further details of ESG risk management, see 'Financial crime risk' on page 231 and 'Regulatory compliance risk environment including conduct' on page 225.

Our ESG review can be found on page 44.

Digitalisation and technological advances risk

Developments in technology and changes to regulations are enabling new entrants to the industry, particularly with respect to payments. This challenges us to continue innovating and taking advantage of new digital capabilities so that we improve how we serve our customers, drive efficiency and adapt our products to attract and retain customers. As a result, we may need to increase our investment in our business to adapt or develop products and services to respond to our customers' evolving needs. We also need to ensure that new digital capabilities do not weaken our resilience or wider risk management capabilities.

New technologies such as blockchain and quantum computing offer both business opportunities and potential risks for HSBC. As with all use of technologies, we aim to maximise their potential while seeking to ensure a robust control environment is in place to help manage the inherent risks, such as the impact on encryption algorithms.

Mitigating actions:

- We continue to monitor this emerging risk, as well as the advances in technology, and changes in customer behaviours to understand how these may impact our business.
- We assess new technologies to help develop appropriate controls and maintain resilience.
- We closely monitor and assess financial crime risk and the impact on payment transparency and architecture.

Internally driven

Risks associated with workforce capability, capacity and environmental factors with potential impact on growth

Our global businesses and functions in all of our markets are exposed to risks associated with workforce capacity challenges, including challenges to retain, develop and attract high-performing employees in key labour markets, and compliance with employment laws and regulations. Changed working arrangements, and the residual impact of local Covid-19-related restrictions and health concerns during the pandemic, have also affected employee mental health and well-being.

Mitigating actions

- We seek to promote a diverse and inclusive workforce and provide health and well-being support. We continue to build our speak-up culture through active campaigns.
- We monitor hiring activities and levels of employee attrition, with each business and function putting in place plans to help ensure they have effective workforce forecasting to meet business demands.
- We monitor people risks that could arise due to organisational restructuring, helping to ensure we manage redundancies sensitively and support impacted employees. We encourage our people leaders to focus on talent retention at all levels, with an empathetic mindset and approach, while ensuring the whole proposition of working at HSBC is well understood.
- Our Future Skills curriculum helps provides skills that will help to enable employees and HSBC to be successful in the future.
- We develop succession plans for key management roles, with oversight from the Group Executive Committee.

Risks arising from the receipt of services from third parties

We use third parties to provide a range of goods and services. Risks arising from the use of third-party providers and their supply chain may be harder to identify. It is critical that we ensure we have appropriate risk management policies, processes and practices over the selection, governance and oversight of third parties and their supply chain, particularly for key activities that could affect our operational resilience. Any deficiency in the management of risks associated with our third parties could affect our ability to support our customers and meet regulatory expectations.

Mitigating actions

- We continue to monitor the effectiveness of the controls operated by our third-party providers and request third-party control reports, where required. We have made further enhancements to our framework to help ensure risks associated with these arrangements are understood and managed effectively by our global businesses, global functions and regions.
- We continue to enhance the effective management of our intra-Group arrangements using the same control standards as we have for external third-party arrangements.
- We are implementing the changes required by new regulations as set by our regulators.

Model risk

Model risk arises whenever business decision making includes reliance on models. We use models in both financial and non-financial contexts, as well as in a range of business applications such as customer selection, product pricing, financial crime transaction monitoring, creditworthiness evaluation and financial reporting. Assessing model performance is a continuous undertaking. Models can need redevelopment as market conditions change. Significant increases in global inflation and interest rates have impacted the reliability and accuracy of both credit and market risk models.

We continued to prioritise the redevelopment of internal ratings-based ('IRB') and internal model methods ('IMM') models, in relation to counterparty credit, as part of the IRB repair and Basel III programmes with a key focus on enhancing the quality of data used as model inputs. A number of these models have been submitted to the UK's Prudential Regulation Authority ('PRA') and other key regulators for feedback, and approval is in progress. Some IMM and internal model approach ('IMA') models have been approved for use, and feedback has been received for some IRB models. Climate risk modelling is a key focus for the Group as HSBC's commitment to ESG has become a key part of the Group's strategy.

Model risk remains a key area of focus given the regulatory scrutiny in this area, with local regulatory exams taking place in many jurisdictions and further developments in policy expected from many regulators, including the PRA.

Mitigating actions

- We have continued to embed the enhanced monitoring, review and challenge of expected credit loss model performance through our Model Risk Management function as part of a broader quarterly process to determine loss levels. The Model Risk Management team aims to provide effective review and challenge of any future redevelopment of these models.
- Model Risk Governance committees at the Group, business and functional levels continue to provide oversight of model risk.
- Model Risk Management works closely with businesses to ensure that IRB/IMM/IMA models in development meet risk management, pricing and capital management needs. Global Internal Audit provides assurance over the risk management framework for models.
- Additional assurance work is performed by the model risk governance teams, which act as second lines of defence. The teams test whether controls implemented by model users comply with model risk policy and if model risk standards are adequate.
- Models using advanced machine learning techniques are validated and monitored to help ensure that risks that are determined by the algorithms have adequate oversight and review. A framework to manage the range of risks that are generated by these advanced techniques, and to recognise the multidisciplinary nature of these risks, is being developed.

Data risk

We use multiple systems and growing quantities of data to support our customers. Risk arises if data is incorrect, unavailable, misused, or unprotected. Along with other banks and financial institutions, we need to meet external regulatory obligations and laws that cover data, such as the Basel Committee on Banking Supervision's 239 guidelines and the General Data Protection Regulation ('GDPR').

Mitigating actions

- Through our global data management framework, we monitor the quality, availability and security of data that supports our customers and internal processes. We work towards resolving any identified data issues in a timely manner.
- We have made improvements to our data policies. We are implementing an updated control framework (which includes trusted sources, data flows and data quality) in order to enhance the end-to-end management of data risk.
- We have established a global data management utility, and continue to simplify and unify data management activities across the Group.
- We seek to protect customer data through our data privacy framework, which establishes practices, design principles and guidelines that enable us to demonstrate compliance with data privacy laws and regulations.
- We continue to modernise our data and analytics infrastructure through investments in Cloud technology, data visualisation, machine learning and artificial intelligence.
- We continue to educate our employees on data risk and data management. We have delivered regular mandatory training globally on how to protect and manage data appropriately.

Change execution risk

We have continued investment in strategic change to support the delivery of our strategic priorities and regulatory commitments. This requires change to be executed safely and efficiently.

Mitigating actions

- In 2022, we added change execution risk to our risk taxonomy and control library, so that it could be defined, assessed, managed, reported and overseen in the same way as our other material risks.
- The Transformation Oversight Executive Committee oversees the prioritisation, strategic alignment and management of execution risk for all change portfolios and initiatives.

Areas of special interest

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. While considered under the themes captured under top and emerging risks, in this section we have placed a particular focus on the Covid-19 pandemic.

Risks related to Covid-19

The impact from the Covid-19 pandemic remains a continuing risk to our customers and organisation. However, the appetite for public health restrictions has reduced following the successful roll-out of vaccine programmes, and as societies have adapted. Countries continue to differ in their approach, although China has recently reversed restrictions on activity and mobility.

In most countries, high vaccination rates and acquired population immunity have minimised the public health risks and the need for restrictions. However, in mainland China and Hong Kong, adherence to public health restrictions had adverse economic implications throughout much of 2022. Government-imposed restrictions on activity in major Chinese cities, and restrictions on travel, adversely affected global tourism and supply chains.

While the recovery in China resulting from the relaxation of Covid-19 related restrictions on movement, international travel and tourism in China that commenced in December 2022, raises the prospect of global growth, it could also lead to renewed inflationary pressures as demand for commodities and other goods rises. However, there are still short-term risks, as any surge in Covid-19 infections in China may dampen confidence and activity, and lead to the emergence of new vaccine-resistant variants of the virus.

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

Our material banking 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 (see page 145)		
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 derivatives.	Credit risk is: • measured as the amount that could be lost if a customer or counterparty fails to make repayments; • monitored using various internal risk management measures and 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 (see page 202)		
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 and transactional 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.	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 (see page 218)		
Market risk is the risk of an adverse financial impact on trading activities arising from changes in market parameters such as interest rates, foreign exchange rates, asset prices, volatilities, correlations and credit spreads.	Exposure to market risk is separated into two portfolios: trading portfolios and non-trading portfolios. Market risk for non-trading portfolios is discussed in the Treasury risk section on page 214. Market risk exposures arising from our insurance operations are discussed on page 237.	Market risk is: • measured using sensitivities, value at risk 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 value at risk, stress testing and other measures; and • managed using risk limits approved by the Group Risk Management Meeting and the risk management meetings in various global businesses.

Description of risks – banking operations (continued)

Risks	Arising from	Measurement, monitoring and management of risk
Climate risk (see page 221)		
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 can 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 • greenwashing risk, which arises 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 the climate commitments or performance of our customers.	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.
Resilience risk (see page 230)		
Resilience risk is the risk of sustained and significant business disruption from execution, delivery, physical security or safety events, causing the inability to provide critical services to our customers, affiliates, and counterparties.	Resilience risk arises from failures or inadequacies in processes, people, systems or external events.	Resilience risk is: • measured using 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 (see page 231)		
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.	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 (see page 231)		
Financial crime risk is the risk that HSBC'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 of, and assessment by, our 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.
Model risk (see page 232)		
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.	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.

Our insurance manufacturing subsidiaries are regulated separately from our banking operations. Risks in our insurance entities are managed using methodologies and processes that are subject to Group oversight. Our insurance operations are also subject to many of the same risks as our banking operations, and these are covered by the Group's risk management processes. However, there are specific risks inherent to the insurance operations as noted below.

Description of risks – insurance manufacturing operations		
Risks	**Arising from**	**Measurement, monitoring and management of risk**
Financial risk (see page 237)		
For insurance entities, financial risk includes the risk of not being able to effectively match liabilities arising under insurance contracts with appropriate investments and that the expected sharing of financial performance with policyholders under certain contracts is not possible.	Exposure to financial risk arises from: • market risk affecting 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 for credit risk, in terms of economic capital and the amount that could be lost if a counterparty fails to make repayments; for market risk, in terms of economic capital, internal metrics and fluctuations in key financial variables; and for liquidity risk, 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.
Insurance risk (see page 238)		
Insurance risk is the risk that, over time, the cost of insurance policies written, including claims and benefits, may exceed the total amount of premiums and investment income received.	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.

Credit risk

Contents

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 derivatives.

Credit risk management

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 IFRS 9 'Financial Instruments' within the Credit Risk sub-function. For certain retail portfolios, we enhanced the significant increase in credit risk ('SICR') approach in relation to capturing relative movements in probability of default ('PD') since origination.

For our retail portfolios, we adopted the EBA 'Guidelines on the application of definition of default' during 2022 and, for our wholesale portfolios, these guidelines were adopted during 2021. 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 inflation, fiscal and monetary policy, the Russia-Ukraine war, broader geopolitical uncertainties, and the continued risks resulting from the Covid-19 pandemic.

For further details, see 'Top and emerging risks' on page 135.

Governance and structure

We have established Group-wide credit risk management and related IFRS 9 processes. 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 actions, 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)

Credit approval authorities are delegated by the Board to the Group Chief Executive together with the authority to sub-delegate them. The Credit Risk sub-function in Group Risk and Compliance is responsible for the key policies and processes for managing credit risk, which include formulating Group 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 HSBC 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 costs and their mitigation.

Key risk management processes

IFRS 9 'Financial Instruments' process

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

Modelling, data and forward economic guidance

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

We have a centralised process for generating unbiased and independent global economic scenarios. Scenarios are subject to a process of review and challenge by a dedicated team, as well as regional groupings. Each quarter, the scenarios and probability weights are reviewed and checked for consistency with the economic conjuncture and current economic and financial risks. These are subject to final review and approval by senior management in a Forward Economic Guidance Global Business Impairment Committee.

Implementation

A centralised impairment engine performs the expected credit losses 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.

Governance

Regional management review forums are established in key sites and regions in order to review and approve the impairment results. Regional management review forums have representatives from Credit Risk and Finance. The key site and regional approvals are reported up to the relevant global business impairment committee for final approval of the Group's ECL for the period. Required members of the committee are the Wholesale Global Chief Corporate Credit Officer and Chief Risk Officer for Wealth and Personal Banking Risk, as well as the relevant global business Chief Financial Officer and the Global Financial Controller.

Concentration of exposure

(Audited)

Concentrations of credit risk arise when a number of counterparties or exposures have comparable economic characteristics, or such counterparties are engaged in similar activities or operate in the same geographical areas or industry sectors so 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 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

The 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 point-in-time probability-weighted PD.

Credit quality classification

	Sovereign debt securities and bills	Other debt securities and bills	Wholesale lending and derivatives		Retail lending	
	External credit rating	External credit rating	Internal credit rating	12-month Basel probability of default %	Internal credit rating	12 month probability-weighted PD %
Quality classification[1,2]						
Strong	**BBB and above**	**A- and above**	**CRR 1 to CRR 2**	**0–0.169**	**Band 1 and 2**	**0.000–0.500**
Good	**BBB- to BB**	**BBB+ to BBB-**	**CRR 3**	**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 probability-weighted probability of default ('PD').

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 1.2(i) on the financial statements.

Forborne loans and advances

(Audited)

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

We continue to class loans as forborne when we modify the contractual payment terms due to having significant concerns about the borrowers' ability to meet contractual payments when they were due.

In 2022, we expanded our definition of forborne to capture non-payment-related concessions, such as covenant waivers. For our wholesale portfolio, we began identifying non-payment-related concessions in 2021 when our internal policies were changed. For our retail portfolios, we began identifying them during 2022.

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

For details of our policy on forbearance, see Note 1.2(i) in the financial statements.

Credit quality of forborne loans

For wholesale lending, where payment-related forbearance measures result in a diminished financial obligation, or if there are other indicators of impairment, the loan will be classified as credit impaired if it is not already so classified. All facilities with a customer, including loans that have not been modified, are considered credit impaired following the identification of a payment-related forborne loan. For retail lending, where a material payment-related concession has been granted, the loan will be classified as credit impaired. In isolation, non-payment forbearance measures may not result in the loan being classified as credit impaired unless combined with other indicators of credit impairment. These are classed as performing forborne loans for both wholesale and retail lending.

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. For wholesale and retail lending, any forbearance measures granted on a loan already classed as forborne results in the customer being classed as credit impaired.

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 1.2(i) on the financial statements.

Write-off of loans and advances

(Audited)

For details of our policy on the write-off of loans and advances, see Note 1.2(i) on the financial statements.

Unsecured personal facilities, including credit cards, are generally written off at between 150 and 210 days past due. The standard period runs until the end of the month in which the account becomes 180 days contractually delinquent. However, in exceptional circumstances to achieve a fair customer outcome, and in line with regulatory expectations, they may be extended further.

For secured 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.

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.

There are exceptions in a few countries and territories where local regulation or legislation constrains earlier write-off, or where the realisation of collateral for secured real estate lending takes more time. 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.

Credit risk in 2022

At 31 December 2022, gross loans and advances to customers and banks of $1,041bn decreased by $99.1bn, compared with 31 December 2021. This included adverse foreign exchange movements of $59.2bn and an $81.2bn decrease due to a reclassification of businesses to assets held for sale, including our banking business in Canada and our retail banking operations in France.

Excluding foreign exchange movements, the underlying decrease of $39.9bn was driven by a $36.1bn decrease in personal loans and advances to customers and by a $29.9bn decrease in wholesale loans and advances to customers. These were partly offset by a $25.9bn increase in loans and advances to banks.

The underlying decrease in personal loans and advances to customers was driven by the $50.1bn reclassification of businesses to assets held for sale, and by a decrease in other personal lending, mainly in Hong Kong (down $1.5bn). This was offset by mortgage growth of $15.4bn, mainly in the UK (up $8.9bn), Hong Kong (up $3.4bn) and Australia (up $1.6bn).

The underlying increase in loans and advances to banks was driven by growth in the UK (up $10.6bn), Hong Kong (up $7.9bn) and Egypt (up $1.9bn), driven mainly by higher central bank placements.

At 31 December 2022, the allowance for ECL of $12.6bn increased by $0.5bn compared with 31 December 2021, including favourable foreign exchange movements of $0.6bn and the effect of reclassifications to assets held for sale of $0.4bn. The $12.6bn allowance comprised $12.1bn in respect of assets held at amortised cost, $0.4bn in respect of loan commitments and financial guarantees, and $0.1bn in respect of debt instruments measured at fair value through other comprehensive income ('FVOCI').

Excluding foreign exchange movements, the allowance for ECL in relation to loans and advances to customers increased by $0.6bn from 31 December 2021. This was attributable to:

- a $0.7bn increase in wholesale loans and advances to customers, of which $0.7bn was driven by stage 3; and
- a $0.1bn decrease in personal loans and advances to customers, of which $0.4bn was driven by stage 3, partly offset by an increase of $0.3bn in stages 1 and 2.

Stage 3 balances at 31 December 2022 increased by $1.9bn from 31 December 2021. This was driven by a $3.2bn increase in wholesale loans and advances to customers, mainly in corporate real estate portfolios in Hong Kong. This was partly offset by a decrease of $1.3bn in personal loans and advances to customers.

At 31 December 2022, for certain retail lending portfolios, we introduced enhancements in the significant increase in credit risk ('SICR') approach in relation to capturing relative movements in probability of default ('PD'). The enhanced approach captured relative movements in PD since origination, which resulted in a significant migration to stage 2 from loans to customers gross carrying amounts in stage 1.

The volume of stage 1 customer accounts with lower absolute levels of credit risk who have exhibited some amount of relative increase in PD since origination have migrated into stage 2, and accounts originated with higher absolute levels of credit risk with no or insignificant increases in PD since origination have been transferred to stage 1, with no material overall change in risk.

The impact on ECL is immaterial due to the offsetting ECL impacts of stage migrations and due to the low loan-to-value ('LTV') profiles. This is particularly applicable to UK customers.

The enhancement of the SICR approach constitutes an improvement towards more responsive models that better reflect the SICR since origination. This includes consideration of the current cost of living pressures, as markets adjust to the higher interest-rate environment.

In wholesale lending, China's commercial real estate sector continued to deteriorate in 2022, resulting in further stage 2 allowances on downgrades and new and additional stage 3 charges.

The ECL charge for 2022 was $3.6bn, inclusive of recoveries. This was driven by higher ECL charges relating to increasing inflationary pressures, rising interest rates, China commercial real estate exposures and economic uncertainty, partly offset by a release in Covid-19-related allowances at the beginning of the year.

The ECL charge comprised: $2.4bn in respect of wholesale lending, of which $1.7bn were in stage 3 and purchased or originated credit impaired ('POCI'); $1.1bn in respect of personal lending, of which $0.5bn were in stage 3; and $0.1bn in respect of debt instruments measured at FVOCI.

Income statement movements are analysed further on page 101.

While credit risk arises across most of our balance sheet, ECL have typically been recognised on loans and advances to customers and banks, in addition to securitisation exposures and other structured products. As a result, our disclosures focus primarily on these two areas. For further details of:

- maximum exposure to credit risk, see page 153;
- measurement uncertainty and sensitivity analysis of ECL estimates, see page 153;
- reconciliation of changes in gross carrying/nominal amount and allowances for loans and advances to banks and customers including loan commitments and financial guarantees, see page 162;
- credit quality, see page 165;
- total wholesale lending for loans and advances to banks and customers by stage distribution, see page 171;
- wholesale lending collateral, see page 180;
- total personal lending for loans and advances to customers at amortised cost by stage distribution, see page 188; and
- personal lending collateral, see page 193.

Summary of credit risk

The following disclosure presents the gross carrying/nominal amount of financial instruments to which the impairment requirements in IFRS 9 are applied and the associated allowance for ECL.

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

(Audited)

	31 Dec 2022		At 31 Dec 2021	
	Gross carrying/ nominal amount	**Allowance for ECL[1]**	Gross carrying/ nominal amount	Allowance for ECL[1]
	$m	**$m**	$m	$m
Loans and advances to customers at amortised cost	**936,307**	**(11,453)**	1,057,231	(11,417)
– personal	**415,012**	**(2,872)**	478,337	(3,103)
– corporate and commercial	**454,356**	**(8,324)**	513,539	(8,204)
– non-bank financial institutions	**66,939**	**(257)**	65,355	(110)
Loans and advances to banks at amortised cost	**104,951**	**(69)**	83,153	(17)
Other financial assets measured at amortised cost	**1,014,498**	**(553)**	880,351	(193)
– cash and balances at central banks	**327,005**	**(3)**	403,022	(4)
– items in the course of collection from other banks	**7,297**	**—**	4,136	—
– Hong Kong Government certificates of indebtedness	**43,787**	**—**	42,578	—
– reverse repurchase agreements – non-trading	**253,754**	**—**	241,648	—
– financial investments	**168,827**	**(80)**	97,364	(62)
– assets held for sale[2]	**102,556**	**(415)**	2,859	(43)
– prepayments, accrued income and other assets[3]	**111,272**	**(55)**	88,744	(84)
Total gross carrying amount on-balance sheet	**2,055,756**	**(12,075)**	2,020,735	(11,627)
Loans and other credit-related commitments	**618,788**	**(386)**	627,637	(379)
– personal	**244,006**	**(27)**	239,685	(39)
– corporate and commercial	**269,187**	**(340)**	283,625	(325)
– financial	**105,595**	**(19)**	104,327	(15)
Financial guarantees	**18,783**	**(52)**	27,795	(62)
– personal	**1,135**	**—**	1,130	—
– corporate and commercial	**13,587**	**(50)**	22,355	(58)
– financial	**4,061**	**(2)**	4,310	(4)
Total nominal amount off-balance sheet[4]	**637,571**	**(438)**	655,432	(441)
	2,693,327	**(12,513)**	2,676,167	(12,068)

	Fair value	**Memorandum allowance for ECL[5]**	Fair value	Memorandum allowance for ECL[5]
	$m	**$m**	$m	$m
Debt instruments measured at fair value through other comprehensive income ('FVOCI')	**266,303**	**(145)**	347,203	(96)

1 *The total ECL is recognised in the loss allowance for the financial asset unless the total ECL exceeds the gross carrying amount of the financial asset, in which case the ECL is recognised as a provision.*
2 *For further details on gross carrying amounts and allowances for ECL related to assets held for sale, see 'Assets held for sale' on page 151.*
3 *Includes only those financial instruments that are subject to the impairment requirements of IFRS 9. 'Prepayments, accrued income and other assets' as presented within the consolidated balance sheet on page 326 comprises both financial and non-financial assets, including cash collateral and settlement accounts.*
4 *Represents the maximum amount at risk should the contracts be fully drawn upon and clients default.*
5 *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 the income statement.*

The following table provides an overview of the Group's credit risk by stage and industry, 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 by industry sector at 31 December 2022

(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[2]	Total	Stage 1	Stage 2	Stage 3	POCI[2]	Total
	$m	$m	$m	$m	$m	$m	$m	$m	$m	$m	%	%	%	%	%
Loans and advances to customers at amortised cost	777,543	139,130	19,505	129	936,307	(1,095)	(3,491)	(6,829)	(38)	(11,453)	0.1	2.5	35.0	29.5	1.2
– personal	362,781	48,891	3,340	—	415,012	(562)	(1,505)	(805)	—	(2,872)	0.2	3.1	24.1	—	0.7
– corporate and commercial	353,010	85,521	15,696	129	454,356	(490)	(1,909)	(5,887)	(38)	(8,324)	0.1	2.2	37.5	29.5	1.8
– non-bank financial institutions	61,752	4,718	469	—	66,939	(43)	(77)	(137)	—	(257)	0.1	1.6	29.2	—	0.4
Loans and advances to banks at amortised cost	103,042	1,827	82	—	104,951	(18)	(29)	(22)	—	(69)	—	1.6	26.8	—	0.1
Other financial assets measured at amortised cost	996,489	17,166	797	46	1,014,498	(124)	(188)	(234)	(7)	(553)	—	1.1	29.4	15.2	0.1
Loan and other credit-related commitments	583,383	34,033	1,372	—	618,788	(141)	(180)	(65)	—	(386)	—	0.5	4.7	—	0.1
– personal	239,521	3,686	799	—	244,006	(26)	(1)	—	—	(27)	—	—	—	—	—
– corporate and commercial	241,313	27,323	551	—	269,187	(111)	(166)	(63)	—	(340)	—	0.6	11.4	—	0.1
– financial	102,549	3,024	22	—	105,595	(4)	(13)	(2)	—	(19)	—	0.4	9.1	—	—
Financial guarantees	16,071	2,463	249	—	18,783	(6)	(13)	(33)	—	(52)	—	0.5	13.3	—	0.3
– personal	1,123	11	1	—	1,135	—	—	—	—	—	—	—	—	—	—
– corporate and commercial	11,547	1,793	247	—	13,587	(5)	(12)	(33)	—	(50)	—	0.7	13.4	—	0.4
– financial	3,401	659	1	—	4,061	(1)	(1)	—	—	(2)	—	0.2	—	—	—
At 31 Dec 2022	**2,476,528**	**194,619**	**22,005**	**175**	**2,693,327**	**(1,384)**	**(3,901)**	**(7,183)**	**(45)**	**(12,513)**	**0.1**	**2.0**	**32.6**	**25.7**	**0.5**

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 following disclosure presents the ageing of stage 2 financial assets by those less than 30 days and greater than 30 DPD and therefore presents those financial assets classified as stage 2 due to ageing (30 DPD) and those identified at an earlier stage (less than 30 DPD).

Stage 2 days past due analysis at 31 December 2022

(Audited)

	Gross carrying amount				Allowance for ECL				ECL coverage %			
	Stage 2	*Up-to-date*	*1 to 29 DPD[1,2]*	*30 and > DPD[1,2]*	Stage 2	*Up-to-date*	*1 to 29 DPD[1,2]*	*30 and > DPD[1,2]*	Stage 2	*Up-to-date*	*1 to 29 DPD[1,2]*	*30 and > DPD[1,2]*
	$m	*$m*	*$m*	*$m*	$m	*$m*	*$m*	*$m*	%	*%*	*%*	*%*
Loans and advances to customers at amortised cost	139,130	*134,733*	*2,411*	*1,986*	(3,491)	*(3,019)*	*(234)*	*(238)*	2.5	*2.2*	*9.7*	*12.0*
– personal	48,891	*46,402*	*1,683*	*806*	(1,505)	*(1,080)*	*(214)*	*(211)*	3.1	*2.3*	*12.7*	*26.2*
– corporate and commercial	85,521	*84,005*	*712*	*804*	(1,909)	*(1,862)*	*(20)*	*(27)*	2.2	*2.2*	*2.8*	*3.4*
– non-bank financial institutions	4,718	*4,326*	*16*	*376*	(77)	*(77)*	*—*	*—*	1.6	*1.8*	*—*	*—*
Loans and advances to banks at amortised cost	1,827	*1,817*	*—*	*10*	(29)	*(29)*	*—*	*—*	1.6	*1.6*	*—*	*—*
Other financial assets measured at amortised cost	17,166	*16,930*	*140*	*96*	(188)	*(164)*	*(8)*	*(16)*	1.1	*1.0*	*5.7*	*16.7*

1 Days past due ('DPD').
2 The days past due amounts presented above are on a contractual basis and include the benefit of any customer relief payment holidays granted.

Summary of credit risk (excluding debt instruments measured at FVOCI) by stage distribution and ECL coverage by industry sector at 31 December 2021 (continued)

(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[2]	Total	Stage 1	Stage 2	Stage 3	POCI[2]	Total
	$m	$m	$m	$m	$m	$m	$m	$m	$m	$m	%	%	%	%	%
Loans and advances to customers at amortised cost	918,936	119,224	18,797	274	1,057,231	(1,367)	(3,119)	(6,867)	(64)	(11,417)	0.1	2.6	36.5	23.4	1.1
– personal	456,956	16,439	4,942	—	478,337	(658)	(1,219)	(1,226)	—	(3,103)	0.1	7.4	24.8	—	0.6
– corporate and commercial	400,894	98,911	13,460	274	513,539	(665)	(1,874)	(5,601)	(64)	(8,204)	0.2	1.9	41.6	23.4	1.6
– non-bank financial institutions	61,086	3,874	395	—	65,355	(44)	(26)	(40)	—	(110)	0.1	0.7	10.1	—	0.2
Loans and advances to banks at amortised cost	81,636	1,517	—	—	83,153	(14)	(3)	—	—	(17)	—	0.2	—	—	—
Other financial assets measured at amortised cost	875,016	4,988	304	43	880,351	(91)	(54)	(42)	(6)	(193)	—	1.1	13.8	14.0	—
Loan and other credit-related commitments	594,473	32,389	775	—	627,637	(165)	(174)	(40)	—	(379)	—	0.5	5.2	—	0.1
– personal	237,770	1,747	168	—	239,685	(37)	(2)	—	—	(39)	—	0.1	—	—	—
– corporate and commercial	254,750	28,269	606	—	283,625	(120)	(165)	(40)	—	(325)	—	0.6	6.6	—	0.1
– financial	101,953	2,373	1	—	104,327	(8)	(7)	—	—	(15)	—	0.3	—	—	—
Financial guarantees	24,932	2,638	225	—	27,795	(11)	(30)	(21)	—	(62)	—	1.1	9.3	—	0.2
– personal	1,114	15	1	—	1,130	—	—	—	—	—	—	—	—	—	—
– corporate and commercial	20,025	2,107	223	—	22,355	(10)	(28)	(20)	—	(58)	—	1.3	9.0	—	0.3
– financial	3,793	516	1	—	4,310	(1)	(2)	(1)	—	(4)	—	0.4	100.0	—	0.1
At 31 Dec 2021	2,494,993	160,756	20,101	317	2,676,167	(1,648)	(3,380)	(6,970)	(70)	(12,068)	0.1	2.1	34.7	22.1	0.5

1 Represents the maximum amount at risk should the contracts be fully drawn upon and clients default.
2 Purchased or originated credit-impaired ('POCI').

Stage 2 days past due analysis at 31 December 2021 (continued)

(Audited)

	Gross carrying amount				Allowance for ECL				ECL coverage %			
	Stage 2	*Up-to-date*	*1 to 29 DPD[1,2]*	*30 and > DPD[1,2]*	Stage 2	*Up-to-date*	*1 to 29 DPD[1,2]*	*30 and > DPD[1,2]*	Stage 2	*Up-to-date*	*1 to 29 DPD[1,2]*	*30 and > DPD[1,2]*
	$m	*$m*	*$m*	*$m*	$m	*$m*	*$m*	*$m*	%	*%*	*%*	*%*
Loans and advances to customers at amortised cost	119,224	*115,350*	*2,193*	*1,681*	(3,119)	*(2,732)*	*(194)*	*(193)*	2.6	*2.4*	*8.8*	*11.5*
– personal	16,439	*14,124*	*1,387*	*928*	(1,219)	*(884)*	*(160)*	*(175)*	7.4	*6.3*	*11.5*	*18.9*
– corporate and commercial	98,911	*97,388*	*806*	*717*	(1,874)	*(1,822)*	*(34)*	*(18)*	1.9	*1.9*	*4.2*	*2.5*
– non-bank financial institutions	3,874	*3,838*	—	*36*	(26)	*(26)*	—	—	0.7	*0.7*	—	—
Loans and advances to banks at amortised cost	1,517	*1,517*	—	—	(3)	*(3)*	—	—	0.2	*0.2*	—	—
Other financial assets measured at amortised cost	4,988	*4,935*	*22*	*31*	(54)	*(47)*	*(4)*	*(3)*	1.1	*1.0*	*18.2*	*9.7*

1 Days past due ('DPD').
2 The days past due amounts presented above are on a contractual basis and include the benefit of any customer relief payment holidays granted.

Stage 2 decomposition

The following table presents the stage 2 decomposition of gross carrying amount and allowances for ECL for loans and advances to customers. It also sets out the reasons why an exposure is classified as stage 2 and therefore presented as a significant increase in credit risk at 31 December 2022.

The quantitative classification shows gross carrying values and allowances for ECL for which the applicable reporting date probability of default ('PD') measure exceeds defined quantitative thresholds for retail and wholesale exposures, as set out in Note 1.2 'Summary of significant accounting policies', on page 342.

The qualitative classification primarily accounts for CRR deterioration, watch-and-worry and retail management judgemental adjustments.

A summary of our current policies and practices for the significant increase in credit risk is set out in 'Summary of significant accounting policies' on page 342.

Loans and advances to customers[1]

	At 31 Dec 2022								
	Gross carrying amount				**Allowance for ECL**				**ECL coverage**
	Personal	**Corporate and commercial**	**Non-bank financial institutions**	**Total**	**Personal**	**Corporate and commercial**	**Non-bank financial institutions**	**Total**	**Total**
	$m	**$m**	**$m**	**$m**	**$m**	**$m**	**$m**	**$m**	**%**
Quantitative	**41,611**	**66,450**	**3,679**	**111,740**	**(1,301)**	**(1,644)**	**(66)**	**(3,011)**	**2.7**
Qualitative	**7,233**	**18,555**	**878**	**26,666**	**(201)**	**(262)**	**(11)**	**(474)**	**1.8**
30 DPD backstop[2]	**47**	**516**	**161**	**724**	**(3)**	**(3)**	**—**	**(6)**	**0.8**
Total stage 2	**48,891**	**85,521**	**4,718**	**139,130**	**(1,505)**	**(1,909)**	**(77)**	**(3,491)**	**2.5**
	At 31 Dec 2021								
Quantitative	9,907	68,000	3,041	80,948	(1,076)	(1,347)	(19)	(2,442)	3.0
Qualitative	6,329	30,326	818	37,473	(134)	(520)	(7)	(661)	1.8
30 DPD backstop[2]	203	585	15	803	(9)	(7)	—	(16)	2.0
Total stage 2	16,439	98,911	3,874	119,224	(1,219)	(1,874)	(26)	(3,119)	2.6

1 *Where balances satisfy more than one of the above three criteria for determining a significant increase in credit risk, the corresponding gross exposure and ECL have been assigned in order of categories presented.*
2 *Days past due ('DPD').*

Assets held for sale

(Audited)

During 2022, gross loans and advances and related impairment allowances were reclassified from 'loans and advances to customers' and 'loans and advances to banks' to 'assets held for sale' in the balance sheet.

At 31 December 2022, the most material balances held for sale came from our banking business in Canada and from our retail banking operations in France.

Disclosures relating to assets held for sale are provided in the following credit risk tables, primarily where the disclosure is relevant to the measurement of these financial assets:

- 'Maximum exposure to credit risk' (page 153);
- 'Distribution of financial instruments by credit quality at 31 December' (page 165);

Although there was a reclassification on the balance sheet, there was no separate income statement reclassification. As a result, charges for changes in expected credit losses and other credit impairment charges shown in the credit risk disclosures include charges relating to financial assets classified as 'assets held for sale'.

'Loans and other credit-related commitments' and 'financial guarantees', as reported in credit disclosures, also include exposures and allowances relating to financial assets classified as 'assets held for sale'.

Loans and advances to customers and banks measured at amortised cost

(Audited)

	2022		2021	
	Total gross loans and advances	**Allowance for ECL**	Total gross loans and advances	Allowance for ECL
	$m	**$m**	$m	$m
As reported	**1,041,258**	**(11,522)**	1,140,384	(11,434)
Reported in 'Assets held for sale'	**81,221**	**(392)**	2,424	(39)
At 31 December	**1,122,479**	**(11,914)**	1,142,808	(11,473)

At 31 December 2022, gross loans and advances of our banking business in Canada were $55.5bn, and the related allowance for ECL were $0.2bn. Gross loans of our retail banking operations in France were $25.1bn, and the related allowance for ECL were $0.1bn.

Lending balances held for sale continue to be measured at amortised cost less allowances for impairment and, therefore, such carrying amounts may differ from fair value.

These lending balances are part of associated disposal groups that are measured in their entirety at the lower of carrying amount and fair value less costs to sell. Any difference between the carrying amount of these assets and their sales price is part of the overall gain or loss on the associated disposal group as a whole.

For further details of the carrying amount and the fair value at 31 December 2022 of loans and advances to banks and customers classified as held for sale, see Note 23 on the financial statements.

Gross loans and allowance for ECL on loans and advances to customers and banks reported in 'Assets held for sale'

(Audited)

	Banking business in Canada		Retail banking operations in France		Other[1]		Total	
	Gross carrying value	Allowance for ECL	Gross carrying value	Allowance for ECL	Gross carrying value	Allowance for ECL	Gross carrying value	Allowance for ECL
	$m	$m	$m	$m	$m	$m	$m	$m
Loans and advances to customers at amortised cost	55,431	(234)	25,121	(92)	412	(62)	80,964	(388)
– personal	26,637	(75)	22,691	(88)	305	(47)	49,633	(210)
– corporate and commercial	27,128	(154)	2,379	(4)	107	(15)	29,614	(173)
– non-bank financial institutions	1,666	(5)	51	—	—	—	1,717	(5)
Loans and advances to banks at amortised cost	100	—	—	—	157	(4)	257	(4)
At 31 December 2022	**55,531**	**(234)**	**25,121**	**(92)**	**569**	**(66)**	**81,221**	**(392)**

	Banking business in Canada		Retail banking operations in France		Other[2]		Total	
	Gross carrying value	Allowance for ECL	Gross carrying value	Allowance for ECL	Gross carrying value	Allowance for ECL	Gross carrying value	Allowance for ECL
	$m	$m	$m	$m	$m	$m	$m	$m
Loans and advances to customers at amortised cost	—	—	—	—	2,424	(39)	2,424	(39)
– personal	—	—	—	—	2,424	(39)	2,424	(39)
– corporate and commercial	—	—	—	—	—	—	—	—
– non-bank financial institutions	—	—	—	—	—	—	—	—
Loans and advances to banks at amortised cost	—	—	—	—	—	—	—	—
At 31 December 2021	—	—	—	—	2,424	(39)	2,424	(39)

1 *Comprising assets held for sale relating to the planned sale of our branch operations in Greece and of our business in Russia.*
2 *Comprising assets held for sale relating to our mass market retail banking business in the US.*

The table below analyses the amount of ECL (charges)/releases arising from assets held for sale. The charges during the period primarily relate to our retail banking operations in France.

Changes in expected credit losses and other credit impairment

(Audited)

	2022	2021
	$m	$m
ECL (charges)/releases arising from:		
– assets held for sale	(5)	—
– assets not held for sale	(3,587)	928
Year ended 31 December	**(3,592)**	928

Credit exposure

Maximum exposure to credit risk

(Audited)

This section provides information on balance sheet items and their offsets as well as loan and other credit-related commitments.

Commentary on consolidated balance sheet movements in 2022 is provided on page 106.

The offset on derivatives remains in line with the movements in maximum exposure amounts.

'Maximum exposure to credit risk' table

The following table presents our maximum exposure before taking account of any collateral held or other credit enhancements (unless such enhancements meet accounting offsetting requirements). The table excludes financial instruments whose carrying amount best represents the net exposure to credit risk, and it excludes equity securities as they are not subject to credit risk. For the financial assets recognised on the balance sheet, the maximum exposure to credit risk equals their carrying amount and is net of the allowance for ECL. For financial guarantees and other guarantees 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.

The offset in the table relates to amounts where there is a legally enforceable right of offset in the event of counterparty default and where, as a result, there is a net exposure for credit risk purposes. However, as there is no intention to settle these balances on a net basis under normal circumstances, they do not qualify for net presentation for accounting purposes. No offset has been applied to off-balance sheet collateral. In the case of derivatives, the offset column also includes collateral received in cash and other financial assets.

Other credit risk mitigants

While not disclosed as an offset in the following 'Maximum exposure to credit risk' table, other arrangements are in place that reduce our maximum exposure to credit risk. These include a charge over collateral on borrowers' specific assets, such as residential properties, collateral held in the form of financial instruments that are not held on the balance sheet and short positions in securities. In addition, for financial assets held as part of linked insurance/investment contracts the credit risk is predominantly borne by the policyholder. See page 341 and Note 31 on the financial statements for further details of collateral in respect of certain loans and advances and derivatives.

Collateral available to mitigate credit risk is disclosed in the 'Collateral' section on page 180.

Maximum exposure to credit risk

(Audited)

	2022			2021		
	Maximum exposure	**Offset**	**Net**	Maximum exposure	Offset	Net
	$m	**$m**	**$m**	$m	$m	$m
Loans and advances to customers held at amortised cost	**924,854**	**(20,315)**	**904,539**	1,045,814	(22,838)	1,022,976
– personal	**412,140**	**(2,575)**	**409,565**	475,234	(4,461)	470,773
– corporate and commercial	**446,032**	**(16,262)**	**429,770**	505,335	(16,824)	488,511
– non-bank financial institutions	**66,682**	**(1,478)**	**65,204**	65,245	(1,553)	63,692
Loans and advances to banks at amortised cost	**104,882**	**—**	**104,882**	83,136	—	83,136
Other financial assets held at amortised cost	**1,029,618**	**(8,969)**	**1,020,649**	882,708	(12,231)	870,477
– cash and balances at central banks	**327,002**	**—**	**327,002**	403,018	—	403,018
– items in the course of collection from other banks	**7,297**	**—**	**7,297**	4,136	—	4,136
– Hong Kong Government certificates of indebtedness	**43,787**	**—**	**43,787**	42,578	—	42,578
– reverse repurchase agreements – non-trading	**253,754**	**(8,969)**	**244,785**	241,648	(12,231)	229,417
– financial investments	**168,747**	**—**	**168,747**	97,302	—	97,302
– assets held for sale	**115,919**	**—**	**115,919**	3,411	—	3,411
– prepayments, accrued income and other assets	**113,112**	**—**	**113,112**	90,615	—	90,615
Derivatives	**284,146**	**(273,497)**	**10,649**	196,882	(188,284)	8,598
Total on-balance sheet exposure to credit risk	**2,343,500**	**(302,781)**	**2,040,719**	2,208,540	(223,353)	1,985,187
Total off-balance sheet	**934,326**	**—**	**934,326**	928,183	—	928,183
– financial and other guarantees	**106,861**	**—**	**106,861**	113,088	—	113,088
– loan and other credit-related commitments	**827,465**	**—**	**827,465**	815,095	—	815,095
At 31 Dec	**3,277,826**	**(302,781)**	**2,975,045**	3,136,723	(223,353)	2,913,370

Concentration of exposure

We have a number of global businesses with a broad range of products. We operate in a number of geographical markets with the majority of our exposures in Asia and Europe.

For an analysis of:

- financial investments, see Note 16 on the financial statements;
- trading assets, see Note 11 on the financial statements;
- derivatives, see page 187 and Note 15 on the financial statements; and
- loans and advances by industry sector and by the location of the principal operations of the lending subsidiary (or, in the case of the operations of The Hongkong and Shanghai Banking Corporation Limited, HSBC Bank plc, HSBC Bank Middle East Limited and HSBC Bank USA, by the location of the lending branch), see page 170 for wholesale lending and page 187 for personal lending.

Credit deterioration of financial instruments

(Audited)

A summary of our current policies and practices regarding the identification, treatment and measurement of stage 1, stage 2, stage 3 (credit impaired) and POCI financial instruments can be found in Note 1.2 on the financial statements.

Measurement uncertainty and sensitivity analysis of ECL estimates

(Audited)

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 judgemental adjustments are used to address late-breaking events, data and model limitations, model deficiencies and expert credit judgements.

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.

Inflation, 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 impairment allowances were recognised. Management continued to reflect a degree of caution both in the selection of economic scenarios and their weightings, and in the use of management judgemental adjustments, described in more detail below.

At 31 December 2022, there was a reduction in management judgemental adjustments compared with 31 December 2021. Adjustments related to Covid-19 and for sector-specific risks were reduced as scenarios and modelled outcomes better reflected the key risks at 31 December 2022.

Methodology

Four global 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 HSBC's top and emerging risks.

Three of the scenarios are drawn from consensus forecasts and distributional estimates. The Central scenario 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 10% probability. The Downside 2 is constructed with a 5% probability. The Central scenario is assigned the remaining 75%. This weighting scheme is deemed appropriate for the unbiased estimation of ECL in most circumstances. However, management may depart from this probability-based scenario weighting approach when the economic outlook is determined to be particularly uncertain and risks are elevated.

In light of ongoing risks, management deviated from this probability weighting in the fourth quarter of 2022, and assigned additional weight to outer scenarios.

Description of economic scenarios

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

Economic forecasts in the Central scenario remain subject to a high degree of uncertainty. Upside and Downside scenarios are constructed so that they encompass the potential crystallisation of a number of key macro-financial risks.

At the end of 2022, risks to the economic outlook included the persistence of high inflation and its consequences on monetary policy. Rapid changes to public policy also increased forecast uncertainty.

In Asia, the removal of Chinese Covid-19-related public health restrictions presents a key source of potential upside risk, but with significant near-term uncertainty relating to a subsequent surge of infections. This policy change could also have global implications.

In Europe, risks relating to energy pricing and supply security remain significant. 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, and the evolution of the UK's relationship with the EU.

Economic forecasts for our main markets deteriorated in the fourth quarter as GDP growth slowed. In North America and Europe, high inflation and rising interest rates have reduced real household incomes and raised business costs, dampening consumption and investment and lowering growth expectations. The effects of higher interest rate expectations and lower growth are evident in asset price expectations, with house prices forecasts, in particular, significantly lower.

In Asia, forecasts for Hong Kong and mainland China were cut following weaker than expected third-quarter GDP growth, and due to China's adherence to a stringent pandemic-related public health policy response for the majority of the year. While China made an abrupt reversal of the policy in December and GDP is expected to recover in 2023, there remains a very high degree of uncertainty to both the upside and downside, and consensus forecasts have been slow to adjust. The increased uncertainty over China's lifting of the restrictions has been reflected in management's assessment of scenario probabilities.

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

The consensus Central scenario

HSBC's Central scenario reflects a low-growth and higher-inflation environment across many of our key markets. The scenario features an initial period of below-trend GDP growth in most of our main markets as higher inflation and tighter monetary policy causes a squeeze on business margins and households' real disposable income. Growth returns to its long-term expected trend in later years as central banks bring inflation back to target.

However, three of our markets are forecast to experience increased GDP growth. 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-related restrictions. In the UAE, high oil prices and the continued recovery of international travel and tourism are expected to ensure growth remains above trend in the short term.

Our Central scenario assumes that inflation peaked in most of our key markets at the end of 2022, but remains high through 2023, before moderating as energy prices stabilise and supply chain disruptions abate. Central banks are expected to keep raising interest rates until the middle of 2023. Inflation is forecast to revert to target in most markets by early 2024.

Global GDP is expected to grow by 1.6% in 2023 in the Central scenario, and the average rate of global GDP growth is forecast to be 2.5% over the five-year forecast period. This is below 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 in European and North American markets continues to weaken. Most major economies are forecast to grow in 2023, but at very low rates. Hong Kong and mainland China are expected to see a recovery in activity from 2023 as Covid-19-related restrictions are lifted.
- In most markets, unemployment rises moderately from historical lows as economic activity slows. Labour markets remain fairly tight across our key markets.
- Inflation is expected to remain elevated across many of our key markets, driven by energy and food prices. Inflation is subsequently expected to converge back towards central banks' target rates over the next two years of the forecast.
- Policy interest rates in key markets will continue to rise in the near term but at a slower pace. Interest rates will stay elevated but start to ease as inflation in each of the markets return to target.
- The West Texas Intermediate oil price is forecast to average $72 per barrel over the projection period.

The Central scenario was first created with forecasts available in November, and reviewed continually until late December. Probability weights assigned to the Central scenario vary from 55% to 70% and reflect relative differences in risk and uncertainty across markets.

