Risk review and Capital review

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The following parts of the Risk review and Capital review form part of the financial statements:

→ From the start of the 'Credit risk review' section (page 153) to the end of 'Other principal risks' in the same section (page 205), excluding:

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→ From the start of 'CRD IV capital base' (page 237) to the end of 'Movement in total capital' excluding capital ratios and risk-weighted assets (RWA) (page 238)

Risk update

All risk types, both financial and non-financial, are managed and reported in accordance with the Group's Enterprise Risk Management Framework. 2019 saw sustained progress towards improving the resilience of the Group's portfolios as shown here by the key highlights from the past year.

Key highlights 2019

- Asset quality broadly stable despite challenging macroeconomic environment
- Credit impairment up year-on-year, but remains below elevated levels seen in previous years
- Our capital and liquidity positions continue to be above current requirements

Our portfolio quality

Despite a challenging macroeconomic environment, the Group has been able to maintain strong performance and solid risk fundamentals, a reflection of the work done over the previous few years to secure the foundations of our risk management approach. Several of our key markets have seen significant volatility, in particular due to the US-China trade tensions, social unrest in Hong Kong, and the evolving novel coronavirus (Covid-19) outbreak. The necessary steps have been taken to maintain stable operations. We are supporting impacted corporate clients and individual customers where appropriate. We continue to assess these situations on an ongoing basis, utilising our stress testing framework and portfolio reviews to analyse the potential impact and appropriate risk management actions. As a result, we performed a review of the economic situation in Hong Kong which, when added to the impact of revisions to other model inputs, contributed to the total increase in Hong Kong expected credit loss (ECL) of $46 million in the second half of the year. After the close of the 2019 accounts, the novel coronavirus outbreak in January 2020 has increased risk aversion and uncertainty. The outbreak will likely lead to a weaker outlook for at least the Group's Asian markets in 2020, which may impact the Group's ECL as well as other financial measures in the coming year.

The Group's proportions of stage 1 and stage 2 loans and advances to customers were broadly consistent with the prior period at 90 per cent and 8 per cent respectively. Credit quality remained broadly stable in 2019 with gross stage 3 loans reducing by a further 12 per cent to $7.4 billion (2018: $8.5 billion) carrying over positive momentum from 2018. Credit grade 12 balances have increased by $0.1 billion compared with the previous year, mainly due to sovereign rating downgrades in Zimbabwe, Zambia and Lebanon in the last quarter of 2019, which impacted the ratings of certain obligors in these countries. This does not represent any specific credit concerns related to these obligors, particularly as the balances consist primarily of short-dated financial institutions and sovereign-related exposures used for local balance sheet management. There was an increase in early alert exposure to $5.3 billion (2018: $4.8 billion) driven by a number of unrelated clients that were transferred in the last quarter of 2019. Net of risk mitigants early alert balances are flat year-on-year. The proportion of investment grade corporate exposures has remained broadly consistent year-on-year at 61 per cent, although this is an increase relative to June 2019, which had seen a drop due to a reduction in repurchase agreements. While collateralisation of sub-investment grade net exposures maturing in more than one year has reduced to 45 per cent (2018: 51 per cent), this is mainly due to a handful of downgrades during the year on account of the deteriorating macroeconomic situation. We continue to focus on the quality of origination and underwriting, within our Risk Appetite.

There was an increase in exposure to our top 20 corporate clients as a percentage of Tier 1 capital, up to 56 per cent from 55 per cent in 2018. This was primarily driven by an increase in exposure to investment grade clients. Overall the Group's portfolios remain predominantly short-tenor and continue to be diversified across industry sectors, products

Key indicators

	2019	2018	01.01.18	2017 (IAS 39)
Group total business[1]				
Stage 1 loans ($ billion)	**246.1**	237.1	228.5	
Stage 2 loans ($ billion)	**20.8**	17.4	20.6	
Stage 3 loans, credit-impaired ($ billion)[2]	**7.4**	8.5	10.7	10.6
Stage 3 cover ratio[2]	**68%**	66%	67%	67%[3]
Stage 3 cover ratio (including collateral)[2]	**85%**	85%	84%	84%
Corporate & Institutional Banking and Commercial Banking[5]				
Investment grade corporate net exposures as a percentage of total corporate net exposures	**61%**	62%		57%
Loans and advances maturing in one year or less as a percentage of total loans and advances to customers	**62%**	61%		70%[4]
Early alert portfolio net exposures ($ billion)	**5.3**	4.8		8.7
Credit grade 12 net exposures ($ billion)	**1.6**	1.5		1.5
Aggregate top 20 corporate net exposures as a percentage of Tier 1 capital	**56%**	55%		50%
Collateralisation of sub-investment grade net exposures maturing in more than one year	**45%**	51%		55%
Retail Banking[5]				
Loan-to-value ratio of retail mortgages	**45%**	45%		47%

1 These numbers represent total loans and advances to customers

2 Balances for 2019 and 2018 reflect interest due but unpaid together with equivalent credit impairment charges. 2018 and 2017 stage 3 balances, provision and cover ratios have been restated

3 2017 total business cover ratios rebased to exclude portfolio impairment provisions to align to IFRS 9 (IAS 39: 65 per cent on 31 December 2017)

4 Includes fair value through profit or loss

5 These metrics are not impacted by the adoption of IFRS 9, hence data as at 1 January 2018 is not needed for comparative purposes

and geographies. We actively review our desired risk profile, and as an example, in 2019 have made the decision to only support clients who actively transition their business to generate less than 10 per cent of earnings from thermal coal by 2030, in line with our sustainability agenda.

Our Retail Banking and Private Banking portfolio represents 45 per cent of total customer loans and advances, a similar proportion to the end of 2018, with the Retail Banking segment continuing to have little exposure outside its core markets of Greater China & North Asia and ASEAN & South Asia. The overall loan-to-value of the Mortgage portfolio remains low at 45 per cent. The proportion of unsecured loans has remained broadly stable at 14 per cent of the Retail Banking and Private Banking portfolio.

The Group maintains a strong liquidity position with healthy buffers above its Risk Appetite and minimum regulatory requirements. The Group's liquidity coverage ratio decreased to 144 per cent from 154 per cent in 2018, as we looked to optimise our liquidity position. Both the liquidity buffer and cash outflows grew during the year in line with the overall balance sheet growth. The Group's advances-to-deposits ratio remained broadly unchanged from last year at 64.2 per cent (2018: 63.1 per cent). We remain a net provider of liquidity to the interbank markets and our customer deposit base is diversified by type and maturity. We have a substantial portfolio of marketable securities which can be realised in the event of a liquidity stress.

The Common Equity Tier 1 ratio decreased from 14.2 per cent to 13.8 per cent predominantly because of the impact of the share buy-back, other distributions to shareholders, including preference dividend and higher risk-weighted assets (RWA) partly offset by profit for the period.

Average Group value at risk in 2019 was $30.2 million, 47 per cent higher than in 2018, driven by the non-trading book, which has seen an increase in the bond inventory of high-quality assets in the Treasury Markets business. The average level of value at risk (VaR) in the trading book was $11 million, 12 per cent higher than in 2018 (2018: $9.8 million). Trading activities have remained relatively unchanged and client-driven. We have seen growth in Financial Markets income in 2019, but remain comfortable with the level of risk we are taking. We continue to actively monitor the portfolio and ensure that any growth is well controlled and in line with our Risk Appetite.

The results of the Bank of England's annual cyclical scenario stress test in 2019 show that the Group is more resilient to stress than a year ago. Despite an increase in the severity of the scenario, the maximum fall in the Group's Common Equity Tier 1 ratio reduced to 520 basis points (2018: 570 basis points), reflecting improved revenue momentum and overall risk profile together with the resolution of legacy conduct and control issues.

Stage 3 loans

Overall gross credit-impaired (stage 3) loans for the Group reduced by 12 per cent in 2019, from $8.5 billion to $7.4 billion, driven by continued reductions in Corporate & Institutional Banking and Commercial Banking.

Gross credit-impaired (stage 3) loans in Corporate & Institutional Banking were significantly lower (2019: $4.2 billion; 2018: $5.0 billion) mainly due to repayments, write-offs and upgrades. Total stage 3 inflows were 6 per cent lower than 2018, with new inflows mainly in ASEAN & South Asia.

In Commercial Banking, stage 3 inflows were also lower in the year by 24 per cent, but we remain cautious of the challenging macroeconomic environment and geopolitical risks. Stage 3 loans decreased from $2.3 billion to $2.0 billion, driven by write-offs and repayments.

Private Banking stage 3 loans increased marginally (2019: $0.4 billion, 2018: $0.3 billion) in the ASEAN & South Asia and Europe & Americas regions.

Stage 3 loans in the Retail Banking portfolio remained broadly stable at $0.8 billion.