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

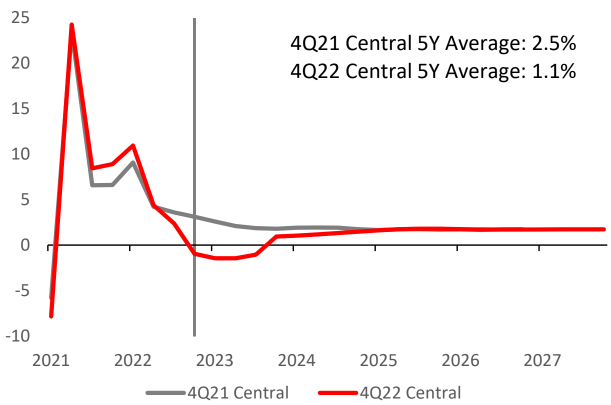
Central scenario 2023–2027

	UK %	US %	Hong Kong %	Mainland China %	Canada %	France %	UAE %	Mexico %
GDP growth rate								
2023: Annual average growth rate	(0.8)	0.2	2.7	4.6	0.6	0.2	3.7	1.2
2024: Annual average growth rate	1.3	1.5	3.0	4.8	1.9	1.6	3.7	2.0
2025: Annual average growth rate	1.7	2.0	2.7	4.7	2.0	1.5	3.1	2.3
5-year average	1.1	1.5	2.7	4.6	1.6	1.2	3.2	1.9
Unemployment rate								
2023: Annual average rate	4.4	4.3	3.7	5.2	6.1	7.6	2.9	3.7
2024: Annual average rate	4.6	4.5	3.5	5.1	5.9	7.5	2.8	3.7
2025: Annual average rate	4.3	4.2	3.4	5.0	6.0	7.3	2.8	3.5
5-year average	4.3	4.2	3.4	5.0	5.9	7.3	2.8	3.6
House price growth								
2023: Annual average growth rate	0.2	(2.5)	(10.0)	(0.1)	(15.6)	1.8	5.9	7.9
2024: Annual average growth rate	(3.8)	(3.2)	(3.0)	2.9	(1.2)	2.0	5.2	5.2
2025: Annual average growth rate	0.7	(1.0)	1.7	3.5	4.0	3.1	4.5	4.2
5-year average	0.4	(0.7)	(1.0)	2.9	(1.1)	2.8	4.4	5.1
Inflation rate								
2023: Annual average rate	6.9	4.1	2.1	2.4	3.5	4.6	3.2	5.7
2024: Annual average rate	2.5	2.5	2.1	2.2	2.2	2.0	2.2	4.1
2025: Annual average rate	2.1	2.2	2.0	2.2	2.1	1.8	2.1	3.7
5-year average	3.1	2.7	2.1	2.2	2.4	2.4	2.3	4.2
Probability	60	70	55	55	70	60	70	70

The graphs compare the respective Central scenario at the year end 2021 with economic expectations at the end of 2022.

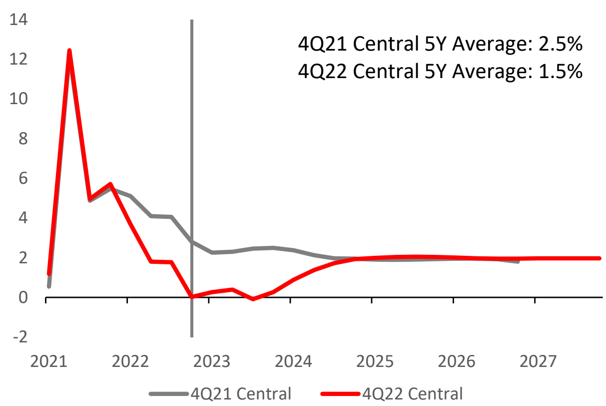
GDP growth: Comparison of Central scenarios

UK



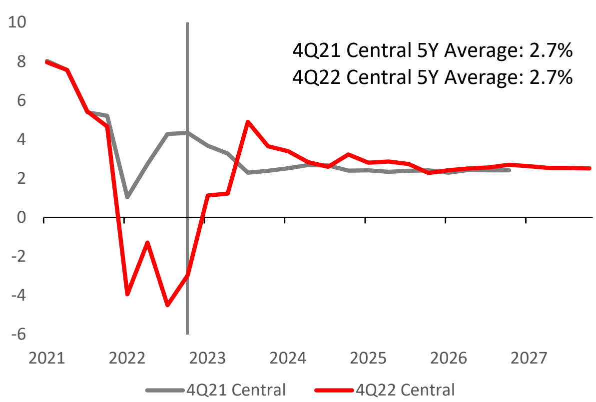
Note: Real GDP shown as year-on-year percentage change.

US



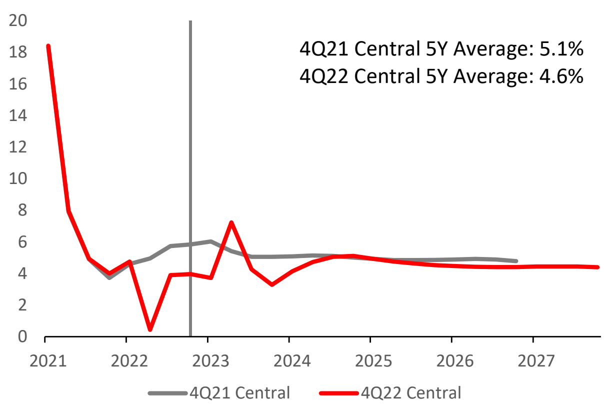
Note: Real GDP shown as year-on-year percentage change.

Hong Kong



Note: Real GDP shown as year-on-year percentage change.

Mainland China



Note: Real GDP shown as year-on-year percentage change.

The consensus Upside scenario

Compared with the Central scenario, the consensus Upside scenario features stronger economic activity in the near term, before converging to long-run trend expectations. It also incorporates a faster fall in the rate of inflation than incorporated in the Central scenario.

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; relaxation of Covid-19 policies in Asia; and improved relations between the UK and the EU.

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

Consensus Upside scenario 'best outcome'

	UK %		US %		Hong Kong %		Mainland China %		Canada %		France %		UAE %		Mexico %	
GDP growth rate	**4.4**	**(4Q24)**	**3.6**	**(4Q24)**	**9.0**	**(3Q23)**	**10.3**	**(2Q23)**	**4.3**	**(3Q24)**	**3.1**	**(1Q24)**	**7.8**	**(4Q23)**	**4.7**	**(4Q23)**
Unemployment rate	**3.5**	**(4Q23)**	**3.1**	**(3Q23)**	**3.0**	**(4Q23)**	**4.7**	**(3Q24)**	**5.2**	**(3Q24)**	**6.5**	**(4Q24)**	**2.2**	**(3Q24)**	**3.1**	**(3Q23)**
House price growth	**4.2**	**(1Q23)**	**3.6**	**(1Q23)**	**1.4**	**(4Q24)**	**6.9**	**(4Q24)**	**4.9**	**(2Q24)**	**3.7**	**(1Q23)**	**9.5**	**(2Q24)**	**10.3**	**(4Q23)**
Inflation rate	**0.7**	**(1Q24)**	**1.6**	**(1Q24)**	**(0.1)**	**(4Q23)**	**0.8**	**(4Q23)**	**1.0**	**(1Q24)**	**0.8**	**(4Q23)**	**1.5**	**(3Q24)**	**3.2**	**(1Q24)**
Probability	**5**		**5**		**20**		**20**		**5**		**5**		**5**		**5**	

Note: Extreme point in the consensus Upside is 'best outcome' in the scenario, for example the highest GDP growth and the lowest unemployment rate, in the first two years of the scenario. The date on which the extreme is reached is indicated in parenthesis. For inflation, lower inflation is interpreted as the 'best' outcome.

Downside scenarios

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

High inflation and a stronger monetary policy response have become key concerns for global growth. In the Downside scenarios, supply chain disruptions intensify, exacerbated by an escalation in the spread of Covid-19, and rising geopolitical tensions drive inflation higher.

There also remains a risk that energy and food prices rise further due to the Russia-Ukraine war, increasing pressure on household budgets and firms' costs.

The possibility of inflation expectations becoming detached from central bank targets also remains a risk. A wage-price spiral triggered by higher inflation and pandemic-related labour supply shortages could put sustained upward pressure on wages, aggravating cost pressures and increasing the squeeze on household real incomes and corporate margins. In turn, it raises the risk of a more forceful policy response from central banks, a steeper trajectory for interest rates and, ultimately, a deep economic recession.

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, with the reopening 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 new vaccine-resistant variants emerging.

The geopolitical environment also present risks, including:

- a prolonged Russia-Ukraine war with escalation beyond Ukraine's borders;
- the deterioration of the trading relationship between the UK and the EU over the Northern Ireland Protocol; and
- continued 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, 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 scenario features a temporary supply side shock that keeps inflation higher than the baseline, before the effects of weaker demand begin to dominate, leading to a fall in commodity prices and to lower inflation.

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

Consensus Downside scenario 'worst outcome'

	UK %		US %		Hong Kong %		Mainland China %		Canada %		France %		UAE %		Mexico %	
GDP growth rate	**(3.5)**	**(3Q23)**	**(3.7)**	**(4Q23)**	**(2.2)**	**(4Q23)**	**(1.2)**	**(4Q23)**	**(3.9)**	**(4Q23)**	**(1.4)**	**(3Q23)**	**1.0**	**(4Q23)**	**(2.7)**	**(4Q23)**
Unemployment rate	**5.8**	**(2Q24)**	**5.9**	**(1Q24)**	**5.2**	**(3Q24)**	**5.9**	**(4Q23)**	**7.6**	**(3Q23)**	**8.8**	**(4Q23)**	**4.1**	**(3Q23)**	**4.4**	**(1Q23)**
House price growth	**(10.1)**	**(2Q24)**	**(7.8)**	**(4Q23)**	**(14.9)**	**(2Q23)**	**(1.9)**	**(1Q23)**	**(23.8)**	**(2Q23)**	**(0.6)**	**(4Q23)**	**(3.0)**	**(4Q23)**	**2.2**	**(3Q24)**
Inflation rate (min)	**(0.4)**	**(4Q24)**	**0.6**	**(4Q24)**	**0.3**	**(4Q24)**	**0.7**	**(4Q24)**	**0.4**	**(4Q24)**	**0.3**	**(4Q24)**	**1.8**	**(2Q23)**	**2.2**	**(4Q24)**
Inflation rate (max)	**10.8**	**(1Q23)**	**6.2**	**(1Q23)**	**3.7**	**(4Q23)**	**4.0**	**(4Q23)**	**6.0**	**(1Q23)**	**7.2**	**(1Q23)**	**4.5**	**(1Q23)**	**7.9**	**(1Q23)**
Probability	**25**		**20**		**20**		**20**		**15**		**25**		**20**		**20**	

Note: Extreme point in the consensus Downside is 'worst outcome' in the scenario, for example lowest GDP growth and the highest unemployment rate, in the first two years of the scenario. The date on which the extreme is reached is indicated in parenthesis. Due to the nature of the shock to inflation in the Downside scenarios, both the lowest and the highest point is shown in the tables.

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 up inflation and interest rates higher. This impulse is expected to prove short lived as a large downside demand pressure 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'

	UK		US		Hong Kong		Mainland China		Canada		France		UAE		Mexico	
	%		%		%		%		%		%		%		%	
GDP growth rate	(6.9)	(3Q23)	(5.0)	(4Q23)	(9.2)	(4Q23)	(6.9)	(4Q23)	(5.9)	(4Q23)	(6.8)	(4Q23)	(3.7)	(2Q24)	(7.4)	(4Q23)
Unemployment rate	8.7	(2Q24)	9.5	(4Q24)	5.8	(1Q24)	6.8	(4Q24)	11.6	(2Q24)	10.3	(4Q24)	4.6	(2Q24)	5.6	(2Q24)
House price growth	(22.9)	(2Q24)	(21.5)	(4Q23)	(18.2)	(1Q24)	(18.5)	(4Q23)	(36.3)	(4Q23)	(6.4)	(2Q24)	(3.6)	(4Q23)	0.9	(3Q24)
Inflation rate (min)	(2.3)	(2Q24)	0.3	(4Q24)	0.6	(4Q24)	1.0	(4Q24)	1.1	(4Q24)	(2.5)	(2Q24)	1.7	(4Q24)	2.0	(4Q24)
Inflation rate (max)	13.5	(2Q23)	6.3	(1Q23)	4.3	(4Q23)	4.6	(4Q23)	6.5	(1Q23)	10.4	(2Q23)	4.8	(1Q23)	7.9	(1Q23)
Probability	10		5		5		5		10		10		5		5	

Note: Extreme point in the Downside 2 is 'worst outcome' in the scenario, for example lowest GDP growth and the highest unemployment rate, in the first two years of the scenario. The date on which the extreme is reached is indicated in parenthesis. Due to the nature of the shock to inflation in the Downside scenarios, both the lowest and the highest point is shown in the tables.

Scenario weighting

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

Key consideration around uncertainty attached to the Central scenario projections focused on:

- the progression of the Covid-19 pandemic in Asian countries, and the announcement of the removal of Covid-19-related measures and travel restrictions in mainland China and Hong Kong;
- further tightening of monetary policy, and the impact on borrowing costs in interest-rate sensitive sectors, such as housing;
- the risks to gas supply security in Europe, and the subsequent impact on inflation and commodity prices and growth; and
- the ongoing risks to global supply chains.

In mainland China and Hong Kong, the announcement of the relaxation of Covid-19-related measures and travel restrictions has led to increased uncertainty around the Central scenario projection. It was management's view that the easing of the policy could increase risks to the upside in the form of increased spending and travel. However, the continuing risks to the downside were also acknowledged, given the surge in Covid-19 infections and the potential for a new vaccine-resistant variant. This led management to assign a combined weighting of 75% to the consensus Upside and Central scenarios in both markets.

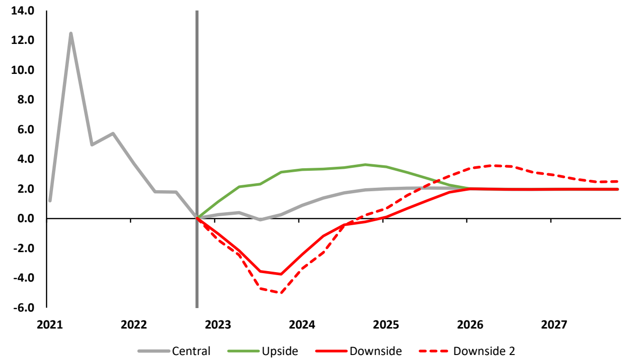
In the UK and US, the surge in price inflation and a squeeze on household real incomes have led to strong monetary policy responses from both central banks. Higher interest rates have increased recession risks and the prospects for outright decline in house prices. The UK faces additional challenges from the rise in energy prices and accompanying deterioration in the terms of trade. For Canada and Mexico, similar risk themes dominate, and the connectivity to the US has also been a key consideration. For the UK, the consensus Upside and Central scenarios had a combined weighting of 65%. In each of the other three markets, the combined weightings of the consensus Upside and Central scenarios were 75%.

In France, uncertainties around the outlook remain elevated due to high inflation and Europe's exposure to the Russia-Ukraine war through the economic costs incurred from the imposition of sanctions, trade disruption and energy dependence on Russia. The consensus Upside and Central scenarios had a combined weighting of 65%.

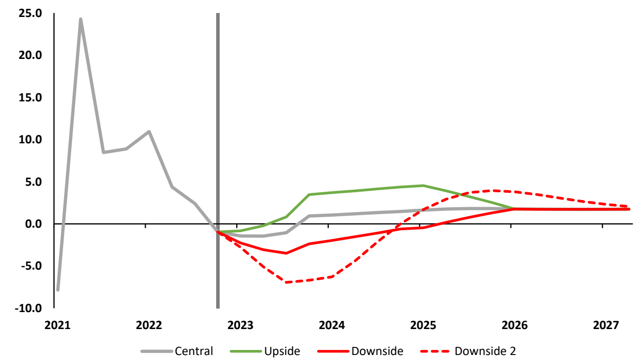
Management concluded that the outlook for the UAE was the least uncertain of all our key markets. It is benefiting from higher commodity prices and the revival in tourism and travel. The consensus Upside and Central scenarios had a combined weighting of 75%.

The following graphs show the historical and forecasted GDP growth rate for the various economic scenarios in our four largest markets.

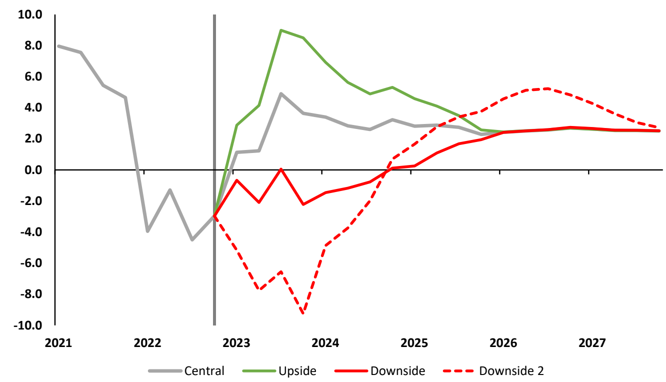
US



UK

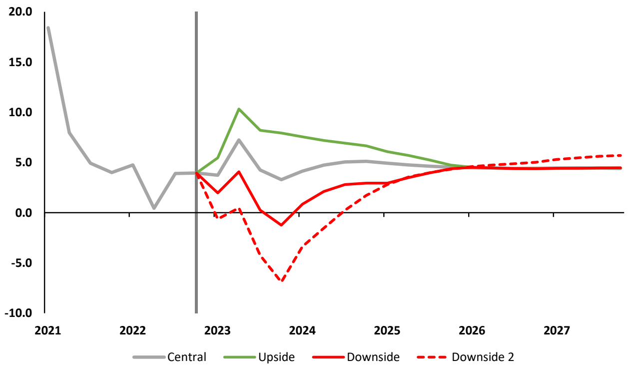


Hong Kong



Risk review

Mainland China



Critical estimates and judgements

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

- the selection and weighting of economic scenarios, given rapidly changing economic conditions and a wide dispersion of economic forecasts. There is judgement in making assumptions about the effects of inflation and interest rates, global growth, supply chain disruption; and
- 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.

How economic scenarios are reflected in ECL calculations

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.

We have developed globally consistent methodologies for the application of forward economic guidance into the calculation of ECL for wholesale and retail credit risk. 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, a global methodology is used for the estimation of 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 country. For LGD calculations, we consider the correlation of forward economic guidance to collateral values and realisation rates for a particular country 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 the forward economic guidance proportionate to the probability-weighted outcome and the Central scenario outcome of the performing population.

For our retail portfolios, 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 IFRS 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 profiles for the remaining maturity of the asset by using national 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 IFRS 9, management judgemental adjustments are typically 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 effects of management judgemental adjustments are considered for both balances and ECL when determining whether or not a significant increase in credit risk has occurred and is allocated to a stage where appropriate. This is in accordance with the internal adjustments framework.

Management judgemental adjustments are reviewed under the governance process for IFRS 9 (as detailed in the section 'Credit risk management' on page 145). Review and challenge focuses on the rationale and quantum of the adjustments with a further review carried out 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.

The drivers of management judgemental adjustments continue to evolve with the economic environment and as new risks emerge.

At 31 December 2022, there was a $0.9bn reduction in management judgemental adjustments compared with 31 December 2021. Adjustments related to Covid-19 and for sector-specific risks were reduced as scenarios and modelled outcomes better reflected the key risks at 31 December 2022.

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 at 31 December 2022[1]

	Retail $bn	Wholesale $bn	Total $bn
Banks, sovereigns, government entities and low-risk counterparties	—	—	—
Corporate lending adjustments		0.5	0.5
Retail lending inflation-related adjustments	0.1		0.1
Other macroeconomic-related adjustments	0.1		0.1
Pandemic-related economic recovery adjustments	—		—
Other retail lending adjustments	0.2		0.2
Total	**0.3**	**0.5**	**0.8**

Management judgemental adjustments to ECL at 31 December 2021[1]

	Retail $bn	Wholesale $bn	Total $bn
Banks, sovereigns, government entities and low-risk counterparties		(0.1)	(0.1)
Corporate lending adjustments		1.3	1.3
Retail lending inflation-related adjustments			—
Other macroeconomic-related adjustments			—
Pandemic-related economic recovery adjustments	0.2		0.2
Other retail lending adjustments	0.3		0.3
Total	0.5	1.2	1.7

1 *Management judgemental adjustments presented in the table reflect increases or (decreases) to ECL, respectively.*

Management judgemental adjustments at 31 December 2022 were an increase to ECL of $0.5bn for the wholesale portfolio and an increase to ECL of $0.3bn for the retail portfolio.

At 31 December 2022, wholesale management judgemental adjustments were an ECL increase of $0.5bn (31 December 2021: $1.2bn increase).

- Adjustments to corporate exposures increased ECL by $0.5bn at 31 December 2022 (31 December 2021: $1.3bn increase). These principally reflected the outcome of management judgements for high-risk and vulnerable sectors in some of our key markets. This was supported by credit experts' input, portfolio risk metrics, short- to medium-term risks under each scenario, model performance, quantitative analyses and benchmarks. Considerations include risk of individual exposures under different macroeconomic scenarios and sub-sector analyses.
  The largest increase 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, booked in Hong Kong.

At 31 December 2022, retail management judgemental adjustments were an ECL increase of $0.3bn (31 December 2021: $0.5bn increase).

- Retail lending inflation-related adjustments increased ECL by $0.1bn (31 December 2021: $0.0bn). These adjustments addressed where increasing inflation and interest rates result in affordability risks that were not fully captured by the modelled output.
- Other macroeconomic-related adjustments increased ECL by $0.1bn (31 December 2021: $0.0bn). These adjustments were primarily in relation to country-specific risks related to future macroeconomic conditions.
- Other retail lending adjustments increased ECL by $0.2bn (31 December 2021: $0.3bn increase), reflecting all other data, model and management judgemental adjustments.
- Pandemic-related economic recovery adjustments were removed during 2022 as scenarios stabilised.

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.

The ECL calculated for the Upside and Downside scenarios should not be taken to represent the upper and lower 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 (stage 3) obligors. It is generally impracticable to separate the effect of macroeconomic factors in individual assessments of obligors in default. The measurement of stage 3 ECL is relatively more sensitive to credit factors specific to the obligor than future economic scenarios, and loans to defaulted obligors are a small portion of the overall wholesale lending exposure, even if representing the majority of the allowance for ECL. Therefore, the sensitivity analysis to macroeconomic scenarios does not capture the residual estimation risk arising from wholesale stage 3 exposures. Due to the range and specificity of the credit factors to which the ECL is sensitive, it is not possible to provide a meaningful alternative sensitivity analysis for a consistent set of risks across all defaulted obligors.

For retail credit risk exposures, the sensitivity analysis includes ECL for loans and advances to customers related to defaulted obligors. This is because the retail ECL for secured mortgage portfolios including loans in all stages is sensitive to macroeconomic variables.

Wholesale and retail sensitivity

The wholesale and retail sensitivity tables present the 100% weighted results. These exclude portfolios held by the insurance business and small portfolios, and as such cannot be directly compared with personal and wholesale lending presented in other credit risk tables. In both the wholesale and retail analysis, the comparative period results for Downside 2 scenarios are also not directly comparable with the current period, because they reflect different risks relative to the consensus scenarios for the period end.

The wholesale and retail sensitivity analysis is stated inclusive of management judgemental adjustments, as appropriate to each scenario.

Wholesale analysis

IFRS 9 ECL sensitivity to future economic conditions[1,2,3]

	Gross carrying amount[2]	Reported ECL	Consensus Central scenario ECL	Consensus Upside scenario ECL	Consensus Downside scenario ECL	Downside 2 scenario ECL
By geography at 31 Dec 2022	**$m**	**$m**	**$m**	**$m**	**$m**	**$m**
UK	**421,685**	**769**	**624**	**484**	**833**	**2,240**
US	**190,858**	**277**	**241**	**227**	**337**	**801**
Hong Kong	**415,875**	**925**	**819**	**592**	**1,315**	**2,161**
Mainland China	**125,466**	**295**	**242**	**144**	**415**	**1,227**
Canada[4]	**83,274**	**126**	**80**	**60**	**148**	**579**
Mexico	**26,096**	**88**	**80**	**67**	**116**	**313**
UAE	**45,064**	**45**	**41**	**30**	**55**	**93**
France	**173,146**	**110**	**102**	**90**	**121**	**145**
By geography at 31 Dec 2021						
UK	483,273	920	727	590	944	1,985
US	227,817	227	204	155	317	391
Hong Kong	434,608	767	652	476	984	1,869
Mainland China	120,627	149	113	36	216	806
Canada[4]	85,117	151	98	61	150	1,121
Mexico	23,054	118	80	61	123	358
UAE	44,767	158	122	73	214	711
France	163,845	133	121	106	162	187

1 *ECL sensitivity includes off-balance sheet financial instruments. These are subject to significant measurement uncertainty.*
2 *Includes low credit-risk financial instruments such as debt instruments at FVOCI, which have high carrying amounts but low ECL under all the above scenarios.*
3 *Excludes defaulted obligors. For a detailed breakdown of performing and non-performing wholesale portfolio exposures, see page 170.*
4 *Classified as held for sale at 31 December 2022.*

At 31 December 2021, the most significant level of ECL sensitivity was observed in the UK, Hong Kong and mainland China.

Real estate was the sector with higher sensitivity to a severe Downside scenario, namely in Hong Kong and mainland China due to higher risk of some material exposures.

In the UK, the real estate and services sectors accounted for the majority of ECL sensitivity due to higher exposure to these sectors in this market.

Retail analysis

IFRS 9 ECL sensitivity to future economic conditions[1]

By geography at 31 December 2022	Gross carrying amount $m	Reported ECL $m	Consensus Central scenario ECL $m	Consensus Upside scenario ECL $m	Consensus Downside scenario ECL $m	Downside 2 scenario ECL $m
UK						
Mortgages	**147,306**	**204**	**188**	**183**	**189**	**399**
Credit cards	**6,518**	**455**	**434**	**396**	**442**	**719**
Other	**7,486**	**368**	**333**	**274**	**383**	**605**
Mexico						
Mortgages	**6,319**	**152**	**127**	**102**	**183**	**270**
Credit cards	**1,616**	**198**	**162**	**97**	**233**	**289**
Other	**3,447**	**438**	**400**	**318**	**503**	**618**
Hong Kong						
Mortgages	**100,107**	**1**	**1**	**—**	**1**	**1**
Credit cards	**8,003**	**261**	**227**	**180**	**417**	**648**
Other	**5,899**	**85**	**81**	**74**	**100**	**123**
UAE						
Mortgages	**2,170**	**37**	**37**	**36**	**38**	**38**
Credit cards	**441**	**41**	**37**	**21**	**68**	**86**
Other	**718**	**17**	**17**	**15**	**19**	**22**
France[3]						
Mortgages	**21,440**	**51**	**50**	**50**	**51**	**52**
Other	**1,433**	**54**	**53**	**52**	**55**	**59**
US						
Mortgages	**13,489**	**7**	**6**	**6**	**8**	**15**
Credit cards	**219**	**26**	**25**	**23**	**27**	**36**
Canada[2]						
Mortgages	**25,163**	**45**	**44**	**43**	**46**	**58**
Credit cards	**299**	**10**	**9**	**8**	**11**	**11**
Other	**1,399**	**16**	**14**	**13**	**17**	**36**

IFRS 9 ECL sensitivity to future economic conditions[1]

By geography at 31 December 2021	Gross carrying amount $m	Reported ECL $m	Consensus Central scenario ECL $m	Consensus Upside scenario ECL $m	Consensus Downside scenario ECL $m	Downside 2 scenario ECL $m
UK						
Mortgages	155,084	191	182	175	197	231
Credit cards	8,084	439	381	330	456	987
Other	7,902	369	298	254	388	830
Mexico						
Mortgages	4,972	123	116	106	130	164
Credit cards	1,167	141	134	122	150	176
Other	2,935	366	360	350	374	401
Hong Kong						
Mortgages	96,697	—	—	—	—	—
Credit cards	7,644	218	206	154	231	359
Other	5,628	109	101	88	128	180
UAE						
Mortgages	1,982	45	44	42	46	57
Credit cards	429	43	41	29	54	82
Other	615	19	18	13	21	25
France						
Mortgages	23,159	63	62	62	63	64
Other	1,602	61	61	60	61	63
US						
Mortgages	15,379	28	27	26	29	41
Credit cards	446	80	76	70	83	118
Canada						
Mortgages	26,097	28	27	26	29	48
Credit cards	279	9	9	9	10	13
Other	1,598	19	18	17	19	27

1 ECL sensitivities exclude portfolios utilising less complex modelling approaches.
2 Classified as 'assets held for sale' at 31 December 2022.
3 Includes balances and ECL, which have been reclassified from 'loans and advances to customers' to 'assets held for sale' in the balance sheet. This also includes any balances and ECL which continue to be reported as personal lending in 'loans and advances to customers' that are in accordance with the basis of inclusion for retail sensitivity analysis.

At 31 December 2022, the most significant level of ECL sensitivity was observed in the UK, Mexico and Hong Kong. Mortgages reflected the lowest level of ECL sensitivity across most markets as collateral values remained resilient. Hong Kong mortgages had low levels of reported ECL due to the credit quality of the portfolio. Credit cards and other unsecured lending are more sensitive to economic forecasts, and therefore reflected the highest level of ECL sensitivity during 2022.

Group ECL sensitivity results

The ECL impact of the scenarios and management judgemental adjustments are highly sensitive to movements in economic forecasts. Based upon the sensitivity tables presented above, if the Group ECL balance was estimated solely on the basis of the Central scenario, Downside scenario or the Downside 2 scenario at 31 December 2022, it would increase/(decrease) as presented in the below table.

Total Group ECL at 31 December 2022	**Retail[1] $bn**	**Wholesale[1] $bn**
Reported ECL	**3.0**	**3.1**
Scenarios		
100% Consensus Central scenario	**(0.2)**	**(0.5)**
100% Consensus Upside scenario	**(0.6)**	**(1.1)**
100% Consensus Downside scenario	**0.4**	**0.8**
100% Downside 2 scenario	**1.8**	**5.5**

Total Group ECL at 31 December 2021	Retail[1] $bn	Wholesale $bn
Reported ECL	3.0	3.1
Scenarios		
100% Consensus Central scenario	(0.2)	(0.6)
100% Consensus Upside scenario	(0.5)	(1.2)
100% Consensus Downside scenario	0.2	0.6
100% Downside 2 scenario	2.0	5.5

1 *On the same basis as retail and wholesale sensitivity analysis.*

At Group level for both the retail and wholesale portfolios, the reported ECL in scope of this analysis remained stable since 31 December 2021. The Group total Downside 2 scenario ECL continues to present the highest level of sensitivity.

The ECL sensitivity for the Central scenario remained flat for the wholesale and retail portfolios from the previous year. For the remaining scenarios, the changes in ECL sensitivity from the previous year were reflective of geographical and sector risks, which increased or reduced accordingly with macroeconomic conditions.

Reconciliation of changes in gross carrying/nominal amount and allowances for loans and advances to banks and customers including loan commitments and financial guarantees

The following disclosure provides a reconciliation by stage of the Group's gross carrying/nominal amount and allowances for loans and advances to banks and customers, including loan commitments and financial guarantees. Movements are calculated on a quarterly basis and therefore fully capture stage movements between quarters. If movements were calculated on a year-to-date basis they would only reflect the opening and closing position of the financial instrument.

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 customer risk rating ('CRR')/probability of default ('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 or purchased', 'assets derecognised (including final repayments)' and 'changes to risk parameters – further lending/repayment' represent the impact from volume movements within the Group's lending portfolio.

Reconciliation of changes in gross carrying/nominal amount and allowances for loans and advances to banks and customers including loan commitments and financial guarantees

(Audited)

	Non-credit impaired				Credit impaired					
	Stage 1		Stage 2		Stage 3		POCI		Total	
	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
	$m	$m	$m	$m	$m	$m	$m	$m	$m	$m
At 1 Jan 2022	1,577,582	(1,557)	155,742	(3,326)	19,797	(6,928)	274	(64)	1,753,395	(11,875)
Transfers of financial instruments:	(99,022)	(798)	89,052	1,620	9,970	(822)	—	—	—	—
– transfers from stage 1 to stage 2	(225,616)	470	225,616	(470)	—	—	—	—	—	—
– transfers from stage 2 to stage 1	128,246	(1,216)	(128,246)	1,216	—	—	—	—	—	—
– transfers to stage 3	(2,392)	9	(10,087)	1,132	12,479	(1,141)	—	—	—	—
– transfers from stage 3	740	(61)	1,769	(258)	(2,509)	319	—	—	—	—
Net remeasurement of ECL arising from transfer of stage	—	739	—	(953)	—	(152)	—	—	—	(366)
New financial assets originated or purchased	483,617	(548)	—	—	—	—	26	(2)	483,643	(550)
Assets derecognised (including final repayments)	(318,659)	148	(37,941)	343	(2,806)	416	(97)	—	(359,503)	907
Changes to risk parameters – further lending/repayment	(65,778)	226	(6,963)	93	(594)	259	(61)	5	(73,396)	583
Changes to risk parameters – credit quality	—	403	—	(1,670)	—	(3,019)	—	32	—	(4,254)
Changes to models used for ECL calculation	—	4	—	(151)	—	13	—	—	—	(134)
Assets written off	—	—	—	—	(2,794)	2,794	(10)	10	(2,804)	2,804
Credit-related modifications that resulted in derecognition	—	—	—	—	(32)	9	—	—	(32)	9
Foreign exchange	(81,975)	59	(8,811)	170	(1,395)	323	(3)	1	(92,184)	553
Others[1]	(60,557)	64	(13,716)	161	(938)	158	—	(20)	(75,211)	363
At 31 Dec 2022	1,435,208	(1,260)	177,363	(3,713)	21,208	(6,949)	129	(38)	1,633,908	(11,960)
ECL income statement change for the period		972		(2,338)		(2,483)		35		(3,814)
Recoveries										316
Others										(26)
Total ECL income statement change for the period										(3,524)

1 *Total includes $82.7bn of gross carrying loans and advances to customers and banks, which were classified to assets held for sale, and a corresponding allowance for ECL of $426m, reflecting business disposals as disclosed in Note 23 'Assets held for sale and liabilities of disposal groups held for sale' on page 389.*

	At 31 Dec 2022		12 months ended 31 Dec 2022
	Gross carrying/ nominal amount	Allowance for ECL	ECL charge
	$m	$m	$m
As above	1,633,908	(11,960)	(3,524)
Other financial assets measured at amortised cost	1,014,498	(553)	(41)
Non-trading reverse purchase agreement commitments	44,921	—	—
Performance and other guarantees not considered for IFRS 9	—	—	41
Summary of financial instruments to which the impairment requirements in IFRS 9 are applied/Summary consolidated income statement	2,693,327	(12,513)	(3,524)
Debt instruments measured at FVOCI	266,303	(145)	(68)
Total allowance for ECL/total income statement ECL change for the period	n/a	(12,658)	(3,592)

As shown in the previous table, the allowance for ECL for loans and advances to customers and banks and relevant loan commitments and financial guarantees increased $85m during the period from $11,875m at 31 December 2021 to $11,960m at 31 December 2022.

This increase was primarily driven by:

- $4,254m relating to underlying credit quality changes, including the credit quality impact of financial instruments transferring between stages;

- $366m relating to the net remeasurement impact of stage transfers; and
- $134m of changes to models used for ECL calculation.

These were partly offset by:

- $2,804m of assets written off;
- $940m relating to volume movements, which included the ECL allowance associated with new originations, assets derecognised and further lending/repayment; and
- foreign exchange and other movements of $916m.

The ECL charge for the period of $3,814m presented in the previous table consisted of $4,254m relating to underlying credit quality changes, including the credit quality impact of financial instruments transferring between stages, $366m relating to the net remeasurement impact of stage transfers, and $134m in changes to models used for ECL calculation. This was partly offset by $940m relating to underlying net book volume movement.

Summary views of the movement in wholesale and personal lending are presented on pages 173 and 191.

Reconciliation of changes in gross carrying/nominal amount and allowances for loans and advances to banks and customers including loan commitments and financial guarantees

(Audited)

	Non-credit impaired				Credit impaired					
	Stage 1		Stage 2		Stage 3		POCI		Total	
	Gross exposure	Allowance / provision for ECL	Gross exposure	Allowance / provision for ECL	Gross exposure	Allowance/ provision for ECL	Gross exposure	Allowance / provision for ECL	Gross exposure	Allowance/ provision for ECL
	$m	$m	$m	$m	$m	$m	$m	$m	$m	$m
At 1 Jan 2021	1,506,451	(2,331)	223,432	(5,403)	20,424	(7,544)	279	(113)	1,750,586	(15,391)
Transfers of financial instruments:	21,107	(1,792)	(27,863)	2,601	6,756	(809)	—	—	—	—
– transfers from stage 1 to stage 2	(159,633)	527	159,633	(527)	—	—	—	—	—	—
– transfers from stage 2 to stage 1	182,432	(2,279)	(182,432)	2,279	—	—	—	—	—	—
– transfers to stage 3	(2,345)	24	(6,478)	1,010	8,823	(1,034)	—	—	—	—
– transfers from stage 3	653	(64)	1,414	(161)	(2,067)	225	—	—	—	—
Net remeasurement of ECL arising from transfer of stage	—	1,225	—	(596)	—	(34)	—	—	—	595
New financial assets originated or purchased	444,070	(553)	—	—	—	—	124	—	444,194	(553)
Assets derecognised (including final repayments)	(304,158)	174	(31,393)	489	(2,750)	458	(10)	6	(338,311)	1,127
Changes to risk parameters – further lending/repayment	(61,742)	547	(3,634)	498	(1,268)	576	(108)	12	(66,752)	1,633
Changes to risk parameters – credit quality	—	1,111	—	(1,012)	—	(2,354)	—	28	—	(2,227)
Changes to models used for ECL calculation	—	(17)	—	(33)	—	1	—	—	—	(49)
Assets written off	—	—	—	—	(2,610)	2,605	(7)	7	(2,617)	2,612
Credit-related modifications that resulted in derecognition	—	—	—	—	(125)	—	—	—	(125)	—
Foreign exchange	(25,231)	26	(2,918)	45	(479)	157	(4)	1	(28,632)	229
Others[1]	(2,915)	53	(1,882)	85	(151)	16	—	(5)	(4,948)	149
At 31 Dec 2021	1,577,582	(1,557)	155,742	(3,326)	19,797	(6,928)	274	(64)	1,753,395	(11,875)
ECL income statement change for the period		2,487		(654)		(1,353)		46		526
Recoveries										409
Others										(111)
Total ECL income statement change for the period										824

1 *Total includes $3.0bn of gross carrying loans and advances to customers, which were classified to assets held for sale, and a corresponding allowance for ECL of $123m, reflecting our exit of the domestic mass market retail banking in the US.*

	At 31 Dec 2021		12 months ended 31 Dec 2021
	Gross carrying/ nominal amount	Allowance for ECL	ECL charge
	$m	$m	$m
As above	1,753,395	(11,875)	824
Other financial assets measured at amortised cost	880,351	(193)	(19)
Non-trading reverse purchase agreement commitments	42,421	—	—
Performance and other guarantees not considered for IFRS 9	—	—	75
Summary of financial instruments to which the impairment requirements in IFRS 9 are applied/Summary consolidated income statement	2,676,167	(12,068)	880
Debt instruments measured at FVOCI	347,203	(96)	48
Total allowance for ECL/total income statement ECL change for the period	n/a	(12,164)	928

Credit quality

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 PD, whereas stages 1 and 2 are determined based on relative deterioration of credit quality since initial recognition for the majority of portfolios. Accordingly, for non-credit-impaired financial instruments, there is no direct relationship between the credit quality assessment and stages 1 and 2, although typically the lower credit quality bands exhibit a higher proportion in stage 2.

The five credit quality classifications provided below each encompass a range of granular internal credit rating grades assigned to wholesale and personal lending businesses and the external ratings attributed by external agencies to debt securities, as shown in the table on page 146.

Distribution of financial instruments by credit quality at 31 December 2022

(Audited)

	Gross carrying/notional amount						Allowance for ECL/ other credit provisions	
	Strong	Good	Satisfactory	Sub-standard	Credit impaired	Total		Net
	$m	$m	$m	$m	$m	$m	$m	$m
In-scope for IFRS 9 ECL								
Loans and advances to customers held at amortised cost	492,848	197,560	196,819	29,446	19,634	936,307	(11,453)	924,854
– personal	333,838	45,696	28,942	3,196	3,340	415,012	(2,872)	412,140
– corporate and commercial	126,659	132,847	154,135	24,890	15,825	454,356	(8,324)	446,032
– non-bank financial institutions	32,351	19,017	13,742	1,360	469	66,939	(257)	66,682
Loans and advances to banks held at amortised cost	93,025	4,890	5,643	1,311	82	104,951	(69)	104,882
Cash and balances at central banks	325,119	1,296	590	—	—	327,005	(3)	327,002
Items in the course of collection from other banks	7,280	12	5	—	—	7,297	—	7,297
Hong Kong Government certificates of indebtedness	43,787	—	—	—	—	43,787	—	43,787
Reverse repurchase agreements – non-trading	170,386	41,659	41,686	20	3	253,754	—	253,754
Financial investments	151,385	14,113	3,121	161	47	168,827	(80)	168,747
Assets held for sale	67,617	17,993	13,972	2,333	641	102,556	(415)	102,141
Other assets	91,114	10,911	8,821	274	152	111,272	(55)	111,217
– endorsements and acceptances	2,350	3,059	2,815	175	25	8,424	(17)	8,407
– accrued income and other	88,764	7,852	6,006	99	127	102,848	(38)	102,810
Debt instruments measured at fair value through other comprehensive income[1]	261,247	10,132	5,981	1,949	42	279,351	(145)	279,206
Out-of-scope for IFRS 9								
Trading assets	91,330	14,371	23,415	820	133	130,069	—	130,069
Other financial assets designated and otherwise mandatorily measured at fair value through profit or loss	6,281	809	1,785	110	—	8,985	—	8,985
Derivatives	241,905	34,181	7,843	181	36	284,146	—	284,146
Assets held for sale	15,254	—	—	—	—	15,254	—	15,254
Total gross carrying amount on balance sheet	2,058,578	347,927	309,681	36,605	20,770	2,773,561	(12,220)	2,761,341
Percentage of total credit quality	74.2%	12.5%	11.2%	1.3%	0.8%	100%		
Loan and other credit-related commitments	402,972	132,402	74,410	7,632	1,372	618,788	(386)	618,402
Financial guarantees	8,281	4,669	4,571	1,013	249	18,783	(52)	18,731
In-scope: Irrevocable loan commitments and financial guarantees	411,253	137,071	78,981	8,645	1,621	637,571	(438)	637,133
Loan and other credit-related commitments	76,095	69,667	59,452	3,360	489	209,063	—	209,063
Performance and other guarantees	37,943	30,029	17,732	2,137	399	88,240	(110)	88,130
Out-of-scope: Revocable loan commitments and non-financial guarantees	114,038	99,696	77,184	5,497	888	297,303	(110)	297,193

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 balance sheet as it excludes fair value gains and losses.*

Distribution of financial instruments by credit quality at 31 December 2021 (continued)

(Audited)

	Gross carrying/notional amount						Allowance for ECL/other credit provisions	
	Strong	Good	Satisfactory	Sub-standard	Credit impaired	Total		Net
	$m	$m	$m	$m	$m	$m	$m	$m
In-scope for IFRS 9 ECL								
Loans and advances to customers held at amortised cost	544,695	230,326	233,739	29,404	19,067	1,057,231	(11,417)	1,045,814
– personal	388,903	52,080	30,492	1,920	4,942	478,337	(3,103)	475,234
– corporate and commercial	124,819	158,938	188,858	27,194	13,730	513,539	(8,204)	505,335
– non-bank financial institutions	30,973	19,308	14,389	290	395	65,355	(110)	65,245
Loans and advances to banks held at amortised cost	72,978	4,037	5,020	1,118	—	83,153	(17)	83,136
Cash and balances at central banks	400,176	1,675	1,171	—	—	403,022	(4)	403,018
Items in the course of collection from other banks	4,122	10	4	—	—	4,136	—	4,136
Hong Kong Government certificates of indebtedness	42,578	—	—	—	—	42,578	—	42,578
Reverse repurchase agreements – non-trading	175,576	46,412	18,881	779	—	241,648	—	241,648
Financial investments	84,477	11,442	1,401	1	43	97,364	(62)	97,302
Assets held for sale	560	1,112	936	110	141	2,859	(43)	2,816
Other assets	66,537	10,997	10,749	298	163	88,744	(84)	88,660
– endorsements and acceptances	1,742	5,240	4,038	199	26	11,245	(17)	11,228
– accrued income and other	64,795	5,757	6,711	99	137	77,499	(67)	77,432
Debt instruments measured at fair value through other comprehensive income[1]	320,161	12,298	11,677	1,087	46	345,269	(96)	345,173
Out-of-scope for IFRS 9								
Trading assets	101,879	16,254	20,283	678	134	139,228	—	139,228
Other financial assets designated and otherwise mandatorily measured at fair value through profit or loss	6,438	723	4,455	150	—	11,766	—	11,766
Derivatives	146,748	42,717	6,691	719	7	196,882	—	196,882
Total gross carrying amount on balance sheet	1,966,925	378,003	315,007	34,344	19,601	2,713,880	(11,723)	2,702,157
Percentage of total credit quality	72.5%	13.9%	11.6%	1.3%	0.7%	100%		
Loan and other credit-related commitments	389,865	136,297	92,558	8,142	775	627,637	(379)	627,258
Financial guarantees	16,511	4,902	5,166	991	225	27,795	(62)	27,733
In-scope: Irrevocable loan commitments and financial guarantees	406,376	141,199	97,724	9,133	1,000	655,432	(441)	654,991
Loan and other credit-related commitments	62,701	65,031	56,446	3,327	332	187,837	—	187,837
Performance and other guarantees	31,510	32,193	19,265	2,027	539	85,534	(179)	85,355
Out-of-scope: Revocable loan commitments and non-financial guarantees	94,211	97,224	75,711	5,354	871	273,371	(179)	273,192

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 balance sheet as it excludes fair value gains and losses.*

Distribution of financial instruments to which the impairment requirements in IFRS 9 are applied, by credit quality and stage allocation

(Audited)

	Gross carrying/notional amount							
	Strong	Good	Satisfactory	Sub-standard	Credit impaired	Total	Allowance for ECL	Net
	$m	$m	$m	$m	$m	$m	$m	$m
Loans and advances to customers at amortised cost	492,848	197,560	196,819	29,446	19,634	936,307	(11,453)	924,854
– stage 1	458,843	170,875	142,695	5,130	—	777,543	(1,095)	776,448
– stage 2	34,005	26,685	54,124	24,316	—	139,130	(3,491)	135,639
– stage 3	—	—	—	—	19,505	19,505	(6,829)	12,676
– POCI	—	—	—	—	129	129	(38)	91
Loans and advances to banks at amortised cost	93,025	4,890	5,643	1,311	82	104,951	(69)	104,882
– stage 1	92,696	4,465	5,466	415	—	103,042	(18)	103,024
– stage 2	329	425	177	896	—	1,827	(29)	1,798
– stage 3	—	—	—	—	82	82	(22)	60
– POCI	—	—	—	—	—	—	—	—
Other financial assets measured at amortised cost	856,688	85,984	68,195	2,788	843	1,014,498	(553)	1,013,945
– stage 1	855,523	80,175	60,583	208	—	996,489	(124)	996,365
– stage 2	1,165	5,809	7,612	2,580	—	17,166	(188)	16,978
– stage 3	—	—	—	—	797	797	(234)	563
– POCI	—	—	—	—	46	46	(7)	39
Loan and other credit-related commitments	402,972	132,402	74,410	7,632	1,372	618,788	(386)	618,402
– stage 1	398,120	121,581	60,990	2,692	—	583,383	(141)	583,242
– stage 2	4,852	10,821	13,420	4,940	—	34,033	(180)	33,853
– stage 3	—	—	—	—	1,372	1,372	(65)	1,307
– POCI	—	—	—	—	—	—	—	—
Financial guarantees	8,281	4,669	4,571	1,013	249	18,783	(52)	18,731
– stage 1	8,189	4,245	3,488	149	—	16,071	(6)	16,065
– stage 2	92	424	1,083	864	—	2,463	(13)	2,450
– stage 3	—	—	—	—	249	249	(33)	216
– POCI	—	—	—	—	—	—	—	—
At 31 Dec 2022	**1,853,814**	**425,505**	**349,638**	**42,190**	**22,180**	**2,693,327**	**(12,513)**	**2,680,814**
Debt instruments at FVOCI[1]								
– stage 1	260,941	10,000	5,690	—	—	276,631	(68)	276,563
– stage 2	306	132	291	1,949	—	2,678	(69)	2,609
– stage 3	—	—	—	—	5	5	(1)	4
– POCI	—	—	—	—	37	37	(7)	30
At 31 Dec 2022	**261,247**	**10,132**	**5,981**	**1,949**	**42**	**279,351**	**(145)**	**279,206**

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 balance sheet as it excludes fair value gains and losses.*

Distribution of financial instruments to which the impairment requirements in IFRS 9 are applied, by credit quality and stage allocation (continued)

(Audited)

	Gross carrying/notional amount							
	Strong	Good	Satisfactory	Sub-standard	Credit impaired	Total	Allowance for ECL	Net
	$m	$m	$m	$m	$m	$m	$m	$m
Loans and advances to customers at amortised cost	544,695	230,326	233,739	29,404	19,067	1,057,231	(11,417)	1,045,814
– stage 1	537,642	206,645	169,809	4,840	—	918,936	(1,367)	917,569
– stage 2	7,053	23,681	63,930	24,560	—	119,224	(3,119)	116,105
– stage 3	—	—	—	—	18,797	18,797	(6,867)	11,930
– POCI	—	—	—	4	270	274	(64)	210
Loans and advances to banks at amortised cost	72,978	4,037	5,020	1,118	—	83,153	(17)	83,136
– stage 1	72,903	3,935	4,788	10	—	81,636	(14)	81,622
– stage 2	75	102	232	1,108	—	1,517	(3)	1,514
– stage 3	—	—	—	—	—	—	—	—
– POCI	—	—	—	—	—	—	—	—
Other financial assets measured at amortised cost	774,026	71,648	33,142	1,188	347	880,351	(193)	880,158
– stage 1	773,427	70,508	30,997	84	—	875,016	(91)	874,925
– stage 2	599	1,140	2,145	1,104	—	4,988	(54)	4,934
– stage 3	—	—	—	—	304	304	(42)	262
– POCI	—	—	—	—	43	43	(6)	37
Loan and other credit-related commitments	389,865	136,297	92,558	8,142	775	627,637	(379)	627,258
– stage 1	387,434	129,455	76,043	1,541	—	594,473	(165)	594,308
– stage 2	2,431	6,842	16,515	6,601	—	32,389	(174)	32,215
– stage 3	—	—	—	—	775	775	(40)	735
– POCI	—	—	—	—	—	—	—	—
Financial guarantees	16,511	4,902	5,166	991	225	27,795	(62)	27,733
– stage 1	16,351	4,469	3,929	183	—	24,932	(11)	24,921
– stage 2	160	433	1,237	808	—	2,638	(30)	2,608
– stage 3	—	—	—	—	225	225	(21)	204
– POCI	—	—	—	—	—	—	—	—
At 31 Dec 2021	1,798,075	447,210	369,625	40,843	20,414	2,676,167	(12,068)	2,664,099
Debt instruments at FVOCI[1]								
– stage 1	319,557	12,196	11,354	—	—	343,107	(67)	343,040
– stage 2	604	102	323	1,087	—	2,116	(22)	2,094
– stage 3	—	—	—	—	—	—	—	—
– POCI	—	—	—	—	46	46	(7)	39
At 31 Dec 2021	320,161	12,298	11,677	1,087	46	345,269	(96)	345,173

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 balance sheet as it excludes fair value gains and losses.*

Credit-impaired loans

(Audited)

We determine that a financial instrument is credit impaired and in stage 3 by considering relevant objective evidence, primarily whether:

- contractual payments of either principal or interest are past due for more than 90 days;
- there are other indications that the borrower is unlikely to pay, such as when a concession has been granted to the borrower for economic or legal reasons relating to the borrower's financial condition; and
- the loan is otherwise considered to be in default. If such unlikeliness to pay is not identified at an earlier stage, it is deemed to occur when an exposure is 90 days past due, even where regulatory rules permit default to be defined based on 180 days past due. Therefore, the definitions of credit impaired and default are aligned as far as possible so that stage 3 represents all loans that are considered defaulted or otherwise credit impaired.