The stage 3 cover ratio in the total customer loan book was higher at 68 per cent (2018: 66 per cent) due to new impairment charges, repayments and upgrades in Corporate & Institutional Banking. The cover ratio including collateral was flat at 85 per cent (2018: 85 per cent).

Credit impairment

With effect from 1 January 2019, the liquidation portfolio has been included in the ongoing portfolio as the actions to reduce exposures in the liquidation portfolio were substantially completed in 2018. 2018 has not been restated.

At Group level, total credit impairment including the restructuring portfolio is $0.9 billion (2018: $0.7 billion), representing a loan loss rate of 27 basis points (bps) of average customer loans and advances (2018: 21bps). The overall increase was driven by higher stage 1 and 2 charges in Corporate & Institutional Banking and Retail Banking, of which half of the change was due to worsening macroeconomic variables over the period, which included a downward revision of Hong Kong's GDP. This was partially offset by lower stage 3 impairment charges across most segments.

Credit impairment for Corporate & Institutional Banking is significantly higher, up 96 per cent on the levels seen last year (2019: $475 million, 2018: $242 million). This is mainly due to higher stage 1 and 2 impairments in 2019 as 2018 benefitted from upgrades within stage 2 as well as releases from improvements in macroeconomic forecasts. Stage 3 provisions also increased, with a $141 million charge booked in the fourth quarter relating to a single client exposure in ASEAN & South Asia.

Commercial Banking credit impairment declined by 50 per cent (2019: $121 million, 2018: $244 million) compared with 2018, primarily in stage 3 as 2018 included significant provisions across a few clients in Africa & Middle East and Greater China & North Asia that did not repeat.

Retail Banking credit impairment increased by 26 per cent (2019: $336 million, 2018: $267 million) mainly due to non-recurring impairment releases in Korea and Indonesia in 2018. Excluding this, impairments were flat year-on-year. The impact of the macroeconomic downgrades for Hong Kong increased stage 1 and 2 provisions. Individual impairment charge has improved year-on-year mainly driven by recoveries in Korea, Singapore and the UAE.

Private Banking impairment reduced by $31 million due to a net provision release of $29 million driven primarily by a single stage 3 client.

Credit impairment in the restructuring portfolio was a $2 million charge (2018: $87 million release), related to a small number of legacy positions in Principal Finance.

Credit impairment

	2019[1] $million (IFRS 9)	2018 $million (IFRS 9)	2017 $million (IAS 39[1])
Corporate & Institutional Banking	**475**	242	657
Retail Banking	**336**	267	374
Commercial Banking	**121**	244	168
Private Banking	**(31)**	–	1
Central & other items	**5**	(13)	–
Ongoing credit impairment charge	**906**	740	1,200
Restructuring charge/(credit)	**2**	(87)	162

1 In 2019, the liquidation portfolio has been included in ongoing business. Prior periods have not been restated

Risk profile

Our risk profile in 2019

Our Enterprise Risk Management Framework (ERMF) and well-established risk governance structure enable us to closely manage enterprise-wide risks with the objective of maximising risk-adjusted returns while remaining within our Risk Appetite. We manage emerging risks through a dynamic risk scanning and risk identification process with inputs on the internal and external risk environment, as well as potential threats and opportunities from a business, function and client lens, enabling us to proactively manage our portfolio.

We continue to take action to reposition our corporate portfolio, exiting weaker credit or lower-returning clients and adding new clients selectively. We continue to remain alert to macroeconomic challenges that may impact our markets. Our corporate portfolios exhibit a strong and sustainable risk profile that is diversified across industries, geographies and products.

The table below highlights the Group's overall risk profile associated with our business strategy.

Our risk profile in 2019

Strengthened risk management approach from an enhanced ERMF

- We have elevated Model Risk to a Principal Risk Type (PRT), effective in 2020
- We recognised Climate Risk as a material cross-cutting risk that manifests through other relevant PRTs
- Existing PRTs were enhanced – changes include the expansion in Country Risk coverage, reclassification of the Fraud Risk sub-type from Operational Risk to Financial Crime Risk, and embedding of principles relating to environment and social risks, defence and dual use goods in Reputational Risk
- A self-assessment process was formalised for our branches and subsidiaries to assess the adoption and effectiveness of the ERMF locally
- The 2019 ERMF effectiveness review showed that risk management for both financial and non-financial risks improved year-on-year

Further details on the ERMF can be found in the Risk management approach (page 206)

Strong and sustainable asset growth

- The Group's proportions of stage 1 and stage 2 loans and advances to customers were broadly consistent with the prior period at 90 per cent and 8 per cent respectively
- Asset quality has remained broadly stable, with investment grade corporate net exposures broadly consistent at 61 per cent
- Total gross stage 3 loans are lower at $7.4 billion as compared with $8.5 billion in 2018, with the stage 3 cover ratio up 2 per cent at 68 per cent
- Although credit impairment for the overall ongoing business increased by 22 per cent, it remains below the elevated levels seen previously
- Our corporate portfolios remain well diversified across industry sectors, products and geographies, and are predominantly short-dated
- Within the Retail Banking portfolio, 85 per cent of our book continues to be fully secured. The average loan-to-value ratio of retail mortgages continues to be low at 45 per cent

Our capital and liquidity positions continue to be at healthy levels

- Our capital and liquidity positions remain well above current requirements
- Our liquidity buffer and cash outflows both grew in 2019 in line with the overall balance sheet growth
- The advances-to-deposits ratio continues to be strong and stable
- We remain a net provider of liquidity to interbank markets and our customer deposit base is diversified by type and maturity

Credit Risk

Basis of preparation

Unless otherwise stated the balance sheet and income statement information presented within this section is based on the Group's management view. This is principally the location from which a client relationship is managed, which may differ from where it is financially booked and may be shared between businesses and/or regions. This view reflects how the client segments and regions are managed internally.

Loans and advances to customers and banks held at amortised cost in this Risk profile section include reverse repurchase agreement balances held at amortised cost, per Note 16 Reverse repurchase and repurchase agreements including other similar secured lending and borrowing.

Credit risk overview

Credit Risk is the potential for loss due to the failure of a counterparty to meet its obligations to pay the Group. Credit exposures arise from both the banking and trading books.

Impairment model

IFRS 9 requires an impairment model that requires the recognition of expected credit losses (ECL) on all financial debt instruments held at amortised cost, fair value through other comprehensive income (FVOCI), undrawn loan commitments and financial guarantees.

Staging of financial instruments

Financial instruments that are not already credit-impaired are originated into stage 1 and a 12-month expected credit loss provision is recognised.

Instruments will remain in stage 1 until they are repaid, unless they experience significant credit deterioration (stage 2) or they become credit-impaired (stage 3).

Instruments will transfer to stage 2 and a lifetime expected credit loss provision recognised when there has been a significant change in the Credit risk compared with what was expected at origination.

The framework used to determine a significant increase in credit risk is set out below.

Stage 1
- → 12-month ECL
- → Performing

Stage 2
- → Lifetime expected credit loss
- → Performing but has exhibited significant increase in Credit risk (SICR)

Stage 3
- → Credit-impaired
- → Non-performing

IFRS 9 principles and approaches

The main methodology principles and approach adopted by the Group are set out in the following table.

Title	Description	Supplementary Information	Page
Approach to determining expected credit losses	For material loan portfolios, the Group has adopted a statistical modelling approach for determining expected credit losses that makes extensive use of credit modelling. While these models leveraged existing advanced Internal Ratings Based (IRB) models, for determining regulatory expected losses where these were available, there are significant differences between the two approaches.	Credit risk methodology Determining lifetime expected credit loss for revolving products	182 183
Incorporation of forward-looking information	The determination of expected credit loss includes various assumptions and judgements in respect of forward-looking macroeconomic information. Refer to page 183 for incorporation of forward-looking information, forecast of key macroeconomic variables underlying the expected credit loss calculation and the impact on non-linearity and sensitivity of expected credit loss calculation to macroeconomic variables.	Incorporation of forward-looking information and impact of non-linearity Forecast of key macroeconomic variables underlying the expected credit loss calculation	183 183
Significant increase in credit risk (SICR)	Expected credit loss for financial assets will transfer from a 12-month basis (stage 1) to a lifetime basis (stage 2) when there is a significant increase in Credit risk (SICR) relative to that which was expected at the time of origination, or when the asset becomes credit-impaired. On transfer to a lifetime basis, the expected credit loss for those assets will reflect the impact of a default event expected to occur over the remaining lifetime of the instrument rather than just over the 12 months from the reporting date. SICR is assessed by comparing the risk of default of an exposure at the reporting date with the risk of default at origination (after considering the passage of time). 'Significant' does not mean statistically significant nor is it reflective of the extent of the impact on the Group's financial statements. Whether a change in the risk of default is significant or not is assessed using quantitative and qualitative criteria, the weight of which will depend on the type of product and counterparty.	Quantitative criteria Significant increase in Credit risk thresholds Specific qualitative and quantitative criteria per segment: Corporate & Institutional and Commercial Banking clients Retail Banking clients Private Banking clients Debt securities	187 187 188 188 188 188 188