Forbearance

The following table shows the gross carrying amounts and allowances for ECL of the Group's holdings of forborne loans and advances to customers by industry sector and by stages.

A summary of our current policies and practices for forbearance is set out in 'Credit risk management' on page 145.

Forborne loans and advances to customers at amortised cost by stage allocation

	Performing – forborne		Non-performing – forborne		Total – forborne
	Stage 1	**Stage 2**	**Stage 3**	**POCI**	**Total**
	$m	**$m**	**$m**	**$m**	**$m**
Gross carrying amount					
Personal	**—**	**651**	**1,171**	**—**	**1,822**
– first lien residential mortgages	**—**	**369**	**738**	**—**	**1,107**
– second lien residential mortgages	**—**	**—**	**7**	**—**	**7**
– guaranteed loans in respect of residential property	**—**	**—**	**4**	**—**	**4**
– other personal lending which is secured	**—**	**5**	**13**	**—**	**18**
– credit cards	**—**	**93**	**75**	**—**	**168**
– other personal lending which is unsecured	**—**	**179**	**334**	**—**	**513**
– motor vehicle finance	**—**	**5**	**—**	**—**	**5**
Wholesale	**—**	**4,873**	**4,576**	**107**	**9,556**
– corporate and commercial	**—**	**4,859**	**4,562**	**107**	**9,528**
– non-bank financial institutions	**—**	**14**	**14**	**—**	**28**
At 31 Dec 2022	**—**	**5,524**	**5,747**	**107**	**11,378**
Allowance for ECL					
Personal	**—**	**(124)**	**(302)**	**—**	**(426)**
– first lien residential mortgages	**—**	**(49)**	**(118)**	**—**	**(167)**
– second lien residential mortgages	**—**	**—**	**(3)**	**—**	**(3)**
– guaranteed loans in respect of residential property	**—**	**—**	**(3)**	**—**	**(3)**
– other personal lending which is secured	**—**	**—**	**(2)**	**—**	**(2)**
– credit cards	**—**	**(19)**	**(44)**	**—**	**(63)**
– other personal lending which is unsecured	**—**	**(54)**	**(132)**	**—**	**(186)**
– motor vehicle finance	**—**	**(2)**	**—**	**—**	**(2)**
Wholesale	**—**	**(152)**	**(1,497)**	**(25)**	**(1,674)**
– corporate and commercial	**—**	**(151)**	**(1,490)**	**(25)**	**(1,666)**
– non-bank financial institutions	**—**	**(1)**	**(7)**	**—**	**(8)**
At 31 Dec 2022	**—**	**(276)**	**(1,799)**	**(25)**	**(2,100)**
Gross carrying amount					
Personal	—	—	2,256	—	2,256
– first lien residential mortgages	—	—	1,547	—	1,547
– second lien residential mortgages	—	—	22	—	22
– guaranteed loans in respect of residential property	—	—	23	—	23
– other personal lending which is secured	—	—	39	—	39
– credit cards	—	—	168	—	168
– other personal lending which is unsecured	—	—	456	—	456
– motor vehicle finance	—	—	1	—	1
Wholesale	366	559	4,505	253	5,683
– corporate and commercial	355	550	4,491	253	5,649
– non-bank financial institutions	11	9	14	—	34
At 31 Dec 2021[1]	366	559	6,761	253	7,939
Allowance for ECL					
Personal	—	—	(400)	—	(400)
– first lien residential mortgages	—	—	(178)	—	(178)
– second lien residential mortgages	—	—	(6)	—	(6)
– guaranteed loans in respect of residential property	—	—	(7)	—	(7)
– other personal lending which is secured	—	—	(5)	—	(5)
– credit cards	—	—	(53)	—	(53)
– other personal lending which is unsecured	—	—	(151)	—	(151)
– motor vehicle finance	—	—	—	—	—
Wholesale	(7)	(24)	(1,282)	(52)	(1,365)
– corporate and commercial	(7)	(24)	(1,274)	(52)	(1,357)
– non-bank financial institutions	—	—	(8)	—	(8)
At 31 Dec 2021[1]	(7)	(24)	(1,682)	(52)	(1,765)

1 *Forborne exposures and allowances for ECL at 31 December 2021 have not been restated and agreed with the policies and disclosures presented in the* Annual Report and Accounts 2021.

Following the adoption of the EBA 'Guidelines on the application of definition of default', retail and wholesale loans are identified as forborne and classified as either performing or non-performing when we modify the contractual terms due to financial difficulty of the borrower. At 31 December 2022, we reported $5,524m (31 December 2021: $925m) of performing forborne loans. The increase of $4,599m was mainly driven by the inclusion of non-payment-related concessions in the forbearance assessment since 1 January 2022.

Forborne loans and advances to customers by geographical region

	Europe	Asia	MENA	North America	Latin America	Total	*of which:* *UK*	*Hong Kong*
	$m	$m	$m	$m	$m	$m	*$m*	*$m*
Gross carrying amount								
Performing forborne	**3,121**	**276**	**482**	**1,100**	**545**	**5,524**	***1,028***	***134***
Non-performing forborne	**2,636**	**1,562**	**1,076**	**368**	**212**	**5,854**	***2,126***	***879***
At 31 Dec 2022	**5,757**	**1,838**	**1,558**	**1,468**	**757**	**11,378**	***3,154***	***1,013***
Allowances for ECL								
Performing forborne	**(95)**	**(21)**	**(19)**	**(62)**	**(79)**	**(276)**	***(64)***	***(17)***
Non-performing forborne	**(566)**	**(525)**	**(536)**	**(83)**	**(114)**	**(1,824)**	***(441)***	***(355)***
At 31 Dec 2022	**(661)**	**(546)**	**(555)**	**(145)**	**(193)**	**(2,100)**	***(505)***	***(372)***
Gross carrying amount								
Performing forborne	698	5	105	89	28	925	*640*	—
Non-performing forborne	3,421	1,317	849	975	452	7,014	*2,829*	*528*
At 31 Dec 2021[1]	4,119	1,322	954	1,064	480	7,939	*3,469*	*528*
Allowances for ECL								
Performing forborne	(13)	—	(9)	(8)	(1)	(31)	*(10)*	—
Non-performing forborne	(615)	(306)	(475)	(138)	(200)	(1,734)	*(459)*	*(89)*
At 31 Dec 2021[1]	(628)	(306)	(484)	(146)	(201)	(1,765)	*(469)*	*(89)*

1 *Forborne exposures and allowances for ECL at 31 December 2021 have not been restated and agreed with the policies and disclosures presented in the* Annual Report and Accounts 2021.

Wholesale lending

This section provides further details on the regions, countries, territories and products comprising wholesale loans and advances to customers and banks. Product granularity is also provided by stage with geographical data presented for loans and advances to customers, banks, other credit commitments, financial guarantees and similar contracts. Additionally, this section provides a reconciliation of the opening 1 January 2022 to 31 December 2022 closing gross carrying/nominal amounts and the associated allowance for ECL.

At 31 December 2022, wholesale lending for loans and advances to banks and customers of $626.2bn decreased by $35.8bn since 31 December 2021. This included adverse foreign exchange movements of $31.9bn. Excluding foreign exchange movements, the total wholesale lending decrease of $3.9bn was driven by a $34.3bn decline in corporate and commercial balances. This was partly offset by a $25.9bn increase in loans and advances to banks and a $4.5bn increase in balances from non-bank financial institutions.

The primary driver of the decline in corporate and commercial balances was the $23.4bn reclassification of our banking business in Canada to held for sale, and a decline of $11.3bn in Asia. In Asia, the decline was driven from a $17.3bn decrease in Hong Kong, partly offset by growth of $2.4bn in Australia, $1.9b in Japan and $1.7bn in India.

Growth in loans and advances to banks was mainly driven by a $13.0bn increase in Asia, a $10.1bn increase in Europe, and a $2.6bn increase in MENA. In Asia, the increase can be largely attributed to $7.9bn in Hong Kong and $1.5bn in Malaysia. In Europe, the growth was mainly from the UK with an increase of $10.6bn.

The increase in balances from non-bank financial institutions was driven from an increase of $3.7bn in Asia and $2.0bn in Europe. This growth was partly offset by a decline of $1.3bn in North America, of which $1.4bn was due to the reclassification of our banking business in Canada to held for sale, and a $0.1bn increase in the US.

Loan commitments and financial guarantees decreased by $22.2bn since 31 December 2021 to $392.4bn at 31 December 2022, including a $3.0bn increase related to unsettled reverse repurchase agreements. This also included adverse foreign exchange movements of $21.8bn.

The allowance for ECL attributable to wholesale loans and advances to banks and customers increased by $0.3bn to $8.7bn at 31 December 2022. This included favourable foreign exchange movements of $0.4bn.

Excluding foreign exchange movements, the total increase in the wholesale ECL allowance for loans and advances to customers and banks was driven by a $0.5bn growth in corporate and commercial allowances. The primary driver of this increase in corporate and commercial allowance for ECL was $1.1bn in Asia, notably $1.4bn in Hong Kong, which was partly offset by a decline of $0.4bn in Singapore. Allowances for ECL decreased by $0.2bn in North America, and by $0.1bn in both Europe and Latin America.

The allowance for ECL attributable to loan commitments and financial guarantees at 31 December 2022 remained at $0.4bn from 31 December 2021.

Total wholesale lending for loans and advances to banks and customers by stage distribution

	Gross carrying amount					Allowance for ECL				
	Stage 1 $m	Stage 2 $m	Stage 3 $m	POCI $m	Total $m	Stage 1 $m	Stage 2 $m	Stage 3 $m	POCI $m	Total $m
Corporate and commercial	353,010	85,521	15,696	129	454,356	(490)	(1,909)	(5,887)	(38)	(8,324)
– agriculture, forestry and fishing	4,805	1,505	261	—	6,571	(10)	(44)	(68)	—	(122)
– mining and quarrying	6,498	1,463	232	1	8,194	(5)	(21)	(145)	(1)	(172)
– manufacturing	70,187	15,251	2,016	49	87,503	(93)	(164)	(867)	(29)	(1,153)
– electricity, gas, steam and air-conditioning supply	15,006	1,799	277	—	17,082	(11)	(31)	(67)	—	(109)
– water supply, sewerage, waste management and remediation	2,690	277	26	—	2,993	(3)	(5)	(13)	—	(21)
– construction	9,692	2,742	791	7	13,232	(21)	(51)	(368)	(3)	(443)
– wholesale and retail trade, repair of motor vehicles and motorcycles	63,755	15,872	2,805	5	82,437	(96)	(226)	(1,341)	(3)	(1,666)
– transportation and storage	19,227	5,062	556	—	24,845	(31)	(65)	(153)	—	(249)
– accommodation and food	9,873	6,523	787	2	17,185	(23)	(139)	(81)	(1)	(244)
– publishing, audiovisual and broadcasting	16,609	1,537	249	28	18,423	(22)	(36)	(58)	(1)	(117)
– real estate	72,195	24,386	4,834	19	101,434	(86)	(904)	(1,861)	—	(2,851)
– professional, scientific and technical activities	15,164	2,229	542	—	17,935	(21)	(51)	(200)	—	(272)
– administrative and support services	20,592	3,505	962	18	25,077	(25)	(90)	(293)	—	(408)
– public administration and defence, compulsory social security	1,166	14	—	—	1,180	—	(1)	—	—	(1)
– education	1,346	181	87	—	1,614	(4)	(5)	(22)	—	(31)
– health and care	3,055	643	266	—	3,964	(6)	(17)	(67)	—	(90)
– arts, entertainment and recreation	1,264	452	146	—	1,862	(4)	(16)	(57)	—	(77)
– other services	10,391	1,547	589	—	12,527	(26)	(30)	(219)	—	(275)
– activities of households	730	14	—	—	744	—	—	—	—	—
– extra-territorial organisations and bodies activities	47	—	—	—	47	—	—	—	—	—
– government	8,699	506	270	—	9,475	(3)	—	(7)	—	(10)
– asset-backed securities	19	13	—	—	32	—	(13)	—	—	(13)
Non-bank financial institutions	61,752	4,718	469	—	66,939	(43)	(77)	(137)	—	(257)
Loans and advances to banks	103,042	1,827	82	—	104,951	(18)	(29)	(22)	—	(69)
At 31 Dec 2022	**517,804**	**92,066**	**16,247**	**129**	**626,246**	**(551)**	**(2,015)**	**(6,046)**	**(38)**	**(8,650)**
By geography										
Europe	150,592	28,060	7,070	31	185,753	(223)	(628)	(1,718)	(1)	(2,570)
– *of which: UK*	*104,595*	*21,489*	*5,432*	*28*	*131,544*	*(186)*	*(501)*	*(1,015)*	*(1)*	*(1,703)*
Asia	293,503	50,826	6,938	81	351,348	(220)	(1,077)	(3,125)	(25)	(4,447)
– *of which: Hong Kong*	*155,513*	*28,275*	*5,338*	*57*	*189,183*	*(104)*	*(775)*	*(2,136)*	*(22)*	*(3,037)*
MENA	29,512	3,254	1,530	17	34,313	(22)	(49)	(909)	(12)	(992)
North America	31,372	6,950	245	—	38,567	(25)	(197)	(44)	—	(266)
Latin America	12,825	2,976	464	—	16,265	(61)	(64)	(250)	—	(375)
At 31 Dec 2022	**517,804**	**92,066**	**16,247**	**129**	**626,246**	**(551)**	**(2,015)**	**(6,046)**	**(38)**	**(8,650)**

Total wholesale lending for loans and other credit-related commitments and financial guarantees by stage distribution[1]

	Nominal amount					Allowance for ECL				
	Stage 1 $m	Stage 2 $m	Stage 3 $m	POCI $m	Total $m	Stage 1 $m	Stage 2 $m	Stage 3 $m	POCI $m	Total $m
Corporate and commercial	252,860	29,116	798	—	282,774	(116)	(178)	(96)	—	(390)
Financial	105,950	3,683	23	—	109,656	(5)	(14)	(2)	—	(21)
At 31 Dec 2022	**358,810**	**32,799**	**821**	**—**	**392,430**	**(121)**	**(192)**	**(98)**	**—**	**(411)**
By geography										
Europe	168,179	17,235	498	—	185,912	(41)	(87)	(85)	—	(213)
– *of which: UK*	*60,532*	*9,941*	*278*	*—*	*70,751*	*(34)*	*(64)*	*(46)*	*—*	*(144)*
Asia	67,473	6,081	114	—	73,668	(54)	(53)	(9)	—	(116)
– *of which: Hong Kong*	*27,102*	*2,448*	*46*	*—*	*29,596*	*(14)*	*(27)*	*(2)*	*—*	*(43)*
MENA	7,500	565	21	—	8,086	(4)	(5)	(2)	—	(11)
North America	112,695	8,642	185	—	121,522	(21)	(47)	(2)	—	(70)
Latin America	2,963	276	3	—	3,242	(1)	—	—	—	(1)
At 31 Dec 2022	**358,810**	**32,799**	**821**	**—**	**392,430**	**(121)**	**(192)**	**(98)**	**—**	**(411)**

1 *Included in loans and other credit-related commitments and financial guarantees is $45bn relating to unsettled reverse repurchase agreements, which once drawn are classified as 'Reverse repurchase agreements – non-trading'.*

Total wholesale lending for loans and advances to banks and customers by stage distribution

	Gross carrying amount					Allowance for ECL				
	Stage 1	Stage 2	Stage 3	POCI	Total	Stage 1	Stage 2	Stage 3	POCI	Total
	$m	$m	$m	$m	$m	$m	$m	$m	$m	$m
Corporate and commercial	400,894	98,911	13,460	274	513,539	(665)	(1,874)	(5,601)	(64)	(8,204)
– agriculture, forestry and fishing	6,510	1,026	362	1	7,899	(10)	(23)	(104)	(1)	(138)
– mining and quarrying	7,167	2,055	447	16	9,685	(17)	(39)	(159)	(12)	(227)
– manufacturing	75,193	16,443	2,019	88	93,743	(110)	(176)	(931)	(31)	(1,248)
– electricity, gas, steam and air-conditioning supply	15,255	1,285	78	—	16,618	(16)	(21)	(31)	—	(68)
– water supply, sewerage, waste management and remediation	3,376	468	51	—	3,895	(5)	(4)	(20)	—	(29)
– construction	9,506	3,605	842	1	13,954	(24)	(44)	(439)	(1)	(508)
– wholesale and retail trade, repair of motor vehicles and motorcycles	79,137	12,802	3,003	2	94,944	(71)	(99)	(1,936)	(1)	(2,107)
– transportation and storage	21,199	7,726	658	9	29,592	(56)	(116)	(191)	—	(363)
– accommodation and food	8,080	14,096	1,199	1	23,376	(67)	(245)	(110)	(1)	(423)
– publishing, audiovisual and broadcasting	16,417	1,804	222	28	18,471	(37)	(47)	(94)	(6)	(184)
– real estate	93,633	25,154	2,375	98	121,260	(132)	(737)	(775)	—	(1,644)
– professional, scientific and technical activities	16,160	2,888	637	—	19,685	(26)	(40)	(172)	—	(238)
– administrative and support services	23,186	4,740	719	30	28,675	(40)	(84)	(296)	(11)	(431)
– public administration and defence, compulsory social security	938	333	—	—	1,271	(5)	(3)	—	—	(8)
– education	1,455	273	65	—	1,793	(4)	(15)	(18)	—	(37)
– health and care	3,743	928	183	—	4,854	(11)	(24)	(37)	—	(72)
– arts, entertainment and recreation	1,620	826	152	—	2,598	(6)	(44)	(42)	—	(92)
– other services	10,123	1,726	448	—	12,297	(26)	(101)	(246)	—	(373)
– activities of households	860	117	—	—	977	—	—	—	—	—
– extra-territorial organisations and bodies activities	2	—	—	—	2	—	—	—	—	—
– government	7,010	602	—	—	7,612	(2)	(2)	—	—	(4)
– asset-backed securities	324	14	—	—	338	—	(10)	—	—	(10)
Non-bank financial institutions	61,086	3,874	395	—	65,355	(44)	(26)	(40)	—	(110)
Loans and advances to banks	81,636	1,517	—	—	83,153	(14)	(3)	—	—	(17)
At 31 Dec 2021	543,616	104,302	13,855	274	662,047	(723)	(1,903)	(5,641)	(64)	(8,331)
By geography										
Europe	154,575	31,871	6,741	30	193,217	(356)	(654)	(1,806)	(9)	(2,825)
– *of which: UK*	*101,029*	*24,461*	*5,126*	*28*	*130,644*	*(306)*	*(518)*	*(1,060)*	*(6)*	*(1,890)*
Asia	297,423	53,993	3,997	199	355,612	(182)	(830)	(2,299)	(43)	(3,354)
– *of which: Hong Kong*	*165,437*	*30,305*	*1,990*	*159*	*197,891*	*(85)*	*(650)*	*(836)*	*(21)*	*(1,592)*
MENA	26,135	5,295	1,682	22	33,134	(62)	(108)	(1,028)	(11)	(1,209)
North America	53,513	10,397	652	—	64,562	(57)	(215)	(169)	—	(441)
Latin America	11,970	2,746	783	23	15,522	(66)	(96)	(339)	(1)	(502)
At 31 Dec 2021	543,616	104,302	13,855	274	662,047	(723)	(1,903)	(5,641)	(64)	(8,331)

Total wholesale lending for loans and other credit-related commitments and financial guarantees by stage distribution[1]

	Nominal amount					Allowance for ECL				
	Stage 1	Stage 2	Stage 3	POCI	Total	Stage 1	Stage 2	Stage 3	POCI	Total
	$m	$m	$m	$m	$m	$m	$m	$m	$m	$m
Corporate and commercial	274,775	30,376	829	—	305,980	(130)	(193)	(60)	—	(383)
Financial	105,746	2,889	2	—	108,637	(9)	(9)	(1)	—	(19)
At 31 Dec 2021	380,521	33,265	831	—	414,617	(139)	(202)	(61)	—	(402)
By geography										
Europe	189,770	15,585	673	—	206,028	(67)	(76)	(47)	—	(190)
– *of which: UK*	*68,136*	*8,430*	*389*	—	*76,955*	*(55)*	*(49)*	*(28)*	—	*(132)*
Asia	72,179	5,229	20	—	77,428	(35)	(40)	(5)	—	(80)
– *of which: Hong Kong*	*31,314*	*1,517*	*10*	—	*32,841*	*(11)*	*(17)*	*(2)*	—	*(30)*
MENA	6,335	1,017	19	—	7,371	(10)	(18)	(3)	—	(31)
North America	109,851	11,350	91	—	121,292	(24)	(66)	(1)	—	(91)
Latin America	2,386	84	28	—	2,498	(3)	(2)	(5)	—	(10)
At 31 Dec 2021	380,521	33,265	831	—	414,617	(139)	(202)	(61)	—	(402)

1 *Included in loans and other credit-related commitments and financial guarantees is $42bn relating to unsettled reverse repurchase agreements, which once drawn are classified as 'Reverse repurchase agreements – non-trading'.*

Wholesale lending – reconciliation of changes in gross carrying/nominal amount and allowances for loans and advances to banks and customers including loan commitments and financial guarantees
(Audited)

	Non-credit impaired				Credit impaired					
	Stage 1		Stage 2		Stage 3		POCI		Total	
	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
	$m	$m	$m	$m	$m	$m	$m	$m	$m	$m
At 1 Jan 2022	**881,742**	**(862)**	**137,541**	**(2,105)**	**14,686**	**(5,702)**	**274**	**(64)**	**1,034,243**	**(8,733)**
Transfers of financial instruments	(58,188)	(299)	49,569	943	8,619	(644)	—	—	—	—
– transfers from stage 1 to stage 2	(157,553)	201	157,553	(201)	—	—	—	—	—	—
– transfers from stage 2 to stage 1	100,839	(482)	(100,839)	482	—	—	—	—	—	—
– transfers to stage 3	(1,831)	7	(8,100)	771	9,931	(778)			—	—
– transfers from stage 3	357	(25)	955	(109)	(1,312)	134	—	—	—	—
ECL arising from transfer of stage	—	241	—	(370)	—	(64)	—	—	—	(193)
New financial assets originated or purchased	352,985	(277)	—	—	—	—	26	(2)	353,011	(279)
Assets derecognised (including final repayments)	(250,014)	54	(33,850)	73	(1,763)	292	(97)	—	(285,724)	419
Changes to risk parameters – further lending/repayments	(34,321)	64	(11,501)	128	(1,491)	292	(61)	5	(47,374)	489
Change in risk parameters – credit quality	—	321	—	(994)	—	(2,197)	—	32	—	(2,838)
Changes to models used for ECL calculation	—	6	—	(57)	—	—	—	—	—	(51)
Assets written off	—	—	—	—	(1,579)	1,579	(10)	10	(1,589)	1,589
Credit-related modifications that resulted in derecognition	—	—	—	—	(32)	9	—	—	(32)	9
Foreign exchange and other[1]	(60,421)	80	(16,984)	175	(1,372)	291	(3)	(19)	(78,780)	527
At 31 Dec 2022	**831,783**	**(672)**	**124,775**	**(2,207)**	**17,068**	**(6,144)**	**129**	**(38)**	**973,755**	**(9,061)**
ECL income statement change for the period		409		(1,220)		(1,677)		35		(2,453)
Recoveries										33
Others										(23)
Total ECL income statement change for the period										(2,443)

1 *Total includes $33.1bn of gross carrying loans and advances to customers and banks, which were classified to assets held for sale, and a corresponding allowance for ECL of $204m, reflecting business disposals as disclosed in Note 23 'Assets held for sale and liabilities of disposal groups held for sale' on page 389.*

As shown in the above table, the allowance for ECL for loans and advances to customers and banks and relevant loan commitments and financial guarantees increased by $328m during the period from $8,733m at 31 December 2021 to $9,061m at 31 December 2022.

This increase was primarily driven by:

- $2,838m relating to underlying credit quality changes, including the credit quality impact of financial instruments transferring between stages;
- $193m relating to the net remeasurement impact of stage transfers; and
- $51m of changes to models used for ECL calculation.

These were partly offset by:

- $1,589m of assets written off;
- $629m relating to volume movements, which included the ECL allowance associated with new originations, assets derecognised and further lending/repayments; and
- foreign exchange and other movements of $527m.

The ECL charge for the period of $2,453m presented in the previous table consisted of $2,838m relating to underlying credit quality changes, including the credit quality impact of financial instruments transferring between stages, $193m relating to the net remeasurement impact of stage transfers and $51m in changes to models used for ECL calculation. This was partly offset by $629m relating to underlying net book volume movement.

During the period, there was a net transfer to stage 2 of $56,714m gross carrying/nominal amounts. The movement reflected the increased level of uncertainty around the macroeconomic outlook during the period. It was primarily driven by $29,049m in Asia, due to deterioration in the macroeconomic outlook affecting real estate portfolios booked in Hong Kong, and $20,860m in Europe, mainly driven by deterioration in the macroeconomic outlook affecting corporate and commercial portfolios in France.

Wholesale lending – reconciliation of changes in gross carrying/nominal amount and allowances for loans and advances to banks and customers including loan commitments and financial guarantees

(Audited)

	Non-credit impaired				Credit impaired					
	Stage 1		Stage 2		Stage 3		POCI		Total	
	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
	$m	$m	$m	$m	$m	$m	$m	$m	$m	$m
At 1 Jan 2021	841,105	(1,465)	196,662	(2,998)	14,662	(6,041)	279	(113)	1,052,708	(10,617)
Transfers of financial instruments	19,285	(638)	(23,361)	888	4,076	(250)	—	—	—	—
– transfers from stage 1 to stage 2	(135,932)	238	135,932	(238)	—	—	—	—	—	—
– transfers from stage 2 to stage 1	156,346	(875)	(156,346)	875	—	—	—	—	—	—
– transfers to stage 3	(1,363)	17	(3,410)	276	4,773	(293)	—	—	—	—
– transfers from stage 3	234	(18)	463	(25)	(697)	43	—	—	—	—
Net remeasurement of ECL arising from transfer of stage	—	400	—	(233)	—	(27)	—	—	—	140
New financial assets originated or purchased	307,150	(342)	—	—	—	—	124	—	307,274	(342)
Assets derecognised (including final repayments)	(221,160)	55	(26,136)	70	(1,514)	239	(10)	6	(248,820)	370
Changes to risk parameters – further lending/repayments	(47,766)	307	(6,014)	384	(987)	525	(108)	12	(54,875)	1,228
Changes to risk parameters – credit quality	—	793	—	(234)	—	(1,347)	—	28	—	(760)
Changes to models used for ECL calculation	—	(15)	—	(33)	—	—	—	—	—	(48)
Assets written off	—	—	—	—	(1,085)	1,085	(7)	7	(1,092)	1,092
Credit-related modifications that resulted in derecognition	—	—	—	—	(125)	—	—	—	(125)	—
Foreign exchange	(16,157)	9	(2,560)	26	(341)	112	(4)	1	(19,062)	148
Others	(715)	34	(1,050)	25	—	2	—	(5)	(1,765)	56
At 31 Dec 2021	881,742	(862)	137,541	(2,105)	14,686	(5,702)	274	(64)	1,034,243	(8,733)
ECL income statement change for the period		1,198		(46)		(610)		46		588
Recoveries										54
Others										(102)
Total ECL income statement change for the period										540

Wholesale lending – distribution of financial instruments to which the impairment requirements of IFRS 9 are applied by credit quality

	Gross carrying/nominal amount							
	Strong	**Good**	**Satisfactory**	**Sub-standard**	**Credit impaired**	**Total**	**Allowance for ECL**	**Net**
	$m	**$m**	**$m**	**$m**	**$m**	**$m**	**$m**	**$m**
By geography								
Europe	**60,016**	**49,831**	**58,580**	**10,224**	**7,102**	**185,753**	**(2,570)**	**183,183**
– *of which: UK*	***44,515***	***38,521***	***36,934***	***6,115***	***5,459***	***131,544***	***(1,703)***	***129,841***
Asia	**167,720**	**81,907**	**84,973**	**9,735**	**7,013**	**351,348**	**(4,447)**	**346,901**
– *of which: Hong Kong*	***77,227***	***44,479***	***54,500***	***7,581***	***5,396***	***189,183***	***(3,037)***	***186,146***
MENA	**15,132**	**5,349**	**11,170**	**1,113**	**1,549**	**34,313**	**(992)**	**33,321**
North America	**7,445**	**13,390**	**12,856**	**4,630**	**246**	**38,567**	**(266)**	**38,301**
Latin America	**1,722**	**6,277**	**5,941**	**1,859**	**466**	**16,265**	**(375)**	**15,890**
At 31 Dec 2022	**252,035**	**156,754**	**173,520**	**27,561**	**16,376**	**626,246**	**(8,650)**	**617,596**
Percentage of total credit quality	**40.3%**	**25.0%**	**27.7%**	**4.4%**	**2.6%**	**100.0%**		
By geography								
Europe	48,758	49,254	74,240	14,196	6,769	193,217	(2,825)	190,392
– *of which: UK*	*30,390*	*37,212*	*48,694*	*9,192*	*5,156*	*130,644*	*(1,890)*	*128,754*
Asia	155,072	95,626	96,046	4,670	4,198	355,612	(3,354)	352,258
– *of which: Hong Kong*	*74,440*	*54,703*	*63,301*	*3,297*	*2,150*	*197,891*	*(1,592)*	*196,299*
MENA	12,264	7,004	10,321	1,844	1,701	33,134	(1,209)	31,925
North America	11,683	24,663	22,022	5,543	651	64,562	(441)	64,121
Latin America	993	5,736	5,638	2,349	806	15,522	(502)	15,020
At 31 Dec 2021	228,770	182,283	208,267	28,602	14,125	662,047	(8,331)	653,716
Percentage of total credit quality	34.6%	27.5%	31.5%	4.3%	2.1%	100.0%		

Our risk rating system facilitates the internal ratings-based approach under the Basel framework adopted by the Group to support calculation of our minimum credit regulatory capital requirement. The credit quality classifications can be found on page 146.

Wholesale lending – credit risk profile by obligor grade for loans and advances at amortised cost

		Gross carrying amount					Allowance for ECL						
	Basel one-year PD range	Stage 1	Stage 2	Stage 3	POCI	Total	Stage 1	Stage 2	Stage 3	POCI	Total	ECL coverage	Mapped external rating
	%	$m	$m	$m	$m	$m	$m	$m	$m	$m	$m	%	
Corporate and commercial		353,010	85,521	15,696	129	454,356	(490)	(1,909)	(5,887)	(38)	(8,324)	1.8	
– CRR 1	0.000 to 0.053	35,630	330	—	—	35,960	(6)	(1)	—	—	(7)	—	AA- and above
– CRR 2	0.054 to 0.169	87,465	3,234	—	—	90,699	(28)	(15)	—	—	(43)	—	A+ to A-
– CRR 3	0.170 to 0.740	115,116	17,731	—	—	132,847	(129)	(122)	—	—	(251)	0.2	BBB+ to BBB-
– CRR 4	0.741 to 1.927	74,229	21,550	—	—	95,779	(155)	(210)	—	—	(365)	0.4	BB+ to BB-
– CRR 5	1.928 to 4.914	36,707	21,649	—	—	58,356	(146)	(361)	—	—	(507)	0.9	BB- to B
– CRR 6	4.915 to 8.860	2,513	9,171	—	—	11,684	(16)	(237)	—	—	(253)	2.2	B-
– CRR 7	8.861 to 15.000	1,164	5,476	—	—	6,640	(8)	(337)	—	—	(345)	5.2	CCC+
– CRR 8	15.001 to 99.999	186	6,380	—	—	6,566	(2)	(626)	—	—	(628)	9.6	CCC to C
– CRR 9/10	100.000	—	—	15,696	129	15,825	—	—	(5,887)	(38)	(5,925)	37.4	D
Non-bank financial institutions		61,752	4,718	469	—	66,939	(43)	(77)	(137)	—	(257)	0.4	
– CRR 1	0.000 to 0.053	15,082	421	—	—	15,503	(2)	(1)	—	—	(3)	—	AA- and above
– CRR 2	0.054 to 0.169	16,350	498	—	—	16,848	(3)	(1)	—	—	(4)	—	A+ to A-
– CRR 3	0.170 to 0.740	17,254	1,763	—	—	19,017	(9)	(13)	—	—	(22)	0.1	BBB+ to BBB-
– CRR 4	0.741 to 1.927	7,074	717	—	—	7,791	(19)	(4)	—	—	(23)	0.3	BB+ to BB-
– CRR 5	1.928 to 4.914	5,215	736	—	—	5,951	(10)	(10)	—	—	(20)	0.3	BB- to B
– CRR 6	4.915 to 8.860	716	90	—	—	806	—	(4)	—	—	(4)	0.5	B-
– CRR 7	8.861 to 15.000	46	32	—	—	78	—	(3)	—	—	(3)	3.8	CCC+
– CRR 8	15.001 to 99.999	15	461	—	—	476	—	(41)	—	—	(41)	8.6	CCC to C
– CRR 9/10	100.000	—	—	469	—	469	—	—	(137)	—	(137)	29.2	D
Banks		103,042	1,827	82	—	104,951	(18)	(29)	(22)	—	(69)	0.1	
– CRR 1	0.000 to 0.053	79,188	120	—	—	79,308	(8)	—	—	—	(8)	—	AA- and above
– CRR 2	0.054 to 0.169	13,508	209	—	—	13,717	(2)	—	—	—	(2)	—	A+ to A-
– CRR 3	0.170 to 0.740	4,465	425	—	—	4,890	(3)	—	—	—	(3)	0.1	BBB+ to BBB-
– CRR 4	0.741 to 1.927	2,154	5	—	—	2,159	(1)	—	—	—	(1)	—	BB+ to BB-
– CRR 5	1.928 to 4.914	3,312	172	—	—	3,484	(4)	(1)	—	—	(5)	0.1	BB- to B
– CRR 6	4.915 to 8.860	—	5	—	—	5	—	—	—	—	—	—	B-
– CRR 7	8.861 to 15.000	1	862	—	—	863	—	(27)	—	—	(27)	3.1	CCC+
– CRR 8	15.001 to 99.999	414	29	—	—	443	—	(1)	—	—	(1)	0.2	CCC to C
– CRR 9/10	100.000	—	—	82	—	82	—	—	(22)	—	(22)	26.8	D
At 31 Dec 2022		517,804	92,066	16,247	129	626,246	(551)	(2,015)	(6,046)	(38)	(8,650)	1.4	

Wholesale lending – credit risk profile by obligor grade for loans and advances at amortised cost (continued)

	Basel one-year PD range	Gross carrying amount					Allowance for ECL					ECL coverage	Mapped external rating
		Stage 1	Stage 2	Stage 3	POCI	Total	Stage 1	Stage 2	Stage 3	POCI	Total		
	%	$m	$m	$m	$m	$m	$m	$m	$m	$m	$m	%	
Corporate and commercial		400,894	98,911	13,460	274	513,539	(665)	(1,874)	(5,601)	(64)	(8,204)	1.6	
– CRR 1	0.000 to 0.053	40,583	599	—	—	41,182	(7)	(1)	—	—	(8)	—	AA- and above
– CRR 2	0.054 to 0.169	78,794	4,843	—	—	83,637	(26)	(43)	—	—	(69)	0.1	A+ to A-
– CRR 3	0.170 to 0.740	139,739	19,199	—	—	158,938	(165)	(145)	—	—	(310)	0.2	BBB+ to BBB-
– CRR 4	0.741 to 1.927	91,268	23,365	—	—	114,633	(218)	(258)	—	—	(476)	0.4	BB+ to BB-
– CRR 5	1.928 to 4.914	45,850	28,375	—	—	74,225	(185)	(424)	—	—	(609)	0.8	BB- to B
– CRR 6	4.915 to 8.860	3,280	11,197	—	—	14,477	(22)	(242)	—	—	(264)	1.8	B-
– CRR 7	8.861 to 15.000	1,101	4,406	—	—	5,507	(24)	(167)	—	—	(191)	3.5	CCC+
– CRR 8	15.001 to 99.999	279	6,927	—	4	7,210	(18)	(594)	—	—	(612)	8.5	CCC to C
– CRR 9/10	100.000	—	—	13,460	270	13,730	—	—	(5,601)	(64)	(5,665)	41.3	D
Non-bank financial institutions		61,086	3,874	395	—	65,355	(44)	(26)	(40)	—	(110)	0.2	
– CRR 1	0.000 to 0.053	14,370	122	—	—	14,492	(2)	(1)	—	—	(3)	—	AA- and above
– CRR 2	0.054 to 0.169	16,438	43	—	—	16,481	(5)	—	—	—	(5)	—	A+ to A-
– CRR 3	0.170 to 0.740	18,282	1,026	—	—	19,308	(11)	(4)	—	—	(15)	0.1	BBB+ to BBB-
– CRR 4	0.741 to 1.927	6,835	1,204	—	—	8,039	(15)	(11)	—	—	(26)	0.3	BB+ to BB-
– CRR 5	1.928 to 4.914	5,053	1,297	—	—	6,350	(11)	(4)	—	—	(15)	0.2	BB- to B
– CRR 6	4.915 to 8.860	102	98	—	—	200	—	(5)	—	—	(5)	2.5	B-
– CRR 7	8.861 to 15.000	5	25	—	—	30	—	(1)	—	—	(1)	3.3	CCC+
– CRR 8	15.001 to 99.999	1	59	—	—	60	—	—	—	—	—	—	CCC to C
– CRR 9/10	100.000	—	—	395	—	395	—	—	(40)	—	(40)	10.1	D
Banks		81,636	1,517	—	—	83,153	(14)	(3)	—	—	(17)	—	
– CRR 1	0.000 to 0.053	61,275	10	—	—	61,285	(4)	—	—	—	(4)	—	AA- and above
– CRR 2	0.054 to 0.169	11,628	65	—	—	11,693	(3)	—	—	—	(3)	—	A+ to A-
– CRR 3	0.170 to 0.740	3,935	102	—	—	4,037	(2)	—	—	—	(2)	—	BBB+ to BBB-
– CRR 4	0.741 to 1.927	4,232	180	—	—	4,412	(5)	—	—	—	(5)	0.1	BB+ to BB-
– CRR 5	1.928 to 4.914	556	52	—	—	608	—	(1)	—	—	(1)	0.2	BB- to B
– CRR 6	4.915 to 8.860	9	541	—	—	550	—	—	—	—	—	—	B-
– CRR 7	8.861 to 15.000	1	564	—	—	565	—	—	—	—	—	—	CCC+
– CRR 8	15.001 to 99.999	—	3	—	—	3	—	(2)	—	—	(2)	66.7	CCC to C
– CRR 9/10	100.000	—	—	—	—	—	—	—	—	—	—	—	D
At 31 Dec 2021		543,616	104,302	13,855	274	662,047	(723)	(1,903)	(5,641)	(64)	(8,331)	1.3	

Commercial real estate

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. The portfolio is globally diversified with larger concentrations in Hong Kong, the UK, mainland China and the US.

Our global exposure is centred largely on cities with economic, political or cultural significance. In more developed markets, our exposure mainly comprises the financing of investment assets, the redevelopment of existing stock and the augmentation of both commercial and residential markets to support economic and population growth. In less developed commercial real estate markets, our exposures comprise lending for development assets on relatively short tenors with a particular focus on supporting larger, better capitalised developers involved in residential construction or assets supporting economic expansion.

Excluding adverse foreign exchange movements of $3.8bn, commercial real estate lending decreased by $14.9bn, mainly due to the reclassification of assets held for sale of our banking operations in Canada of $7.1bn, compounded by loan repayments in Hong Kong of $6.7bn and France of $0.7bn.

Commercial real estate lending to customers

	Europe	Asia	MENA	North America	Latin America	Total	*of which:* UK	*of which:* Hong Kong
	$m	$m	$m	$m	$m	$m	*$m*	*$m*
Gross loans and advances								
Stage 1	**17,318**	**46,757**	**1,115**	**1,534**	**880**	**67,604**	***12,209***	***35,963***
Stage 2	**3,590**	**16,337**	**364**	**798**	**44**	**21,133**	***3,008***	***11,092***
Stage 3	**980**	**3,320**	**286**	**8**	**54**	**4,648**	***827***	***3,029***
POCI	**—**	**19**	**—**	**—**	**—**	**19**	***—***	***19***
At 31 Dec 2022	**21,888**	**66,433**	**1,765**	**2,340**	**978**	**93,404**	***16,044***	***50,103***
– of which: forborne loans	***359***	***763***	***472***	***173***	***47***	***1,814***	**336**	**654**
Allowance for ECL	**(369)**	**(2,095)**	**(159)**	**(12)**	**(31)**	**(2,666)**	***(323)***	***(1,879)***
Gross loans and advances								
Stage 1	20,317	56,734	781	8,328	1,073	87,233	*14,235*	*42,951*
Stage 2	3,505	17,103	569	1,265	218	22,660	*2,781*	*13,300*
Stage 3	1,062	543	206	9	249	2,069	*905*	*435*
POCI	—	98	—	—	—	98	*—*	*98*
At 31 Dec 2021	24,884	74,478	1,556	9,602	1,540	112,060	*17,921*	*56,784*
– of which: forborne loans[1]	*440*	*251*	*145*	—	—	*836*	436	170
Allowance for ECL	(450)	(693)	(158)	(26)	(130)	(1,457)	*(366)*	*(604)*

1 *Forborne gross loans and advances at 31 December 2021 have not been restated, and agreed with the policies and disclosures presented in the* Annual Report and Accounts 2021.

Refinance risk in commercial real estate

Commercial real estate lending tends to require the repayment of a significant proportion of the principal at maturity. Typically, a customer will arrange repayment through the acquisition of a new loan to settle the existing debt. Refinance risk is the risk that a customer, being unable to repay the debt on maturity, fails to refinance it at commercial terms. We monitor our commercial real estate portfolio closely, assessing indicators for signs of potential issues with refinancing.

Commercial real estate gross loans and advances to customers maturity analysis

	Europe	Asia	MENA	North America	Latin America	Total	*of which:* UK	*of which:* Hong Kong
	$m	$m	$m	$m	$m	$m	*$m*	*$m*
On demand, overdrafts or revolving								
< 1 year	**10,996**	**23,492**	**434**	**196**	**299**	**35,417**	***9,211***	***18,698***
1–2 years	**5,197**	**18,052**	**255**	**280**	**117**	**23,901**	***3,678***	***13,917***
2–5 years	**4,031**	**21,818**	**694**	**1,832**	**462**	**28,837**	***2,472***	***14,978***
> 5 years	**1,664**	**3,071**	**382**	**32**	**100**	**5,249**	***683***	***2,510***
At 31 Dec 2022	**21,888**	**66,433**	**1,765**	**2,340**	**978**	**93,404**	***16,044***	***50,103***
On demand, overdrafts or revolving								
< 1 year	12,980	26,736	478	5,961	336	46,491	*10,546*	*20,466*
1–2 years	4,794	18,192	159	1,098	280	24,523	*3,921*	*14,399*
2–5 years	5,352	26,668	631	2,297	559	35,507	*2,805*	*19,562*
> 5 years	1,758	2,882	288	246	365	5,539	*649*	*2,357*
At 31 Dec 2021	24,884	74,478	1,556	9,602	1,540	112,060	*17,921*	*56,784*

The following table presents the Group's exposure to borrowers classified in the commercial real estate sector where the ultimate parent is based in mainland China, as well as all commercial real estate exposures booked on mainland China balance sheets. The exposures at 31 December 2022 are split by country/territory and credit quality including allowances for ECL by stage.