Title	Description	Supplementary Information	Page
Assessment of credit-impaired financial assets	Credit-impaired (stage 3) financial assets comprise those assets that have experienced an observed credit event and are in default. Default represents those assets that are at least 90 days past due in respect of principal and interest payments and/or where the assets are otherwise considered unlikely to pay. This definition is consistent with internal Credit risk management and the regulatory definition of default. Unlikely to pay factors include objective conditions such as bankruptcy, debt restructuring, fraud or death. It also includes credit-related modifications of contractual cash flows due to significant financial difficulty (forbearance) where the Group has granted concessions that it would not ordinarily consider. Following a clarification issued by IFRIC in March 2019, if there are any recoveries on stage 3 loans, any contractual interest earned while the asset was in stage 3 is recognised in the credit impairment line. Although this differs from the Group's previous approach of recognising a residual amount of this within interest income, there is no material impact on the classification of amounts reported in the income statement in the current or prior period and accordingly no adjustments have been made to comparative information. Further, the gross asset balances for stage 3 financial instruments have been increased to reflect contractual interest due but not paid with a corresponding increase in credit impairment provisions. These changes have been disclosed within the credit risk section. There has been no net impact on the balance sheet or on shareholders' equity.	Retail Banking clients Corporate & Institutional Banking clients Commercial Banking and Private Banking clients	188 188 188
Transfers between stages	Assets will transfer from stage 3 to stage 2 when they are no longer considered to be credit-impaired. Assets will not be considered credit-impaired only if the customer makes payments such that they are paid to current in line with the original contractual terms. Assets may transfer to stage 1 if they are no longer considered to have experienced a significant increase in Credit risk. This will be immediate when the original PD based transfer criteria are no longer met (and as long as none of the other transfer criteria apply). Where assets were transferred using other measures, the assets will only transfer back to stage 1 when the condition that caused the significant increase in Credit risk no longer applies (and as long as none of the other transfer criteria apply).	Movement in loan exposures and expected credit losses	163
Modified financial assets	Where the contractual terms of a financial instrument have been modified, and this does not result in the instrument being derecognised, a modification gain or loss is recognised in the income statement representing the difference between the original cashflows and the modified cash flows, discounted at the effective interest rate. The modification gain/loss is directly applied to the gross carrying amount of the instrument. If the modification is credit related, such as forbearance or where the Group has granted concessions that it would not ordinarily consider, then it will be considered credit-impaired. Modifications that are not credit related will be subject to an assessment of whether the asset's Credit risk has increased significantly since origination by comparing the remaining lifetime probability of default (PD) based on the modified terms to the remaining lifetime PD based on the original contractual terms.	Forbearance and other modified loans	277
Governance and application of expert credit judgement in respect of expected credit losses	The models used in determining ECL are reviewed and approved by the Group Credit Model Assessment Committee and have been validated by Group Model Validation, which is independent of the business. A quarterly model monitoring process is in place that uses recent data to compare the differences between model predictions and actual outcomes against approved thresholds. Where a model's performance breaches the monitoring thresholds then an assessment of whether an ECL adjustment is required to correct for the identified model issue is completed. The determination of expected credit losses requires a significant degree of management judgement which had an impact on governance processes, with the output of the expected credit models assessed by the IFRS 9 Impairment Committee.	Group Credit Model Assessment Committee IFRS 9 Impairment Committee	189 189

Maximum exposure to Credit risk

The table below presents the Group's maximum exposure to Credit risk for its on-balance sheet and off-balance sheet financial instruments as at 31 December 2019, before and after taking into account any collateral held or other Credit risk mitigation.

The Group's on-balance sheet maximum exposure to Credit risk increased by $27 billion to $694 billion (31 December 2018: $667 billion).

This was largely driven by an $18 billion increase in investment securities as the Group increased holdings of corporate and government securities and a $12 billion increase in loans and advances to customers, $6 billion of which was in Retail products. These were partially offset by a reduction in loans and advances to banks of $8 billion, and a decrease in cash at central bank of $5 billion.

Other assets increased by $3.5 billion mainly driven by unsettled trades due to normal settlement timing differences.

	2019				2018			
		Credit risk management				Credit risk management		
	Maximum exposure $million	Collateral $million	Master netting agreements $million	Net exposure $million	Maximum exposure $million	Collateral $million	Master netting agreements $million	Net exposure $million
On-balance sheet								
Cash and balances at central banks	52,728			52,728	57,511			57,511
Loans and advances to banks[1, 8]	53,549	1,341		52,208	61,414	3,815		57,599
of which – reverse repurchase agreements and other similar secured lending[7]	1,341	1,341		–	3,815	3,815		–
Loans and advances to customers[1, 8]	268,523	122,115		146,408	256,557	109,326		147,231
of which – reverse repurchase agreements and other similar secured lending[7]	1,469	1,469		–	3,151	3,151		–
Investment securities – Debt securities, alternative Tier 1 and other eligible bills[2]	143,440			143,440	125,638			125,638
Fair value through profit or loss[3, 7]	90,349	57,604	–	32,745	85,441	54,769		30,672
Loans and advances to banks	3,528			3,528	3,768			3,768
Loans and advances to customers	6,896			6,896	4,928			4,928
Reverse repurchase agreements and other similar lending[7]	57,604	57,604		–	54,769	54,769		–
Investment securities – Debt securities, alternative Tier 1 and other eligible bills[2]	22,321			22,321	21,976			21,976
Derivative financial instruments[4, 7]	47,212	7,824	28,659	10,729	45,621	9,259	32,283	4,079
Accrued income	2,358			2,358	2,228			2,228
Assets held for sale	90			90	23			23
Other assets[5]	36,161			36,161	32,678			32,678
Total balance sheet	694,410	188,884	28,659	476,867	667,111	177,169	32,283	457,659
Off-balance sheet								
Contingent liabilities[6]	42,432	–	–	42,432	41,952	–	–	41,952
Undrawn irrevocable standby facilities, credit lines and other commitments to lend[6]	141,194	–	–	141,194	147,728	–	–	147,728
Documentary credits and short-term trade-related transactions[6]	4,282	–	–	4,282	3,982	–	–	3,982
Total off-balance sheet	187,908	–	–	187,908	193,662	–	–	193,662
Total	882,318	188,884	28,659	664,775	860,773	177,169	32,283	651,321

1 An analysis of credit quality is set out in the credit quality analysis section (page 158). Further details of collateral held by client segment and stage are set out in the collateral analysis section (page 174)

2 Excludes equity and other investments of $291 million (31 December 2018: $263 million). Further details are set out in Note 13 Financial Instruments

3 Excludes equity and other investments of $2,469 million (31 December 2018: $1,691 million). Further details are set out in Note 13 Financial Instruments

4 The Group enters into master netting agreements, which in the event of default result in a single amount owed by or to the counterparty through netting the sum of the positive and negative mark-to-market values of applicable derivative transactions

5 Other assets include Hong Kong certificates of indebtedness, cash collateral, and acceptances, in addition to unsettled trades and other financial assets

6 Excludes ECL allowances which are reported under Provisions for liabilities and charges

7 Collateral capped at maximum exposure (over-collateralised)

8 Adjusted for over-collateralisation, which has been determined with reference to the drawn and undrawn component as this best reflects the effect on the amount arising from expected credit losses

Analysis of financial instrument by stage

This table shows financial instruments and off-balance sheet commitments by stage, along with the total credit impairment loss provision against each class of financial instrument.

The proportion of financial instruments held within stage 1 increased marginally to 94 per cent (31 December 2018: 93 per cent). Stage 2 financial instruments decreased marginally to 5 per cent (31 December 2018: 6 per cent). Within this, the proportion of stage 2 debt securities declined to 3 per cent compared with 5 per cent at 31 December 2018, reflecting changes in the approach for stage allocations with a consequential reduction in the credit impairment provisions held. Stage 2 also includes the impact of downgrading $550 million of government securities, loans to banks and loans to financial institutions to 'Higher risk' following the sovereign downgrades in Zambia, Zimbabwe and Lebanon. The downgrades are specifically due to the change in sovereign ratings and do not represent any specific concerns related to our obligors.

Stage 3 financial instruments were stable at 1 per cent of the Group total. Stage 3 loans and advances to customers fell $1,056 million due to a combination of repayments, write-offs and upgrades to stage 2. The stage 3 cover ratio (excluding collateral) was higher at 68 per cent from 66 per cent on 31 December 2018.