Mainland China commercial real estate

	Hong Kong (audited)[1]	Mainland China (audited)[1]	Rest of the Group (unaudited)[1]	Total (unaudited)[1]
	$m	$m	$m	$m
Loans and advances to customers[2]	9,129	5,752	860	15,741
Guarantees issued and others[3]	249	755	18	1,022
Total mainland China commercial real estate exposure at 31 Dec 2022	**9,378**	**6,507**	**878**	**16,763**
Distribution of mainland China commercial real estate exposure by credit quality				
– Strong	1,425	2,118	220	3,763
– Good	697	1,087	370	2,154
– Satisfactory	1,269	2,248	77	3,594
– Sub-standard	2,887	779	193	3,859
– Credit impaired	3,100	275	18	3,393
At 31 Dec 2022	**9,378**	**6,507**	**878**	**16,763**
Allowance for ECL by credit quality				
– Strong	—	(5)	—	(5)
– Good	—	(8)	(1)	(9)
– Satisfactory	(20)	(81)	—	(101)
– Sub-standard	(458)	(42)	(3)	(503)
– Credit impaired	(1,268)	(105)	—	(1,373)
At 31 Dec 2022	**(1,746)**	**(241)**	**(4)**	**(1,991)**
Allowance for ECL by stage distribution				
– Stage 1	(1)	(9)	(1)	(11)
– Stage 2	(477)	(127)	(3)	(607)
– Stage 3	(1,268)	(105)	—	(1,373)
– POCI	—	—	—	—
At 31 Dec 2022	**(1,746)**	**(241)**	**(4)**	**(1,991)**
ECL coverage %	**18.6**	**3.7**	**0.5**	**11.9**

1 *Disclosures in respect of mainland China commercial real estate exposures in Hong Kong and mainland China form part of the scope of the audit of the Group's* Annual Report and Accounts 2022. *Amounts disclosed for mainland China commercial real estate exposures elsewhere in the Group have not been audited but are provided for completeness.*

2 *Amounts represent gross carrying amount.*

3 *Amounts represent nominal amount for guarantees and other contingent liabilities.*

Mainland China commercial real estate

	Hong Kong[1] (audited)[2] $m	Mainland China (audited)[2] $m	Rest of the Group (unaudited)[2] $m	Total (unaudited)[2] $m
Loans and advances to customers[3]	11,484	6,811	410	18,705
Guarantees issued and others[4]	166	2,376	79	2,621
Total mainland China commercial real estate exposure at 31 Dec 2021	11,650	9,187	489	21,326
Distribution of mainland China commercial real estate exposure by credit quality				
– Strong	3,543	3,864	155	7,562
– Good	2,652	2,354	73	5,079
– Satisfactory	3,383	2,855	106	6,344
– Sub-standard	1,570	12	155	1,737
– Credit impaired	502	102	—	604
At 31 Dec 2021	11,650	9,187	489	21,326
Allowance for ECL by credit quality				
– Strong	(15)	(7)	—	(22)
– Good	(37)	(10)	—	(47)
– Satisfactory	(382)	(20)	(2)	(404)
– Sub-standard	(24)	(1)	—	(25)
– Credit impaired	(102)	(11)	—	(113)
At 31 Dec 2021	(560)	(49)	(2)	(611)
Allowance for ECL by stage distribution				
– Stage 1	(2)	(11)	(1)	(14)
– Stage 2	(456)	(27)	(1)	(484)
– Stage 3	(102)	(11)	—	(113)
– POCI	—	—	—	—
At 31 Dec 2021	(560)	(49)	(2)	(611)
ECL coverage %	4.8	0.5	0.4	2.9

1 *Comparatives have been restated to reflect an exposure reclassification from 'guarantees and others' to 'loans and advances to customers', which better reflects the nature of product.*
2 *Disclosures in respect of mainland China commercial real estate exposures in Hong Kong and mainland China form part of the scope of the audit of the Group's* Annual Report and Accounts 2022. *Amounts disclosed for mainland China commercial real estate exposures elsewhere in the Group have not been audited but are provided for completeness.*
3 *Amounts represent gross carrying amount.*
4 *Amounts represent nominal amount for guarantees and other contingent liabilities.*

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

The exposures in the table 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 exposures in the table above had 57% (31 December 2021: 89%) of exposure booked with a credit quality of 'satisfactory' or above. This deterioration reflects increased funding risks and weaker sales performance for a number of our customers over the period.

Facilities booked in Hong Kong are exposures which represent relatively higher risk within the mainland China commercial real estate portfolio. This portfolio had 36% (31 December 2021: 82%) of exposure booked with a credit quality of 'satisfactory' or above, reflecting sustained credit deterioration in this book over the course of the year. At 31 December 2022, the Group had allowances for ECL of $1.7bn (31 December 2021: $0.6bn) held against mainland China commercial real estate exposures booked in Hong Kong .

Over one third of the unimpaired exposure in the Hong Kong portfolio reflects lending to state owned enterprises, and much of the remaining is to relatively strong privately owned enterprises. This is reflected in the relatively low ECL allowance in this part of the portfolio.

Regulatory and policy developments in the latter part of 2022 appear to have stabilised the sector. Sustained liquidity support and improved domestic residential demand will be necessary to support a recovery.

The Group has additional exposures to mainland China commercial real estate as a result of lending to multinational corporates, which is not incorporated in the table above.

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 cash flow resources rather than placing primary reliance on collateral and other credit risk enhancements. Depending on the customer's standing and the type of product, facilities may be provided without any collateral or other credit enhancements. For other lending, a charge over collateral is obtained and considered in determining the credit decision and pricing. In the event of default, the Group may utilise the collateral as a source of repayment.

Depending on its form, collateral can have a significant financial effect in mitigating our exposure to credit risk. Where there is sufficient collateral, an expected credit loss is not recognised. This is the case for reverse repurchase agreements and for certain loans and advances to customers where the loan to value ('LTV') is very low.

Mitigants may include a charge on borrowers' specific assets, such as real estate or financial instruments. Other credit risk mitigants include short positions in securities and financial assets held as part of linked insurance/investment contracts where the risk is predominantly borne by the policyholder. Additionally, risk may be managed by employing other types of collateral and credit risk enhancements, such as second charges, other liens and unsupported guarantees. Guarantees are normally taken from corporates and export credit agencies. Corporates would normally provide guarantees as part of a parent/subsidiary relationship and span a number of credit grades. The export credit agencies will normally be investment grade.

Certain credit mitigants are used strategically in portfolio management activities. While single name concentrations arise in portfolios managed by Global Banking and Corporate Banking, it is only in Global Banking that their size requires the use of portfolio level credit mitigants. Across Global Banking, risk limits and utilisations, maturity profiles and risk quality are monitored and managed proactively. This process is key to the setting of risk appetite for these larger, more complex, geographically distributed customer groups. While the principal form of risk management continues to be at the point of exposure origination, through the lending decision-making process, Global Banking also utilises loan sales and credit default swap ('CDS') hedges to manage concentrations and reduce risk.

These transactions are the responsibility of a dedicated Global Banking portfolio management team. Hedging activity is carried out within agreed credit parameters, and is subject to market risk limits and a robust governance structure. Where applicable, CDSs are entered into directly with a central clearing house counterparty. Otherwise, the Group's exposure to CDS protection providers is diversified among mainly banking counterparties with strong credit ratings.

CDS mitigants are held at portfolio level and are not included in the expected credit loss calculations. CDS mitigants are not reported in the following tables.

Collateral on loans and advances

Collateral held is analysed separately for commercial real estate and for other corporate, commercial and financial (non-bank) lending. The following tables include off-balance sheet loan commitments, primarily undrawn credit lines.

The collateral measured in the following tables consists of fixed first charges on real estate, and charges over cash and marketable financial instruments. The values in the tables represent the expected market value on an open market basis. No adjustment has been made to the collateral for any expected costs of recovery. Marketable securities are measured at their fair value.

Other types of collateral such as unsupported guarantees and floating charges over the assets of a customer's business are not measured in the following tables. While such mitigants have value, often providing rights in insolvency, their assignable value is not sufficiently certain and they are therefore assigned no value for disclosure purposes.

The LTV ratios presented are calculated by directly associating loans and advances with the collateral that individually and uniquely supports each facility. When collateral assets are shared by multiple loans and advances, whether specifically or, more generally, by way of an all monies charge, the collateral value is pro-rated across the loans and advances protected by the collateral.

For credit-impaired loans, the collateral values cannot be directly compared with impairment allowances recognised. The LTV figures use open market values with no adjustments. Impairment allowances are calculated on a different basis, by considering other cash flows and adjusting collateral values for costs of realising collateral as explained further on page 342.

Commercial real estate loans and advances

The value of commercial real estate collateral is determined by using a combination of external and internal valuations and physical inspections. For commercial real estate, where the facility exceeds regulatory threshold requirements, Group policy requires an independent review of the valuation at least every three years, or more frequently as the need arises.

In Hong Kong, market practice is typically for lending to major property companies to be either secured by guarantees or unsecured. In Europe, facilities of a working capital nature are generally not secured by a first fixed charge, and are therefore disclosed as not collateralised.

Wholesale lending – commercial real estate loans and advances to customers including loan commitments by level of collateral for key countries/territories (by stage)

(Audited)

	Total		of which: UK		of which: Hong Kong	
	Gross carrying/ nominal amount	ECL coverage	Gross carrying/ nominal amount	ECL coverage	Gross carrying/ nominal amount	ECL coverage
	$m	%	$m	%	$m	%
Stage 1						
Not collateralised	44,052	0.1	5,960	0.3	20,286	—
Fully collateralised	53,475	0.1	10,293	0.1	27,926	—
LTV ratio:						
– less than 50%	29,486	0.1	2,900	0.2	21,185	—
– 51% to 75%	18,530	0.1	6,361	0.1	5,365	0.1
– 76% to 90%	2,941	0.1	556	0.2	995	—
– 91% to 100%	2,518	0.2	476	0.2	381	—
Partially collateralised (A):	4,923	0.1	1,920	0.2	804	—
– *collateral value on A*	2,800		1,113		584	
Total	102,450	0.1	18,173	0.2	49,016	—
Stage 2						
Not collateralised	9,804	5.7	2,511	1.5	4,673	10.5
Fully collateralised	15,423	1.6	2,025	0.9	7,457	1.1
LTV ratio:						
– less than 50%	5,945	1.6	664	0.9	3,539	1.4
– 51% to 75%	6,821	1.1	1,197	0.9	3,536	1.0
– 76% to 90%	908	2.1	140	1.4	134	0.1
– 91% to 100%	1,749	3.6	24	0.4	248	0.2
Partially collateralised (B):	1,624	1.6	179	1.1	390	2.8
– *collateral value on B*	997		144		249	
Total	26,851	3.1	4,715	1.3	12,520	4.7
Stage 3						
Not collateralised	2,612	53.7	295	35.3	2,123	56.9
Fully collateralised	1,617	10.8	372	6.5	864	5.2
LTV ratio:						
– less than 50%	544	16.5	53	3.8	318	2.2
– 51% to 75%	594	4.4	291	2.1	205	3.4
– 76% to 90%	315	4.1	11	18.2	264	1.9
– 91% to 100%	164	28.7	17	76.5	77	32.5
Partially collateralised (C):	513	54.2	176	68.8	73	61.6
– *collateral value on C*	293		72		39	
Total	4,742	39.1	843	29.5	3,060	42.5
POCI						
Not collateralised	—	—	—	—	—	—
Fully collateralised	—	—	—	—	—	—
LTV ratio:						
– less than 50%	—	—	—	—	—	—
– 51% to 75%	—	—	—	—	—	—
– 76% to 90%	—	—	—	—	—	—
– 91% to 100%	—	—	—	—	—	—
Partially collateralised (D):	19	—	—	—	19	—
– *collateral value on D*	8		—		8	
Total	19	—	—	—	19	—
At 31 Dec 2022	134,062	2.1	23,731	1.4	64,615	2.9

Wholesale lending – commercial real estate loans and advances to customers including loan commitments by level of collateral for key countries/territories (by stage) (continued)

(Audited)

	Total		Of which: UK		Of which: Hong Kong	
	Gross carrying/ nominal amount	ECL coverage	Gross carrying/ nominal amount	ECL coverage	Gross carrying/ nominal amount	ECL coverage
	$m	%	$m	%	$m	%
Stage 1						
Not collateralised	50,603	0.1	7,623	0.4	23,864	—
Fully collateralised	71,769	0.1	13,139	0.2	32,951	—
LTV ratio:						
– less than 50%	35,984	0.1	4,142	0.2	22,645	—
– 51% to 75%	26,390	0.1	6,460	0.2	8,082	—
– 76% to 90%	5,284	0.2	1,859	0.2	1,181	—
– 91% to 100%	4,111	0.1	678	—	1,043	0.1
Partially collateralised (A):	5,429	0.1	2,018	0.1	714	—
– *collateral value on A*	2,942		874		447	
Total	127,801	0.1	22,780	0.3	57,529	—
Stage 2						
Not collateralised	11,729	4.3	1,970	0.9	7,758	5.9
Fully collateralised	12,741	1.1	1,131	2.3	6,385	0.4
LTV ratio:						
– less than 50%	5,759	1.0	605	3.1	3,633	0.3
– 51% to 75%	4,804	1.1	471	1.3	2,389	0.5
– 76% to 90%	757	1.5	43	—	269	0.4
– 91% to 100%	1,421	1.5	12	—	94	—
Partially collateralised (B):	1,783	2.7	366	0.3	172	2.9
– *collateral value on B*	930		223		70	
Total	26,253	2.7	3,467	1.3	14,315	3.4
Stage 3						
Not collateralised	828	40.9	407	42.0	198	35.9
Fully collateralised	1,176	22.0	346	5.2	290	11.0
LTV ratio:						
– less than 50%	645	19.8	36	2.8	284	10.9
– 51% to 75%	286	9.1	250	5.2	—	—
– 76% to 90%	62	14.5	11	—	2	—
– 91% to 100%	183	52.5	49	8.2	4	25.0
Partially collateralised (C):	265	47.9	204	49.0	—	—
– *collateral value on C*	149		97		—	
Total	2,269	32.0	957	30.2	488	21.1
POCI						
Not collateralised	—	—	—	—	—	—
Fully collateralised	98	—	—	—	98	—
LTV ratio:						
– less than 50%	98	—	—	—	98	—
– 51% to 75%	—	—	—	—	—	—
– 76% to 90%	—	—	—	—	—	—
– 91% to 100%	—	—	—	—	—	—
Partially collateralised (D):	—	—	—	—	—	—
– *collateral value on D*	—		—		—	
Total	98	—	—	—	98	—
At 31 Dec 2021	156,421	1.0	27,204	1.5	72,430	0.8

Wholesale lending – commercial real estate loans and advances including loan commitments by level of collateral for key countries/territories

(Audited)

	Total		of which: UK		of which: Hong Kong	
	Gross carrying/ nominal amount	ECL coverage	Gross carrying/ nominal amount	ECL coverage	Gross carrying/ nominal amount	ECL coverage
	$m	%	$m	%	$m	%
Rated CRR/PD1 to 7						
Not collateralised	**52,373**	**0.6**	***8,457***	***0.7***	***23,861***	***0.9***
Fully collateralised	**68,020**	**0.3**	***12,309***	***0.3***	***34,779***	***0.1***
Partially collateralised (A):	**6,479**	**0.4**	***2,098***	***0.2***	***1,194***	***0.9***
– collateral value on A	***3,754***		**1,257**		**833**	
Total	**126,872**	**0.4**	***22,864***	***0.4***	***59,834***	***0.5***
Rated CRR/PD8						
Not collateralised	**1,483**	**19.8**	***14***	***3.6***	***1,098***	***26.0***
Fully collateralised	**878**	**9.2**	***9***	***11.1***	***604***	***7.1***
LTV ratio:						
– less than 50%	**236**	**21.6**	***4***	***7.5***	***167***	***15.0***
– 51% to 75%	**594**	**5.1**	***3***	***13.3***	***393***	***4.6***
– 76% to 90%	**45**	**0.4**	***—***	***—***	***44***	***0.2***
– 91% to 100%	**3**	**3.3**	***2***	***3.5***	***—***	***—***
Partially collateralised (B):	**68**	**2.9**	***1***	***8.0***	***—***	***—***
– collateral value on B	***43***		***—***		***—***	
Total	**2,429**	**15.5**	***24***	***6.6***	***1,702***	***19.3***
Rated CRR/PD9 to 10						
Not collateralised	**2,612**	**53.7**	***295***	***35.3***	***2,123***	***56.9***
Fully collateralised	**1,617**	**10.8**	***372***	***6.5***	***864***	***5.2***
LTV ratio:						
– less than 50%	**544**	**16.5**	***53***	***3.8***	***318***	***2.2***
– 51% to 75%	**594**	**4.4**	***291***	***2.1***	***205***	***3.4***
– 76% to 90%	**315**	**4.1**	***11***	***18.2***	***264***	***1.9***
– 91% to 100%	**164**	**28.7**	***17***	***76.5***	***77***	***32.5***
Partially collateralised (C):	**532**	**52.3**	***176***	***68.8***	***92***	***48.9***
– collateral value on C	***301***		**72**		**47**	
Total	**4,761**	**39.0**	***843***	***29.5***	***3,079***	***42.2***
At 31 Dec 2022	**134,062**	**2.1**	***23,731***	***1.4***	***64,615***	***2.9***
Rated CRR/PD1 to 7						
Not collateralised	61,279	0.5	*9,586*	*0.5*	*30,917*	*0.6*
Fully collateralised	83,456	0.2	*14,218*	*0.2*	*38,817*	*0.1*
Partially collateralised (A):	7,059	0.5	*2,379*	*0.2*	*886*	*0.6*
– collateral value on A	*3,729*		1,092		517	
Total	151,794	0.3	*26,183*	*0.3*	*70,620*	*0.3*
Rated CRR/PD8						
Not collateralised	1,053	26.5	*7*	*42.9*	*705*	*38.6*
Fully collateralised	1,054	3.8	*52*	*38.5*	*519*	*2.1*
LTV ratio:						
– less than 50%	503	4.8	*41*	*41.5*	*378*	*0.8*
– 51% to 75%	447	3.1	*8*	*25.0*	*137*	*5.8*
– 76% to 90%	60	1.7	*1*	*—*	*4*	*—*
– 91% to 100%	44	2.3	*2*	*—*	*—*	*—*
Partially collateralised (B):	153	15.0	*5*	*20.0*	*—*	*—*
– collateral value on B	*143*		5		—	
Total	2,260	15.1	*64*	*37.5*	*1,224*	*23.1*
Rated CRR/PD9 to 10						
Not collateralised	828	40.9	*407*	*42.0*	*198*	*35.9*
Fully collateralised	1,274	20.3	*346*	*5.2*	*388*	*8.2*
LTV ratio:						
– less than 50%	743	17.2	*36*	*2.8*	*382*	*8.1*
– 51% to 75%	286	9.1	*250*	*5.2*	*—*	*—*
– 76% to 90%	62	14.5	*11*	*—*	*2*	*—*
– 91% to 100%	183	52.5	*49*	*8.2*	*4*	*25.0*
Partially collateralised (C):	265	47.9	*204*	*49.0*	*—*	*—*
– collateral value on C	*149*		97		—	
Total	2,367	30.6	*957*	*30.2*	*586*	*17.6*
At 31 Dec 2021	156,421	1.0	*27,204*	*1.5*	*72,430*	*0.8*

Other corporate, commercial and financial (non-bank) loans and advances

Other corporate, commercial and financial (non-bank) loans are analysed separately in the following table, which focuses on the countries/territories containing the majority of our loans and advances balances. For financing activities in other corporate and commercial lending, collateral value is not strongly correlated to principal repayment performance.

Collateral values are generally refreshed when an obligor's general credit performance deteriorates and we have to assess the likely performance of secondary sources of repayment should it prove necessary to rely on them.

Accordingly, the following table reports values only for customers with CRR 8–10, recognising that these loans and advances generally have valuations that are comparatively recent.

Wholesale lending – other corporate, commercial and financial (non-bank) loans and advances including loan commitments by level of collateral for key countries/territories (by stage)

(Audited)

	Total		*of which:* UK		*of which:* Hong Kong	
	Gross carrying/ nominal amount	ECL coverage	*Gross carrying/ nominal amount*	*ECL coverage*	*Gross carrying/ nominal amount*	*ECL coverage*
	$m	%	*$m*	*%*	*$m*	*%*
Stage 1						
Not collateralised	632,847	0.1	105,126	0.1	109,919	—
Fully collateralised	96,434	0.1	21,192	0.1	39,165	0.1
LTV ratio:						
– less than 50%	36,896	0.1	6,928	0.1	15,695	0.1
– 51% to 75%	29,242	0.1	7,611	0.1	13,893	0.1
– 76% to 90%	9,922	0.1	1,889	0.1	4,964	0.1
– 91% to 100%	20,374	0.1	4,764	—	4,613	0.1
Partially collateralised (A):	54,836	0.1	6,480	0.1	17,704	0.1
– *collateral value on A*	27,779		3,470		7,737	
Total	784,117	0.1	132,798	0.1	166,788	0.1
Stage 2						
Not collateralised	79,013	1.0	16,886	2.2	9,906	0.7
Fully collateralised	29,618	1.2	6,511	1.3	12,693	1.0
LTV ratio:						
– less than 50%	11,221	1.3	2,872	1.0	4,577	0.9
– 51% to 75%	11,948	1.4	2,656	1.5	5,413	1.2
– 76% to 90%	2,990	1.0	578	1.9	1,479	0.7
– 91% to 100%	3,459	0.8	405	1.2	1,224	0.3
Partially collateralised (B):	13,130	1.0	2,288	1.2	3,379	0.6
– *collateral value on B*	6,484		1,197		1,524	
Total	121,761	1.1	25,685	1.9	25,978	0.8
Stage 3						
Not collateralised	8,278	38.4	3,783	17.8	939	56.0
Fully collateralised	1,948	13.7	699	4.6	665	3.8
LTV ratio:						
– less than 50%	678	18.7	175	3.4	175	1.7
– 51% to 75%	503	11.3	336	6.5	115	7.8
– 76% to 90%	402	4.7	102	1.0	268	0.4
– 91% to 100%	365	17.5	86	3.5	107	10.3
Partially collateralised (C):	2,120	37.3	308	25.6	777	30.9
– *collateral value on C*	1,133		158		397	
Total	12,346	34.3	4,790	16.4	2,381	33.2
POCI						
Not collateralised	64	18.8	28	3.6	—	—
Fully collateralised	24	91.7	—	—	24	91.7
LTV ratio:						
– less than 50%	—	—	—	—	—	—
– 51% to 75%	1	—	—	—	1	—
– 76% to 90%	23	95.7	—	—	23	95.7
– 91% to 100%	—	—	—	—	—	—
Partially collateralised (D):	22	18.2	—	—	14	—
– *collateral value on D*	16		—		13	
Total	110	34.5	28	3.6	38	57.9
At 31 Dec 2022	918,334	0.7	163,301	0.9	195,185	0.6

Wholesale lending – other corporate, commercial and financial (non-bank) loans and advances including loan commitments by level of collateral for key countries/territories (by stage) (continued)

(Audited)

	Total		of which: UK		of which: Hong Kong	
	Gross carrying/ nominal amount	ECL coverage	*Gross carrying/ nominal amount*	*ECL coverage*	*Gross carrying/ nominal amount*	*ECL coverage*
	$m	%	*$m*	*%*	*$m*	*%*
Stage 1						
Not collateralised	624,935	0.1	*112,188*	*0.2*	*111,948*	*—*
Fully collateralised	112,905	0.1	*22,971*	*0.2*	*45,479*	*0.1*
LTV ratio:						
– less than 50%	40,636	0.1	*6,512*	*0.2*	*16,915*	*—*
– 51% to 75%	38,709	0.1	*9,431*	*0.2*	*16,533*	*0.1*
– 76% to 90%	13,284	0.1	*2,556*	*0.1*	*4,920*	*0.1*
– 91% to 100%	20,276	0.1	*4,472*	*—*	*7,111*	*0.1*
Partially collateralised (A):	64,058	0.1	*8,665*	*0.1*	*20,358*	*—*
– *collateral value on A*	*30,890*		4,826		9,322	
Total	801,898	0.1	*143,824*	*0.2*	*177,785*	*—*
Stage 2						
Not collateralised	85,394	1.1	*18,562*	*2.0*	*8,310*	*1.1*
Fully collateralised	32,019	1.1	*8,231*	*1.3*	*11,503*	*0.7*
LTV ratio:						
– less than 50%	10,892	1.2	*3,148*	*1.5*	*3,378*	*0.5*
– 51% to 75%	14,281	1.1	*4,161*	*1.2*	*5,202*	*0.9*
– 76% to 90%	2,752	1.2	*687*	*1.5*	*1,148*	*0.9*
– 91% to 100%	4,094	0.9	*235*	*1.7*	*1,775*	*0.2*
Partially collateralised (B):	12,484	1.0	*1,824*	*1.9*	*1,788*	*0.4*
– *collateral value on B*	*6,675*		937		785	
Total	129,897	1.1	*28,617*	*1.8*	*21,601*	*0.8*
Stage 3						
Not collateralised	8,122	47.3	*2,979*	*21.6*	*732*	*74.7*
Fully collateralised	2,278	12.7	*1,212*	*3.4*	*240*	*2.1*
LTV ratio:						
– less than 50%	603	20.9	*249*	*4.8*	*76*	*—*
– 51% to 75%	1,110	5.0	*786*	*1.4*	*110*	*3.6*
– 76% to 90%	295	11.5	*115*	*9.6*	*26*	*—*
– 91% to 100%	270	27.4	*62*	*9.7*	*28*	*3.6*
Partially collateralised (C):	2,134	38.7	*318*	*35.5*	*616*	*28.9*
– *collateral value on C*	*1,200*		186		358	
Total	12,534	39.6	*4,509*	*17.7*	*1,588*	*46.0*
POCI						
Not collateralised	114	36.0	*28*	*21.4*	*4*	*—*
Fully collateralised	61	34.4	*—*	*—*	*57*	*36.8*
LTV ratio:						
– less than 50%	—	—	*—*	*—*	*—*	*—*
– 51% to 75%	57	36.8	*—*	*—*	*57*	*36.8*
– 76% to 90%	—	—	*—*	*—*	*—*	*—*
– 91% to 100%	4	—	*—*	*—*	*—*	*—*
Partially collateralised (D):	2	100.0	*—*	*—*	*—*	*—*
– *collateral value on D*	*2*		—		—	
Total	177	36.2	*28*	*21.4*	*61*	*34.4*
At 31 Dec 2021	944,506	0.8	*176,978*	*0.9*	*201,035*	*0.5*

Wholesale lending – other corporate, commercial and financial (non-bank) loans and advances including loan commitments by level of collateral for key countries/territories

(Audited)

	Total		of which: UK		of which: Hong Kong	
	Gross carrying/ nominal amount	ECL coverage	Gross carrying/ nominal amount	ECL coverage	Gross carrying/ nominal amount	ECL coverage
	$m	%	$m	%	$m	%
Rated CRR/PD8						
Not collateralised	**4,209**	**3.5**	**1,071**	**1.6**	**62**	**38.7**
Fully collateralised	**2,208**	**3.8**	**303**	**3.3**	**171**	**12.3**
LTV ratio:						
– less than 50%	**1,104**	**4.3**	**184**	**0.5**	**84**	**14.3**
– 51% to 75%	**933**	**3.5**	**95**	**5.3**	**84**	**10.7**
– 76% to 90%	**44**	**6.8**	**22**	**13.6**	**—**	**—**
– 91% to 100%	**127**	**0.8**	**2**	**10.0**	**3**	**6.7**
Partially collateralised (A):	**1,298**	**2.9**	**24**	**4.2**	**9**	**11.1**
– *collateral value on A*	***1,212***		**4**		**5**	
Total	**7,715**	**3.5**	**1,398**	**2.0**	**242**	**19.0**
Rated CRR/PD9 to 10						
Not collateralised	**8,342**	**38.2**	**3,810**	**17.7**	**939**	**56.0**
Fully collateralised	**1,971**	**14.6**	**699**	**4.6**	**688**	**6.7**
LTV ratio:						
– less than 50%	**677**	**18.8**	**175**	**3.4**	**175**	**1.7**
– 51% to 75%	**504**	**11.3**	**336**	**6.5**	**116**	**7.8**
– 76% to 90%	**425**	**9.6**	**102**	**1.0**	**290**	**7.9**
– 91% to 100%	**365**	**17.5**	**86**	**3.5**	**107**	**10.3**
Partially collateralised (B):	**2,143**	**37.1**	**309**	**25.6**	**792**	**30.3**
– *collateral value on B*	***1,149***		**158**		**410**	
Total	**12,456**	**34.3**	**4,818**	**16.3**	**2,419**	**33.6**
At 31 Dec 2022	**20,171**	**22.5**	**6,216**	**13.1**	**2,661**	**32.2**
Rated CRR/PD8						
Not collateralised	4,790	3.9	1,587	3.1	79	30.4
Fully collateralised	1,653	3.9	259	6.6	32	—
LTV ratio:						
– less than 50%	803	3.5	113	6.2	2	—
– 51% to 75%	583	3.8	110	8.2	1	—
– 76% to 90%	116	5.2	23	4.3	29	—
– 91% to 100%	151	5.3	13	—	—	—
Partially collateralised (A):	1,253	3.7	138	8.0	11	—
– *collateral value on A*	*921*		40		6	
Total	7,696	3.9	1,984	3.9	122	20.5
Rated CRR/PD9 to 10						
Not collateralised	8,239	47.1	3,007	21.5	736	74.3
Fully collateralised	2,335	13.3	1,212	3.4	297	9.1
LTV ratio:						
– less than 50%	604	20.9	249	4.8	75	—
– 51% to 75%	1,166	6.7	786	1.4	168	14.9
– 76% to 90%	295	11.5	115	9.6	26	—
– 91% to 100%	270	27.4	62	9.7	28	3.6
Partially collateralised (B):	2,137	38.7	318	35.5	616	28.9
– *collateral value on B*	*1,203*		186		358	
Total	12,711	39.5	4,537	17.7	1,649	45.6
At 31 Dec 2021	20,407	26.1	6,521	13.5	1,771	43.8

Other credit risk exposures

In addition to collateralised lending, other credit enhancements are employed and methods used to mitigate credit risk arising from financial assets. These are summarised below:

- Some securities issued by governments, banks and other financial institutions benefit from additional credit enhancements provided by government guarantees that cover the assets.
- Debt securities issued by banks and financial institutions include asset-backed securities ('ABSs') and similar instruments, which are supported by underlying pools of financial assets. Credit risk associated with ABSs is reduced through the purchase of credit default swap ('CDS') protection.
- Trading loans and advances mainly pledged against cash collateral are posted to satisfy margin requirements. There is limited credit risk on cash collateral posted since in the event of default of the counterparty this would be set off against the related liability. Reverse repos and stock borrowing are by their nature collateralised.

Collateral accepted as security that the Group is permitted to sell or repledge under these arrangements is described on page 378 of the financial statements.

- The Group's maximum exposure to credit risk includes financial guarantees and similar contracts granted, as well as loan and other credit-related commitments. Depending on the terms of the arrangement, we may use additional credit mitigation if a guarantee is called upon or a loan commitment is drawn and subsequently defaults.

For further information on these arrangements, see Note 33 on the financial statements.

Derivatives

We participate in transactions exposing us to counterparty credit risk. Counterparty credit risk is the risk of financial loss if the counterparty to a transaction defaults before satisfactorily settling it. It arises principally from over-the-counter ('OTC') derivatives and securities financing transactions and is calculated in both the trading and non-trading books. Transactions vary in value by reference to a market factor such as an interest rate, exchange rate or asset price.

The counterparty risk from derivative transactions is taken into account when reporting the fair value of derivative positions. The adjustment to the fair value is known as the credit valuation adjustment ('CVA').

For an analysis of CVAs, see Note 12 on the financial statements.

The following table reflects by risk type the fair values and gross notional contract amounts of derivatives cleared through an exchange, central counterparty or non-central counterparty.

Notional contract amounts and fair values of derivatives

	2022			2021		
	Notional amount	**Fair value**		Notional amount	Fair value	
		Assets	**Liabilities**		Assets	Liabilities
	$m	**$m**	**$m**	$m	$m	$m
Total OTC derivatives	**23,649,591**	**421,309**	**423,911**	21,964,665	246,108	241,136
– total OTC derivatives cleared by central counterparties	**11,360,729**	**149,190**	**154,167**	10,086,344	59,147	60,686
– total OTC derivatives not cleared by central counterparties	**12,288,862**	**272,119**	**269,744**	11,878,321	186,961	180,450
Total exchange traded derivatives	**1,146,426**	**3,824**	**2,840**	1,359,692	4,152	3,306
Gross	**24,796,017**	**425,133**	**426,751**	23,324,357	250,260	244,442
Offset		**(140,987)**	**(140,987)**		(53,378)	(53,378)
At 31 Dec		**284,146**	**285,764**		196,882	191,064

The purposes for which HSBC uses derivatives are described in Note 15 on the financial statements.

The International Swaps and Derivatives Association ('ISDA') master agreement is our preferred agreement for documenting derivatives activity. It is common, and our preferred practice, for the parties involved in a derivative transaction 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.

We manage the counterparty exposure on our OTC derivative contracts by using collateral agreements with counterparties and netting agreements. Currently, we do not actively manage our general OTC derivative counterparty exposure in the credit markets, although we may manage individual exposures in certain circumstances.

We place strict policy restrictions on collateral types and as a consequence the types of collateral received and pledged are, by value, highly liquid and of a strong quality, being predominantly cash.

Where a collateral type is required to be approved outside the collateral policy, approval is required from a committee of senior representatives from Markets, Legal and Risk.

See Note 31 on the financial statements for details regarding legally enforceable right of offset in the event of counterparty default and collateral received in respect of derivatives.

Personal lending

This section presents further disclosures related to personal lending. It provides details of the regions, countries and products that are driving the change observed in personal loans and advances to customers, with the impact of foreign exchange separately identified. Additionally, Hong Kong and UK mortgage book LTV data is provided.

This section also provides a reconciliation of the opening 1 January 2022 to 31 December 2022 closing gross carrying/nominal amounts and associated allowance for ECL. Further product granularity is also provided by stage, with geographical data presented for loans and advances to customers, loan and other credit-related commitments and financial guarantees.

At 31 December 2022, total personal lending for loans and advances to customers of $415bn decreased by $63.3bn compared with 31 December 2021. This decrease included adverse foreign exchange movements of $27.3bn. Excluding foreign exchange movements, there was a decrease of $36bn. This decrease was due to the reclassification to assets held for sale of our banking business in Canada of $26.1bn and our retail banking operations in France of $23.7bn.

The reduction was partly mitigated by growth of $8.7bn in the UK, $2.8bn in Asia and $2.0bn in Latin America.

The allowance for ECL attributable to personal lending, excluding off-balance sheet loan commitments and guarantees, decreased by $0.2bn to $2.9bn at 31 December 2022. This included favourable foreign exchange movements of $0.1bn.

Excluding foreign exchange movements and reclassifications to held for sale, mortgage lending balances increased by $15.4bn to $336.8bn at 31 December 2022. The majority of the growth was in the UK by $8.9bn; Asia by $4.4bn, notably $3.4bn in Hong Kong and $1.6bn in Australia; and in Latin America by $1.0bn. The allowance for ECL, excluding foreign exchange, attributable to mortgages of $0.6bn decreased by $0.1bn compared with 31 December 2021.

At 31 December 2022, for certain retail lending portfolios, we introduced enhancements in the significant increase in credit risk ('SICR') approach in relation to capturing relative movements in probability of default ('PD'). The enhanced approach captured relative movements in PD since origination, which resulted in a significant migration to stage 2 from loans to customers gross carrying amounts in stage 1.

The volume of stage 1 customer accounts with lower absolute levels of credit risk who have exhibited some amount of relative increase in PD since origination have migrated into stage 2, and accounts originated with higher absolute levels of credit risk with no or insignificant increases in PD since origination have been transferred to stage 1, with no material overall change in risk.

The impact on ECL is immaterial due to the offsetting ECL impacts of stage migrations and due to the LTV profiles. This is particularly applicable to UK customers.

The enhancement of the SICR approach constitutes an improvement towards more responsive models that better reflect the SICR since origination. This includes consideration of the current cost of living pressures, as markets adjust to the higher interest-rate environment.

The quality of both our Hong Kong and UK mortgage books remained strong, with low levels of impairment allowances. The average LTV ratio on new mortgage lending in Hong Kong was 59%, compared with an estimated 57% for the overall mortgage portfolio. The average LTV ratio on new lending in the UK was 67%, compared with an estimated 50% for the overall mortgage portfolio.

Excluding foreign exchange movements and reclassifications to held for sale, other personal lending balances at 31 December 2022 decreased by $1.4bn compared with 31 December 2021. This was mainly from a decline of $2.0bn from Hong Kong in secured personal lending, partly offset by an increase of $0.5bn from Latin America in credit cards.

The allowance for ECL, excluding foreign exchange, attributable to other personal lending of $2.3bn remained unchanged from 31 December 2021. Excluding foreign exchange, the allowance for ECL attributable to credit cards increased by $0.1bn, offset by a decrease of $0.1bn in unsecured personal lending.

Total personal lending for loans and advances to customers at amortised cost by stage distribution

	Gross carrying amount				Allowance for ECL			
	Stage 1 $m	Stage 2 $m	Stage 3 $m	Total $m	Stage 1 $m	Stage 2 $m	Stage 3 $m	Total $m
By portfolio								
First lien residential mortgages	294,918	39,860	2,043	336,821	(74)	(230)	(270)	(574)
– *of which: interest only (including offset)*	*19,636*	*4,485*	*169*	*24,290*	*(3)*	*(46)*	*(41)*	*(90)*
– *affordability (including US adjustable rate mortgages)*	*14,773*	*369*	*240*	*15,382*	*(5)*	*(3)*	*(4)*	*(12)*
Other personal lending	67,863	9,031	1,297	78,191	(488)	(1,275)	(535)	(2,298)
– second lien residential mortgages	353	20	6	379	(1)	(2)	(3)	(6)
– guaranteed loans in respect of residential property	1,121	121	125	1,367	(1)	(3)	(30)	(34)
– other personal lending which is secured	31,306	594	206	32,106	(15)	(10)	(30)	(55)
– credit cards	16,705	4,423	260	21,388	(225)	(777)	(160)	(1,162)
– other personal lending which is unsecured	16,617	3,706	687	21,010	(235)	(470)	(305)	(1,010)
– motor vehicle finance	1,761	167	13	1,941	(11)	(13)	(7)	(31)
At 31 Dec 2022	362,781	48,891	3,340	415,012	(562)	(1,505)	(805)	(2,872)
By geography								
Europe	143,438	38,186	1,269	182,893	(151)	(706)	(282)	(1,139)
– *of which: UK*	*132,312*	*37,974*	*1,027*	*171,313*	*(137)*	*(696)*	*(230)*	*(1,063)*
Asia	185,828	8,723	1,117	195,668	(139)	(363)	(188)	(690)
– *of which: Hong Kong*	*128,218*	*4,563*	*236*	*133,017*	*(59)*	*(255)*	*(39)*	*(353)*
MENA	5,347	237	132	5,716	(33)	(42)	(70)	(145)
North America	17,772	562	439	18,773	(15)	(44)	(67)	(126)
Latin America	10,396	1,183	383	11,962	(224)	(350)	(198)	(772)
At 31 Dec 2022	362,781	48,891	3,340	415,012	(562)	(1,505)	(805)	(2,872)

At 31 December 2022, the stage 2 personal lending balances in the UK of $38.0bn increased by $33.3bn compared with 31 December 2021. This increase was largely due to the enhancement in the SICR approach in relation to capturing relative movements in PD since origination, and also, to a lesser extent, it considered cost of living pressures. The impact on ECL was immaterial due to the offsetting ECL impacts of stage migrations due to the low LTV profiles applicable to these UK customers.

Total personal lending for loans and other credit-related commitments and financial guarantees by stage distribution

	Nominal amount				Allowance for ECL			
	Stage 1 $m	Stage 2 $m	Stage 3 $m	Total $m	Stage 1 $m	Stage 2 $m	Stage 3 $m	Total $m
Europe	53,299	592	114	54,005	(11)	(1)	—	(12)
– *of which: UK*	*51,589*	*454*	*107*	*52,150*	*(11)*	*(1)*	—	*(12)*
Asia	170,103	2,914	633	173,650	(2)	—	—	(2)
– *of which: Hong Kong*	*128,990*	*2,176*	*624*	*131,790*	*(2)*	—	—	*(2)*
MENA	2,328	20	2	2,350	(1)	—	—	(1)
North America	10,418	140	48	10,606	(1)	—	—	(1)
Latin America	4,496	31	3	4,530	(11)	—	—	(11)
At 31 Dec 2022	240,644	3,697	800	245,141	(26)	(1)	—	(27)

Total personal lending for loans and advances to customers at amortised cost by stage distribution (continued)

	Gross carrying amount				Allowance for ECL			
	Stage 1	Stage 2	Stage 3	Total	Stage 1	Stage 2	Stage 3	Total
	$m	$m	$m	$m	$m	$m	$m	$m
By portfolio								
First lien residential mortgages	360,686	7,637	3,045	371,368	(128)	(131)	(416)	(675)
– *of which: interest only (including offset)*	*28,506*	*1,795*	*255*	*30,556*	*(5)*	*(24)*	*(81)*	*(110)*
– *affordability (including US adjustable rate mortgages)*	*13,621*	*712*	*452*	*14,785*	*(6)*	*(6)*	*(5)*	*(17)*
Other personal lending	96,270	8,802	1,897	106,969	(530)	(1,088)	(810)	(2,428)
– second lien residential mortgages	314	44	37	395	(1)	(4)	(9)	(14)
– guaranteed loans in respect of residential property	20,643	731	236	21,610	(9)	(7)	(42)	(58)
– other personal lending which is secured	36,533	1,096	366	37,995	(21)	(15)	(120)	(156)
– credit cards	18,623	3,897	338	22,858	(246)	(675)	(214)	(1,135)
– other personal lending which is unsecured	18,743	2,820	915	22,478	(240)	(378)	(421)	(1,039)
– motor vehicle finance	1,414	214	5	1,633	(13)	(9)	(4)	(26)
At 31 Dec 2021	456,956	16,439	4,942	478,337	(658)	(1,219)	(1,226)	(3,103)
By geography								
Europe	212,284	5,639	2,148	220,071	(199)	(499)	(637)	(1,335)
– *of which: UK*	*176,547*	*4,668*	*1,488*	*182,703*	*(167)*	*(480)*	*(399)*	*(1,046)*
Asia	187,391	7,796	1,303	196,490	(158)	(381)	(226)	(765)
– *of which: Hong Kong*	*125,854*	*4,959*	*202*	*131,015*	*(65)*	*(231)*	*(43)*	*(339)*
MENA	4,965	252	202	5,419	(38)	(40)	(94)	(172)
North America	43,489	2,126	1,005	46,620	(43)	(67)	(118)	(228)
Latin America	8,827	626	284	9,737	(220)	(232)	(151)	(603)
At 31 Dec 2021	456,956	16,439	4,942	478,337	(658)	(1,219)	(1,226)	(3,103)

Total personal lending for loans and other credit-related commitments and financial guarantees by stage distribution (continued)

	Nominal amount				Allowance for ECL			
	Stage 1	Stage 2	Stage 3	Total	Stage 1	Stage 2	Stage 3	Total
	$m	$m	$m	$m	$m	$m	$m	$m
Europe	57,109	558	107	57,774	(11)	(1)	—	(12)
– *of which: UK*	*54,704*	*407*	*104*	*55,215*	*(10)*	*(1)*	—	*(11)*
Asia	160,248	894	21	161,163	—	—	—	—
– *of which: Hong Kong*	*121,597*	*292*	*19*	*121,908*	—	—	—	—
MENA	2,568	30	16	2,614	(5)	—	—	(5)
North America	15,039	251	23	15,313	(15)	(1)	—	(16)
Latin America	3,920	29	2	3,951	(6)	—	—	(6)
At 31 Dec 2021	238,884	1,762	169	240,815	(37)	(2)	—	(39)

Exposure to UK interest-only mortgage loans

The following information is presented for HSBC branded interest-only mortgage loans. This excludes offset mortgages in first direct and private banking mortgages.

At the end of 2022, the average LTV ratio of the interest-only mortgage loans was 41% (2021: 40%) and 99% (2021: 99%) had a LTV ratio of 75% or less.

Of the interest-only mortgage loans that expired in 2020, 83% were repaid within 12 months of expiry with a total of 96% being repaid within 24 months of expiry. For those expiring during 2021, 95% were repaid within 12 months of expiry. The increase of the amount fully repaid within the 12 months is explained by the extensions granted as part of the FCA guidance on helping borrowers with maturing interest-only mortgages during the pandemic, which reduced the repayment rates within 12 months for cases maturing in 2022. Following the end of these extension in October 2021, repayment rates have now returned to levels similar to 2019.

At 31 December 2022, interest-only mortgage loans exposures were $14.4bn and the maturity profile is as follows:

UK interest-only mortgage loans

	$m
Expired interest-only mortgage loans	**134**
Interest-only mortgage loans by maturity	
– 2023	**219**
– 2024	**215**
– 2025	**300**
– 2026	**383**
– 2027–2031	**2,951**
– post-2031	**10,248**
At 31 Dec 2022	**14,450**
Expired interest-only mortgage loans	167
Interest-only mortgage loans by maturity	
– 2022	267
– 2023	401
– 2024	330
– 2025	420
– 2026–2030	3,288
– post-2030	10,333
At 31 Dec 2021	15,206

Exposure to offset mortgage in first direct

The offset mortgage in first direct is a flexible way for our customers to take control of their finances. It works by grouping together the customer's mortgage, savings and current accounts to offset their credit and debit balances against their mortgage exposure.

At 31 December 2022, exposures were worth a total $5.5bn with an average LTV ratio of 32% (2021: $7.0bn exposure and 35% LTV ratio).

Personal lending – reconciliation of changes in gross carrying/nominal amount and allowances for loans and advances to customers including loan commitments and financial guarantees

(Audited)

	Non-credit impaired				Credit impaired			
	Stage 1		Stage 2		Stage 3		Total	
	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
	$m	$m	$m	$m	$m	$m	$m	$m
At 1 Jan 2022	695,840	(695)	18,201	(1,221)	5,111	(1,226)	719,152	(3,142)
Transfers of financial instruments	(40,834)	(499)	39,483	677	1,351	(178)	—	—
– transfers from stage 1 to stage 2	(68,063)	269	68,063	(269)	—	—	—	—
– transfers from stage 2 to stage 1	27,407	(734)	(27,407)	734	—	—	—	—
– transfers to stage 3	(561)	2	(1,987)	361	2,548	(363)	—	—
– transfers from stage 3	383	(36)	814	(149)	(1,197)	185	—	—
Net remeasurement of ECL arising from transfer of stage	—	498	—	(583)	—	(88)	—	(173)
New financial assets originated or purchased	130,632	(271)	—	—	—	—	130,632	(271)
Assets derecognised (including final repayments)	(68,645)	94	(4,091)	270	(1,043)	124	(73,779)	488
Changes to risk parameters – further lending/ repayments	(31,457)	162	4,538	(35)	897	(33)	(26,022)	94
Change in risk parameters – credit quality	—	82	—	(676)	—	(822)	—	(1,416)
Changes to models used for ECL calculation	—	(2)	—	(94)	—	13	—	(83)
Assets written off	—	—	—	—	(1,215)	1,215	(1,215)	1,215
Foreign exchange and other[1]	(82,111)	43	(5,543)	156	(961)	190	(88,615)	389
At 31 Dec 2022	603,425	(588)	52,588	(1,506)	4,140	(805)	660,153	(2,899)
ECL income statement change for the period		563		(1,118)		(806)		(1,361)
Recoveries								283
Other								(3)
Total ECL income statement change for the period								(1,081)

1 *Total includes $49.6bn of gross carrying loans and advances to customers, which were classified to assets held for sale, and a corresponding allowance for ECL of $221m, reflecting business disposals as disclosed in Note 23 'Assets held for sale and liabilities of disposal groups held for sale' on page 389.*

As shown in the above table, the allowance for ECL for loans and advances to customers and relevant loan commitments and financial guarantees decreased by $243m during the period from $3,142m at 31 December 2021 to $2,899m at 31 December 2022.

This decrease was primarily driven by:

- $1,215m of assets written off;
- foreign exchange and other movements of $389m; and
- $311m relating to volume movements, which included the ECL allowance associated with new originations, assets derecognised and further lending/repayment.

These were partly offset by:

- $1,416m relating to underlying credit quality changes, including the credit quality impact of financial instruments transferring between stages;
- $173m relating to the net remeasurement impact of stage transfers; and
- $83m of changes to models used for ECL calculation.

The ECL charge for the period of $1,361m presented in the above table consisted of $1,416m relating to underlying credit quality changes, including the credit quality impact of financial instruments transferring between stages, $83m in changes to models used for ECL calculation and $173m relating to the net remeasurement impact of stage transfers. This was partly offset by $311m relating to underlying net book volume movements.

During the period, there was a net transfer to stage 2 of $40,656m gross carrying/nominal amounts. This increase was primarily driven by $36,816m in Europe, of which $34,278m was from the UK, largely due to enhancements in the SICR approach in relation to capturing relative movements in PD since origination and taking into consideration cost of living pressures. Further details are presented on page 187.

Personal lending – reconciliation of changes in gross carrying/nominal amount and allowances for loans and advances to customers including loan commitments and financial guarantees

(Audited)

	Non-credit impaired				Credit impaired			
	Stage 1		Stage 2		Stage 3		Total	
	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
	$m	$m	$m	$m	$m	$m	$m	$m
At 1 Jan 2021	665,346	(866)	26,770	(2,405)	5,762	(1,503)	697,878	(4,774)
Transfers of financial instruments	1,822	(1,154)	(4,502)	1,713	2,680	(559)	—	—
– transfers from stage 1 to stage 2	(23,701)	289	23,701	(289)	—	—	—	—
– transfers from stage 2 to stage 1	26,086	(1,404)	(26,086)	1,404	—	—	—	—
– transfers to stage 3	(982)	7	(3,068)	734	4,050	(741)	—	—
– transfers from stage 3	419	(46)	951	(136)	(1,370)	182	—	—
Net remeasurement of ECL arising from transfer of stage	—	825	—	(363)	—	(7)	—	455
New financial assets originated or purchased	136,920	(211)	—	—	—	—	136,920	(211)
Assets derecognised (including final repayments)	(82,998)	119	(5,257)	419	(1,236)	219	(89,491)	757
Changes to risk parameters – further lending/ repayments	(13,976)	240	2,380	114	(281)	51	(11,877)	405
Change in risk parameters – credit quality	—	318	—	(778)	—	(1,007)	—	(1,467)
Changes to models used for ECL calculation	—	(2)	—	—	—	1	—	(1)
Assets written off	—	—	—	—	(1,525)	1,520	(1,525)	1,520
Foreign exchange	(9,074)	17	(358)	19	(138)	45	(9,570)	81
Others[1]	(2,200)	19	(832)	60	(151)	14	(3,183)	93
At 31 Dec 2021	695,840	(695)	18,201	(1,221)	5,111	(1,226)	719,152	(3,142)
ECL income statement change for the period		1,289		(608)		(743)		(62)
Recoveries								355
Other								(9)
Total ECL income statement change for the period								284

1 Total includes $3.0bn of gross carrying loans and advances to customers, which were classified to assets held for sale, and a corresponding allowance for ECL of $123m, reflecting our exit of the domestic mass market retail banking in the US.