	2019											
	Stage 1			Stage 2			Stage 3			Total		
	Gross balance[1] $million	Total credit impairment $million	Net carrying value $million	Gross balance[1] $million	Total credit impairment $million	Net carrying value $million	Gross balance[1] $million	Total credit impairment $million	Net carrying value $million	Gross balance[1] $million	Total credit impairment $million	Net carrying value $million
Cash and balances at central banks	52,728	–	52,728	–	–	–	–	–	–	52,728	–	52,728
Loans and advances to banks (amortised cost)	52,634	(5)	52,629	924	(4)	920	–	–	–	53,558	(9)	53,549
Loans and advances to customers (amortised cost)	246,149	(402)	245,747	20,759	(377)	20,382	7,398	(5,004)	2,394	274,306	(5,783)	268,523
Debt securities, alternative Tier 1 and other eligible bills	138,782	(50)		4,644	(23)		75	(45)		143,501	(118)	
Amortised cost	13,678	(10)	13,668	277	(6)	271	75	(45)	30	14,030	(61)	13,969
FVOCI[2]	125,104	(40)		4,367	(17)		–	–		129,471	(57)	
Accrued income (amortised cost)[4]	2,358	–	2,358	–	–	–	–	–	–	2,358	–	2,358
Assets held for sale[4]	90	–	90	–	–	–	–	–	–	90	–	90
Other assets	36,161	(3)	36,158	–	–	–	164	(161)	3	36,325	(164)	36,161
Undrawn commitments[3]	136,179	(43)		9,277	(38)		20	–		145,476	(81)	
Financial guarantees[3]	38,660	(14)		3,183	(16)		589	(206)		42,432	(236)	
Total	703,741	(517)		38,787	(458)		8,246	(5,416)		750,774	(6,391)	

1 Gross carrying amount for off-balance sheet refers to notional values

2 These instruments are held at fair value on the balance sheet. The ECL provision in respect of debt securities measured at FVOCI is held within the OCI reserve

3 These are off-balance sheet instruments. Only the ECL is recorded on-balance sheet as a financial liability and therefore there is no 'net carrying amount'. ECL allowances on off-balance sheet instruments are held as liability provisions to the extent that the drawn and undrawn components of loan exposures can be separately identified. Otherwise they will be reported against the drawn component

4 Stage 1 ECL is not material

	2018											
	Stage 1			Stage 2			Stage 3			Total		
	Gross balance[1] $million	Total credit impairment $million	Net carrying value $million	Gross balance[1] $million	Total credit impairment $million	Net carrying value $million	Gross balance[1] $million	Total credit impairment $million	Net carrying value $million	Gross balance[1] $million	Total credit impairment $million	Net carrying value $million
Cash and balances at central banks	57,511	–	57,511	–	–	–	–	–	–	57,511	–	57,511
Loans and advances to banks (amortised cost)	60,350	(5)	60,345	1,070	(1)	1,069	–	–	–	61,420	(6)	61,414
Loans and advances to customers (amortised cost)[2]	237,103	(426)	236,677	17,428	(416)	17,012	8,454	(5,586)	2,868	262,985	(6,428)	256,557
Debt securities, alternative Tier 1 and other eligible bills[2]	118,713	(27)		6,909	(31)		498	(472)		126,120	(530)	
Amortised cost	8,225	(7)	8,218	1,062	(3)	1,059	498	(472)	26	9,785	(482)	9,303
FVOCI[3]	110,488	(20)		5,847	(28)		–	–		116,335	(48)	
Accrued income (amortised cost)[5]	2,228	–	2,228	–	–	–	–	–	–	2,228	–	2,228
Assets held for sale[5]	23	–	23	–	–	–	–	–	–	23	–	23
Other assets[5]	32,678	–	32,678	–	–	–	155	(155)	–	32,833	(155)	32,678
Undrawn commitments[4]	137,783	(69)		13,864	(39)		63	–		151,710	(108)	
Financial guarantees[4]	38,532	(4)		3,053	(13)		367	(156)		41,952	(173)	
Total	684,921	(531)		42,324	(500)		9,537	(6,369)		736,782	(7,400)	

1 Gross carrying amount for off-balance sheet refers to notional values

2 Stage 3 balances have been restated to reflect interest due but unpaid together with equivalent credit impairment charges

3 These instruments are held at fair value on the balance sheet. The ECL provision in respect of debt securities measured at FVOCI is held within the OCI reserve