Personal lending – credit risk profile by internal PD band for loans and advances to customers at amortised cost

		Gross carrying amount				Allowance for ECL				
	PD range[1]	Stage 1	Stage 2	Stage 3	Total	Stage 1	Stage 2	Stage 3	Total	ECL coverage
	%	$m	$m	$m	$m	$m	$m	$m	$m	%
First lien residential mortgages		**294,918**	**39,860**	**2,043**	**336,821**	**(74)**	**(230)**	**(270)**	**(574)**	**0.2**
– Band 1	**0.000 to 0.250**	**247,330**	**21,220**	**—**	**268,550**	**(13)**	**(4)**	**—**	**(17)**	**—**
– Band 2	**0.251 to 0.500**	**19,614**	**7,900**	**—**	**27,514**	**(4)**	**(3)**	**—**	**(7)**	**—**
– Band 3	**0.501 to 1.500**	**21,323**	**5,691**	**—**	**27,014**	**(18)**	**(7)**	**—**	**(25)**	**0.1**
– Band 4	**1.501 to 5.000**	**6,594**	**2,694**	**—**	**9,288**	**(39)**	**(24)**	**—**	**(63)**	**0.7**
– Band 5	**5.001 to 20.000**	**34**	**1,024**	**—**	**1,058**	**—**	**(40)**	**—**	**(40)**	**3.8**
– Band 6	**20.001 to 99.999**	**23**	**1,331**	**—**	**1,354**	**—**	**(152)**	**—**	**(152)**	**11.2**
– Band 7	**100.000**	**—**	**—**	**2,043**	**2,043**	**—**	**—**	**(270)**	**(270)**	**13.2**
Other personal lending		**67,863**	**9,031**	**1,297**	**78,191**	**(488)**	**(1,275)**	**(535)**	**(2,298)**	**2.9**
– Band 1	**0.000 to 0.250**	**30,151**	**153**	**—**	**30,304**	**(54)**	**(13)**	**—**	**(67)**	**0.2**
– Band 2	**0.251 to 0.500**	**7,219**	**251**	**—**	**7,470**	**(26)**	**(1)**	**—**	**(27)**	**0.4**
– Band 3	**0.501 to 1.500**	**17,183**	**1,499**	**—**	**18,682**	**(82)**	**(44)**	**—**	**(126)**	**0.7**
– Band 4	**1.501 to 5.000**	**10,342**	**2,061**	**—**	**12,403**	**(171)**	**(104)**	**—**	**(275)**	**2.2**
– Band 5	**5.001 to 20.000**	**2,501**	**3,692**	**—**	**6,193**	**(154)**	**(520)**	**—**	**(674)**	**10.9**
– Band 6	**20.001 to 99.999**	**467**	**1,375**	**—**	**1,842**	**(1)**	**(593)**	**—**	**(594)**	**32.2**
– Band 7	**100.000**	**—**	**—**	**1,297**	**1,297**	**—**	**—**	**(535)**	**(535)**	**41.2**
At 31 Dec 2022		**362,781**	**48,891**	**3,340**	**415,012**	**(562)**	**(1,505)**	**(805)**	**(2,872)**	**0.7**

1 12-month point in time adjusted for multiple economic scenarios.

Personal lending – credit risk profile by internal PD band for loans and advances to customers at amortised cost (continued)

		Gross carrying amount				Allowance for ECL				
	PD range[1]	Stage 1	Stage 2	Stage 3	Total	Stage 1	Stage 2	Stage 3	Total	ECL coverage
	%	$m	$m	$m	$m	$m	$m	$m	$m	%
First lien residential mortgages		360,686	7,637	3,045	371,368	(128)	(131)	(416)	(675)	0.2
– Band 1	0.000 to 0.250	310,042	451	—	310,493	(30)	(5)	—	(35)	—
– Band 2	0.251 to 0.500	19,741	203	—	19,944	(7)	(2)	—	(9)	—
– Band 3	0.501 to 1.500	25,835	1,936	—	27,771	(79)	(8)	—	(87)	0.3
– Band 4	1.501 to 5.000	4,976	2,657	—	7,633	(12)	(30)	—	(42)	0.6
– Band 5	5.001 to 20.000	88	1,416	—	1,504	—	(35)	—	(35)	2.3
– Band 6	20.001 to 99.999	4	974	—	978	—	(51)	—	(51)	5.2
– Band 7	100.000	—	—	3,045	3,045	—	—	(416)	(416)	13.7
Other personal lending		96,270	8,802	1,897	106,969	(530)	(1,088)	(810)	(2,428)	2.3
– Band 1	0.000 to 0.250	45,049	187	—	45,236	(50)	(13)	—	(63)	0.1
– Band 2	0.251 to 0.500	12,625	605	—	13,230	(27)	(6)	—	(33)	0.2
– Band 3	0.501 to 1.500	22,791	1,518	—	24,309	(102)	(30)	—	(132)	0.5
– Band 4	1.501 to 5.000	13,006	2,360	—	15,366	(213)	(108)	—	(321)	2.1
– Band 5	5.001 to 20.000	2,732	3,257	—	5,989	(138)	(554)	—	(692)	11.6
– Band 6	20.001 to 99.999	67	875	—	942	—	(377)	—	(377)	40.0
– Band 7	100.000	—	—	1,897	1,897	—	—	(810)	(810)	42.7
At 31 Dec 2021		456,956	16,439	4,942	478,337	(658)	(1,219)	(1,226)	(3,103)	0.6

1 12-month point in time adjusted for multiple economic scenarios.

Collateral on loans and advances

(Audited)

The following table provides a quantification of the value of fixed charges we hold over specific assets where we have a history of enforcing, and are able to enforce, collateral in satisfying a debt in the event of the borrower failing to meet its contractual obligations, and where the collateral is cash or can be realised by sale in an established market. The collateral valuation excludes any adjustments for obtaining and selling the collateral and, in particular, loans shown as not collateralised or partially collateralised may also benefit from other forms of credit mitigants.

Personal lending – residential mortgage loans including loan commitments by level of collateral for key countries/territories by stage

(Audited)

	Total		of which: UK		of which: Hong Kong	
	Gross carrying/ nominal amount	ECL coverage	Gross carrying/ nominal amount	ECL coverage	Gross carrying/ nominal amount	ECL coverage
	$m	%	$m	%	$m	%
Stage 1						
Fully collateralised	310,705	—	134,044	—	94,949	—
LTV ratio:						
– less than 50%	154,337	—	70,936	—	44,740	—
– 51% to 60%	57,386	—	23,226	—	18,027	—
– 61% to 70%	44,805	—	20,391	—	10,096	—
– 71% to 80%	25,458	—	12,849	—	4,167	—
– 81% to 90%	17,106	—	5,922	—	7,883	—
– 91% to 100%	11,613	—	720	—	10,036	—
Partially collateralised (A):	6,964	—	329	—	6,441	—
LTV ratio:						
– 101% to 110%	6,127	—	73	—	5,953	—
– 111% to 120%	570	—	61	—	482	—
– greater than 120%	267	0.4	195	—	6	—
– *collateral value on A*	6,521		237		6,146	
Total	317,669	—	134,373	—	101,390	—
Stage 2						
Fully collateralised	39,906	0.6	34,541	0.4	981	—
LTV ratio:						
– less than 50%	12,250	0.7	10,387	0.6	577	—
– 51% to 60%	7,372	0.5	6,402	0.4	171	—
– 61% to 70%	9,617	0.4	8,541	0.3	85	—
– 71% to 80%	6,770	0.5	5,922	0.3	37	—
– 81% to 90%	3,388	0.5	2,918	0.2	51	0.1
– 91% to 100%	509	1.1	371	0.2	60	0.2
Partially collateralised (B):	143	6.9	49	0.3	47	0.2
LTV ratio:						
– 101% to 110%	73	3.6	10	1.2	45	0.2
– 111% to 120%	24	12.5	10	—	2	—
– greater than 120%	46	9.1	29	0.1	—	—
– *collateral value on B*	123		38		44	
Total	40,049	0.6	34,590	0.4	1,028	—
Stage 3						
Fully collateralised	2,097	9.9	676	11.1	237	0.1
LTV ratio:						
– less than 50%	1,077	7.2	448	9.4	105	—
– 51% to 60%	330	7.6	110	9.7	26	0.1
– 61% to 70%	207	12.6	48	15.9	11	0.7
– 71% to 80%	212	14.7	33	19.7	25	0.1
– 81% to 90%	147	17.8	10	24.5	27	—
– 91% to 100%	124	18.1	27	22.5	43	—
Partially collateralised (C):	133	46.9	12	9.8	1	0.3
LTV ratio:						
– 101% to 110%	37	24.3	10	3.7	1	0.4
– 111% to 120%	17	32.7	—	64.9	—	—
– greater than 120%	79	60.5	2	36.2	—	—
– *collateral value on C*	79		4		1	
Total	2,230	12.1	688	11.1	238	0.1
At 31 Dec 2022	359,948	0.2	169,651	0.1	102,656	—

Personal lending – residential mortgage loans including loan commitments by level of collateral for key countries/territories by stage (continued)

(Audited)

	Total		of which: UK		of which: Hong Kong	
	Gross carrying/ nominal amount	ECL coverage	*Gross carrying/ nominal amount*	*ECL coverage*	*Gross carrying/ nominal amount*	*ECL coverage*
	$m	%	*$m*	*%*	*$m*	*%*
Stage 1						
Fully collateralised	377,454	—	*168,737*	—	*98,020*	—
LTV ratio:						
– less than 50%	190,370	—	*81,582*	—	*61,234*	—
– 51% to 60%	64,217	—	*28,555*	—	*12,070*	—
– 61% to 70%	51,842	—	*25,949*	—	*4,649*	—
– 71% to 80%	46,932	0.1	*24,114*	—	*8,360*	—
– 81% to 90%	18,778	0.1	*7,899*	—	*8,420*	—
– 91% to 100%	5,315	0.1	*638*	—	*3,287*	—
Partially collateralised (A):	682	0.3	*358*	—	*30*	—
LTV ratio:						
– 101% to 110%	254	0.6	*104*	—	*26*	—
– 111% to 120%	98	0.4	*60*	—	*1*	—
– greater than 120%	330	0.1	*194*	—	*3*	—
– *collateral value on A*	*484*		235		28	
Total	378,136	—	*169,095*	—	*98,050*	—
Stage 2						
Fully collateralised	7,710	1.7	*2,738*	*2.1*	*1,166*	—
LTV ratio:						
– less than 50%	4,380	1.5	*1,846*	*1.6*	*905*	—
– 51% to 60%	1,317	1.4	*397*	*2.4*	*106*	—
– 61% to 70%	1,016	1.6	*282*	*3.0*	*34*	—
– 71% to 80%	725	2.3	*175*	*4.7*	*50*	—
– 81% to 90%	208	4.3	*32*	*5.6*	*58*	—
– 91% to 100%	64	4.1	*6*	*1.9*	*13*	—
Partially collateralised (B):	24	13.6	*3*	*7.7*	—	—
LTV ratio:						
– 101% to 110%	7	18.6	*1*	*1.0*	—	—
– 111% to 120%	8	16.6	—	—	—	—
– greater than 120%	9	6.7	*2*	*11.1*	—	—
– *collateral value on B*	*20*		2		—	
Total	7,734	1.7	*2,741*	*2.1*	*1,166*	—
Stage 3						
Fully collateralised	2,853	11.5	*954*	*14.2*	*68*	*0.3*
LTV ratio:						
– less than 50%	1,490	9.2	*635*	*13.0*	*48*	*0.5*
– 51% to 60%	443	8.6	*129*	*14.0*	*10*	*0.1*
– 61% to 70%	371	10.9	*79*	*16.2*	*2*	*0.1*
– 71% to 80%	256	15.4	*67*	*19.1*	*3*	—
– 81% to 90%	171	20.4	*21*	*25.2*	*4*	—
– 91% to 100%	122	32.2	*23*	*18.6*	*1*	—
Partially collateralised (C):	220	39.6	*7*	*30.8*	—	—
LTV ratio:						
– 101% to 110%	56	27.5	*4*	*22.3*	—	—
– 111% to 120%	29	29.2	—	—	—	—
– greater than 120%	135	46.9	*3*	*45.5*	—	—
– *collateral value on C*	*143*		6		—	
Total	3,073	13.5	*961*	*14.4*	*68*	*0.3*
At 31 Dec 2021	388,943	0.2	*172,797*	*0.1*	*99,284*	—

Supplementary information

Wholesale lending – loans and advances to customers at amortised cost by country/territory

	Gross carrying amount				Allowance for ECL			
	Corporate and commercial	Of which: real estate[1]	Non-bank financial institutions	Total	Corporate and commercial	Of which: real estate[1]	Non-bank financial institutions	Total
	$m	$m	$m	$m	$m	$m	$m	$m
Europe	146,236	19,814	18,198	164,434	(2,376)	(370)	(139)	(2,515)
– UK	104,775	14,309	12,663	117,438	(1,522)	(329)	(130)	(1,652)
– France	27,571	4,216	4,152	31,723	(622)	(36)	(4)	(626)
– Germany	6,603	252	713	7,316	(154)	—	(3)	(157)
– Switzerland	988	635	298	1,286	(8)	—	—	(8)
– other	6,299	402	372	6,671	(70)	(5)	(2)	(72)
Asia	245,872	73,164	38,863	284,735	(4,361)	(2,197)	(77)	(4,438)
– Hong Kong	145,411	56,161	20,812	166,223	(3,001)	(1,966)	(36)	(3,037)
– Australia	11,641	3,106	1,157	12,798	(97)	(1)	—	(97)
– India	9,052	1,711	4,267	13,319	(80)	(22)	(10)	(90)
– Indonesia	3,214	85	226	3,440	(187)	(1)	—	(187)
– mainland China	31,790	5,752	8,908	40,698	(328)	(167)	(30)	(358)
– Malaysia	5,986	1,081	180	6,166	(133)	(15)	—	(133)
– Singapore	15,904	3,812	1,192	17,096	(388)	(12)	(1)	(389)
– Taiwan	4,700	20	65	4,765	(1)	—	—	(1)
– other	18,174	1,436	2,056	20,230	(146)	(13)	—	(146)
Middle East and North Africa (excluding Saudi Arabia)	21,565	1,766	324	21,889	(983)	(158)	(3)	(986)
– Egypt	1,261	77	101	1,362	(117)	(5)	(1)	(118)
– UAE	13,503	1,569	149	13,652	(673)	(152)	—	(673)
– other	6,801	120	74	6,875	(193)	(1)	(2)	(195)
North America	28,619	5,783	8,791	37,410	(230)	(102)	(37)	(267)
– US	28,249	5,714	8,640	36,889	(214)	(94)	(26)	(240)
– Canada[2]	—	—	—	—	—	—	—	—
– other	370	69	151	521	(16)	(8)	(11)	(27)
Latin America	12,064	907	763	12,827	(374)	(24)	(1)	(375)
– Mexico	9,784	903	717	10,501	(335)	(24)	(1)	(336)
– other	2,280	4	46	2,326	(39)	—	—	(39)
At 31 Dec 2022	**454,356**	**101,434**	**66,939**	**521,295**	**(8,324)**	**(2,851)**	**(257)**	**(8,581)**
Europe	163,341	23,137	17,818	181,159	(2,770)	(546)	(41)	(2,811)
– UK	115,386	16,233	11,306	126,692	(1,855)	(489)	(32)	(1,887)
– France	34,488	5,520	4,391	38,879	(654)	(47)	(2)	(656)
– Germany	6,746	306	987	7,733	(120)	—	(3)	(123)
– Switzerland	1,188	731	688	1,876	(8)	—	—	(8)
– other	5,533	347	446	5,979	(133)	(10)	(4)	(137)
Asia	263,821	81,453	36,321	300,142	(3,297)	(731)	(44)	(3,341)
– Hong Kong	162,684	62,792	20,182	182,866	(1,585)	(624)	(7)	(1,592)
– Australia	9,937	2,596	717	10,654	(108)	(3)	—	(108)
– India	8,221	1,786	4,003	12,224	(84)	(29)	(8)	(92)
– Indonesia	3,436	86	226	3,662	(246)	(2)	(1)	(247)
– mainland China	33,555	6,811	9,359	42,914	(198)	(41)	(28)	(226)
– Malaysia	7,229	1,741	197	7,426	(172)	(21)	—	(172)
– Singapore	16,401	4,158	782	17,183	(792)	(5)	—	(792)
– Taiwan	6,291	31	47	6,338	—	—	—	—
– other	16,067	1,452	808	16,875	(112)	(6)	—	(112)
Middle East and North Africa (excluding Saudi Arabia)	21,963	1,555	376	22,339	(1,207)	(158)	(3)	(1,210)
– Egypt	1,788	69	152	1,940	(161)	(7)	—	(161)
– UAE	12,942	1,370	190	13,132	(811)	(149)	—	(811)
– other	7,233	116	34	7,267	(235)	(2)	(3)	(238)
North America	52,577	13,639	10,197	62,774	(427)	(87)	(18)	(445)
– US	27,002	5,895	8,511	35,513	(207)	(64)	(1)	(208)
– Canada	25,048	7,650	1,546	26,594	(198)	(15)	(6)	(204)
– other	527	94	140	667	(22)	(8)	(11)	(33)
Latin America	11,837	1,476	643	12,480	(503)	(122)	(4)	(507)
– Mexico	9,561	1,475	618	10,179	(452)	(122)	(4)	(456)
– other	2,276	1	25	2,301	(51)	—	—	(51)
At 31 Dec 2021	513,539	121,260	65,355	578,894	(8,204)	(1,644)	(110)	(8,314)

1 *Real estate lending within this disclosure corresponds solely to the industry of the borrower. Commercial real estate on page 177 includes borrowers in multiple industries investing in income-producing assets and to a lesser extent, their construction and development.*
2 *Classified as held for sale at 31 December 2022.*

Personal lending – loans and advances to customers at amortised cost by country/territory

	Gross carrying amount				Allowance for ECL			
	First lien residential mortgages $m	Other personal $m	*Of which: credit cards $m*	Total $m	First lien residential mortgages $m	Other personal $m	*Of which: credit cards $m*	Total $m
Europe	**159,063**	**23,830**	***6,665***	**182,893**	**(265)**	**(874)**	***(451)***	**(1,139)**
– UK	**154,519**	**16,794**	***6,622***	**171,313**	**(226)**	**(837)**	***(449)***	**(1,063)**
– France[1]	**30**	**76**	***9***	**106**	**(14)**	**(8)**	***—***	**(22)**
– Germany	**—**	**234**	***—***	**234**	**—**	**—**	***—***	**—**
– Switzerland	**1,378**	**5,094**	***—***	**6,472**	**—**	**(22)**	***—***	**(22)**
– other	**3,136**	**1,632**	***34***	**4,768**	**(25)**	**(7)**	***(2)***	**(32)**
Asia	**151,058**	**44,610**	***11,805***	**195,668**	**(50)**	**(640)**	***(423)***	**(690)**
– Hong Kong	**101,478**	**31,539**	***8,645***	**133,017**	**(1)**	**(352)**	***(258)***	**(353)**
– Australia	**21,372**	**456**	***396***	**21,828**	**(11)**	**(19)**	***(18)***	**(30)**
– India	**1,078**	**590**	***162***	**1,668**	**(4)**	**(18)**	***(13)***	**(22)**
– Indonesia	**70**	**278**	***141***	**348**	**(1)**	**(17)**	***(12)***	**(18)**
– mainland China	**9,305**	**921**	***378***	**10,226**	**(3)**	**(62)**	***(49)***	**(65)**
– Malaysia	**2,292**	**2,437**	***843***	**4,729**	**(27)**	**(93)**	***(31)***	**(120)**
– Singapore	**7,501**	**6,264**	***422***	**13,765**	**—**	**(36)**	***(14)***	**(36)**
– Taiwan	**5,428**	**1,189**	***284***	**6,617**	**—**	**(18)**	***(5)***	**(18)**
– other	**2,534**	**936**	***534***	**3,470**	**(3)**	**(25)**	***(23)***	**(28)**
Middle East and North Africa (excluding Saudi Arabia)	**2,450**	**3,266**	***735***	**5,716**	**(22)**	**(123)**	***(52)***	**(145)**
– Egypt	**—**	**310**	***83***	**310**	**—**	**(2)**	***(1)***	**(2)**
– UAE	**2,104**	**1,340**	***426***	**3,444**	**(14)**	**(83)**	***(41)***	**(97)**
– other	**346**	**1,616**	***226***	**1,962**	**(8)**	**(38)**	***(10)***	**(46)**
North America	**17,907**	**866**	***256***	**18,773**	**(91)**	**(35)**	***(24)***	**(126)**
– US	**16,847**	**704**	***213***	**17,551**	**(10)**	**(30)**	***(23)***	**(40)**
– Canada[2]	**—**	**—**	***—***	**—**	**—**	**—**	***—***	**—**
– other	**1,060**	**162**	***43***	**1,222**	**(81)**	**(5)**	***(1)***	**(86)**
Latin America	**6,343**	**5,619**	***1,927***	**11,962**	**(146)**	**(626)**	***(212)***	**(772)**
– Mexico	**6,124**	**4,894**	***1,615***	**11,018**	**(145)**	**(593)**	***(196)***	**(738)**
– other	**219**	**725**	***312***	**944**	**(1)**	**(33)**	***(16)***	**(34)**
At 31 Dec 2022	**336,821**	**78,191**	***21,388***	**415,012**	**(574)**	**(2,298)**	***(1,162)***	**(2,872)**
Europe	170,818	49,253	*8,624*	220,071	(329)	(1,006)	*(437)*	(1,335)
– UK	163,549	19,154	*8,213*	182,703	(223)	(823)	*(434)*	(1,046)
– France[1]	3,124	22,908	*366*	26,032	(38)	(91)	*(3)*	(129)
– Germany	—	282	*—*	282	—	—	*—*	—
– Switzerland	1,367	6,615	*—*	7,982	—	(75)	*—*	(75)
– other	2,778	294	*45*	3,072	(68)	(17)	*—*	(85)
Asia	149,709	46,781	*11,413*	196,490	(59)	(706)	(428)	(765)
– Hong Kong	98,019	32,996	*8,154*	131,015	(1)	(338)	*(217)*	(339)
– Australia	21,149	504	*427*	21,653	(5)	(33)	*(32)*	(38)
– India	981	543	*181*	1,524	(10)	(30)	*(20)*	(40)
– Indonesia	76	272	*147*	348	(1)	(20)	*(14)*	(21)
– mainland China	10,525	1,103	*563*	11,628	(4)	(72)	*(66)*	(76)
– Malaysia	2,532	2,657	*791*	5,189	(33)	(122)	*(34)*	(155)
– Singapore	7,811	6,649	*367*	14,460	—	(40)	*(13)*	(40)
– Taiwan	5,672	1,188	*271*	6,860	—	(17)	*(5)*	(17)
– other	2,944	869	*512*	3,813	(5)	(34)	*(27)*	(39)
Middle East and North Africa (excluding Saudi Arabia)	2,262	3,157	*761*	5,419	(26)	(146)	*(60)*	(172)
– Egypt	—	368	*98*	368	—	(3)	*(1)*	(3)
– UAE	1,924	1,232	*417*	3,156	(18)	(88)	*(39)*	(106)
– other	338	1,557	*246*	1,895	(8)	(55)	*(20)*	(63)
North America	43,529	3,091	*555*	46,620	(141)	(87)	*(47)*	(228)
– US	16,642	799	*232*	17,441	(12)	(53)	*(36)*	(65)
– Canada	25,773	2,123	*284*	27,896	(33)	(27)	*(8)*	(60)
– other	1,114	169	*39*	1,283	(96)	(7)	*(3)*	(103)
Latin America	5,050	4,687	*1,505*	9,737	(120)	(483)	*(163)*	(603)
– Mexico	4,882	4,006	*1,172*	8,888	(119)	(450)	*(148)*	(569)
– other	168	681	*333*	849	(1)	(33)	*(15)*	(34)
At 31 Dec 2021	371,368	106,969	*22,858*	478,337	(675)	(2,428)	*(1,135)*	(3,103)

1 *Included in other personal lending at 31 December 2022 is nil (31 December 2021: $19,972m) guaranteed by Crédit Logement as our retail banking business in France has been classified as held for sale.*
2 *Classified as held for sale at 31 December 2022.*

Summary of financial instruments to which the impairment requirements in IFRS 9 are applied – by global business

	Gross carrying/nominal amount					Allowance for ECL				
	Stage 1	Stage 2	Stage 3	POCI	Total	Stage 1	Stage 2	Stage 3	POCI	Total
	$m	$m	$m	$m	$m	$m	$m	$m	$m	$m
Loans and advances to customers at amortised cost	777,543	139,130	19,505	129	936,307	(1,095)	(3,491)	(6,829)	(38)	(11,453)
– WPB	373,889	49,096	3,502	—	426,487	(572)	(1,512)	(850)	—	(2,934)
– CMB	232,296	69,784	12,794	112	314,986	(435)	(1,529)	(4,891)	(38)	(6,893)
– GBM	171,033	20,207	3,209	17	194,466	(88)	(437)	(1,088)	—	(1,613)
– Corporate Centre	325	43	—	—	368	—	(13)	—	—	(13)
Loans and advances to banks at amortised cost	103,042	1,827	82	—	104,951	(18)	(29)	(22)	—	(69)
– WPB	26,111	377	—	—	26,488	(3)	(1)	—	—	(4)
– CMB	23,735	257	4	—	23,996	(5)	—	(2)	—	(7)
– GBM	47,128	1,050	78	—	48,256	(9)	(28)	(20)	—	(57)
– Corporate Centre	6,068	143	—	—	6,211	(1)	—	—	—	(1)
Other financial assets measured at amortised cost	996,489	17,166	797	46	1,014,498	(124)	(188)	(234)	(7)	(553)
– WPB	248,708	5,644	458	46	254,856	(57)	(96)	(130)	(7)	(290)
– CMB	184,459	10,883	253	—	195,595	(37)	(84)	(91)	—	(212)
– GBM	486,224	637	78	—	486,939	(28)	(8)	(13)	—	(49)
– Corporate Centre	77,098	2	8	—	77,108	(2)	—	—	—	(2)
Total gross carrying amount on-balance sheet at 31 Dec 2022	**1,877,074**	**158,123**	**20,384**	**175**	**2,055,756**	**(1,237)**	**(3,708)**	**(7,085)**	**(45)**	**(12,075)**
Loans and other credit-related commitments	583,383	34,033	1,372	—	618,788	(141)	(180)	(65)	—	(386)
– WPB	238,161	4,377	769	—	243,307	(25)	(1)	—	—	(26)
– CMB	121,909	18,376	512	—	140,797	(78)	(128)	(55)	—	(261)
– GBM	223,065	11,279	91	—	234,435	(38)	(51)	(10)	—	(99)
– Corporate Centre	248	1	—	—	249	—	—	—	—	—
Financial guarantees	16,071	2,463	249	—	18,783	(6)	(13)	(33)	—	(52)
– WPB	1,196	11	1	—	1,208	—	—	—	—	—
– CMB	6,665	1,524	128	—	8,317	(5)	(8)	(26)	—	(39)
– GBM	8,210	928	120	—	9,258	(1)	(5)	(7)	—	(13)
– Corporate Centre	—	—	—	—	—	—	—	—	—	—
Total nominal amount off-balance sheet at 31 Dec 2022	**599,454**	**36,496**	**1,621**	**—**	**637,571**	**(147)**	**(193)**	**(98)**	**—**	**(438)**
WPB	113,557	1,213	—	33	114,803	(18)	(26)	—	(6)	(50)
CMB	70,728	736	—	4	71,468	(9)	(15)	—	(1)	(25)
GBM	75,951	434	—	1	76,386	(11)	(8)	—	—	(19)
Corporate Centre	3,347	299	—	—	3,646	(31)	(19)	(1)	—	(51)
Debt instruments measured at FVOCI at 31 Dec 2022	**263,583**	**2,682**	**—**	**38**	**266,303**	**(69)**	**(68)**	**(1)**	**(7)**	**(145)**

Summary of financial instruments to which the impairment requirements in IFRS 9 are applied – by global business (continued)

	Gross carrying/nominal amount					Allowance for ECL				
	Stage 1	Stage 2	Stage 3	POCI	Total	Stage 1	Stage 2	Stage 3	POCI	Total
	$m	$m	$m	$m	$m	$m	$m	$m	$m	$m
Loans and advances to customers at amortised cost	918,936	119,224	18,797	274	1,057,231	(1,367)	(3,119)	(6,867)	(64)	(11,417)
– WPB	469,477	17,285	5,211	—	491,973	(664)	(1,247)	(1,276)	—	(3,187)
– CMB	267,517	76,798	11,462	245	356,022	(571)	(1,369)	(4,904)	(53)	(6,897)
– GBM	181,247	25,085	2,124	29	208,485	(132)	(493)	(687)	(11)	(1,323)
– Corporate Centre	695	56	—	—	751	—	(10)	—	—	(10)
Loans and advances to banks at amortised cost	81,636	1,517	—	—	83,153	(14)	(3)	—	—	(17)
– WPB	20,464	481	—	—	20,945	(1)	(1)	—	—	(2)
– CMB	15,269	352	—	—	15,621	(1)	—	—	—	(1)
– GBM	36,875	654	—	—	37,529	(10)	(2)	—	—	(12)
– Corporate Centre	9,028	30	—	—	9,058	(2)	—	—	—	(2)
Other financial assets measured at amortised cost	875,016	4,988	304	43	880,351	(91)	(54)	(42)	(6)	(193)
– WPB	207,335	1,407	175	43	208,960	(51)	(44)	(14)	(6)	(115)
– CMB	163,457	2,370	61	—	165,888	(12)	(8)	(20)	—	(40)
– GBM	409,808	1,204	62	—	411,074	(28)	(2)	(8)	—	(38)
– Corporate Centre	94,416	7	6	—	94,429	—	—	—	—	—
Total gross carrying amount on-balance sheet at 31 Dec 2021	1,875,588	125,729	19,101	317	2,020,735	(1,472)	(3,176)	(6,909)	(70)	(11,627)
Loans and other credit-related commitments	594,473	32,389	775	—	627,637	(165)	(174)	(40)	—	(379)
– WPB	235,722	2,111	153	—	237,986	(37)	(3)	—	—	(40)
– CMB	126,728	17,490	555	—	144,773	(80)	(118)	(37)	—	(235)
– GBM	231,890	12,788	67	—	244,745	(48)	(53)	(3)	—	(104)
– Corporate Centre	133	—	—	—	133	—	—	—	—	—
Financial guarantees	24,932	2,638	225	—	27,795	(11)	(30)	(21)	—	(62)
– WPB	1,295	15	1	—	1,311	—	(1)	—	—	(1)
– CMB	6,105	1,606	126	—	7,837	(7)	(16)	(17)	—	(40)
– GBM	17,531	1,017	98	—	18,646	(4)	(13)	(4)	—	(21)
– Corporate Centre	1	—	—	—	1	—	—	—	—	—
Total nominal amount off-balance sheet at 31 Dec 2021	619,405	35,027	1,000	—	655,432	(176)	(204)	(61)	—	(441)
WPB	143,373	718	—	35	144,126	(20)	(7)	—	(5)	(32)
CMB	86,247	471	—	10	86,728	(11)	(1)	—	(1)	(13)
GBM	111,473	526	—	1	112,000	(13)	(2)	—	—	(15)
Corporate Centre	4,038	311	—	—	4,349	(25)	(11)	—	—	(36)
Debt instruments measured at FVOCI at 31 Dec 2021	345,131	2,026	—	46	347,203	(69)	(21)	—	(6)	(96)

Loans and advances to customers and banks metrics

	Gross carrying amount $m	*of which: stage 3 and POCI* *$m*	Allowance for ECL $m	*of which: stage 3 and POCI* *$m*	Change in ECL $m	Write-offs $m	Recoveries $m
First lien residential mortgages	336,821	*2,043*	(574)	*(270)*	180	(48)	26
– second lien residential mortgages	379	*6*	(6)	*(3)*	9	(1)	4
– guaranteed loans in respect of residential property	1,367	*125*	(34)	*(30)*	(11)	(9)	2
– other personal lending which is secured	32,106	*206*	(55)	*(30)*	(16)	(8)	1
– credit cards	21,388	*260*	(1,162)	*(160)*	(638)	(471)	126
– other personal lending which is unsecured	21,010	*687*	(1,010)	*(305)*	(655)	(660)	119
– motor vehicle finance	1,941	*13*	(31)	*(7)*	39	(18)	5
Other personal lending	78,191	*1,297*	(2,298)	*(535)*	(1,272)	(1,167)	257
Personal lending	415,012	*3,340*	(2,872)	*(805)*	(1,092)	(1,215)	283
– agriculture, forestry and fishing	6,571	*261*	(122)	*(68)*	(32)	(42)	—
– mining and quarrying	8,194	*233*	(172)	*(146)*	(24)	(46)	—
– manufacturing	87,503	*2,065*	(1,153)	*(896)*	(191)	(171)	3
– electricity, gas, steam and air-conditioning supply	17,082	*277*	(109)	*(67)*	(75)	(16)	—
– water supply, sewerage, waste management and remediation	2,993	*26*	(21)	*(13)*	3	(1)	—
– construction	13,232	*798*	(443)	*(371)*	(93)	(136)	6
– wholesale and retail trade, repair of motor vehicles and motorcycles	82,437	*2,810*	(1,666)	*(1,344)*	(344)	(667)	8
– transportation and storage	24,845	*556*	(249)	*(153)*	(13)	(82)	1
– accommodation and food	17,185	*789*	(244)	*(82)*	103	(29)	—
– publishing, audiovisual and broadcasting	18,423	*277*	(117)	*(59)*	9	(47)	1
– real estate	101,434	*4,853*	(2,851)	*(1,861)*	(1,537)	(174)	2
– professional, scientific and technical activities	17,935	*542*	(272)	*(200)*	(81)	(31)	1
– administrative and support services	25,077	*980*	(408)	*(293)*	(27)	(27)	1
– public administration and defence, compulsory social security	1,180	*—*	(1)	*—*	5	—	—
– education	1,614	*87*	(31)	*(22)*	1	(3)	—
– health and care	3,964	*266*	(90)	*(67)*	(30)	(7)	1
– arts, entertainment and recreation	1,862	*146*	(77)	*(57)*	1	(17)	—
– other services	12,527	*589*	(275)	*(219)*	120	(92)	7
– activities of households	744	*—*	—	*—*	—	—	—
– extra-territorial organisations and bodies activities	47	*—*	—	*—*	1	—	1
– government	9,475	*270*	(10)	*(7)*	(5)	—	—
– asset-backed securities	32	*—*	(13)	*—*	(4)	—	—
Corporate and commercial	454,356	*15,825*	(8,324)	*(5,925)*	(2,213)	(1,588)	32
Non-bank financial institutions	66,939	*469*	(257)	*(137)*	(165)	(1)	1
Wholesale lending	521,295	*16,294*	(8,581)	*(6,062)*	(2,378)	(1,589)	33
Loans and advances to customers	936,307	*19,634*	(11,453)	*(6,867)*	(3,470)	(2,804)	316
Loans and advances to banks	104,951	*82*	(69)	*(22)*	(53)	—	—
At 31 Dec 2022	1,041,258	*19,716*	(11,522)	*(6,889)*	(3,523)	(2,804)	316

Loans and advances to customers and banks metrics (continued)

	Gross carrying amount	*of which: stage 3 and POCI*	Allowance for ECL	*of which: stage 3 and POCI*	Change in ECL	Write-offs	Recoveries
	$m	*$m*	$m	*$m*	$m	$m	$m
First lien residential mortgages	371,368	*3,045*	(675)	*(416)*	—	(70)	31
– second lien residential mortgages	395	*37*	(14)	*(9)*	12	(1)	6
– guaranteed loans in respect of residential property	21,610	*236*	(58)	*(42)*	(5)	(8)	2
– other personal lending which is secured	37,995	*366*	(156)	*(120)*	(11)	(11)	1
– credit cards	22,858	*338*	(1,135)	*(214)*	172	(751)	153
– other personal lending which is unsecured	22,478	*915*	(1,039)	*(421)*	135	(659)	156
– motor vehicle finance	1,633	*5*	(26)	*(4)*	(22)	(20)	6
Other personal lending	106,969	*1,897*	(2,428)	*(810)*	281	(1,450)	324
Personal lending	478,337	*4,942*	(3,103)	*(1,226)*	281	(1,520)	355
– agriculture, forestry and fishing	7,899	*363*	(138)	*(105)*	61	(5)	—
– mining and quarrying	9,685	*463*	(227)	*(171)*	72	(57)	(1)
– manufacturing	93,743	*2,107*	(1,248)	*(962)*	102	(222)	7
– electricity, gas, steam and air-conditioning supply	16,618	*78*	(68)	*(31)*	5	—	—
– water supply, sewerage, waste management and remediation	3,895	*51*	(29)	*(20)*	3	(7)	—
– construction	13,954	*843*	(508)	*(440)*	(13)	(94)	9
– wholesale and retail trade, repair of motor vehicles and motorcycles	94,944	*3,005*	(2,107)	*(1,937)*	163	(238)	15
– transportation and storage	29,592	*667*	(363)	*(191)*	100	(10)	2
– accommodation and food	23,376	*1,200*	(423)	*(111)*	12	(17)	6
– publishing, audiovisual and broadcasting	18,471	*250*	(184)	*(100)*	(12)	(4)	1
– real estate	121,260	*2,473*	(1,644)	*(775)*	(674)	(152)	5
– professional, scientific and technical activities	19,685	*637*	(238)	*(172)*	97	(39)	1
– administrative and support services	28,675	*749*	(431)	*(307)*	48	(37)	—
– public administration and defence, compulsory social security	1,271	—	(8)	—	6	—	1
– education	1,793	*65*	(37)	*(18)*	1	(1)	—
– health and care	4,854	*183*	(72)	*(37)*	44	(69)	1
– arts, entertainment and recreation	2,598	*152*	(92)	*(42)*	27	(26)	—
– other services	12,297	*448*	(373)	*(246)*	(59)	(109)	6
– activities of households	977	—	—	—	—	—	—
– extra-territorial organisations and bodies activities	2	—	—	—	1	—	1
– government	7,612	—	(4)	—	(6)	—	—
– asset-backed securities	338	—	(10)	—	3	—	—
Corporate and commercial	513,539	*13,734*	(8,204)	*(5,665)*	(19)	(1,087)	54
Non-bank financial institutions	65,355	*395*	(110)	*(40)*	129	(5)	—
Wholesale lending	578,894	*14,129*	(8,314)	*(5,705)*	110	(1,092)	54
Loans and advances to customers	1,057,231	*19,071*	(11,417)	*(6,931)*	391	(2,612)	409
Loans and advances to banks	83,153	—	(17)	—	22	—	—
At 31 Dec 2021	1,140,384	*19,071*	(11,434)	*(6,931)*	413	(2,612)	409

HSBC Holdings

(Audited)

Risk in HSBC Holdings is overseen by the HSBC Holdings Asset and Liability Management Committee. The major risks faced by HSBC Holdings are credit risk, liquidity risk and market risk (in the form of interest rate risk and foreign exchange risk).

Credit risk in HSBC Holdings primarily arises from transactions with Group subsidiaries and its investments in those subsidiaries.

In HSBC Holdings, the maximum exposure to credit risk arises from two components:

- financial instruments on the balance sheet (see page 332); and
- financial guarantees and similar contracts, where the maximum exposure is the maximum that we would have to pay if the guarantees were called upon (see Note 33).

In the case of our derivative balances, we have amounts with a legally enforceable right of offset in the case of counterparty default that are not included in the carrying value. These offsets also include collateral received in cash and other financial assets.

The total offset relating to our derivative balances was $3.1bn at 31 December 2022 (2021: $1.6bn).

The credit quality of loans and advances and financial investments, both of which consist of intra-Group lending and US Treasury bills and bonds, is assessed as 'strong', with 100% of the exposure being neither past due nor impaired (2021: 100%). For further details of credit quality classification, see page 146.

Treasury risk

Contents

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 earnings or capital due to structural or transactional 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

(Audited)

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

Our 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. The risk management framework incorporates a number of measures aligned to our assessment of risks for both internal and regulatory purposes. These risks include credit, market, operational, pensions, structural and transactional foreign exchange risk, and interest rate risk in the banking book.

For further details, refer to our Pillar 3 Disclosures at 31 December 2022.

Treasury risk management

Key developments in 2022

- All of the Group's material operating entities were above regulatory minimum levels of capital, liquidity and funding at 31 December 2022.
- Our CET1 position decreased from 15.8% at 31 December 2021 to 14.2% at 31 December 2022. This included a 0.8 percentage point impact from new regulatory requirements and a 0.7 percentage point decrease from the fall in the fair value of securities.
- The Board approved a new interest rate risk in the banking book ('IRRBB') strategy in September, with the objective of increasing our stabilisation of net interest income ('NII'), with consideration given to any capital or other constraints, and then adopting a managed approach based on interest rates and outlook.
- We took steps to reduce the duration risk of the Global Treasury hold-to-collect-and-sell portfolio, which is accounted for at fair value through other comprehensive income ('FVOCI'), primarily to dampen the capital impact from rising interest rates. This risk reduction lowered the hold-to-collect-and-sell stressed value at risk ('VaR') exposure of this portfolio from $3.63bn at the end of 2021 to $2.15bn at the end of 2022. For further details of the calculation of this exposure and the use of this metric in our interest rate risk management framework, see page 215.
- We implemented a new hold-to-collect business model to better reflect our management strategy to stabilise NII. This portfolio of high-quality liquid assets will form a material part of our liquid asset buffer going forward, as well as being a hedge to our structural interest rate risk.
- We enhanced monitoring and forecasting as a result of the Russia-Ukraine war, although there were no direct material capital or liquidity impacts.
- The HBUK section of the HSBC Bank (UK) Pension Scheme's trustee funding level remained stable during the volatility in the UK gilt markets in September and October, as a result of its proactive pension scheme management, low-risk investment strategy and limited leverage in its liability-driven investment funds. Refinements relating to the scheme's inflation hedging strategy ensured continued effectiveness in the high-inflation environment.
- HSBC Overseas Holdings (UK) Limited entered into an agreement to sell its banking business in Canada to Royal Bank of Canada, subject to regulatory and governmental approvals. The transaction is expected to complete in late 2023. As a consequence of the gain on the sale and disposal of risk-weighted assets ('RWAs') from our banking business in Canada, we expect an increase of approximately 1.3 percentage points in CET1 capital before any distribution. In addition, the hedging activity in respect to this transaction reduced the full-year 2022 ratio by 0.06 percentage point. This impact will revert on completion of sale.
- HSBC Continental Europe signed a framework agreement with Promontoria MMB SAS ('My Money Group') and its subsidiary Banque des Caraïbes SA for the sale of its retail banking business in France. The sale, which is subject to regulatory and governmental approvals, is anticipated to complete in the second half of 2023. The impact of classifying the disposal as held for sale resulted in a 0.3 percentage point reduction in the Group's CET1 ratio, which will be partly offset by the reduction in RWAs upon closing.
- We identified an error in the RWA calculations of the European resolution group whereby $35bn of non-capital MREL instruments issued by the Asian and US resolution groups and held by the European resolution group were excluded from these calculations and were only deducted from MREL, whereas the relevant UK legislation requires these instruments to be both risk-weighted and deducted from MREL. In rectifying this error, we changed our treatment of $35bn of non-capital MREL investments held by the European resolution group from entities outside its group to deduct them from the European resolution group's own funds rather than from solely its MREL, allowing us to exclude them from RWAs. The change in treatment significantly reduced the European resolution group's total capital and increased its leverage ratio at 31 December 2022, although the European resolution group has no capital requirements. For further details regarding MREL, see 'Assessment and risk appetite' on page 203.
- We performed our inaugural resolvability self-assessment to meet the Bank of England requirements, which came into effect on 1 January 2022. This was incorporated into the Bank of England's publication of its findings on its first assessment of the resolvability of the eight major UK firms, as part of the Resolvability Assessment Framework.

For quantitative disclosures on capital ratios, own funds and RWAs, see pages 205 to 207. For quantitative disclosures on liquidity and funding metrics, see pages 209 to 210. For quantitative disclosures on interest rate risk in the banking book, see pages 213 to 215.

Governance and structure

The Global Head of Traded and Treasury Risk Management and Risk Analytics is the accountable risk steward for all treasury risks. The Group Treasurer is the risk owner for all treasury risks, with the exception of pension risk and insurance risk. The Group Treasurer co-owns pension risk with the Group Head of Performance, Reward and Employee Relations. Insurance risk is owned by the Chief Executive Officer for Global Insurance.

Capital risk, liquidity risk, interest rate risk in the banking book, structural foreign exchange risk and transactional foreign exchange risk are the responsibility of the Group Executive Committee and the Group Risk Committee ('GRC'). Global Treasury actively manages these risks on an ongoing basis, supported by the Holdings Asset and Liability Management Committee ('ALCO') and local ALCOs, overseen by Treasury Risk Management and Risk Management Meetings.

Pension risk is overseen by a network of local and regional pension risk management meetings. The Global Pensions Risk Management Meeting provides oversight of all pension plans sponsored by HSBC globally, and is chaired by the accountable risk steward. Insurance risk is overseen by the Global Insurance Risk Management Meeting, chaired by the Chief Risk Officer for Global Insurance.

Capital, liquidity and funding risk management processes

Assessment and risk appetite

Our capital management policy is supported by a global capital management framework. The framework sets out our approach to determining key capital risk appetites including CET1, total capital, minimum requirements for own funds and eligible liabilities ('MREL'), the leverage ratio and double leverage. Our internal capital adequacy assessment process ('ICAAP') is an assessment of the Group's capital position, outlining both regulatory and internal capital resources and requirements resulting from HSBC's business model, strategy, risk profile and management, performance and planning, risks to capital, and the implications of stress testing. Our assessment of capital adequacy is driven by an assessment of risks. These risks include credit, market, operational, pensions, insurance, structural foreign exchange, interest rate risk in the banking book and Group risk. Climate risk is also considered as part of the ICAAP, and we are continuing to develop our approach. The Group's ICAAP supports the determination of the consolidated capital risk appetite and target ratios, as well as enables the assessment and determination of capital requirements by regulators. Subsidiaries prepare ICAAPs in line with global guidance, while considering their local regulatory regimes to determine their own risk appetites and ratios.

HSBC Holdings is the provider of equity capital and MREL-eligible debt to its subsidiaries, and also provides them with non-equity capital where necessary. These investments are funded by HSBC Holdings' own equity capital and MREL-eligible debt. MREL includes own funds and liabilities that can be written down or converted into capital resources in order to absorb losses or recapitalise a bank in the event of its failure. In line with our existing structure and business model, HSBC has three resolution groups – the European resolution group, the Asian resolution group and the US resolution group. There are some smaller entities that fall outside these resolution groups.

HSBC Holdings seeks to maintain a prudent balance between the composition of its capital and its investments in subsidiaries.

As a matter of long-standing policy, the holding company retains a substantial holdings capital buffer comprising high-quality liquid assets ('HQLA'), which at 31 December 2022 was in excess of $24bn.

We aim to ensure that management has oversight of our liquidity and funding risks at Group and entity level through robust governance, in line with our risk management framework. We manage liquidity and funding risk at an operating entity level in accordance with globally consistent policies, procedures and reporting standards. This ensures that obligations can be met in a timely manner, in the jurisdiction where they fall due.

Operating entities are required to meet internal minimum requirements and any applicable regulatory requirements at all times. These requirements are assessed through our internal liquidity adequacy assessment process ('ILAAP'), which ensures that operating entities have robust strategies, policies, processes and systems for the identification, measurement, management and monitoring of liquidity risk over an appropriate set of time horizons, including intra-day. The ILAAP informs the validation of risk tolerance and the setting of risk appetite. It also assesses the capability to manage liquidity and funding effectively in each major entity. These metrics are set and managed locally but are subject to robust global review and challenge to ensure consistency of approach and application of the Group's policies and controls.

Planning and performance

Capital and RWA plans form part of the annual financial resource plan that is approved by the Board. Capital and RWA forecasts are submitted to the Group Executive Committee on a monthly basis, and capital and RWAs are monitored and managed against the plan. The responsibility for global capital allocation principles rests with the Group Chief Financial Officer, supported by the Group Capital Management Meeting. This is a specialist forum addressing capital management, reporting into Holdings ALCO.

Through our internal governance processes, we seek to strengthen discipline over our investment and capital allocation decisions, and to ensure that returns on investment meet management's objectives. Our strategy is to allocate capital to businesses and entities to support growth objectives where returns above internal hurdle levels have been identified and in order to meet their regulatory and economic capital needs. We evaluate and manage business returns by using a return on average tangible equity measure.

Funding and liquidity plans also form part of the financial resource plan that is approved by the Board. The Board-level appetite measures are the liquidity coverage ratio ('LCR') and net stable funding ratio ('NSFR'), together with an internal liquidity metric. In addition, we use a wider set of measures to manage an appropriate funding and liquidity profile, including legal entity depositor concentration limits, intra-day liquidity, forward-looking funding assessments and other key measures.

Risks to capital and liquidity

Outside the stress testing framework, other risks may be identified that have the potential to affect our RWAs, capital and/or liquidity position. Downside and Upside scenarios are assessed against our management objectives, and mitigating actions are assigned as necessary. We closely monitor future regulatory changes and continue to evaluate the impact of these upon our capital and liquidity requirements, particularly those related to the UK's implementation of the outstanding measures to be implemented from the Basel III reforms ('Basel 3.1').

Regulatory developments

Our capital adequacy ratios were affected by regulatory developments in 2022, including changes to internal-ratings based ('IRB') modelling requirements and the UK's implementation of the revisions to the Capital Requirements Regulation and Directive ('CRR II'). The PRA's final rules on NSFR were implemented and have been reflected in disclosures since the first quarter of 2022.

Future changes to our ratios will occur with the implementation of Basel 3.1. The PRA has published its consultation paper on the UK's implementation, with a proposed implementation date of 1 January 2025. We currently do not foresee a material net impact on our ratios from the initial implementation. The RWA output floor under Basel 3.1 is proposed to be subject to a five-year transitional provision. Any impact from the output floor would be towards the end of the transition period.

Regulatory reporting processes and controls

The quality of regulatory reporting remains a key priority for management and regulators. We are progressing with a comprehensive programme to strengthen our processes, improve consistency and enhance controls across our prudential regulatory reporting, focusing on PRA requirements initially. We commissioned a number of independent external reviews, some at the request of our regulators, including one on our credit risk RWA reporting process, which concluded in December 2022. These reviews have so far resulted in enhancements to our RWAs and the LCR through improvements in reporting accuracy, which have been reflected in our year-end regulatory reported ratios. Our prudential regulatory reporting programme is being phased over a number of years, prioritising RWA, capital and liquidity reporting in the early stages of the programme. While this programme continues, there may be further impacts on some of our regulatory ratios, such as the CET1, LCR and NSFR, as we implement recommended changes and continue to enhance our controls across the process.

Stress testing and recovery and resolution planning

The Group uses stress testing to inform management of the capital and liquidity needed to withstand internal and external shocks, including a global economic downturn or a systems failure. Stress testing results are also used to inform risk mitigation actions, allocation of financial resources, and recovery and resolution planning, as well as to re-evaluate business plans where analysis shows capital, liquidity and/or returns do not meet their target.

In addition to a range of internal stress tests, we are subject to supervisory stress testing in many jurisdictions. These include the programmes of the Bank of England, the US Federal Reserve Board, the European Banking Authority, the European Central Bank and the Hong Kong Monetary Authority. The results of regulatory stress testing and our internal stress tests are used when assessing our internal capital and liquidity requirements through the ICAAP and ILAAP. The outcomes of stress testing exercises carried out by the PRA and other regulators feed into the setting of regulatory minimum ratios and buffers.

We maintain recovery plans for the Group and material entities, which set out potential options management could take in a range of stress scenarios that could result in a breach of capital or liquidity buffers. The Group recovery plan sets out the framework and governance arrangements to support restoring HSBC to a stable and viable position, and so lowering the probability of failure from either idiosyncratic company-specific stress or systemic market-wide issues. Our material entities' recovery plans provide detailed actions that management would consider taking in a stress scenario should their positions deteriorate and threaten to breach risk appetite and regulatory minimum levels. This is to help ensure that HSBC entities can stabilise their financial position and recover from financial losses in a stress environment.

The Group also has capabilities, resources and arrangements in place to address the unlikely event that HSBC might not be recoverable and would therefore need to be resolved by regulators. The Group performed the inaugural Resolvability Assessment Framework self-assessment during 2021 to meet the Bank of England's requirements, which came into effect on 1 January 2022.

Overall, HSBC's recovery and resolution planning helps safeguard the Group's financial and operational stability. The Group is committed to further developing its recovery and resolution capabilities, including in relation to the Bank of England's Resolvability Assessment Framework.

Measurement of interest rate risk in the banking book processes

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 in order to hedge positions held with trading intent. Interest rate risk that can be economically hedged may be transferred to Global Treasury. Hedging is generally executed through interest rate derivatives or fixed-rate government bonds. Any interest rate risk that Global Treasury cannot economically hedge is not transferred and will remain within the global business where the risks originate.

Global Treasury uses a number of measures to monitor and control interest rate risk in the banking book, including:

- net interest income sensitivity; and
- economic value of equity sensitivity.

Net interest income sensitivity

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, where entities calculate both one-year and five-year NII sensitivities across a range of interest rate scenarios.

NII sensitivity figures represent the effect of pro forma movements in projected yield curves based on a static balance sheet size and structure, except for certain mortgage products where balances are impacted by interest-rate sensitive prepayments. These sensitivity calculations do not incorporate actions that would be taken by Global 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.

Further details of HSBC's risk management of interest rate risk in the banking book can be found in the Group's Pillar 3 Disclosures at 31 December 2022.

Other Group risks

Non-trading book foreign exchange exposures

Structural foreign exchange exposures

Structural foreign exchange exposures arise from net assets or capital investments in foreign operations, together with any associated hedging. A foreign operation is defined as a subsidiary, associate, joint arrangement or branch where the activities are conducted in a currency other than that of the reporting entity. An entity's functional reporting 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 ('OCI'). We use the US dollar as our presentation currency in our consolidated financial statements because the US dollar and currencies linked to it form the major currency bloc in which we transact and fund our business. Therefore, our consolidated balance sheet is affected by exchange differences between the US dollar and all the non-US dollar functional currencies of underlying foreign operations.

Our structural foreign exchange exposures are managed with the primary objective of ensuring, where practical, that our consolidated capital ratios and the capital ratios of individual banking subsidiaries are largely protected from the effect of changes in exchange rates. We hedge structural foreign exchange positions where it is capital efficient to do so, and subject to approved limits. This is achieved through a combination of net investment hedges and economic hedges. Hedging positions are monitored and rebalanced periodically to manage RWA or downside risks associated with HSBC's foreign currency investments.

For further details of our structural foreign exchange exposures, see page 212.

Transactional foreign exchange exposures

Transactional foreign exchange risk arises primarily from day-to-day transactions in the banking book generating profit and loss or fair value through other comprehensive income ('FVOCI') reserves in a currency other than the reporting currency of the operating entity. Transactional foreign exchange exposure generated through profit and loss is periodically transferred to Markets and Securities Services and managed within limits with the exception of limited residual foreign exchange exposure arising from timing differences or for other reasons. Transactional foreign exchange exposure generated through OCI reserves is managed by Global Treasury within agreed appetite.

HSBC Holdings risk management

As a financial services holding company, HSBC Holdings has limited market risk activities. Its activities predominantly involve maintaining sufficient capital resources to support the Group's diverse activities; allocating these capital resources across the Group's businesses; earning dividend and interest income on its investments in the businesses; payment of operating expenses; providing dividend payments to its equity shareholders and interest payments to providers of debt capital; and maintaining a supply of short-term liquid assets for deployment under extraordinary circumstances.

The main market risks to which HSBC Holdings is exposed are banking book interest rate risk and foreign currency risk. Exposure to these risks arises from short-term cash balances, funding positions held, loans to subsidiaries, investments in long-term financial assets, financial liabilities including debt capital issued, and structural foreign exchange hedges. The objective of HSBC Holdings' market risk management strategy is to manage volatility in capital resources, cash flows and distributable reserves that could be caused by movements in market parameters. Market risk for HSBC Holdings is monitored by Holdings ALCO in accordance with its risk appetite statement.

HSBC Holdings uses interest rate swaps and cross-currency interest rate swaps to manage the interest rate risk and foreign currency risk arising from its long-term debt issues. It also uses forward foreign exchange contracts to manage its structural foreign exchange exposures.

For quantitative disclosures on interest rate risk in the banking book, see pages 213 to 215.

Pension risk management processes

Our global pensions strategy is to move from defined benefit to defined contribution plans, where local law allows and it is considered competitive to do so.

In defined contribution pension plans, the contributions that HSBC is required to make are known, while the ultimate pension benefit will vary, typically with investment returns achieved by investment choices made by the employee. While the market risk to HSBC of defined contribution plans is low, the Group is still exposed to operational and reputational risk.

In defined benefit pension plans, the level of pension benefit is known. Therefore, the level of contributions required by HSBC will vary due to a number of risks, including:

- investments delivering a return below that required to provide the projected plan benefits;
- the prevailing economic environment leading to corporate failures, thus triggering write-downs in asset values (both equity and debt);
- a change in either interest rates or inflation expectations, causing an increase in the value of plan liabilities; and
- plan members living longer than expected (known as longevity risk).

Pension risk is assessed using an economic capital model that takes into account potential variations in these factors. The impact of these variations on both pension assets and pension liabilities is assessed using a one-in-200-year stress test. Scenario analysis and other stress tests are also used to support pension risk management, including the review of de-risking opportunities.

To fund the benefits associated with defined benefit plans, sponsoring Group companies, and in some instances employees, make regular contributions in accordance with advice from actuaries and in consultation with the plan's fiduciaries where relevant. These contributions are normally set to ensure that there are sufficient funds to meet the cost of the accruing benefits for the future service of active members. However, higher contributions are required when plan assets are considered insufficient to cover the existing pension liabilities. Contribution rates are typically revised annually or once every three years, depending on the plan.

The defined benefit plans invest contributions in a range of investments designed to limit the risk of assets failing to meet a plan's liabilities. Any changes in expected returns from the investments may also change future contribution requirements. In pursuit of these long-term objectives, an overall target allocation is established between asset classes of the defined benefit plan. In addition, each permitted asset class has its own benchmarks, such as stock-market or property valuation indices or liability characteristics. The benchmarks are reviewed at least once every three to five years and more frequently if required by local legislation or circumstances. The process generally involves an extensive asset and liability review.

In addition, some of the Group's pension plans hold longevity swap contracts. These arrangements provide long-term protection to the relevant plans against costs resulting from pensioners or their dependants living longer than initially expected. The most sizeable plan to do this is the HSBC Bank (UK) Pension Scheme, which holds longevity swaps covering approximately 60% of the plan's pensioner liabilities.

Capital risk in 2022

Capital overview

Capital adequacy metrics

	At	
	31 Dec 2022	31 Dec 2021
Risk-weighted assets ('RWAs') ($bn)		
Credit risk	**679.1**	680.6
Counterparty credit risk	**37.1**	35.9
Market risk	**37.6**	32.9
Operational risk	**85.9**	88.9
Total RWAs	**839.7**	838.3
Capital on a transitional basis ($bn)		
Common equity tier 1 ('CET1') capital	**119.3**	132.6
Tier 1 capital	**139.1**	156.3
Total capital	**162.4**	177.8
Capital ratios on a transitional basis (%)		
Common equity tier 1 ratio	**14.2**	15.8
Tier 1 ratio	**16.6**	18.6
Total capital ratio	**19.3**	21.2
Capital on an end point basis ($bn)		
Common equity tier 1 ('CET1') capital	**119.3**	132.6
Tier 1 capital	**139.1**	155.0
Total capital	**157.2**	167.5
Capital ratios on an end point basis (%)		
Common equity tier 1 ratio	**14.2**	15.8
Tier 1 ratio	**16.6**	18.5
Total capital ratio	**18.7**	20.0
Liquidity coverage ratio ('LCR')[1]		
Total high-quality liquid assets ($bn)	**647.0**	688.2
Total net cash outflow ($bn)	**490.8**	495.1
LCR ratio (%)	**131.8**	139.0
Net stable funding ratio ('NSFR')[1]		
Total available stable funding ($bn)	**1,552.0**	N/A
Total required stable funding ($bn)	**1,138.4**	N/A
NSFR ratio (%)	**136.3**	N/A

1 *The LCR and NSFR ratios presented in the above table are based on average value. The LCR is the average of the preceding 12 months. The NSFR is the average of the preceding four quarters. The prior periods for LCR have been restated for consistency. We have not restated the prior periods for NSFR as no comparatives are available.*

References to EU regulations and directives (including technical standards) should, as applicable, be read as references to the UK's version of such regulation or directive, as onshored into UK law under the European Union (Withdrawal) Act 2018, and as may be subsequently amended under UK law.

Capital figures and ratios in the previous table are calculated in accordance with the revised Capital Requirements Regulation and Directive, as implemented ('CRR II'). The table presents them under the transitional arrangements in CRR II for capital instruments and after their expiry, known as the end point. The end point figures in the table above include the benefit of the regulatory transitional arrangements in CRR II for IFRS 9, which are more fully described below. Where applicable, they also reflect government relief schemes intended to mitigate the impact of the Covid-19 pandemic.

At 31 December 2022, our common equity tier 1 ('CET1') capital ratio decreased to 14.2% from 15.8% at 31 December 2021. This primarily reflected a decrease of $13.3bn in our CET1 capital. The key drivers of the fall in our CET1 ratio were:

- a 0.8 percentage point impact from new regulatory requirements, which reduced CET1 capital by $3.5bn and increased risk-weighted assets ('RWAs') by $27.1bn at implementation;
- a 0.7 percentage point decrease from a $5.6bn fall in the fair value through other comprehensive income ('FVOCI');
- a 0.4 percentage point impact from RWA growth, offset by favourable foreign currency translations; and
- a 0.3 percentage point impact from the $2.0bn impairment on the reclassification of our French retail operations to held for sale.

Profits and other movements added $4.4bn to CET1 capital and a 0.7 percentage point to the CET1 ratio. This included capital deductions for deferred tax, dividends and the share buy-back.

Our Pillar 2A requirement at 31 December 2022, as per the PRA's Individual Capital Requirement based on a point-in-time assessment, was 2.6% of RWAs, of which 1.5% was required to be met by CET1. Structural foreign exchange risk is now capitalised in RWAs under Pillar 1 and assessed for Pillar 2A in the same manner as other risks.

Own funds disclosure

(Audited)

		At	
Ref*		**31 Dec 2022 $m**	31 Dec 2021 $m
	Common equity tier 1 ('CET1') capital: instruments and reserves		
1	Capital instruments and the related share premium accounts	**23,406**	23,513
	– ordinary shares	**23,406**	23,513
2	Retained earnings[1]	**127,155**	121,059
3	Accumulated other comprehensive income (and other reserves)[1]	**4,105**	8,273
5	Minority interests (amount allowed in consolidated CET1)	**4,444**	4,186
5a	Independently reviewed net profits net of any foreseeable charge or dividend	**8,633**	5,887
6	**Common equity tier 1 capital before regulatory adjustments[2]**	**167,743**	162,918
28	Total regulatory adjustments to common equity tier[2]	**(48,452)**	(30,353)
29	**Common equity tier 1 capital**	**119,291**	132,565
36	Additional tier 1 capital before regulatory adjustments	**19,836**	23,787
43	Total regulatory adjustments to additional tier 1 capital	**(60)**	(60)
44	**Additional tier 1 capital**	**19,776**	23,727
45	**Tier 1 capital**	**139,067**	156,292
51	Tier 2 capital before regulatory adjustments	**24,779**	23,018
57	Total regulatory adjustments to tier 2 capital	**(1,423)**	(1,524)
58	**Tier 2 capital**	**23,356**	21,494
59	**Total capital**	**162,423**	177,786

* *The references identify lines prescribed in the Prudential Regulatory Authority ('PRA') template, which are applicable and where there is a value.*

1 *To comply with new disclosures guidance from the PRA, with effect from 1 January 2022 we report changes in 'Retained earnings' during 2022 separately in 'Accumulated other comprehensive income'. As this change has no impact on CET1 capital, we have not restated prior periods.*

2 *From 30 September 2022, investments in non-financial institution subsidiaries or participations have been measured on an equity accounting basis in compliance with UK regulatory requirements. This change increased 'Common equity tier 1 capital before regulatory adjustments' and 'Total regulatory adjustments to common equity tier' by $13.2bn, with no impact on CET1 capital as at 31 December 2022. As this change has immaterial impact on CET1 capital as at 31 December 2021, we have not restated the comparatives.*

Throughout 2022, we complied with the PRA's regulatory capital adequacy requirements, including those relating to stress testing.

Regulatory and other developments

We expect the recently announced reduction of the Hong Kong Monetary Authority's risk weight floor for residential mortgages from 25% to 15% to improve our CET1 ratio by 0.1 percentage points with effect from 1 January 2023. This reduction will be partly offset by a change to the sourcing and risk-weighting of balances we proportionally consolidate for our associates.

During 2023, our CET1 ratio will continue to be affected by strategic decisions we have taken.

Based on our capital position on 31 December 2022, we would expect that on completing the planned sale of our banking operations in Canada, branch operations in Greece, and our retail banking operations in France, we would improve our CET1 ratio by around 1.4 percentage points, net of the impact from foreign exchange hedges related to the proceeds from the planned sale of our Canada business. The exact timing and impact on our capital position of these transactions may change as the balance sheets being disposed evolve in 2023.

Risk-weighted assets

RWAs by global business

	WPB	CMB	GBM	Corporate Centre	Total
	$bn	$bn	$bn	$bn	$bn
Credit risk	149.3	307.4	146.2	76.2	679.1
Counterparty credit risk	0.9	0.7	33.8	1.7	37.1
Market risk	1.6	1.1	23.6	11.3	37.6
Operational risk	31.1	25.6	29.9	(0.7)	85.9
At 31 Dec 2022	**182.9**	**334.8**	**233.5**	**88.5**	**839.7**
At 31 Dec 2021	178.3	332.9	236.2	90.9	838.3

RWAs by geographical region

	Europe	Asia	MENA	North America	Latin America	Total
	$bn	$bn	$bn	$bn	$bn	$bn
Credit risk	180.3	330.2	49.8	87.4	31.4	679.1
Counterparty credit risk	18.9	10.4	2.7	4.2	0.9	37.1
Market risk[1]	28.2	28.6	2.6	4.2	1.2	37.6
Operational risk	23.8	40.1	5.9	10.7	5.4	85.9
At 31 Dec 2022	**251.2**	**409.3**	**61.0**	**106.5**	**38.9**	**839.7**
At 31 Dec 2021	261.1	396.3	60.2	110.4	35.9	838.3

1 *RWAs are non-additive across geographical regions due to market risk diversification effects within the Group.*

RWA movement by global business by key driver

	Credit risk, counterparty credit risk and operational risk					
	WPB	CMB	GBM	Corporate Centre	Market risk	Total RWAs
	$bn	$bn	$bn	$bn	$bn	$bn
RWAs at 1 Jan 2022	176.6	332.0	215.9	80.9	32.9	838.3
Asset size	6.5	13.7	(3.5)	(0.6)	4.8	20.9
Asset quality	1.6	(1.1)	3.4	(0.8)	—	3.1
Model updates	(3.1)	1.0	(0.7)	(0.1)	—	(2.9)
Methodology and policy	11.6	8.9	4.7	(0.9)	(0.1)	24.2
Acquisitions and disposals	(2.0)	—	—	—	—	(2.0)
Foreign exchange movements[1]	(9.9)	(20.8)	(9.9)	(1.3)	—	(41.9)
Total RWA movement	4.7	1.7	(6.0)	(3.7)	4.7	1.4
RWAs at 31 Dec 2022	181.3	333.7	209.9	77.2	37.6	839.7

RWA movement by geographical region by key driver

	Credit risk, counterparty credit risk and operational risk						
	Europe	Asia	MENA	North America	Latin America	Market risk	Total RWAs
	$bn	$bn	$bn	$bn	$bn	$bn	$bn
RWAs at 1 Jan 2022	236.5	371.0	57.9	105.1	34.9	32.9	838.3
Asset size	1.5	3.9	3.6	1.9	5.2	4.8	20.9
Asset quality	(2.6)	7.1	—	(1.7)	0.3	—	3.1
Model updates	(3.0)	0.2	0.1	(0.2)	—	—	(2.9)
Methodology and policy	11.2	10.5	1.4	1.0	0.2	(0.1)	24.2
Acquisitions and disposals	—	—	(0.2)	(1.8)	—	—	(2.0)
Foreign exchange movements[1]	(20.6)	(12.0)	(4.4)	(2.0)	(2.9)	—	(41.9)
Total RWA movement	(13.5)	9.7	0.5	(2.8)	2.8	4.7	1.4
RWAs at 31 Dec 2022	223.0	380.7	58.4	102.3	37.7	37.6	839.7

1 *Foreign exchange movements in this disclosure are computed by retranslating the RWAs into US dollars for non-US dollar branches, subsidiaries, joint ventures and associates.*

Risk-weighted assets ('RWAs') rose by $1.4bn during the year. An increase of $43.3bn, driven by regulatory change and lending growth, was partly offset by a decrease of $41.9bn due to favourable foreign currency translation differences. At 31 December 2022, our cumulative RWA saves as part of our transformation programme were $128bn.

Asset size

The $20.9bn increase in RWAs due to asset size movement included an increase of $4.8bn in market risk RWAs, mostly attributable to heightened market risk volatility, and an increase in transactional and structural foreign exchange exposures. The $13.7bn increase in CMB RWAs reflected corporate loan growth in Europe, Asia and North America.

GBM RWAs fell by $3.5bn due to a reduction in counterparty credit risk of $2.8bn, driven by mark-to-market movements and management initiatives. Lower lending in Europe further reduced RWAs, which was partly offset by growth in Asia and Latin America.

WPB RWAs increased by $6.5bn, primarily due to lending growth in Asia and Latin America, largely in term lending and the mortgage portfolio.

Asset quality

The increase of $3.1bn RWAs was mostly driven by credit migration, primarily in Europe and Asia and partly offset against portfolio mix changes.

Model updates

The $3.1bn RWA decrease in WPB was mostly due to the implementation of a credit card model in Hong Kong and a retail model in France. A reduction of $1.6bn RWAs in GBM was driven by the introduction of a counterparty credit risk equity model in Europe. This was mostly offset by a $2.1bn increase in RWAs in GBM and CMB due to a commercial property loan model in Asia.

Methodology and policy

The $24.2bn increase in RWAs was driven by the regulatory changes of $27.1bn for revised IRB modelling requirements and the UK's implementation of the CRR II rules.

These increases were partly offset by reductions predominantly due to data enhancements driven by internal and external reviews of our regulatory reporting processes, and the reversal of the beneficial changes to the treatment of software assets in Corporate Centre.

Acquisitions and disposals

The $2.0bn RWA decrease was mainly due to the $1.8bn sale of WPB retail branches in US.

Leverage ratio[1]

	At	
	31 Dec 2022 $bn	31 Dec 2021 $bn
Tier 1 capital	**139.1**	155.0
Total leverage ratio exposure	**2,417.2**	2,962.7
	%	%
Leverage ratio	**5.8**	5.2

1 *The CRR II regulatory transitional arrangements for IFRS 9 are applied in the leverage ratio calculation. This calculation is in line with the UK leverage rules that were implemented on 1 January 2022, and excludes central bank claims. Comparatives for 2021 are reported based on the disclosure rules in force at that time, and include claims on central banks.*

Our leverage ratio was 5.8% at 31 December 2022, up from 5.2% at 31 December 2021. The improvement was mainly due to the exclusion of central bank claims following the implementation of the UK leverage ratio framework from 1 January 2022, and foreign exchange translation movement. This was partly offset by a decline in tier 1 capital.

At 31 December 2022, our UK minimum leverage ratio requirement of 3.25% was supplemented by a leverage ratio buffer of 0.8%, which consists of an additional leverage ratio buffer of 0.7% and a countercyclical leverage ratio buffer of 0.1%. These buffers translated into capital values of $16.9bn and $2.4bn respectively. We exceeded these leverage requirements.

Regulatory transitional arrangements for IFRS 9 'Financial Instruments'

We have adopted the regulatory transitional arrangements in CRR II for IFRS 9, including paragraph four of article 473a. Our capital and ratios are presented under these arrangements throughout the tables in this section, including in the end point figures. Without their application, our CET1 ratio would be 14.2%.

The IFRS 9 regulatory transitional arrangements allow banks to add back to their capital base a proportion of the impact that IFRS 9 has upon their loan loss allowances. The impact is defined as:

- the increase in loan loss allowances on day one of IFRS 9 adoption; and
- any subsequent increase in ECL in the non-credit-impaired book thereafter.

Any add-back must be tax affected and accompanied by a recalculation of deferred tax, exposure and RWAs. The impact is calculated separately for portfolios using the standardised ('STD') and internal ratings-based ('IRB') approaches. For IRB portfolios, there is no add-back to capital unless loan loss allowances exceed regulatory 12-month expected losses.

The EU's CRR 'Quick Fix' relief package increased the 2022 scalar from 25% to 75% the relief that banks may take for loan loss allowances recognised since 1 January 2020 on the non-credit-impaired book.

In the current period, the add-back to CET1 capital amounted to $0.4bn under the STD approach with a tax impact of $0.1bn. At 31 December 2021, the add-back to the capital base under the STD approach was $1.0bn with a tax impact of $0.2bn.

Pillar 3 disclosure requirements

Pillar 3 of the Basel regulatory framework is related to market discipline and aims to make financial services firms more transparent by requiring publication of wide-ranging information on their risks, capital and management. Our *Pillar 3 Disclosures at 31 December 2022* is published on our website at www.hsbc.com/investors.

Liquidity and funding risk in 2022

Liquidity metrics

At 31 December 2022, all of the Group's material operating entities were above regulatory minimum liquidity and funding levels.

Each entity maintains sufficient unencumbered liquid assets to comply with local and regulatory requirements. The liquidity value of these assets for each entity is shown in the following table, along with the individual LCR ratio on a local regulatory requirements basis wherever applicable. Where local regulatory requirements are not applicable, the PRA LCR is shown. The local basis may differ from PRA measures due to differences in the way regulators have implemented the Basel III standards.

Each entity maintains a sufficient stable funding profile and is assessed using the NSFR or other appropriate metrics.

In addition to regulatory metrics, we use a wide set of measures to manage our liquidity and funding profile.

The Group liquidity and funding position on an average basis is analysed in the following sections.

Operating entities' liquidity[1]

	At 31 December 2022			
	LCR	**HQLA**	**Net outflows**	**NSFR**
	%	**$bn**	**$bn**	**%**
HSBC UK Bank plc (ring-fenced bank)[2]	**226**	**136**	**60**	**164**
HSBC Bank plc (non-ring-fenced bank)[3,4]	**143**	**128**	**90**	**115**
The Hongkong and Shanghai Banking Corporation – Hong Kong branch[5]	**179**	**147**	**82**	**130**
HSBC Singapore[6]	**247**	**21**	**9**	**173**
Hang Seng Bank	**228**	**50**	**22**	**156**
HSBC Bank China	**183**	**23**	**13**	**132**
HSBC Bank USA	**164**	**85**	**52**	**131**
HSBC Continental Europe[7,8]	**151**	**55**	**37**	**132**
HSBC Bank Middle East Ltd – UAE branch	**239**	**12**	**5**	**158**
HSBC Canada[7]	**149**	**22**	**15**	**122**
HSBC Mexico	**155**	**8**	**5**	**129**
	At 31 December 2021			
HSBC UK Bank plc (ring-fenced bank)[2]	222	143	64	176
HSBC Bank plc (non-ring-fenced bank)[3,4]	142	118	84	115
The Hongkong and Shanghai Banking Corporation – Hong Kong branch[5]	190	139	74	136
HSBC Singapore[6]	277	19	7	165
Hang Seng Bank	200	48	24	145
HSBC Bank China	155	23	15	143
HSBC Bank USA	169	104	62	145
HSBC Continental Europe[7]	142	56	39	131
HSBC Bank Middle East Ltd – UAE branch	203	12	6	154
HSBC Canada[7]	154	25	16	125
HSBC Mexico	210	9	4	138

1 *The LCR and NSFR ratios presented in the above table are based on average values. The LCR is the average of the preceding 12 months. The NSFR is the average of the preceding four quarters. Prior period numbers have been restated for consistency.*
2 *HSBC UK Bank plc refers to the HSBC UK liquidity group, which comprises four legal entities: HSBC UK Bank plc, Marks and Spencer Financial Services plc, HSBC Private Bank (UK) Ltd and HSBC Trust Company (UK) Limited, managed as a single operating entity, in line with the application of UK liquidity regulation as agreed with the PRA.*
3 *HSBC Bank plc includes overseas branches and special purpose entities consolidated by HSBC for financial statements purposes.*
4 *HSBC Bank plc implemented a strategic data enhancement that resulted in a reclassification of some securities. This reclassification drove a reduction in total HQLA and corresponding LCR as of 31 December 2022. Prior period numbers have been restated for consistency.*
5 *The Hongkong and Shanghai Banking Corporation – Hong Kong branch represents the material activities of The Hongkong and Shanghai Banking Corporation Limited.*
6 *HSBC Singapore includes HSBC Bank Singapore Limited and The Hongkong and Shanghai Banking Corporation – Singapore branch. Liquidity and funding risk is monitored and controlled at country level in line with the local regulator's approval. Prior period numbers have been restated for consistency.*
7 *HSBC Continental Europe and HSBC Canada represent the consolidated banking operations of the Group in France and Canada, respectively. HSBC Continental Europe and HSBC Canada are each managed as single distinct operating entities for liquidity purposes.*
8 *In response to the requirement for an intermediate parent undertaking in line with EU Capital Requirements Directive ('CRD V'), HSBC Continental Europe acquired control of HSBC Germany and HSBC Bank Malta on 30 November 2022. The averages for LCR and NSFR includes the impact of the inclusion of two entities for November 2022 and December 2022.*

Consolidated liquidity metrics

Net stable funding ratio

From 1 January 2022, we started managing funding risk based on the PRA's NSFR rules. The Group's NSFR at 31 December 22, calculated from the average of the four preceding quarters average, was 136%.

	At[1]		
	31 Dec 2022 $bn	30 Jun 2022 $bn	31 Dec 2021 $bn
Total available stable funding ($bn)	**1,552**	1,567	N/A
Total required stable funding ($bn)	**1,138**	1,139	N/A
NSFR ratio (%)	**136**	138	N/A

1 *Group NSFR numbers above are based on average values. The NSFR number is the average of the preceding quarters.*

Liquidity coverage ratio

At 31 December 2022, the average HQLA held at entity level amounted to $812bn (31 December 2021: $861bn). Since 2021, we have implemented a revised approach to the application of the requirements under the European Commission Delegated Regulation (EU) 2015/61 and PRA rule book. This revised approach was used to reflect the impact of limitations in the transferability of entity liquidity around the Group, and resulted in an adjustment of $165bn to LCR HQLA and $9bn to LCR inflows on an average basis. The change in methodology was designed to better incorporate local regulatory restrictions on the transferability of liquidity.

	At[1]		
	31 Dec 2022 $bn	30 Jun 2022 $bn	31 Dec 2021 $bn
High-quality liquid assets (in entities)	**812**	848	861
EC Delegated Act adjustment for transfer restrictions[2]	**(174)**	(181)	(176)
Group LCR HQLA	**647**	676	688
Net outflows	**491**	500	495
Liquidity coverage ratio	**132%**	135%	139%

1 *Group LCR numbers above are based on average values. The LCR is the average of the preceding 12 months.*
2 *This includes adjustments made to high-quality liquid assets and inflows in entities to reflect liquidity transfer restrictions.*

Liquid assets

After the $165bn adjustment, the average Group LCR HQLA of $647bn (31 December 2021: $688bn) was held in a range of asset classes and currencies. Of these, 97% were eligible as level 1 (31 December 2021: 93%).

The following tables reflect the composition of the average liquidity pool by asset type and currency at 31 December 2022.

Liquidity pool by asset type[1]

	Liquidity pool $bn	**Cash $bn**	**Level 1[2] $bn**	**Level 2[2] $bn**
Cash and balance at central bank	**344**	**344**	**—**	**—**
Central and local government bonds	**288**	**—**	**272**	**16**
Regional government public sector entities	**2**	**—**	**2**	**—**
International organisation and multilateral developments banks	**9**	**—**	**9**	**—**
Covered bonds	**2**	**—**	**—**	**2**
Other	**2**	**—**	**1**	**1**
Total at 31 Dec 2022	**647**	**344**	**284**	**19**
Total at 31 Dec 2021	688	390	251	47

1 *Group liquid assets numbers are based on average values.*
2 *As defined in EU regulations, level 1 assets means 'assets of extremely high liquidity and credit quality', and level 2 assets means 'assets of high liquidity and credit quality'.*

Liquidity pool by currency[1]

	$ $bn	**£ $bn**	**€ $bn**	**HK$ $bn**	**Other $bn**	**Total $bn**
Liquidity pool at 31 Dec 2022	**167**	**191**	**98**	**54**	**137**	**647**
Liquidity pool at 31 Dec 2021	176	206	117	67	122	688

1 *Group liquid assets numbers are based on average values.*

Sources of funding

Our primary sources of funding are customer current accounts and savings deposits payable on demand or at short notice. We issue secured and unsecured wholesale securities to supplement customer deposits, meet regulatory obligations and to change the currency mix, maturity profile or location of our liabilities.

The following 'Funding sources' and 'Funding uses' tables provide a view of how our consolidated balance sheet is funded. In practice, all the principal operating entities are required to manage liquidity and funding risk on a stand-alone basis.

The tables analyse our consolidated balance sheet according to the assets that primarily arise from operating activities and the sources of funding primarily supporting these activities. Assets and liabilities that do not arise from operating activities are presented at a net balancing source or deployment of funds.

Funding sources

(Audited)

	2022 $m	2021 $m
Customer accounts	**1,570,303**	1,710,574
Deposits by banks	**66,722**	101,152
Repurchase agreements – non-trading	**127,747**	126,670
Debt securities in issue	**78,149**	78,557
Cash collateral, margin and settlement accounts	**88,468**	65,452
Liabilities of disposal groups held for sale[1]	**114,597**	9,005
Subordinated liabilities	**22,290**	20,487
Financial liabilities designated at fair value	**127,327**	145,502
Liabilities under insurance contracts	**114,844**	112,745
Trading liabilities	**72,353**	84,904
– repos	**16,254**	11,004
– stock lending	**3,541**	2,332
– other trading liabilities	**52,558**	71,568
Total equity	**196,028**	206,777
Other balance sheet liabilities	**387,702**	296,114
At 31 Dec	**2,966,530**	2,957,939

Funding uses

(Audited)

	2022 $m	2021 $m
Loans and advances to customers	**924,854**	1,045,814
Loans and advances to banks	**104,882**	83,136
Reverse repurchase agreements – non-trading	**253,754**	241,648
Cash collateral, margin and settlement accounts	**82,986**	59,884
Assets held for sale[1]	**115,919**	3,411
Trading assets	**218,093**	248,842
– reverse repos	**14,797**	14,994
– stock borrowing	**10,706**	8,082
– other trading assets	**192,590**	225,766
Financial investments	**425,564**	446,274
Cash and balances with central banks	**327,002**	403,018
Other balance sheet assets	**513,476**	425,912
At 31 Dec	**2,966,530**	2,957,939

1 *'Liabilities of disposal groups held for sale' includes $85bn and $27bn and 'Assets held for sale' includes $90bn and $23bn, in respect of planned sale of our banking business in Canada and planned sale of our retail banking operations in France respectively, that were classified as assets held for sale during 2022.*

Wholesale term debt maturity profile

The maturity profile of our wholesale term debt obligations is set out in the following table. The balances in the table are not directly comparable with those in the consolidated balance sheet because the table presents gross cash flows relating to principal payments and not the balance sheet carrying value, which includes debt securities and subordinated liabilities measured at fair value.

Wholesale funding cash flows payable by HSBC under financial liabilities by remaining contractual maturities[1]

	Due not more than 1 month	Due over 1 month but not more than 3 months	Due over 3 months but not more than 6 months	Due over 6 months but not more than 9 months	Due over 9 months but not more than 1 year	Due over 1 year but not more than 2 years	Due over 2 years but not more than 5 years	Due over 5 years	Total
	$m	$m	$m	$m	$m	$m	$m	$m	$m
Debt securities issued	**11,959**	**11,266**	**12,532**	**8,225**	**8,212**	**26,669**	**52,435**	**52,952**	**184,250**
– unsecured CDs and CP	**3,821**	**6,017**	**7,088**	**4,137**	**3,123**	**1,264**	**707**	**1,004**	**27,161**
– unsecured senior MTNs	**5,973**	**2,351**	**3,534**	**1,363**	**3,238**	**19,229**	**44,023**	**44,021**	**123,732**
– unsecured senior structured notes	**1,264**	**1,421**	**1,247**	**1,850**	**1,627**	**4,463**	**2,609**	**5,990**	**20,471**
– secured covered bonds	**—**	**—**	**—**	**—**	**—**	**—**	**602**	**—**	**602**
– secured asset-backed commercial paper	**690**	**—**	**—**	**—**	**—**	**—**	**—**	**—**	**690**
– secured ABS	**15**	**28**	**40**	**38**	**36**	**123**	**656**	**220**	**1,156**
– others	**196**	**1,449**	**623**	**837**	**188**	**1,590**	**3,838**	**1,717**	**10,438**
Subordinated liabilities	**—**	**—**	**11**	**160**	**—**	**2,000**	**5,581**	**25,189**	**32,941**
– subordinated debt securities	**—**	**—**	**11**	**160**	**—**	**2,000**	**5,581**	**23,446**	**31,198**
– preferred securities	**—**	**—**	**—**	**—**	**—**	**—**	**—**	**1,743**	**1,743**
At 31 Dec 2022	**11,959**	**11,266**	**12,543**	**8,385**	**8,212**	**28,669**	**58,016**	**78,141**	**217,191**
Debt securities issued	17,602	14,593	9,293	9,249	5,233	25,058	55,388	56,639	193,055
– unsecured CDs and CP	4,586	6,795	4,281	2,837	1,189	947	834	931	22,400
– unsecured senior MTNs	8,542	4,140	2,633	2,078	2,074	14,932	45,063	45,259	124,721
– unsecured senior structured notes	2,090	1,610	1,017	975	1,206	2,996	3,382	8,604	21,880
– secured covered bonds	—	1,137	—	997	—	2,417	1,997	—	6,548
– secured asset-backed commercial paper	956	—	—	—	—	—	—	—	956
– secured ABS	1	133	33	31	193	896	1,696	98	3,081
– others	1,427	778	1,329	2,331	571	2,870	2,416	1,747	13,469
Subordinated liabilities	—	—	11	—	—	417	7,023	21,274	28,725
– subordinated debt securities	—	—	11	—	—	417	7,023	19,427	26,878
– preferred securities	—	—	—	—	—	—	—	1,847	1,847
At 31 Dec 2021	17,602	14,593	9,304	9,249	5,233	25,475	62,411	77,913	221,780

1 *Excludes financial liabilities of disposal groups.*

Structural foreign exchange risk in 2022

Structural foreign exchange exposures represent net assets or capital investments in subsidiaries, branches, joint arrangements or associates, together with any associated hedges, the functional currencies of which are currencies other than the US dollar. Exchange differences on structural exposures are usually recognised in 'other comprehensive income'.

Net structural foreign exchange exposures

	2022					
	Net investment in foreign operations (excl non-controlling interest)	Net investment hedges	Structural foreign exchange exposures (pre-economic hedges)	Economic hedges – structural FX hedges[1]	Economic hedges – equity securities (AT1)[2]	Net structural foreign exchange exposures
Currency of structural exposure	**$m**	**$m**	**$m**	**$m**	**$m**	**$m**
Hong Kong dollars	**47,204**	**(4,597)**	**42,607**	**(8,363)**	**—**	**34,244**
Pounds sterling	**39,535**	**(14,000)**	**25,535**	**—**	**(1,205)**	**24,330**
Chinese renminbi	**35,801**	**(3,532)**	**32,269**	**(994)**	**—**	**31,275**
Euros	**15,182**	**(777)**	**14,405**	**—**	**(2,402)**	**12,003**
Canadian dollars	**4,402**	**(811)**	**3,591**	**—**	**—**	**3,591**
Indian rupees	**4,967**	**(1,380)**	**3,587**	**—**	**—**	**3,587**
Mexican pesos	**3,989**	**—**	**3,989**	**—**	**—**	**3,989**
Saudi riyals	**4,182**	**(109)**	**4,073**	**—**	**—**	**4,073**
UAE dirhams	**4,534**	**(731)**	**3,803**	**(2,285)**	**—**	**1,518**
Malaysian ringgit	**2,715**	**—**	**2,715**	**—**	**—**	**2,715**
Singapore dollars	**3,108**	**(358)**	**2,750**	**—**	**(559)**	**2,191**
Australian dollars	**2,264**	**—**	**2,264**	**—**	**—**	**2,264**
Taiwanese dollars	**2,058**	**(1,140)**	**918**	**—**	**—**	**918**
Indonesian rupiah	**1,453**	**(469)**	**984**	**—**	**—**	**984**
Swiss francs	**1,233**	**(727)**	**506**	**—**	**—**	**506**
Korean won	**1,283**	**(817)**	**466**	**—**	**—**	**466**
Thai baht	**908**	**—**	**908**	**—**	**—**	**908**
Egyptian pound	**746**	**—**	**746**	**—**	**—**	**746**
Qatari rial	**785**	**(200)**	**585**	**(277)**	**—**	**308**
Argentinian peso	**968**	**—**	**968**	**—**	**—**	**968**
Others, each less than $700m	**5,135**	**(495)**	**4,640**	**(36)**	**—**	**4,604**
At 31 Dec	**182,452**	**(30,143)**	**152,309**	**(11,955)**	**(4,166)**	**136,188**
	2021					
Hong Kong dollars	44,714	(4,992)	39,722	(7,935)	—	31,787
Pounds sterling	47,935	(15,717)	32,218	—	(1,353)	30,865
Chinese renminbi	35,879	—	35,879	(1,255)	—	34,624
Euros	14,671	—	14,671	—	(4,262)	10,409
Canadian dollars	5,147	(1,093)	4,054	—	—	4,054
Indian rupees	5,106	—	5,106	—	—	5,106
Mexican pesos	3,598	—	3,598	—	—	3,598
Saudi riyals	4,115	—	4,115	—	—	4,115
UAE dirhams	4,155	(700)	3,455	(1,985)	—	1,470
Malaysian ringgit	2,713	—	2,713	—	—	2,713
Singapore dollars	2,339	(680)	1,659	—	(1,298)	361
Australian dollars	2,300	—	2,300	—	—	2,300
Taiwanese dollars	2,105	(1,019)	1,086	—	—	1,086
Indonesian rupiah	1,748	—	1,748	—	—	1,748
Swiss francs	1,107	(809)	298	—	—	298
Korean won	1,219	(696)	523	—	—	523
Thai baht	859	—	859	—	—	859
Egyptian pound	1,051	—	1,051	—	—	1,051
Qatari rial	725	—	725	(332)	—	393
Argentinian peso	795	—	795	—	—	795
Others, each less than $700m	5,242	(200)	5,042	(36)	—	5,006
At 31 Dec	187,523	(25,906)	161,617	(11,543)	(6,913)	143,161

1 *Represents hedges that do not qualify as net investment hedges for accounting purposes.*
2 *Represents foreign currency-denominated preference share and AT1 instruments. These are accounted for at historical cost under IFRSs and do not qualify as net investment hedges for accounting purposes. The gain or loss arising from changes in the US dollar value of these instruments is recognised on redemption in retained earnings.*

For definition of structural foreign exchange exposures, see page 205.

Interest rate risk in the banking book in 2022

Net interest income sensitivity

The following tables set out the assessed impact to a hypothetical base case projection of our banking book NII under the following scenarios:

- an immediate shock of 25 basis points ('bps') to the current market-implied path of interest rates across all currencies on 1 January 2023 (effects over one year and five years); and
- an immediate shock of 100bps to the current market-implied path of interest rates across all currencies on 1 January 2023 (effects over one year and five years).

The sensitivities shown represent a hypothetical simulation of the base case NII, assuming a static balance sheet (specifically no assumed migration from current account to term deposits), no management actions from Global Treasury and a simplified 50% pass-on assumption applied for material entities. This also incorporates the effect of interest rate behaviouralisation, hypothetical managed rate product pricing assumptions, prepayment of mortgages and deposit stability. The sensitivity calculations exclude pensions, insurance and investments in subsidiaries.

The NII sensitivity analysis performed in the case of a down-shock does not include floors to market rates, and it does not include floors on some wholesale assets and liabilities. However, floors have been maintained for deposits and loans to customers where this is contractual or where negative rates would not be applied.

As market and policy rates move, the degree to which these changes are passed on to customers will vary based on a number of factors, including the absolute level of market rates, regulatory and contractual frameworks, and competitive dynamics. To aid comparability between markets, we have simplified the basis of preparation for our disclosure, and have used a 50% pass-on assumption for major entities on certain interest bearing deposits. Our pass-through asset assumptions are largely in line with our contractual agreements or established market practice, which typically results in a significant portion of interest rate changes being passed on.

The one-year and five-year NII sensitivities in the down-shock scenarios decreased at 31 December 2022 at Group level when compared with 31 December 2021. This was driven by changes in the forecasted yield curves and changes in balance sheet composition.

Immediate interest rate rises of 25bps and 100bps would increase projected NII for the 12 months to 31 December 2023 by $884m and $3,535m, respectively. Immediate interest rate falls of 25bps and 100bps would decrease projected NII for the 12 months to 31 December 2023 by $973m and $3,969m, respectively.

The sensitivity of NII for 12 months decreased by $1,879m in the plus 100bps parallel shock and by $1,792m in the minus 100bps parallel shock, comparing 31 December 2022 with 31 December 2021. The decrease in the sensitivity of NII for 12 months in the plus 100bps parallel shock was mainly driven by changes in market pricing, reflecting current market expectations of main policy rates. The key drivers of the reduction in NII sensitivity are the reduced effects of flooring as rates have moved higher, deposit migration, and management actions.

The sensitivities broken down by currency in the tables below do not include the impact of vanilla foreign exchange swaps to optimise cash management across the Group.

For further details of measurement of interest rate risk in the banking book, see page 204.

NII sensitivity to an instantaneous change in yield curves (12 months) – 1 year NII sensitivity by currency

	Currency					
	\$	**HK\$**	**£**	**€**	**Other**	**Total**
	\$m	**\$m**	**\$m**	**\$m**	**\$m**	**\$m**
Change in Jan 2023 to Dec 2023 (based on balance sheet at 31 December 2022)						
+25bps parallel	**(66)**	**107**	**245**	**167**	**431**	**884**
-25bps parallel	**64**	**(115)**	**(289)**	**(194)**	**(439)**	**(973)**
+100bps parallel	**(267)**	**413**	**1,026**	**674**	**1,689**	**3,535**
-100bps parallel	**236**	**(476)**	**(1,177)**	**(765)**	**(1,787)**	**(3,969)**
Change in Jan 2022 to Dec 2022 (based on balance sheet at 31 December 2021)						
+25bps parallel	125	265	420	106	393	1,309
-25bps parallel	(257)	(536)	(594)	(170)	(395)	(1,952)
+100bps parallel	458	1,054	1,739	632	1,532	5,414
-100bps parallel	(466)	(1,020)	(2,070)	(595)	(1,610)	(5,761)

NII sensitivity to an instantaneous change in yield curves (5 years) – Cumulative 5 years NII sensitivity by currency

	Currency					
	\$	**HK\$**	**£**	**€**	**Other**	**Total**
	\$m	**\$m**	**\$m**	**\$m**	**\$m**	**\$m**
Change in Jan 2023 to Dec 2027 (based on balance sheet at 31 December 2022)						
+25bps parallel	**192**	**668**	**2,315**	**924**	**2,500**	**6,599**
-25bps parallel	**(282)**	**(688)**	**(2,336)**	**(1,044)**	**(2,498)**	**(6,848)**
+100bps parallel	**673**	**2,401**	**9,254**	**3,764**	**9,765**	**25,857**
-100bps parallel	**(1,522)**	**(3,004)**	**(9,454)**	**(4,173)**	**(10,317)**	**(28,470)**
Change in Jan 2022 to Dec 2026 (based on balance sheet at 31 December 2021)						
+25bps parallel	1,026	1,410	3,333	827	2,510	9,106
-25bps parallel	(1,701)	(2,887)	(4,216)	(997)	(2,600)	(12,401)
+100bps parallel	3,922	4,870	13,389	3,919	9,841	35,941
-100bps parallel	(5,060)	(7,052)	(14,893)	(3,571)	(10,481)	(41,057)

The net interest income sensitivities arising from the scenarios presented in the tables above are not directly comparable. This is due to timing differences relating to interest rate changes and the repricing of assets and liabilities.

NII sensitivity to an instantaneous change in yield curves (5 years) – NII sensitivity by years

	Year 1 $m	Year 2 $m	Year 3 $m	Year 4 $m	Year 5 $m	Total $m
Change in Jan 2023 to Dec 2027 (based on balance sheet at 31 December 2022)						
+25bps parallel	**884**	**1,145**	**1,378**	**1,550**	**1,642**	**6,599**
-25bps parallel	**(973)**	**(1,178)**	**(1,420)**	**(1,579)**	**(1,699)**	**(6,848)**
+100bps parallel	**3,535**	**4,565**	**5,367**	**5,962**	**6,429**	**25,857**
-100bps parallel	**(3,969)**	**(4,944)**	**(5,925)**	**(6,565)**	**(7,067)**	**(28,470)**
Change in Jan 2022 to Dec 2026 (based on balance sheet at 31 December 2021)						
+25bps parallel	1,309	1,758	1,896	2,002	2,141	9,106
-25bps parallel	(1,952)	(2,324)	(2,593)	(2,687)	(2,845)	(12,401)
+100bps parallel	5,414	6,738	7,492	7,937	8,359	35,941
-100bps parallel	(5,761)	(7,664)	(8,675)	(9,354)	(9,603)	(41,057)

Non-trading value at risk

Non-trading portfolios comprise positions that primarily arise from the interest rate management of our retail and commercial banking assets and liabilities, financial investments measured at fair value through other comprehensive income, debt instruments measured at amortised cost, and exposures arising from our insurance operations.

Value at risk of non-trading portfolios

Value at risk ('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 the market risk management of non-trading portfolios to have a complete picture of risk, complementing risk sensitivity analysis.

Our models are predominantly based on historical simulation that incorporates the following features:

- historical market rates and prices, which are calculated with reference to interest rates, credit spreads and the associated volatilities;
- potential market movements that are calculated with reference to data from the past two years; and
- calculations to a 99% confidence level and using a one-day holding period.

Although a valuable guide to risk, VaR is used for non-trading portfolios with awareness of its limitations. For example:

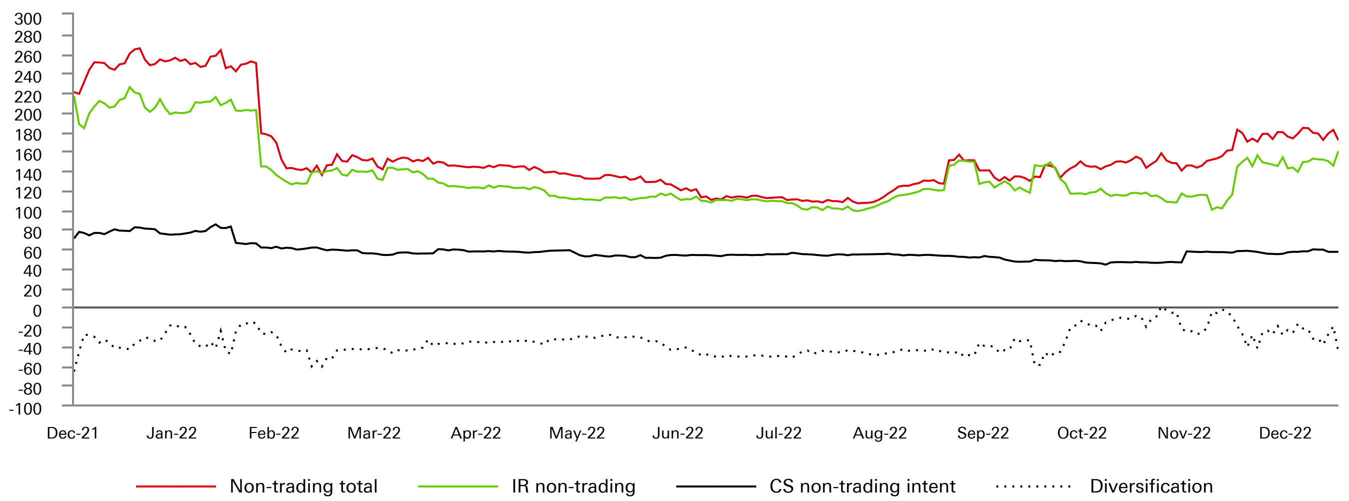
- The use of historical data as a proxy for estimating future market moves may not encompass all potential market events, particularly those that are extreme in nature. As the model is calibrated on the last 500 business days, it does not adjust instantaneously to a change in the market regime.
- The use of a one-day holding period for risk management purposes of non-trading books is only an indication of exposure and not indicative of the time period required to hedge or liquidate positions.
- The use of a 99% confidence level by definition does not take into account losses that might occur beyond this level of confidence.

The interest rate risk on the fixed-rate securities issued by HSBC Holdings is not included in the Group non-trading VaR. The management of this risk is described on page 217. Non-trading VaR also excludes the equity risk on securities held at fair value and non-trading book foreign exchange risk.

The VaR for non-trading activity at 31 December 2022 was lower than at 31 December 2021.

The daily levels of total non-trading VaR in 2022 are set out in the graph below.

Daily VaR (non-trading portfolios), 99% 1 day ($m)



The Group non-trading VaR for 2022 is shown in the table below.

Non-trading VaR, 99% 1 day

(Audited)

	Interest rate $m	Credit spread $m	Portfolio diversification[1] $m	Total[2] $m
Balance at 31 Dec 2022	**159.8**	**56.6**	**(45.3)**	**171.1**
Average	**134.6**	**56.9**	**(35.9)**	**155.6**
Maximum	**225.5**	**84.7**		**265.3**
Minimum	**98.3**	**43.4**		**106.3**
Balance at 31 Dec 2021	216.4	70.3	(66.3)	220.4
Average	200.7	76.9	(40.3)	237.3
Maximum	248.7	99.3	—	298.8
Minimum	163.3	64.7	—	193.5

1 *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 – such as interest rate and credit spreads – 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 occurs on different days for different risk types, it is not meaningful to calculate a portfolio diversification benefit for these measures.*

2 *The total VaR is non-additive across risk types due to diversification effects.*

The decrease at the end of February was primarily driven by Covid-19 scenarios moving out of the two-year historical scenario window used to calculate VaR. Non-trading VaR remained at relatively low levels throughout the next two quarters, with an increase in duration risk exposure in Global Treasury during November driving an increase in both interest rate and total VaR. The average portfolio diversification effect between interest rate and credit spread exposure remained relatively stable between 2021 and 2022.

Sensitivity of capital and reserves

Hold-to-collect-and-sell stressed VaR is a quantification of the potential losses to a 99% confidence level of the portfolio of high-quality liquid assets held under a hold-to-collect-and-sell business model in Global Treasury. The portfolio is accounted for at fair value through other comprehensive income together with the derivatives held in designated hedging relationships with these securities. The mark-to-market of this portfolio therefore has an impact on CET1. Stressed VaR is quantified based on the worst losses over a one-year period going back to the beginning of 2007 and the assumed holding period is 60 days. At the end of December 2022, the stressed VaR of the portfolio was $2.15bn (2021: $3.63bn). The decrease was primarily due to actions taken to reduce the overall duration risk of the portfolio in order to dampen the capital impact from higher interest rates.

Alongside our monitoring of the stressed VaR of this portfolio, we also monitor the sensitivity of reported cash flow hedging reserves to interest rate movements on a yearly basis by assessing the expected reduction in valuation of cash flow hedges due to parallel movements of plus or minus 100bps in all yield curves.

The following table describes the sensitivity of our cash flow hedge reported reserves to the stipulated movements in yield curves at the year end. The sensitivities are indicative and based on simplified scenarios. These particular exposures form only a part of our overall interest rate exposure. We apply flooring on negative rates in the minus 100bps scenario in this assessment. However, due to increases in interest rates in most major markets, the effect of this flooring is immaterial at the end of 2022.

Comparing 31 December 2022 with 31 December 2021, the sensitivity of the cash flow hedging reserve increased by $368m in the plus 100bps scenario and increased by $375m in the minus 100bps scenario. Although our largest exposure by currency remained fixed rate pound sterling hedges transacted in HSBC UK Bank plc, the increase in sensitivity during 2022 was driven by increases in hedge exposure in a variety of other currencies including US dollars and Hong Kong dollars.

Sensitivity of cash flow hedging reported reserves to interest rate movements

	$m
At 31 Dec 2022	
+100 basis point parallel move in all yield curves	**(1,899)**
As a percentage of total shareholders' equity	**(1.01)%**
-100 basis point parallel move in all yield curves	**1,912**
As a percentage of total shareholders' equity	**1.02%**
At 31 Dec 2021	
+100 basis point parallel move in all yield curves	(1,531)
As a percentage of total shareholders' equity	(0.77)%
-100 basis point parallel move in all yield curves	1,537
As a percentage of total shareholders' equity	0.78%

Third-party assets in Markets Treasury

Third-party assets in Markets Treasury decreased by 3% compared with 31 December 2021. The net decrease of $22bn was partly reflective of a reduction in our commercial surplus during the year, as well as the impact of foreign exchange rates and interest rates, as central banks tightened monetary policy during 2022. The increase of $31bn in 'Other' was largely driven by the reclassification of our banking business in Canada to held for sale.

Third-party assets in Markets Treasury

	2022 $m	2021 $m
Cash and balances at central banks	**317,479**	379,106
Trading assets	**498**	329
Loans and advances:		
– to banks	**67,612**	47,363
– to customers	**2,102**	371
Reverse repurchase agreements	**53,016**	47,067
Financial investments	**319,852**	338,692
Other	**36,192**	5,451
At 31 Dec	**796,751**	818,379

Defined benefit pension plans

Market risk arises within our defined benefit pension plans to the extent that the obligations of the plans are not fully matched by assets with determinable cash flows.

For details of our defined benefit plans, including asset allocation, see Note 5 on the financial statements, and for pension risk management, see page 205.

Additional market risk measures applicable only to the parent company

HSBC Holdings monitors and manages foreign exchange risk and interest rate risk. In order to manage interest rate risk, HSBC Holdings uses the projected sensitivity of its NII to future changes in yield curves and the interest rate repricing gap tables.

During 2022, HSBC Holdings hedged $22.7bn of previously unhedged issuances. The impact can be observed in the NII sensitivity tables with a change from positive to negative sensitivities due to increases in interest rates.

Foreign exchange risk

HSBC Holdings' foreign exchange exposures derive almost entirely from the execution of structural foreign exchange hedges on behalf of the Group as its business-as-usual foreign exchange exposures are managed within tight risk limits. At 31 December 2022, HSBC Holdings had forward foreign exchange contracts of $30.1bn (2021: $25.9bn) to manage the Group's structural foreign exchange exposures.

For further details of our structural foreign exchange exposures, see page 212.

Sensitivity of net interest income

HSBC Holdings monitors NII sensitivity over 12-month and five-year time horizons, reflecting the longer-term perspective on interest rate risk management appropriate to a financial services holding company. These sensitivities assume that any issuance where HSBC Holdings has an option to reimburse at a future call date is called at this date. The tables below set out the effect on HSBC Holdings' future NII of the following scenarios:

- an immediate shock of 25bps to the current market-implied path of interest rates across all currencies on 1 January 2023; and
- an immediate shock of 100bps to the current market-implied path of interest rates across all currencies on 1 January 2023.

The NII sensitivities shown are indicative and based on simplified scenarios. Immediate interest rate rises of 25bps and 100bps would decrease projected NII for the 12 months to 31 December 2023 by $60m and $240m respectively. Conversely, falls of 25bps and 100bps would increase projected NII for the 12 months to 31 December 2023 by $60m and $240m respectively.

NII sensitivity to an instantaneous change in yield curves (12 months)

	$ $m	HK$ $m	£ $m	€ $m	Other $m	Total $m
Change in Jan 2023 to Dec 2023 (based on balance sheet at 31 December 2022)						
+25bps	**(66)**	**—**	**4**	**2**	**—**	**(60)**
-25bps	**66**	**—**	**(4)**	**(2)**	**—**	**60**
+100bps	**(265)**	**—**	**16**	**9**	**—**	**(240)**
-100bps	**265**	**—**	**(16)**	**(9)**	**—**	**240**
Change in Jan 2022 to Dec 2022 (based on balance sheet at 31 December 2021)						
+25bps	16	—	8	4	—	29
-25bps	(16)	—	(8)	(4)	—	(28)
+100bps	65	—	31	16	—	113
-100bps	(64)	—	(31)	(14)	—	(109)

NII sensitivity to an instantaneous change in yield curves (5 years)

	Year 1 $m	Year 2 $m	Year 3 $m	Year 4 $m	Year 5 $m	Total $m
Change in Jan 2023 to Dec 2023 (based on balance sheet at 31 December 2022)						
+25bps	**(60)**	**(41)**	**(36)**	**(37)**	**(38)**	**(212)**
-25bps	**60**	**41**	**36**	**37**	**38**	**212**
+100bps	**(240)**	**(162)**	**(143)**	**(148)**	**(154)**	**(847)**
-100bps	**240**	**162**	**143**	**148**	**154**	**847**
Change in Jan 2022 to Dec 2022 (based on balance sheet at 31 December 2021)					—	
+25bps	29	44	45	38	28	184
-25bps	(28)	(44)	(45)	(38)	(28)	(183)
+100bps	113	177	180	152	112	733
-100bps	(109)	(174)	(174)	(148)	(109)	(715)

The figures represent hypothetical movements in NII based on our projected yield curve scenarios, HSBC Holdings' current interest rate risk profile and assumed changes to that profile during the next five years.

The sensitivities represent our assessment of the change to a hypothetical base case based on a static balance sheet assumption, and do not take into account the effect of actions that could be taken to mitigate this interest rate risk.

Interest rate repricing gap table

The interest rate risk on the fixed-rate securities issued by HSBC Holdings is not included within the Group VaR, but is managed on a repricing gap basis. The following 'Repricing gap analysis of HSBC Holdings' table analyses the full term structure of interest rate mismatches within HSBC Holdings' balance sheet where debt issuances are reflected based on either the next repricing date if floating rate or the maturity/call date (whichever is first) if fixed rate.

Repricing gap analysis of HSBC Holdings

	Total	Up to 1 year	From over 1 to 5 years	From over 5 to 10 years	More than 10 years	Non-interest bearing
	$m	$m	$m	$m	$m	$m
Cash at bank and in hand:						
– balances with HSBC undertakings	**2,590**	**2,590**				
Derivatives	**2,811**					**2,811**
Loans and advances to HSBC undertakings	**76,516**	**22,545**	**29,759**	**20,347**	**2,000**	**1,865**
Financial investments in HSBC undertakings	**26,194**	**22,917**	**3,268**			**9**
Investments in subsidiaries	**163,211**	**5,425**	**8,395**	**600**		**148,791**
Other assets	**1,850**					**1,850**
Total assets	**273,172**	**53,477**	**41,422**	**20,947**	**2,000**	**155,326**
Amounts owed to HSBC undertakings	**(111)**					**(111)**
Financial liabilities designated at fair values	**(32,418)**	**(5,925)**	**(10,801)**	**(14,942)**	**(750)**	
Derivatives	**(1,220)**					**(1,220)**
Debt securities in issue	**(67,483)**	**(11,244)**	**(34,917)**	**(19,322)**	**(2,000)**	
Other liabilities	**(4,551)**					**(4,551)**
Subordinated liabilities	**(17,059)**	**(1,131)**	**(3,705)**	**(1,780)**	**(10,443)**	
Total equity	**(150,330)**	**(2,446)**	**(11,096)**	**(8,721)**		**(128,067)**
Total liabilities and equity	**(273,172)**	**(20,746)**	**(60,519)**	**(44,765)**	**(13,193)**	**(133,949)**
Off-balance sheet items attracting interest rate sensitivity		**(18,797)**	**(10,871)**	**1,434**	**6,184**	**308**
Net interest rate risk gap at 31 Dec 2022		**13,952**	**(8,226)**	**(22,384)**	**(5,009)**	**21,667**
Cumulative interest rate gap		**13,952**	**5,726**	**(16,658)**	**(21,667)**	
Cash at bank and in hand:						
– balances with HSBC undertakings	2,590	2,590				
Derivatives	2,811					2,811
Loans and advances to HSBC undertakings	76,516	22,545	29,759	20,347	2,000	1,865
Financial investments in HSBC undertakings	26,194	22,917	3,268			9
Investments in subsidiaries	163,211	5,425	8,395	600		148,791
Other assets	1,850					1,850
Total assets	273,172	53,477	41,422	20,947	2,000	155,326
Amounts owed to HSBC undertakings	(111)					(111)
Financial liabilities designated at fair values	(32,418)	(5,925)	(10,801)	(14,942)	(750)	
Derivatives	(1,220)					(1,220)
Debt securities in issue	(67,483)	(11,244)	(34,917)	(19,322)	(2,000)	
Other liabilities	(4,551)					(4,551)
Subordinated liabilities	(17,059)	(1,131)	(3,705)	(1,780)	(10,443)	
Total equity	(150,330)	(2,446)	(11,096)	(8,721)		(128,067)
Total liabilities and equity	(273,172)	(20,746)	(60,519)	(44,765)	(13,193)	(133,949)
Off-balance sheet items attracting interest rate sensitivity		(18,797)	(10,871)	1,434	6,184	308
Net interest rate risk gap at 31 Dec 2021[1]		13,952	(8,226)	(22,384)	(5,009)	21,667
Cumulative interest rate gap		13,952	5,726	(16,658)	(21,667)	

1 *Investments in subsidiaries and equity have been allocated based on call dates for any callable bonds. The prior year figures have been amended to reflect this.*

Market risk

Contents

Overview

Market risk is the risk of an adverse financial impact on trading activities arising from changes in market parameters such as interest rates, foreign exchange rates, asset prices, volatilities, correlations and credit spreads. Exposure to market risk is separated into two portfolios: trading portfolios and non-trading portfolios.

For further details of market risk in non-trading portfolios, page 214, of the Annual Report and Accounts 2022.

Market risk management

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.

Risk types	**Trading risk** • Foreign exchange and commodities • Interest rates • Credit spreads • Equities
Global business	GBM
Risk measure	Value at risk | Sensitivity | Stress testing

The objective of our 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 our established risk appetite.

Market risk is managed and controlled through limits approved by the Group Chief Risk and Compliance Officer for HSBC Holdings. These limits are allocated across business lines and to the Group's legal entities. Each major operating entity 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 local Markets and Securities Services or Markets Treasury unit for management, or to separate books managed under the supervision of the local 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 derivative products to offices with appropriate levels of product expertise and robust control systems.

Key risk management processes

Monitoring and limiting market risk exposures

Our objective is to manage and control market risk exposures while maintaining a market profile consistent with our risk appetite.

We use a range of tools to monitor and limit market risk exposures including sensitivity analysis, VaR and stress testing.

Sensitivity analysis

Sensitivity analysis measures the impact of individual market factor movements on specific instruments or portfolios, including interest rates, foreign exchange rates and equity prices. We use 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

(Audited)

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 we capitalise them. Where we do not calculate VaR explicitly, we use alternative tools as summarised in the 'Stress testing' section below.

Our models 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; and
- calculations to a 99% confidence level and using a one-day holding period.

The models also incorporate the effect of 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. As the model is calibrated on the last 500 business days, it does not adjust instantaneously to a change in the market regime.
- 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.
- VaR is calculated on the basis of exposures outstanding at the close of business and therefore does not reflect intra-day exposures.

Risk not in VaR framework

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. The outcome of the VaR-based RNIV approach is included in the overall VaR calculation but excluded from the VaR measure used for regulatory back-testing. In addition, the stressed VaR measure also includes risk factors considered in the VaR-based RNIV approach.

Stress-type RNIVs include a deal contingent derivatives capital charge to capture risk for these transactions and a de-peg risk measure to capture risk to pegged and heavily managed currencies.

Stress testing

Stress testing is an important procedure that is integrated into our 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, regional and overall Group levels. A set of scenarios is used consistently across all regions within the Group. 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 our 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.

Back-testing

We routinely validate the accuracy of our 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 hypothetical profit and loss reflects the profit and loss that would be realised if positions were held constant from the end of one trading day to the end of the next. This measure of profit and loss does not align with how risk is dynamically hedged, and is not therefore necessarily indicative of the actual performance of the business.

The number of hypothetical loss back-testing exceptions, together with a number of other indicators, is used to assess model performance and to consider whether enhanced internal monitoring of a VaR model is required. We back-test our VaR at set levels of our Group entity hierarchy.

Market risk in 2022

During 2022, financial markets were driven by concerns over high inflation and recession risks, against the backdrop of the Russia-Ukraine war and continued Covid-19-related pandemic restrictions in some countries. Throughout the year, several 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. In addition, a change in the UK fiscal stance in late September led to the pound reaching record lows and to significant turmoil in the market for long-dated UK government bonds, which was exacerbated by rapid deleveraging of liability-driven investment funds used by pension schemes. There was pronounced volatility in equity valuations, with declines 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. Investor sentiment remained fragile in credit markets, with credit spreads in both investment-grade and high-yield debt benchmarks reaching their widest levels since the start of the Covid-19 pandemic.

We 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 testing and scenario analysis.

Trading portfolios

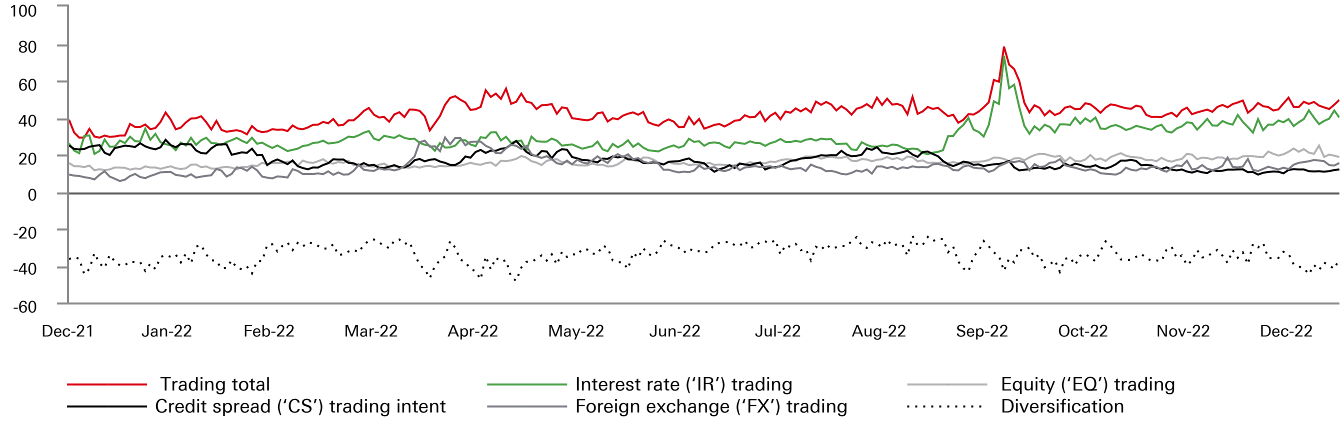
Value at risk of the trading portfolios

Trading VaR was predominantly generated by the Markets and Securities Services business.

Trading VaR as at 31 December 2022 increased compared with 31 December 2021. The increase, which peaked in September 2022, was mainly driven by interest rate risk factors across business lines, although lower loss contributions from credit spread risks provided a partial offset. VaR returned to normal operating range in the fourth quarter of 2022.

The daily levels of total trading VaR during 2022 are set out in the graph below.

Daily VaR (trading portfolios), 99% 1 day ($m)



Risk review

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

Trading VaR, 99% 1 day[1]

(Audited)

	Foreign exchange and commodity	Interest rate	Equity	Credit spread	Portfolio diversification[2]	Total[3]
	$m	$m	$m	$m	$m	$m
Balance at 31 Dec 2022	**15.4**	**40.0**	**18.6**	**11.9**	**(36.4)**	**49.5**
Average	**13.6**	**29.6**	**16.1**	**16.8**	**(34.0)**	**42.1**
Maximum	**29.2**	**73.3**	**24.8**	**27.9**		**78.3**
Minimum	**5.7**	**20.2**	**11.5**	**9.1**		**29.1**
Balance at 31 Dec 2021	9.1	25.9	15.4	24.8	(36.5)	38.8
Average	12.9	33.8	16.7	19.2	(45.5)	37.1
Maximum	31.8	51.7	24.3	29.4		53.8
Minimum	6.7	18.5	12.1	12.2		27.7

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 – such as interest rate, equity 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 occurs on different days for different risk types, it is not meaningful to calculate a portfolio diversification benefit for these measures.*
3 *The total VaR is non-additive across risk types due to diversification effects.*

The table below shows trading VaR at a 99% confidence level compared with trading VaR at a 95% confidence level at 31 December 2022. This comparison facilitates the benchmarking of the trading VaR, which can be stated at different confidence levels, with financial institution peers. The 95% VaR is unaudited.

Comparison of trading VaR, 99% 1 day vs trading VaR, 95% 1 day

	Trading VaR, 99% 1 day	Trading VaR, 95% 1 day
	$m	$m
Balance at 31 Dec 2022	**49.5**	**31.7**
Average	**42.1**	**24.6**
Maximum	**78.3**	**49.0**
Minimum	**29.1**	**17.5**
Balance at 31 Dec 2021	38.8	21.6
Average	37.1	24.0
Maximum	53.8	30.0
Minimum	27.7	18.9

Back-testing

During 2022, the Group experienced 10 loss back-testing exceptions against hypothetical profit and losses, of which seven exceptions occurred in the second half of the year. The high number of hypothetical back-testing exceptions was primarily driven by the volatile market environment and a rapid shift in the global interest rate regime in 2022.

The hypothetical profit and loss reflects the profit and loss that would be realised if positions were held constant from the end of one trading day to the end of the next. This measure of profit and loss does not align with how risk is dynamically hedged, and is not therefore indicative of the actual performance of the business. Accordingly, of the 10 loss back-testing exceptions against hypothetical profit and loss, only one corresponded to an actual profit and loss exception.

The Group experienced four loss back-testing exceptions against actual profit and losses during 2022. Losses were attributable to fair value adjustments that were adopted for factors not incorporated within valuation models, and from the impacts of restructuring of derivative exposures under our RWA optimisation programme.

Given the heightened number of hypothetical loss back-testing exceptions in the second half of 2022, we have undertaken a review of our VaR model assumptions and updated the risk parameters within the model.

Market risk balance sheet linkages

The following balance sheet lines in the Group's consolidated position are subject to market risk:

Trading assets and liabilities

The Group's trading assets and liabilities are in almost all cases originated by GBM. These assets and liabilities are treated as traded risk for the purposes of market risk management, other than a limited number of exceptions, primarily in Global Banking where the short-term acquisition and disposal of the assets are linked to other non-trading-related activities such as loan origination.

Derivative assets and liabilities

We undertake derivative activity for three primary purposes: to create risk management solutions for clients, to manage the portfolio risks arising from client business, and to manage and hedge our own risks. Most of our derivative exposures arise from sales and trading activities within GBM. The assets and liabilities included in trading VaR give rise to a large proportion of the income included in net income from financial instruments held for trading or managed on a fair value basis. Adjustments to trading income such as valuation adjustments are not measured by the trading VaR model.

For information on the accounting policies applied to financial instruments at fair value, see Note 1 on the financial statements.

Climate risk TCFD

Contents

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 risk can materialise through:

- physical risk, which arises from the increased frequency and severity of weather events, such as hurricanes and floods, or chronic shifts in weather patterns;
- transition risk, which arises from the process of moving to a low-carbon economy, including changes in government or public policy, technology and end-demand; and
- 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 product or service, or the climate commitments or performance of our customers.

Approach and policy

We are affected by climate risks either directly or indirectly 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. 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. In addition, if we are perceived to mislead stakeholders on our business activities or if we fail to achieve our stated net zero ambitions, we could face greenwashing risk resulting in significant reputational damage and potential regulatory fines, impacting our revenue generating ability.

We have integrated climate risk into our existing risk taxonomy, and incorporated it within the risk management framework through the policies and controls for the existing risks where appropriate.

Our climate risk approach is aligned to our Group-wide risk management framework and three lines of defence model, which sets out how we identify, assess and manage our risks (for further details of our three lines of defence framework, see page 134). This approach provides the Board and senior management with visibility and oversight of our key climate risks.

Our initial approach to managing climate risk was 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. In 2022, we expanded our scope to consider climate risk impacts on our other risk types in our risk taxonomy.

We consider greenwashing to be an important emerging risk that is likely to increase over time as we look to develop capabilities and products to achieve our net zero 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 risk, and guidance has been provided to the first and second lines of defence on the key risk factors, and how it should be managed.

Our ambition to achieve net zero in our financed emissions also exposes us to potential reputational, compliance and legal risks if we fail to effectively deliver on our ambition. Achieving this ambition is dependent on a number of known and unknown factors including the accuracy and reliability of data, emerging methodologies and the need to develop new tools to accurately assess emissions reductions. We have taken initial steps to develop our capabilities to monitor our exposures and set risk appetites, although, operationalising our ambition is dependent on data and methodologies maturing over time, and requires us to continue developing our internal processes and tools to help achieve our ambition.

The tables below provide an overview of the climate risk drivers considered within HSBC's climate risk framework. Primary risk drivers refer to risk drivers aligned to the Financial Stability Board's Task Force on Climate-related Financial Disclosures ('TCFD'), which sets a framework to help public companies and other organisations disclose climate-related risks and opportunities. Thematic risk drivers are bespoke to our internal climate risk framework.

The following table provides an overview of the physical and transition climate risk drivers.

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 or stranded assets • 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, sea level rise, shifting monsoons or chronic heat waves)	
Transition	**Policy and legal**	Mandates on, and regulation of products and services and/or policy support for low carbon alternatives. Litigation from parties who have suffered loss and damage from climate impacts	
	Technology	Replacement of existing products with lower emissions options	
	End-demand (market)	Changing consumer demand from individuals and corporates	
	Reputational	Increased scrutiny following a change in stakeholder perceptions of climate-related action or inaction	

Risk review

The table below provides an overview of the drivers of greenwashing risk, which is considered to be a thematic risk driver within HSBC's framework.

Climate risk – thematic risk drivers		Details
Greenwashing	**Firm**	Failure to be accurate and transparent in communicating our progress against our net zero 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 key performance indicators

In February 2022, we refreshed a high-level assessment of how climate risk may impact HSBC taxonomy risk types over a 12-month horizon, and we conducted an assessment to understand which parts of our risk taxonomy could be impacted by greenwashing risk. The table below summarises the results of these exercises. Assessments were completed prior to year-end 2022 and do not take into account all of the factors that were considered in our assessment of climate risk impacts on the financial statements for the year ended 31 December 2022. The assessments will be refreshed annually, and, results may change as our understanding of climate risk and how it impacts HSBC evolves (for further details, see 'Impact on reporting and financial statements' on page 46). In addition to these assessments, we also consider climate risk in our emerging risk process, which considers potential impacts across longer time horizons (for further details, see 'Top and emerging risks' on page 135).

		Relevant risk drivers		
		Primary risk drivers		Thematic risk drivers
	Risk type	Physical	Transition	Greenwashing
Financial risk	Wholesale credit risk	●	●	
	Retail credit risk	●	●	
	Treasury risk – insurance risk	●	●	
	Treasury risk – pension risk		●	●
	Traded risk	●	●	
	Strategic business risk		●	
	Reputational risk		●	●
Non-financial risk	Regulatory compliance risk		●	●
	Resilience risk	●	●	●
	Model risk	●	●	●
	Financial crime risk	●	●	●
	Financial reporting risk		●	●
	Legal risk		●	●

● *Relevant risk driver*

Climate risk management

Key developments in 2022

Our climate risk programme continues to support the development of our climate risk management capabilities. The following outlines key developments in 2022.

- We updated our climate risk management approach to cover all risk types in our risk taxonomy.
- We expanded the scope of climate-related training for employees to cover additional topics, such as greenwashing risk, and increased the availability of training to the broader workforce.
- We developed new metrics to monitor physical climate risk exposure in our mortgage portfolio in all our markets, based on locally available data.
- We enhanced our transition and physical risk questionnaire and scoring tool, which will help us improve our understanding of the impact of transition and physical risk on corporate clients in high climate transition risk sectors.
- We assessed transition plans for EU and OECD managed clients in scope of our thermal coal phase-out policy.
- We developed our first internal climate scenario exercise, where we used four scenarios that were designed to articulate our view of the range of potential outcomes for global climate change. For further details of our internal climate scenario analysis, see page 226.

While we have made progress in developing our climate risk framework, there remains significant work to fully integrate climate risk, including the need to provide additional skills for our colleagues and clients on climate risk topics, and develop further metrics to understand how climate risk can impact our risk taxonomy. We also need to continue to enhance our stress testing capabilities and expand our greenwashing risk framework. We have a dependency on data and systems in order to achieve these aims, which continue to be enhanced.

Governance and structure

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

The Group ESG Committee supports the development and delivery of our ESG strategy, key policies and material commitments by providing oversight, coordination and management of ESG commitments and initiatives. It is co-chaired by the Group Company Secretary and Chief Governance Officer, and Group Chief Sustainability Officer.

The Group Chief Risk and Compliance Officer is responsible for the management of climate-related financial risks under the UK Senior Managers Regime, which involves holding overall accountability for the Group's climate risk programme. The Climate Risk Oversight Forum oversees risk activities relating to climate risk management and the escalation of climate risks. It is supported by equivalent forums at regional level.

The Group Reputational Risk Committee considers matters arising from customers, transactions and third parties that either present a serious potential reputational risk to the Group or merit a Group-led decision to ensure a consistent risk management approach across the regions, global businesses and global functions.

The Group Risk Management Meeting and the Group Risk Committee receive regular updates on our climate risk profile and progress of our climate risk programme.

For further details on the Group's ESG governance structure, see page 86.

Risk appetite

Our climate risk appetite supports the oversight and management of the financial and non-financial risks from climate change, and supports the business to deliver our climate ambition in a safe and sustainable way. Our initial risk appetite focused on the oversight and management of climate risks in five priority areas, including exposure to high transition risk sectors in our wholesale portfolio and physical risk exposures in our retail portfolio. We have created metrics both at global and regional levels, where appropriate, to help manage our risk appetite. We continue to review our risk appetite regularly to capture the most material climate risks and will enhance our metrics over time, including to monitor risk exposures associated with our financed emissions reduction targets.

Policies, processes and controls

We are integrating climate risk into the policies, processes and controls across many areas of our organisation, and we will continue to update these as our climate risk management capabilities mature over time. In 2022, we incorporated climate considerations into our UK mortgage origination process for our retail business, and new money request process for our key wholesale businesses. We also continued to enhance our climate risk scoring tool, which will enable us to assess our customers' exposures to climate risk. We also published our updated energy policy, covering the broader energy system, including upstream oil and gas, oil and gas power generation, coal, hydrogen, renewables and hydropower, nuclear, biomass and energy from waste, and we updated our thermal coal phase-out policy after its initial publication in 2021. For further details of how we manage climate risk across our global businesses, see page 64.

Wholesale credit risk

Identification and assessment

In 2019, we initially identified six key sectors where our wholesale credit customers had the highest exposure to climate transition risk, based on their carbon emissions, which were: automotive; chemicals; construction and building materials; metals and mining; oil and gas; and power and utilities. For a majority of customers in these sectors, we use a transition and physical risk questionnaire to help assess and improve our understanding of the impact of climate change on our customers' business models and any related transition strategies. Relationship managers work with these customers to record questionnaire responses and also help identify potential business opportunities to support the transition. Since 2020, we have rolled out the questionnaire so that it includes the majority of our largest customers in the next highest climate transition risk sectors: agriculture; industrials; real estate; and transportation. In 2022, we continued to roll out the physical and transition risk questionnaire in these sectors by adding new countries to the scope of the questionnaire. Due to ongoing data and methodology challenges across the industry, our risk appetite metrics remained limited in their ability to monitor our risk profile.

In 2023, we intend to roll out the questionnaire to additional customers and enhance our scoring model. We will also continue engaging with peers and regulators to explore approaches for further integration of climate in credit risk models. We continue to develop processes and training to improve the quality and accuracy of the questionnaire responses.

Management

In 2022, we updated our credit risk policy to require that relationship managers comment on climate risk factors in credit applications for new money requests. We continued using a climate risk scoring tool, which provides a climate risk score for each customer based on questionnaire responses. The climate risk score is used to inform portfolio level management discussions, and are made available to relationship management teams and credit risk management teams. The scoring tool will be enhanced and refined over time as more data becomes available.

In 2023, we aim to further embed climate risk considerations in our credit risk management processes.

Aggregation and reporting

We report our exposure to the six high transition risk sectors in the wholesale portfolio, as well as our related RWAs internally.

We also report the proportion of questionnaire responses that have a board policy or management plan for transition risk. Our key wholesale credit exposures are included as part of our broader ESG management information dashboard, which is presented to the Group Executive Committee each quarter. In addition, a representative from the Wholesale Credit Risk Management function attends the Global Climate Risk Oversight Forum to ensure there is consideration of this risk type, and we report our exposure through the climate risk management information dashboard at this meeting.

Since 2019, we have received responses from customers within the six high transition risk sectors, which represent 59% of our exposure, an increase in coverage of 7% since last year. The table below presents a breakdown of our customer responses by sector.

The table below also captures our lending activity, including environmentally responsible and sustainable finance activities, to customers within the six high risk sectors. Green financing for large companies that work in high transition sectors is also included. The overall exposure has decreased to 17.7% (2021: 18.2%). We have restated the 2021 comparatives to reflect the new 2022 sector allocations and to remove certain off-balance sheet exposures that were previously included following improvements in our data and processes. For further details of how we designate counterparties as high transition risk, see footnote 2.

Wholesale loan exposure to transition risk sectors and customer questionnaire responses at 31 December 2022[1]

	Automotive	Chemicals	Construction and building materials	Metals and mining	Oil and gas	Power and utilities	Total
	%	%	%	%	%	%	%
Wholesale loan exposure as % of total wholesale loans and advances to customers and banks[2,3,4]	≤ 3.0	≤ 3.3	≤ 3.2	≤ 2.1	≤ 2.6	≤ 3.5	≤ 17.7
Proportion of sector for which questionnaires were completed[5]	63	49	55	56	67	66	59
Proportion of questionnaire responses that reported either having a board policy or a management plan[5]	69	81	74	71	77	94	79
Sector weight as proportion of high transition risk sector[5]	16	19	18	12	15	20	100

1 *The 2022 numbers reflect the new 2022 sector allocations and remove certain off-balance sheet exposures that were previously included following improvements in our data and processes. See the* ESG Data Pack *for comparative 2020 and 2021 data.*
2 *Amounts shown in the table also include green and other sustainable finance loans, which support the transition to the net zero economy. The methodology for quantifying our exposure to high transition risk sectors and the transition risk metrics will evolve over time as more data becomes available and is incorporated in our risk management systems and processes.*
3 *Counterparties are allocated to the high transition risk sectors via a two-step approach. Firstly, where the main business of a group of connected counterparties is in a high transition risk sector, all lending to the group is included in one high transition risk sector irrespective of the sector of each individual obligor within the group. Secondly, where the main business of a group of connected counterparties is not in a high transition risk sector, only lending to individual obligors in the high transition risk sectors is included. From 2022, for Global Banking and Markets clients and Commercial Banking clients, the main business of a group of connected counterparties is identified by the industry that generates the majority of revenue within a group. Customer revenue data utilised during this allocation process is the most recent readily available and will not align to our own reporting period. In prior periods for Global Banking and Markets clients, the main business of a group of connected counterparties was identified by the relationship manager for the group. For Commercial Banking clients, the main business of a group of connected counterparties was identified based on the largest industry of HSBC's total lending limits to the group.*
4 *Total wholesale loans and advances to customers and banks amount to $658bn (2021: $662bn). Amounts include loans and advances that are held for sale.*
5 *All percentages are weighted by exposure.*

Retail credit risk

Identification and assessment

We continued to improve our identification and assessment of climate risk within our retail mortgage portfolio. We increased our investments in centrally available physical risk data and enhanced our internal risk assessment capabilities and models, in order to understand our physical risk exposure across a larger proportion of our global portfolio. We have also started to identify and monitor potential physical risk in the remainder of our global mortgage markets, using locally available data.

In 2022, we undertook an internal climate scenario analysis exercise to further our understanding and assessment of the potential impacts that physical risk could have on our mortgage portfolios. We completed detailed analysis for the UK, Hong Kong, Singapore and Australia, which together represent 73.8% of balances of the global mortgage portfolio. We also undertook a stress test for our portfolio in Singapore at the behest of the Monetary Authority of Singapore, and participated in the second round of the Bank of England's climate biennial exploratory scenario exercise, focusing on management actions. For further details of our approach and results of our scenario analysis, see the 'Insights on climate scenario analysis' section on page 226.

Management

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

In the UK, which has our largest retail mortgage portfolio, we integrated climate risk data into our decision-making framework as part of the mortgage origination process. We are actively managing our UK mortgage portfolio with a climate risk perspective, and in line with our risk appetite, taking conduct considerations into account in the lending decision-making process.

Our UK team is also proactively supporting customers by providing information on our public website relating to how physical risk and home energy efficiency ratings may impact their mortgage applications. This gives customers more insight when considering purchasing a property that may be susceptible to physical climate risk or which may not be energy efficient.

Aggregation and reporting

We manage and monitor the integration of climate risk in Wealth and Personal Banking through the WPB Risk Management Meeting and other senior leadership forums.

We assess the progress of the implementation of our strategic climate risk plans, and ensure that we update operational processes and risk management frameworks as our data and understanding of climate risk evolves. A senior representative from WPB Risk attends the Group Climate Risk Oversight Forum to ensure we maintain alignment with the Group strategy.

Monitoring climate risk

In 2022, each of our retail mortgage businesses defined metrics and began reporting on their potential balance sheet exposure to physical climate risk. Locally relevant data sources were used to identify properties or areas with potentially heightened climate risk. These climate risk exposure metrics are in the early stages of development and the underlying data and methodologies may require refinement in the future, although they provide an indicative view.

We continue to measure climate risk using third-party data in our most material mortgage market, which is the UK, where the primary physical risk facing properties is flooding. Using a risk methodology that considers a combination of the likelihood and severity of flood hazard affecting individual properties, we estimate that on a total value basis, and at present day risk levels, 3.5% of the UK retail mortgage portfolio is at high risk of flooding, and 0.2% is at a very high risk. This is based on approximately 93% coverage by value of our portfolio at the end of September 2022, and is reliant on flood data provided by Ambiental Risk Analytics.

In line with the UK government ambition to improve the energy performance certificate ('EPC') ratings of housing stock, we continue to identify the current and potential EPC ratings for individual properties within the UK mortgage portfolio.

At the end of September, we had approximately 62% of properties by value in our UK residential mortgage portfolio with a valid EPC certificate dated within the last 10 years. While 37.7% of these, with balances of $31.5bn, had a 'current' rating of A to C, 96.8% of them, with balances of $81.1bn, had the potential to improve to that level. We are working on improving the EPC data coverage, we currently do not have EPC data for properties in Northern Ireland.

For both flood risk and EPC data, we disclose the end of September position. This is due to the time required for the data to be processed by a third party and our reliance on the government's public EPC data.

Beyond the UK, we have strengthened our focus on the development of initiatives to support customers with their transition to more energy efficient homes.

The table below shows the maturity level of the UK retail mortgage portfolio at the end of December 2022, split by tenor.

Tenor	Loan by residual maturity ($bn)
<1 years	0.45
1–5 years	3.38
>5 years	143.90

For further details of flood risk and the EPC breakdown of our UK retail mortgage portfolio, see our *ESG Data Pack* at www.hsbc.com/esg.

Resilience risk

Identification and assessment

Our Operational and Resilience Risk function is responsible for overseeing the identification and assessment of physical and transition climate 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, and assess the mitigants to ensure ongoing operational resilience.

Management

Operational and Resilience Risk policies are reviewed and enhanced periodically so they remain relevant to evolving risks, including those linked to climate change. The capability of our colleagues is enhanced through training, periodic communications and dedicated guidance.

Aggregation and reporting

With our ambition to achieve net zero in our own operations, 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 at the Group's Climate Risk Oversight Forum.

Regulatory compliance risk

Identification and assessment

Compliance continues to prioritise the identification and assessment of compliance risks that may arise from climate risk.

Throughout 2022, our focus remained on greenwashing risk, particularly with regard to the development and ongoing governance of new, changed or withdrawn climate and ESG products and services, and ensuring sales practices and marketing materials were clear, fair and not misleading.

To support the ongoing management and mitigation of greenwashing risk, Regulatory Compliance worked across all business lines to enhance our product controls. This 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 and ESG risks within our existing product governance framework;
- enhancing our product templates and forms to ensure climate risk is actively considered and documented by the business within product review and creation; and
- clarifying and improving product governance policies, associated guidance and key governance terms of reference to ensure new climate and ESG products, as well as climate- and ESG-related amendments to existing products, comply with both internal and external standards, and are subject to robust governance.

Management

Our policies continue to set the Group-wide 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 they take climate into consideration. They are reviewed on a periodic basis to ensure they remain relevant and up to date.

The Compliance function continues to focus on improving the capability of colleagues through training, communications and dedicated guidance, with a particular focus on ensuring colleagues remain up to date with changes in the evolving regulatory landscape.

Aggregation and reporting

The Compliance function continues to operate an ESG and Climate Risk Working Group to track and monitor the integration and embedding of climate risk within the management of regulatory compliance risks. The working group also continues to monitor ongoing regulatory and legislative changes across the ESG and climate risk agenda.

We have continued to develop our key climate risk-related metrics and indicators, aligned to the broader focus on regulatory compliance risks, to continually improve our risk monitoring capability. This has included the development of a climate-specific risk profile, alongside the introduction and improvement of existing metrics and indicators.

The Compliance function continues to be represented at the Group's Climate Risk Oversight Forums.

Reputational risk

Identification and assessment

We implement sustainability risk policies, including the Equator Principles, as part of our broader reputational risk framework. We focus on sensitive sectors that may have a high adverse impact on people or the environment, and in which we have a significant number of customers. A key area of focus is high-carbon sectors, which include oil and gas, power generation, mining, agricultural commodities and forestry. In 2022, we published our updated energy policy, covering the broader energy system, including upstream oil and gas, oil and gas power generation, hydrogen, renewables and hydropower, nuclear, biomass and energy from waste. We also updated our thermal coal phase-out policy after its initial publication in 2021.

Management

As the primary point of contact for our customers, our relationship managers are responsible for checking that our customers meet policies aimed at reducing carbon impacts. Our global network of more than 75 sustainability risk managers provides local policy support and expertise to relationship managers. Risk Strategy includes a team of reputational and sustainability risk specialists that provides a higher level of guidance and is responsible for the oversight of policy compliance and implementation over wholesale banking activities.

For further details on our sustainability risk policies, see our ESG review on page 65.

Aggregation and reporting

Our Sustainability Risk Oversight Forum provides a Group-wide forum for senior members of our Group Risk and Compliance team and global businesses. It also oversees the development and implementation of sustainability risk policies. Cases involving complex sustainability risk issues related to customers, transactions or third parties are managed through the reputational risk and client selection governance process. We report annually on our implementation of the Equator Principles and the corporate loans, project-related bridge loans and advisory mandates completed under the principles. For the latest report, see: www.hsbc.com/who-we-are/esg-and-responsible-business/esg-reporting-centre. A representative from Reputational

Risk attends the Group Climate Risk Forum to ensure consideration of this risk type.

Other risks

The following section outlines key developments that we made to embed climate considerations within other risk types in our risk taxonomy. All risk functions, including those not referenced below, performed a materiality assessment to determine the impact of climate risk on their risk framework.

Treasury risk

We established a treasury risk-specific climate risk governance forum to provide oversight over climate-related topics that may impact Global Treasury. We updated relevant treasury risk policies to strengthen our climate risk guidance and requirements pertaining to treasury risk. We undertook an initial assessment to understand the exposure of high transition risk sectors within our pension plans.

Traded risk

We established a climate stress testing-focused working group to coordinate the implementation of climate stress testing, and support the delivery of internal climate scenario analysis. As part of the annual limit review in 2022, we developed a set of climate metrics for Markets and Securities Services, which we plan to implement in 2023.

Insights from climate scenario analysis

Scenario analysis supports our strategy by assessing our position under a range of climate scenarios. It helps to build our awareness of climate change, plan for the future and meet our growing regulatory requirements.

Having run our first Group-wide climate change scenario analysis exercise in 2021, we produced several climate stress tests for global regulators in 2022, including the Monetary Authority of Singapore and the European Central Bank. We also conducted our first internal climate scenario analysis.

We continue to develop how we produce our climate scenario analysis exercises so that we can have a more comprehensive understanding of climate headwinds, risks and opportunities that will support our strategic planning and actions.

In climate scenario analysis, we consider, jointly:

- transition risk arising from the process of moving to a net zero economy, including changes in policy, technology, consumer behaviour and stakeholder perception, which could each impact borrowers' operating income, financing requirements and asset values; and
- physical risk arising from the increased frequency and severity of weather events, such as hurricanes and floods, or chronic shifts in weather patterns, which could each impact property values, repair costs and lead to business interruptions.

We also analyse how these climate risks impact how we manage other risks within our organisation, including credit and market risks, and on an exploratory basis, operational, liquidity, insurance and pension risks.

Our climate scenarios

In our 2022 internal climate scenario analysis exercise, we used four scenarios that were designed to articulate our view of the range of potential outcomes for global climate change. The analysis considered the key regions in which we operate, and assessed the impact on our balance sheet between the 2022 and 2050 time period. In the following sections, the time horizons are considered to cover three distinct time periods: short term is up to 2025; medium term is 2026 to 2035; and long term is 2036 to 2050. The timeframes chosen are aligned to the Climate Action 100+ disclosure framework.

These internal scenarios were formed with reference to external publicly available climate scenarios, including those produced by the Network for Greening the Financial System ('NGFS'), the Intergovernmental Panel on Climate Change and the International Energy Agency. Using these external scenarios as a template, we adapted them by incorporating our unique climate risks and vulnerabilities to which our organisation and customers across different business sectors and regions are exposed. This helped us produce the scenarios, which varied by severity and probability, to analyse how climate risks will impact our portfolios. Our scenarios were:

- the Net Zero scenario, which aligns with our net zero strategy and is consistent with the Paris Agreement, and which assumes that there will be rapid and considerable climate action, limiting global warming to no more than 1.5°C by 2100, when compared with pre-industrial levels;
- the Current Commitments scenario, which assumes that climate action is limited to the current governmental commitments and pledges, leading to global temperature rises of 2.4°C by 2100;
- the Downside Transition Risk scenario, which assumes that climate action is delayed until 2030, but will be rapid enough to limit global temperature rises to 1.5°C by 2100; and
- the Downside Physical Risk scenario, which assumes climate action is limited to current governmental policies, leading to extreme global warming with global temperatures increasing by 3.1°C by 2100.

We have chosen these scenarios as they are designed to identify, measure and assess our most material climate vulnerabilities through considering our global presence, business activities and exposures. Our scenarios reflect inputs from our businesses and experts, and have been reviewed and approved through internal governance.

Our four scenarios reflect different levels of physical and transition risks. The scenario assumptions include varying levels of governmental climate policy changes, macroeconomic factors and technological developments. However, these scenarios rely on the development of technologies that are still unproven, such as global hydrogen production to decarbonise aviation and shipping.

The nature of the scenarios, our developing capabilities, and limitations of the analysis lead to outcomes that are indicative of climate change headwinds, although they are not a direct forecast.

Developments in climate science, data, methodology and scenario analysis techniques will help us shape our approach further. We therefore expect this view to change over time.

For further details of our four internal climate scenarios, including a table including their key underlying assumptions, see our ESG Data Pack *at www.hsbc.com/esg.*

Our modelling approach

For our scenario analysis, we used models to assess how transition and physical risks may impact our portfolios under different scenarios. Our models incorporate a range of climate-specific metrics that will have an impact on our customers, including expected production volumes, revenue, unit costs and capital expenditure.

We also assess how these metrics interplay with economic factors such as carbon prices, which represent the cost effect of climate-related policies that aim to discourage carbon-emitting activities and encourage low-carbon solutions. The expected result of higher carbon prices is a reduction in emissions as high-emission activities become uneconomical. We also assume carbon prices will vary from country to country.

The models for our wholesale corporate lending portfolio consider metrics across each climate scenario, and from 2022 also incorporated our customers' individual climate transition plans as part of our climate scenario analysis. These results in turn feed into the calculation of our risk-weighted assets and expected credit loss projections. For our residential real estate portfolio models, we focus on physical risk factors, including property locations, perils and insurance coverage when assessing the overall credit risk impact to the portfolio. The results were reviewed by our sector specialists who, subject to our governance procedures, make bespoke adjustments to our results based on their expert judgement when relevant.

We continue to enhance our capabilities by incorporating lessons learnt from previous exercises and feedback from key stakeholders, including regulators.

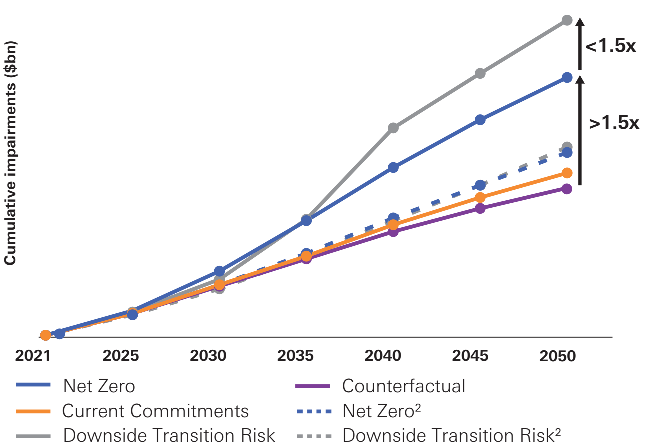
For a broad overview of the models that we use for our climate scenario analysis, as well as graphs that show how global carbon prices and carbon emissions will differ under our climate scenarios, see our ESG Data Pack *at www.hsbc.com/esg.*

Analysing the outputs of the climate scenario analysis

Climate scenario analysis allows us to model how different potential climate pathways may affect our customers and portfolios, particularly in respect of credit losses. As the chart below shows, losses are influenced by their exposure to a variety of climate risks under different climate scenarios. Under the Current Commitments scenario, we expect moderate levels of losses relating to transition risks. However, the rise in global warming will lead to increasing levels of physical risk losses in later years.

Modelled climate losses

How credit losses from climate risks have been modelled under different scenarios.



1 *The counterfactual scenario is modelled on a scenario where there will be no losses due to climate change.*
2 *The dotted lines in the chart show the impact of modelled expected credit losses following our strategic responses to reduce the effect of climate risks under the Net Zero and Downside Transition Risk scenarios.*

A gradual transition towards net zero, as shown in the Net Zero scenario, still requires fundamental shifts in our customers' business models, and significant investments. This will have an impact on profitability, leading to higher credit risk in the transition period. A delayed transition will be even more disruptive due to lower levels of innovation that limits the ability to decarbonise effectively, and rising carbon prices that squeeze profit margins.

Overall, our scenario analysis shows that the level of potential credit losses can be mitigated if we support our customers in enhancing their climate transition plans.

In the following sections, we assess the impacts to our banking portfolios under different climate scenarios.

How climate change is impacting our wholesale lending portfolio

In our scenario analysis, we assessed the impact of climate-related risks on our corporate counterparties under different climate scenarios, which we measured by reviewing the modelled effect on our expected credit losses ('ECL').

We focused our analysis on the 11 wholesale sectors that we expect to be most impacted by climate risks. As at December 2021, these portfolios represented 27% of our wholesale lending portfolio.

For each sector in each scenario, we calculated a peak ECL increase, a metric showing the highest level of ECL modelled to be experienced during the 2022 to 2050 period. The peak ECL increase metric compares the multiplied levels of exposure in the scenario against a counterfactual scenario that incorporates no climate change.

We use the sector's exposure at default ('EAD'), which represents the relative size of our exposure to potential losses from customer defaults. This helps to demonstrate which sectors are the most material to us in terms of the impact of climate change.

Due to current limitations, we are unable to fully model the impact of physical risks on our corporate customers' supply chain. As a result, we have not included the Downside Physical Risk scenario in the following analysis, although we continue to develop our modelling capabilities.

Impact of climate risk on wholesale lending portfolios under modelled climate solutions

Relative size of exposures at default and increase in peak ECL under each scenario compared with the counterfactual scenario (expressed as a multiple).

Sector level	Exposure at default	Net Zero	Downside Transition Risk	Current Commitments
Conglomerates and industrials		<5x	>5x	<1.5x
Power and utilities		<3x	<3x	<1.5x
Construction and building materials		<3x	<3x	<1.25x
Oil and gas		<1.5x	<1.5x	<1.25x
Chemicals		<4x	<4x	<1.5x
Automotive		<3x	<3x	<1.25x
Land transport and logistics		<5x	>5x	<1.5x
Aviation		<2x	<3x	<1.25x
Agriculture and soft commodities		<5x	<4x	<1.5x
Marine		<2x	<3x	<1.25x
Metals and mining		<5x	>5x	<1.5x

As the table above illustrates, we expect our ECL to rise most under the Net Zero or Downside Transition Risk scenarios. This is reflective of the high transition risks to which these sectors are exposed, and the potential impact of not having clear transition plans to mitigate these risks.

For many sectors, the impact of rising carbon prices will lead to increased credit losses. However, this will depend on individual companies to determine how much of the additional costs associated with carbon pricing will be absorbed by their suppliers or customers and demand for more economically viable substitute products that emerge.

The conglomerates and industrials sector, which includes large companies with business activities in multiple business segments, is the most impacted by climate change in each scenario. It also represents our largest climate-related exposure, and would potentially experience the highest increases in credit losses, largely due to the transition risks predominantly within the high-emitting and lower-profitability manufacturing segments.

Of our other largest and most impacted sectors, the power and utilities, construction and building materials, and chemicals sectors are subject to increased levels of transition risks due to their ongoing exposure to higher carbon emitting activities.

Within the analysis, there is a range of geographical outcomes, dictated by the varied pace of change in the transition to net zero, such as in Asia, where the quality of our customers' climate transition plans within our high-risk sectors lags behind other regions.

We use the results of our climate scenario analysis, including how different scenarios will impact on different sectors, to assess the impact of climate change risk mitigation on our clients, including our customers' creditworthiness. It informs us about climate risks in our wholesale portfolio, allowing us to identify and prioritise the sectors and sub-sectors that require the greatest support to transition. This also allow us to test the impact of actions that can support our customers' transition and our net zero ambition.

Our net zero ambition represents one of our four strategic pillars. For further details of our net zero ambition, see the 'Transition to net zero' section of the ESG review on page 47, including how we are supporting our customers transition to net zero on page 57.

How climate change is impacting our retail mortgage portfolio

As part of our internal climate scenario analysis, we carried out a detailed physical risk assessment of four of our retail mortgage markets – the UK, Hong Kong, Singapore and Australia – which represent 73.8% of balances in our retail mortgage portfolio.

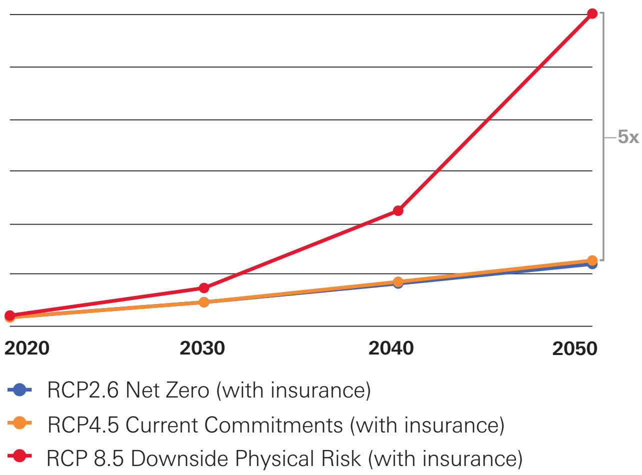
We modelled defaults and losses under three physical risk scenarios. Under the Net Zero and Current Commitments scenarios, we project minimal losses over the modelled time horizon. However, under the Downside Physical Risk scenario, the mortgage book is expected to experience a moderate increase in defaults and losses, as the severity of perils is expected to worsen, although overall losses are still low.

The modelling, data and methodology in relation to climate scenario analysis is still evolving, so the results are not expected to be stable or consistent in the short to medium term, and are meant to give an indicative, directional assessment for strategic awareness only.

In our analysis of our retail mortgage portfolio, we assessed several physical perils that could impact the value of properties, including flooding, wildfire and windstorms. We also assessed the ability and willingness of borrowers to service their debts.

In 2022, we enhanced the methodology to factor in the negative impact on property valuations, as well as the impact of affordability due to repair costs, following physical risk events. We also considered the retail mortgage portfolio with and without insurance. The scenario assumptions reflected whether or not properties within the portfolio had buildings insurance coverage to pay for damage incurred from physical events. In addition, we addressed geolocation data deficiencies, implemented new models and incorporated more data, although the data and models used to estimate defaults and losses are still evolving.

Losses as a proportion of global retail mortgage book under tested scenarios[1]



1 Our internal climate scenarios are supported by the Intergovernmental Panel on Climate Change's Representative Concentration Pathways ('RCP') and are used as inputs into physical risk modelling. The Net Zero scenario is mostly aligned to the RCP 2.6 scenario; the Current Commitments scenario is mostly aligned to the RCP 4.5 scenario; and the Downside Physical Risk scenario is mostly aligned to the RCP 8.5 scenario.

The modelled impact on our portfolio projects losses will remain negligible under the Net Zero and Current Commitments scenarios by 2050. Under the Downside Physical Risk (with insurance) scenario, although losses are five times larger than under the Net Zero and Current Commitments scenario, they remain at low levels. This moderate increase is largely driven by the expected demise of Flood Re in the UK in 2039. Flood Re is a UK government-backed insurance scheme that ensures that properties at the highest risk of flooding can obtain buildings insurance. Under this scenario, properties ceded to the scheme become uninsurable post-2039. The proportion of our properties that were reinsured by Flood Re was less than 4% of the UK portfolio at December 2021. While overall modelled losses were low, a large proportion of these were driven by such properties.

One of the outcomes from the exercise was that the non-availability of insurance for impacted properties was a key contributor to losses. It was assumed that properties that are insurable, or where insurance is affordable, will largely maintain their insurance. We also assessed the impact of enhanced EPC legislation, although it was deemed to be immaterial.

In addition, we assessed the risk of tropical cyclones and related storm surges as they were deemed material in Hong Kong. However, defaults are expected to remain low through to 2050 due to buildings being designed to withstand high wind speeds and investment into sea defences. We also looked at wildfire in Australia, although the risk and severity is limited given our mortgage portfolio is predominantly located in metropolitan areas. Similarly, losses in Singapore were low in all the scenarios due to its geographical location and strong sea defences.

Projected peril risk

Flooding is usually localised to specific areas that are close to water sources such as rivers or the coast, areas that are located in particular valleys where surface water can 'pool', or urban areas with poor drainage following flash floods.

As the 'Exposure to flooding' table below shows, the majority of properties located in the four markets are predicted to experience zero to low risk of flooding, with flood depths of less than 0.5 metres, under a 1-in-100-year event in each of the scenarios, demonstrating the resilience of our portfolio.

Exposure to flooding

Proportion of properties with projected flood depths in a 1-in-100-year severity flood event (%)[1]

Markets	Flood depth (metres)	Baseline flood risk	Net Zero	Downside Physical Risk
		Scenarios		
		2022	2050	2050
UK	>1.5	**0.2**	0.2	0.4
	0.5–1.5	**0.7**	2.5	3.7
	0–0.5	**99.1**	97.3	95.9
Hong Kong	>1.5	**0.7**	0.8	1.2
	0.5–1.5	**1.2**	1.3	30.4
	0–0.5	**98.1**	97.9	68.4
Singapore	>1.5	**0**	0	0.1
	0.5–1.5	**2.8**	2.9	7.4
	0–0.5	**97.2**	97.1	92.5
Australia	>1.5	**0.6**	0.6	0.7
	0.5–1.5	**1.2**	1.2	2.6
	0–0.5	**98.2**	98.2	96.7

1 *Severe flood events include river and surface flooding and coastal inundation. The table compares 2050 snapshots under the Net Zero and Downside Physical Risk scenarios with a baseline view in 2022.*

The most impacted market is Hong Kong, where over 30% of the locations would be susceptible to flood depths greater than 0.5 metres under the Downside Physical Risk scenario in 2050. This is primarily driven by higher coastal and storm surges. However, this did not take into account building type and property floor level, which we expect would reduce the impact of flooding for a large number of individual properties, given the majority of buildings in Hong Kong are high-rise apartments.

For the remainder of the markets, more than 90% of mortgage locations within each market are expected to experience flood depths of less than 0.5 metres in all scenarios, which would not be material.

How climate change is impacting our commercial real estate portfolios

We assessed the impact of various perils to which our commercial real estate customers could be vulnerable, including flooding and windstorms. Our commercial real estate portfolio is globally diversified with larger concentrations in Hong Kong, the UK and the US.

The impact of exposures to these perils can lead to increased ECL, largely due to the cost of repairs following damages caused by physical risk events or property valuation impacts caused by the increasing frequency of physical risk events.

The 'Exposure to peril' table below shows exposure of our commercial real estate portfolio within our largest markets to specific physical risk events. The 'peak multiplier increase in ECL' table shows for our largest markets the peak ECL increase modelled to be experienced during the 2022 to 2050 period. This is a metric which compares the multiplied levels of exposure in the scenario against a counterfactual scenario that incorporates no climate change. We use the sector's exposure at default, which represents the relative size of our exposure to potential losses from customer defaults within each jurisdiction.

Exposure to peril

Proportion of our portfolio exposed to main perils in key markets.

	Coastal inundation	Cyclone wind	Surface water flooding	Riverine flooding
	%	%	%	%
Hong Kong	**2**	**94**	**18**	**11**
UK	**15**	**0**	**12**	**8**
US	**16**	**83**	**15**	**28**

Peak multiplier increase in ECL

Relative size of exposures at default ('EAD') and increase in peak ECL under each scenario compared with the counterfactual scenario (expressed as a multiple)

	Exposure at default in 2021	Net Zero	Current Commit-ments	Downside Transition Risk	Downside Physical Risk (with insurance)	Downside Physical Risk (without insurance
Hong Kong		<1.25x	<1.25x	<1.25x	<1.25x	<1.25x
UK		<1.25x	<1.25x	<1.25x	<1.5x	<1.5x
US		<1.25x	<1.25x	<1.25x	<1.25x	<1.5x

The tables show that despite a varying degree of exposure to perils across our most significant markets, our portfolio continues to maintain a strong level of resilience to physical climate risks out to the long term. In addition, the impact of insurance coverage mitigates some of the risks under the most severe Downside Physical Risk climate scenario.

Our largest credit exposure is in Hong Kong, where our portfolio has material exposure to tropical cyclone winds. However, the resulting impact on prospective credit losses remains low in the medium to long term due to high building standards.

In the UK, in line with our retail portfolio, the main perils that drive potential credit losses relate to coastal, river and surface water flooding, although the impacts from these perils are not expected to cause significant damages. Around 20% of our financed properties are in London, and most are protected by the Thames Barrier. Under the Net Zero scenario, transition risks materialise from 2025 due to the costs of retrofitting requirements, and these are expected to lead to increased impairments.

In the US, the major perils are from coastal flooding, largely in the north-east of the country and in Florida, and from hurricane impact, including gust damage, heavy rainfall and storm surges. The intensity of these events are expected to increase in the future with a greater proportion of tropical cyclones falling within the highest categories. These will not only affect the regions that are currently exposed, but also new areas due to the projected poleward shift of future tropical cyclones. Building resilience and the future availability and affordability of insurance cover in these regions will be the key determinants of climate risks.

Understanding the resilience of our critical properties

Climate change poses a physical risk to the buildings that we occupy as an organisation, including our offices, retail branches and data centres, both in terms of loss and damage, and business interruption. We measure the impacts of climate and weather events to our buildings on an ongoing basis, using historical, current and scenario modelled forecast data. In 2022, there were 38 major storms that had no impact on the availability of our buildings.

We use stress testing to evaluate the potential for impact to our owned or leased premises. Our scenario stress test, conducted in 2022, analysed how seven different climate change-related hazards – comprising coastal inundation, extreme heat, extreme winds, wildfires, riverine flooding, soil movement due to drought, and surface water flooding – could impact 500 of our critical and important buildings.

The 2022 stress test covered all 500 buildings and modelled climate change with the NGFS's Hot house scenario that projects that the rise in the temperature of the world will likely exceed 4°C by 2100. It also modelled a less severe scenario that projects that global warming will likely be limited to 2°C, in line with the upper limit ambition of the Paris Agreement.

Key findings from the 4°C or greater Hot house scenario included:

- By 2050, 62 of the 500 critical and important buildings will have a high potential for impact due to climate change, with insurance-related losses estimated to be in excess of 10% of the insured value of our buildings.
- These included 40 locations that face the risk of coastal flooding due to sea levels rising and storm surges associated with typhoons and hurricanes. In addition, five locations face the risk of fluvial flooding due to surface water run-off caused by heavy rain. The remaining 17 locations are data centres where the predominant risk emanate from a mixture of temperature extremes and water stress, which could impact the mechanical cooling equipment or drought for which the specific direct physical impacts could be soil movement.
- A further 84 locations have the potential to be impacted by climate change, albeit to a lesser extent, with insurance-related losses estimated at between 5% and 10% of the insured value of our buildings. The principal risks are coastal flooding, drought, temperature extremes, and water stress.

A key finding from the 2°C, less severe scenario showed:

- The total number of buildings at risk reduces from 146 to 98, with the same 62 key facilities still at risk by 2050 from the same perils.

This forward-looking data will inform real estate planning. We will continue to improve our understanding of how extreme weather events impact our building portfolio as climate risk assessment tools improve and evolve. Additionally, we buy insurance for property damage and business interruption, and consider insurance as a loss mitigation strategy depending on its availability and price.

We regularly review and enhance our building selection process and global engineering standards, and will continue to assess historical claims data to help ensure our building selection and design standards reflect the potential impacts of climate change.

Resilience risk

Overview

Resilience risk is the risk of sustained and significant business disruption from execution, delivery, physical security or safety events, causing the inability to provide critical services to our customers, 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 resilience 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 easy-to-access risk and control information and metrics to enable management to focus on non-financial risks 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. We also remotely provide oversight and stewardship, including support of chief risk officers, in territories where we have no physical presence.

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 Non-Financial Risk Management Board, chaired by the Group Chief Risk and Compliance Officer, with an escalation path to the Group Risk Management Meeting and Group 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 and 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 quarterly 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 situation in Russia and Ukraine, and remain ready to take measures to help ensure business continuity, should the situation require. There has been no significant impact to our services in nearby markets where the Group operates. Publications from the UK government, EU Commission and energy company National Grid, among others, advised on potential plans for power cuts and energy restrictions across the UK and continental Europe during the winter period. In light of potential disruption, businesses and functions in these markets are reviewing existing plans and responses to minimise the impact.

Regulatory compliance risk

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.

Regulatory compliance risk management

Key developments in 2022

The dedicated programme to embed our updated purpose-led conduct approach has concluded. Work to map applicable regulations to our risks and controls continues in 2023 alongside the adoption of new tooling to support enterprise-wide horizon scanning for new regulatory obligations and manage our 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.

Governance and structure

The structure of the Compliance function is substantively unchanged and the Group Regulatory Conduct capability and Group Financial Crime capability both continue to work closely with the regional chief compliance officers and their respective teams to help them identify and manage regulatory and financial crime compliance risks across the Group.

They also work together and with all relevant stakeholders to achieve good conduct outcomes and provide enterprise-wide support on the compliance risk agenda in collaboration with the Group's 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 regional chief compliance officers and their 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 identification and escalation of any actual or potential regulatory breaches, and relevant reportable events are escalated to the Group's Non-Financial Risk Management Board, the Group Risk Management Meeting and Group Risk Committee, as appropriate. The Group Head of Compliance reports to the Group Chief Risk and Compliance Officer and attends the Risk and Compliance Executive Committee, the Group Risk Management Meeting and the Group Risk Committee.

Financial crime risk

Overview

Financial crime risk is the risk that HSBC'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 regularly 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.
- We deployed a key component of our intelligence-led, dynamic risk assessment capability for customer account monitoring in additional UK entities, Mexico and Singapore, and have expanded coverage to include monitoring of customer credit card activity in the UK. Furthermore we have deployed a next generation capability for the monitoring of correspondent banking activity in Hong Kong and the UK.
- We reconfigured our transaction screening capability to be ready for the global change to payment systems formatting under ISO20022 requirements, and enhanced transaction screening capabilities by implementing automated alert discounting.
- We strengthened 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 function remained substantively unchanged in 2022, although we continued to review the effectiveness of our governance framework to manage financial crime risk. The Group Head of Financial Crime and Group Money Laundering Reporting Officer continues to report to the Group Chief Risk and Compliance Officer, while the Group Risk Committee retains oversight of matters relating to fraud, bribery and corruption, tax evasion, sanctions and export control breaches, money laundering, terrorist financing and proliferation financing.

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 HSBC 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 the markets in which we operate and applying a consistently high financial crime standard globally.

We continue to assess the effectiveness of our end-to-end financial crime risk management framework, 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 and our investigative and monitoring capabilities through technology deployments. We developed more targeted metrics, and have also enhanced our 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 around the world. In 2022, our focus remained on measures to improve the overall effectiveness of the global financial crime framework, notably by providing input into legislative and regulatory reform activities. We did this by contributing to the development of responses to consultation papers focused on how financial crime risk management frameworks can deliver more effective outcomes in detecting and deterring criminal activity, including tackling evolving criminal behaviours such as fraud. Through our work with the Wolfsberg Group and the Institute of International Finance, we supported the efforts of the global standard setter, the Financial Action Task Force. In addition, we participated in a number of public events related to tackling forestry crimes, wildlife trafficking and human trafficking.

Independent Reviews

In August 2022, the Board of Governors of the Federal Reserve System terminated its 2012 cease-and-desist order, with immediate effect. This order was the final remaining regulatory enforcement action that HSBC had entered into in 2012. In June 2021, the UK Financial Conduct Authority had already determined that no further skilled person work was required under section 166 of the Financial Services and Markets Act. The Group Risk Committee retains oversight of matters relating to financial crime, including any remaining remedial activity not yet completed as part of previous recommendations.

Model risk

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

In 2022, we continued to make improvements in our model risk management processes amid regulatory changes in model requirements.

Initiatives during the year included:

- In response to regulatory capital changes, we redeveloped, independently validated and submitted to the PRA and other local regulators our models for the internal ratings-based ('IRB') approach for credit risk, internal model method ('IMM') for counterparty credit risk and internal model approach ('IMA') for market risk. These new models have been built to enhanced standards using improved data as a result of investment in processes and systems.
- We redeveloped and validated models impacted by the changes to the alternative rate setting mechanisms due to the Ibor transition.
- We embedded changes to address gaps in the control framework that emerged as a result of increases in adjustments and overlays that were applied to compensate for the impact of the Covid-19 pandemic, and the subsequent volatility due to the effects of the rise in global interest rates on the ECL models.
- We have increased the involvement of first line colleagues in businesses and functions in the development and management of models. We also put an enhanced focus on key model risk drivers such as data quality and model methodology.
- We have sought to enhance the reporting that supports the model risk appetite measures, to support our businesses and functions in managing model risk more effectively.
- We continued the transformation of the Model Risk Management team, with further enhancements to the independent model validation processes, including new systems and working practices. Key senior hires were made during the year to lead the business areas and regions to strengthen oversight and expertise within the function.
- We have completed independent validations of a suite of newly developed models for the forthcoming IFRS17 accounting standards for insurance.
- We have enhanced our model risk teams with specialist skills to manage the increased model risk in areas such as climate risk and models using advanced analytics and machine learning, as they become critical areas of focus that will grow in importance in 2023 and beyond.

Governance and structure

Model risk governance committees at the Group, business and functional levels provide oversight of model risk. The committees include senior leaders from the three global businesses and the Group Risk and Compliance function, and focus on model-related concerns and are supported by key model risk metrics. We also have Model Risk Committees in our geographical regions focused on local delivery and requirements. The Group-level Model Risk Committee is chaired by the Group Chief Risk and Compliance Officer, and the heads of key businesses participate in these meetings.

Key risk management processes

We use a variety of modelling approaches, including regression, simulation, sampling, machine learning and judgemental scorecards for a range of business applications. These activities include customer selection, product pricing, financial crime transaction monitoring, creditworthiness evaluation and financial reporting. Global responsibility for managing model risk is delegated from the Board to the Group Chief Risk and Compliance Officer, who authorises the Group Model Risk Committee. This committee regularly reviews our model risk management policies and procedures, and requires the first line of defence to demonstrate comprehensive and effective controls based on a library of model risk controls provided by Model Risk Management. Model Risk Management also reports on model risk to senior management and the Group Risk Committee on a regular basis through the use of the risk map, risk appetite metrics and top and emerging risks.

We regularly review the effectiveness of these processes, including the model oversight committee structure, to help ensure appropriate understanding and ownership of model risk is embedded in the businesses and functions.

Insurance manufacturing operations risk

Contents

Overview

The key risks for our insurance manufacturing operations are market risk, in particular interest rate and equity, credit risk and insurance underwriting risk. These have a direct impact on the financial results and capital positions of the insurance operations. Liquidity risk, while significant in other parts of the Group, is relatively minor for our insurance operations.

HSBC's insurance business

We sell insurance products through a range of channels including our branches, insurance salesforces, direct channels and third-party distributors. The majority of sales are through an integrated bancassurance model that provides insurance products principally for customers with whom we have a banking relationship, although the proportion of sales through other sources such as independent financial advisers, tied agents and digital is increasing.

For the insurance products we manufacture, the majority of sales are savings, universal life and protection contracts.

We choose to manufacture these insurance products in HSBC subsidiaries 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.

We have life insurance manufacturing subsidiaries in eight markets, which are Hong Kong, Singapore, mainland China, France, the UK, Malta, Mexico and Argentina. We also have a life insurance manufacturing associate in India.

Where we do not have the risk appetite or operational scale to be an effective insurance manufacturer, we engage with a small number of leading external insurance companies in order to provide insurance products to our customers. 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 all of our geographical regions.

This section focuses only on the risks relating to the insurance products we manufacture.

Insurance manufacturing operations risk management

Key developments in 2022

The insurance manufacturing subsidiaries follow the Group's risk management framework. In addition, there are specific policies and practices relating to the risk management of insurance contracts, which have not changed materially over 2022. During the year, there was continued market volatility observed across interest rates, equity markets and foreign exchange rates. This was predominantly driven by geopolitical factors and wider inflationary concerns. One area of key risk management focus was the implementation of the new accounting standard, IFRS17 'Insurance Contracts'. Given the fundamental nature of the impact of the accounting standard on insurance accounting, this presents additional financial reporting and model risks for the Group. Another area of focus was the acquisition early in 2022 of an insurance business in Singapore and the subsequent integration of that business into the Group's risk management framework.

Governance and structure

(Audited)

Insurance manufacturing risks are managed to a defined risk appetite, which is aligned to the Group's risk appetite and risk management framework, including its three lines of defence model. For details of the Group's governance framework, see page 133. The Global Insurance Risk Management Meeting oversees the control framework globally and is accountable to the WPB Risk Management Meeting on risk matters relating to the insurance business.

The monitoring of the risks within our insurance operations is carried out by Insurance Risk teams. The Group's risk stewardship functions support the Insurance Risk teams in their respective areas of expertise.

Stress and scenario testing

(Audited)

Stress testing forms a key part of the risk management framework for the insurance business. We participate in local and Group-wide regulatory stress tests, as well as internally developed stress and scenario tests, including Group internal stress test exercises.

The results of these stress tests and the adequacy of management action plans to mitigate these risks are considered in the Group's ICAAP and the entities' regulatory Own Risk and Solvency Assessments ('ORSAs'), which are produced by all material entities.

Key risk management processes

Market risk

(Audited)

All our insurance manufacturing subsidiaries have market risk mandates and limits that specify the investment instruments in which they are permitted to invest and the maximum quantum of market risk that 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:

- We are able to adjust bonus rates to manage the liabilities to policyholders for products with discretionary participating features ('DPF'). The effect is that a significant proportion of the market risk is borne by the policyholder.
- We use 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. We use models to assess the effect of a range of future scenarios on the values of financial assets and associated liabilities, and ALCOs employ the outcomes in determining how best to structure asset holdings to support liabilities.
- We use derivatives to protect against adverse market movements.
- We design new products to mitigate market risk, such as changing the investment return sharing proportion between policyholders and the shareholder.

Credit risk

(Audited)

Our insurance manufacturing subsidiaries also have credit risk mandates and limits within which they are permitted to operate, which consider the credit risk exposure, 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.

Stress testing is performed on investment credit exposures using credit spread sensitivities and default probabilities.

We use a number of tools to manage and monitor credit risk. These include a credit report containing a watch-list of investments with current credit concerns, primarily investments that may be at risk of future impairment or where high concentrations to counterparties are present in the investment portfolio. Sensitivities to credit spread risk are assessed and monitored regularly.

Capital and liquidity risk

(Audited)

Capital risk for our insurance manufacturing subsidiaries is assessed in the Group's ICAAP based on their financial capacity to support the risks to which they are exposed. Capital adequacy is assessed on both the Group's economic capital basis, and the relevant local insurance regulatory basis.

Risk appetite buffers are set to ensure that the operations are able to remain solvent, allowing for business-as-usual volatility and extreme but plausible stress events. In certain cases, entities use reinsurance to manage capital risk.

Liquidity risk is relatively minor for the insurance business. It is managed by cash flow 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.

Insurance manufacturing subsidiaries complete quarterly liquidity risk reports and an annual review of the liquidity risks to which they are exposed.

Insurance underwriting risk

Our insurance manufacturing subsidiaries primarily use the following frameworks and processes to manage and mitigate insurance underwriting risks:

- a formal approval process for launching new products or making changes to products;
- a product pricing and profitability framework, which requires initial and ongoing assessment of the adequacy of premiums charged on new insurance contracts to meet the risks associated with them;
- a framework for customer underwriting;
- reinsurance, which cedes risks to third-party reinsurers to keep risks within risk appetite, reduce volatility and improve capital efficiency; and
- oversight of expense and reserve risks by entity Financial Reporting Committees.

Insurance manufacturing operations risk in 2022

Measurement

The following tables show the composition of assets and liabilities by contract type and by geographical region.

Balance sheet of insurance manufacturing subsidiaries by type of contract[1]

(Audited)

	With DPF	Unit-linked	Other contracts[2]	Shareholder assets and liabilities	Total
	$m	$m	$m	$m	$m
Financial assets	**89,907**	**8,144**	**21,467**	**9,086**	**128,604**
– financial assets designated and otherwise mandatorily measured at fair value through profit or loss	**30,950**	**7,992**	**3,899**	**1,543**	**44,384**
– derivatives	**418**	**—**	**30**	**15**	**463**
– financial investments at amortised cost	**46,142**	**43**	**16,114**	**4,805**	**67,104**
– financial investments at fair value through other comprehensive income	**8,349**	**—**	**486**	**1,920**	**10,755**
– other financial assets[3]	**4,048**	**109**	**938**	**803**	**5,898**
Reinsurance assets	**2,945**	**50**	**1,724**	**2**	**4,721**
PVIF[4]	**—**	**—**	**—**	**9,900**	**9,900**
Other assets and investment properties	**2,521**	**2**	**225**	**957**	**3,705**
Total assets	**95,373**	**8,196**	**23,416**	**19,945**	**146,930**
Liabilities under investment contracts designated at fair value	**—**	**2,084**	**3,296**	**—**	**5,380**
Liabilities under insurance contracts	**91,948**	**5,438**	**17,521**	**—**	**114,907**
Deferred tax[5]	**227**	**6**	**22**	**1,495**	**1,750**
Other liabilities	**—**	**—**	**—**	**7,212**	**7,212**
Total liabilities	**92,175**	**7,528**	**20,839**	**8,707**	**129,249**
Total equity	**—**	**—**	**—**	**17,681**	**17,681**
Total liabilities and equity at 31 Dec 2022	**92,175**	**7,528**	**20,839**	**26,388**	**146,930**
Financial assets	88,969	8,881	19,856	9,951	127,657
– financial assets designated and otherwise mandatorily measured at fair value through profit or loss	30,669	8,605	3,581	1,827	44,682
– derivatives	129	1	15	2	147
– financial investments at amortised cost	42,001	61	14,622	4,909	61,593
– financial investments at fair value through other comprehensive income	10,858	—	459	1,951	13,268
– other financial assets[3]	5,312	214	1,179	1,262	7,967
Reinsurance assets	2,180	72	1,666	3	3,921
PVIF[4]	—	—	—	9,453	9,453
Other assets and investment properties	2,558	1	206	820	3,585
Total assets	93,707	8,954	21,728	20,227	144,616
Liabilities under investment contracts designated at fair value	—	2,297	3,641	—	5,938
Liabilities under insurance contracts	89,492	6,558	16,757	—	112,807
Deferred tax[5]	179	9	24	1,418	1,630
Other liabilities	—	—	—	7,269	7,269
Total liabilities	89,671	8,864	20,422	8,687	127,644
Total equity	—	—	—	16,972	16,972
Total liabilities and equity at 31 Dec 2021	89,671	8,864	20,422	25,659	144,616

1 *Balance sheet of insurance manufacturing operations is shown before elimination of inter-company transactions with HSBC non-insurance operations.*
2 *'Other contracts' includes term insurance, credit life insurance, universal life insurance and investment contracts not included in the 'Unit-linked' or 'With DPF' columns.*
3 *Comprise mainly loans and advances to banks, cash and inter-company balances with other non-insurance legal entities.*
4 *Present value of in-force long-term insurance business.*
5 *'Deferred tax' includes the deferred tax liabilities arising on recognition of PVIF.*

Balance sheet of insurance manufacturing subsidiaries by geographical region[1,2]

(Audited)

	Europe	Asia	Latin America	Total
	$m	$m	$m	$m
Financial assets	**27,407**	**100,224**	**973**	**128,604**
– financial assets designated and otherwise mandatorily measured at fair value through profit or loss	**15,858**	**28,030**	**496**	**44,384**
– derivatives	**292**	**171**	**—**	**463**
– financial investments – at amortised cost	**383**	**66,674**	**47**	**67,104**
– financial investments – at fair value through other comprehensive income	**9,505**	**861**	**389**	**10,755**
– other financial assets[3]	**1,369**	**4,488**	**41**	**5,898**
Reinsurance assets	**183**	**4,533**	**5**	**4,721**
PVIF[4]	**1,296**	**8,407**	**197**	**9,900**
Other assets and investment properties	**958**	**2,687**	**60**	**3,705**
Total assets	**29,844**	**115,851**	**1,235**	**146,930**
Liabilities under investment contracts designated at fair value	**1,143**	**4,237**	**—**	**5,380**
Liabilities under insurance contracts	**24,076**	**89,904**	**927**	**114,907**
Deferred tax[5]	**288**	**1,440**	**22**	**1,750**
Other liabilities	**2,166**	**4,992**	**54**	**7,212**
Total liabilities	**27,673**	**100,573**	**1,003**	**129,249**
Total equity	**2,171**	**15,278**	**232**	**17,681**
Total liabilities and equity at 31 Dec 2022	**29,844**	**115,851**	**1,235**	**146,930**
Financial assets	34,264	92,535	858	127,657
– financial assets designated and otherwise mandatorily measured at fair value through profit or loss	19,030	25,248	404	44,682
– derivatives	65	82	—	147
– financial investments – at amortised cost	1,161	60,389	43	61,593
– financial investments – at fair value through other comprehensive income	12,073	817	378	13,268
– other financial assets[3]	1,935	5,999	33	7,967
Reinsurance assets	213	3,703	5	3,921
PVIF[4]	1,098	8,177	178	9,453
Other assets and investment properties	1,091	2,431	63	3,585
Total assets	36,666	106,846	1,104	144,616
Liabilities under investment contracts designated at fair value	1,396	4,542	—	5,938
Liabilities under insurance contracts	30,131	81,840	836	112,807
Deferred tax[5]	250	1,357	23	1,630
Other liabilities	2,711	4,523	35	7,269
Total liabilities	34,488	92,262	894	127,644
Total equity	2,178	14,584	210	16,972
Total liabilities and equity at 31 Dec 2021	36,666	106,846	1,104	144,616

1 HSBC has no insurance manufacturing subsidiaries in the Middle East and North Africa or North America.
2 Balance sheet of insurance manufacturing operations is shown before elimination of inter-company transactions with HSBC non-insurance operations.
3 Comprise mainly loans and advances to banks, cash and inter-company balances with other non-insurance legal entities.
4 Present value of in-force long-term insurance business.
5 'Deferred tax' includes the deferred tax liabilities arising on recognition of PVIF.

Key risk types

Market risk

(Audited)

Description and exposure

Market risk is the risk of changes in market factors affecting HSBC's capital or profit. Market factors include interest rates, equity and growth assets 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'). 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 fixed interest, with a proportion allocated to other asset classes to provide customers with the potential for enhanced returns.

DPF products expose HSBC 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 HSBC. Amounts are held against the cost of such guarantees, calculated by stochastic modelling in the larger entities.

The cost of such guarantees is accounted for as a deduction from the present value of in-force ('PVIF') asset, unless the cost of such guarantees is already explicitly allowed for within the insurance contract liabilities.

The following table shows the total reserve held for the cost of guarantees, the range of investment returns on assets supporting these products and the implied investment return that would enable the business to meet the guarantees.

The cost of guarantees decreased to $745m (2021: $938m), primarily due increases in interest rates during 2022.

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

Financial return guarantees

(Audited)

	2022			2021		
	Investment returns implied by guarantee	**Long-term investment returns on relevant portfolios**	**Cost of guarantees**	Investment returns implied by guarantee	Long-term investment returns on relevant portfolios	Cost of guarantees
	%	**%**	**$m**	%	%	$m
Capital	**—**	**1.6-5.1**	**47**	—	0.7-2.3	220
Nominal annual return	**0.1-1.9**	**3.6-6.8**	**548**	0.1-1.9	2.7-6.4	423
Nominal annual return	**2.0-3.9**	**2.0-5.5**	**109**	2.0-3.9	2.2-4.1	183
Nominal annual return	**4.0-5.0**	**2.0-4.2**	**41**	4.0-5.0	2.2-4.2	112
At 31 Dec			**745**			938

Sensitivities

Changes in financial market factors, from the economic assumptions in place at the start of the year, had a negative impact on reported profit before tax of $988m (2021: $516m). 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 equity of our insurance manufacturing subsidiaries. These sensitivities are prepared in accordance with current IFRSs, which will change following the adoption of IFRS 17 'Insurance Contracts', effective from 1 January 2023. Further information about the adoption of IFRS 17 is provided on page 335.

Where appropriate, the effects of the sensitivity tests on profit after tax and equity incorporate the impact of the stress on the PVIF.

Due in part to the impact of the cost of guarantees and hedging strategies, which may be in place, the relationship between the profit and total equity and the risk factors is non-linear, particularly in a low interest-rate environment. Therefore, the results disclosed should not be extrapolated to measure sensitivities to different levels of stress. For the same reason, the impact of the stress is not necessarily symmetrical on the upside and downside. The sensitivities are stated before allowance for management actions, which may mitigate the effect of changes in the market environment. The sensitivities presented allow for adverse changes in policyholder behaviour that may arise in response to changes in market rates. The differences between the impacts on profit after tax and equity are driven by the changes in value of the bonds measured at fair value through other comprehensive income, which are only accounted for in equity. The increased upward sensitivity and reduced downward sensitivity of profit after tax to a parallel shift in yield curves is driven by rising interest rates having reduced the sensitivity impact associated with the cost of guarantees in France.

Sensitivity of HSBC's insurance manufacturing subsidiaries to market risk factors

(Audited)

	2022		2021	
	Effect on profit after tax	**Effect on total equity**	Effect on profit after tax	Effect on total equity
	$m	**$m**	$m	$m
+100 basis point parallel shift in yield curves	**(100)**	**(236)**	(2)	(142)
-100 basis point parallel shift in yield curves	**35**	**177**	(154)	(9)
10% increase in equity prices	**391**	**391**	369	369
10% decrease in equity prices	**(419)**	**(419)**	(377)	(377)
10% increase in US dollar exchange rate compared with all currencies	**98**	**98**	80	80
10% decrease in US dollar exchange rate compared with all currencies	**(98)**	**(98)**	(80)	(80)

Credit risk

(Audited)

Description and exposure

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 manufacturers:

- 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 shown in the table on page 235.

The credit quality of the reinsurers' share of liabilities under insurance contracts is assessed as 'satisfactory' or higher (as defined on page 146), with 100% of the exposure being neither past due nor impaired (2021: 100%).

Credit risk on assets supporting unit-linked liabilities is predominantly borne by the policyholders. Therefore, our exposure is primarily related to liabilities under non-linked insurance and investment contracts and shareholders' funds. The credit quality of insurance financial assets is included in the table on page 165.

The risk associated with credit spread volatility is to a large extent mitigated by holding debt securities to maturity, and sharing a degree of credit spread experience with policyholders.

Liquidity risk

(Audited)

Description and exposure

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. Liquidity risk may be able to be shared with policyholders for products with DPF.

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

The profile of the expected maturity of insurance contracts at 31 December 2022 remained comparable with 2021.

The remaining contractual maturity of investment contract liabilities is included in Note 30 on page 396.

Expected maturity of insurance contract liabilities

(Audited)

	Expected cash flows (undiscounted)				
	Within 1 year	1–5 years	5–15 years	Over 15 years	Total
	$m	$m	$m	$m	$m
Unit-linked	**801**	**1,732**	**2,522**	**2,355**	**7,410**
With DPF and Other contracts	**8,637**	**31,290**	**55,157**	**135,002**	**230,086**
At 31 Dec 2022	**9,438**	**33,022**	**57,679**	**137,357**	**237,496**
Unit-linked	1,346	2,605	3,159	2,293	9,403
With DPF and Other contracts	8,803	31,334	51,891	94,168	186,196
At 31 Dec 2021	10,149	33,939	55,050	96,461	195,599

Insurance underwriting risk

Description and exposure

Insurance underwriting 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, lapse and expense rates. Lapse risk exposure on products with premium financing increased over the year as rising interest rates led to an increase in the cost of financing for customers.

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 tables on pages 235 and 236 analyse our life insurance risk exposures by type of contract and by geographical region.

The insurance risk profile and related exposures remain largely consistent with those observed at 31 December 2021.

Sensitivities

(Audited)

The following table shows the sensitivity of profit and total equity to reasonably possible changes in non-economic assumptions across all our insurance manufacturing subsidiaries. These sensitivities are prepared in accordance with current IFRSs, which will change following the adoption of IFRS 17 'Insurance Contracts', effective from 1 January 2023. Further information about the adoption of IFRS 17 is provided on page 335.

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. An increase in lapse rates typically has a negative effect on profit due to the loss of future income on the lapsed policies. However, some contract lapses have a positive effect on profit due to the existence of policy surrender charges.

Expense rate risk is the exposure to a change in the allocated 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. This risk is generally greatest for our smaller entities.

Sensitivity analysis

(Audited)

	2022	2021
	$m	$m
Effect on profit after tax and total equity at 31 Dec		
Effect on profit after tax and total equity at 10% increase in mortality and/or morbidity rates	**(105)**	(112)
Effect on profit after tax and total equity at 10% decrease in mortality and/or morbidity rates	**109**	115
Effect on profit after tax and total equity at 10% increase in lapse rates	**(121)**	(115)
Effect on profit after tax and total equity at 10% decrease in lapse rates	**124**	129
Effect on profit after tax and total equity at 10% increase in expense rates	**(89)**	(108)
Effect on profit after tax and total equity at 10% decrease in expense rates	**89**	107