4 These are off-balance sheet instruments. Only the ECL is recorded on-balance sheet as a financial liability and therefore there is no 'net carrying amount'. ECL allowances on off-balance sheet instruments are held as liability provisions to the extent that the drawn and undrawn components of loan exposures can be separately identified. Otherwise they will be reported against the drawn component

5 Stage 1 ECL is not material

Credit quality analysis

Credit quality by client segment

For the Corporate & Institutional Banking and Commercial Banking portfolios, exposures are analysed by credit grade (CG), which plays a central role in the quality assessment and monitoring of risk. All loans are assigned a CG, which is reviewed periodically and amended in light of changes in the borrower's circumstances or behaviour. CGs 1 to 12 are assigned to stage 1 and stage 2 (performing) clients or accounts, while CGs 13 and 14 are assigned to stage 3 (defaulted) clients. The mapping of credit quality is as follows.

Mapping of credit quality

The Group uses the following internal risk mapping to determine the credit quality for loans.

	Corporate & Institutional Banking and Commercial Banking			Private Banking[1]	Retail Banking
Credit quality description	Internal grade mapping	S&P external ratings equivalent	Regulatory PD range (%)	Internal ratings	Number of days past due
Strong	1A to 5B	AAA to BB+	0 to 0.425	Class I and Class IV	Current loans (no past dues nor impaired)
Satisfactory	6A to 11C	BB to B-/CCC	0.426 to 15.75	Class II and Class III	Loans past due till 29 days
Higher risk	Grade 12	CCC/C	15.751 to 99.999	GSAM managed	Past due loans 30 days and over till 90 days

1 For Private Banking, classes of risk represent the type of collateral held. Class I represents facilities with liquid collateral, such as cash and marketable securities. Class II represents unsecured/partially secured facilities and those with illiquid collateral, such as equity in private enterprises. Class III represents facilities with residential or commercial real estate collateral. Class IV covers margin trading facilities

The table overleaf sets out the gross loans and advances held at amortised cost, expected credit loss provisions and expected credit loss coverage by business segment and stage. Expected credit loss coverage represents the expected credit loss reported for each segment and stage as a proportion of the gross loan balance for each segment and stage.

Stage 1

Stage 1 gross loans and advances to customers increased by $9.0 billion, or 4 per cent compared with 31 December 2018 and continued to represent 90 per cent of loans and advances to customers (31 December 2018: 90 per cent). Most of the growth was concentrated in the Greater China & North Asia region. The stage 1 coverage ratio remained at 0.2 per cent compared with 31 December 2018.

83 per cent (31 December 2018: 85 per cent) of loans in Corporate & Institutional Banking and Commercial Banking are held in stage 1, with those rated as strong increased marginally to 56 per cent (31 December 2018: 55 per cent) as the Group continues to focus on the origination of investment grade lending. Within Corporate & Institutional Banking and Commercial Banking, overall stage 1 loans grew by $2.7 billion, primarily in the transport and mining and quarrying sectors, reflecting the overall increase in the portfolio since 31 December 2018.

Retail Banking stage 1 loans remained stable at 96 per cent with the proportion rated as strong at 97 per cent. Stage 1 Secured wealth products increased by $2.8 billion, of which Private Banking deposits increased by $1.5 billion in Hong Kong and Singapore. Stage 1 Mortgages also increased by $2.4bn, mainly in Greater China & North Asia.

Stage 2

Stage 2 loans and advances to customers gross balances increased by $3.3 billion, compared with 31 December 2018, with the proportion of stage 2 loans increasing from 7 per cent to 8 per cent. This was largely due to a $4 billion increase in Corporate & Institutional Banking reflecting an increase in Trading companies and distributors sector and in non purely precautionary early alert accounts within the Manufacturing sector.

Commercial Banking stage 2 balances fell by $0.6 billion in line with the overall improvement in credit quality of the portfolio.

Retail Banking stage 2 loans saw an increase in coverage due to a higher level of coverage on more than 30 day past due exposures relating to credit cards and personal lending, which attracts higher levels of credit impairment provisions. This increase reflects in part the deteriorating macroeconomic environment and an increase in past dues in some payroll linked exposures in Africa & Middle East.

Stage 2 loans to banks classified as 'Higher risk' increased by $0.2 billion following the sovereign downgrades in Zambia, Zimbabwe and Lebanon.

Stage 3

Stage 3 loans and advances to customers fell by $1.1 billion, or 12 per cent, to $7.4 billion compared with 31 December 2018, with overall stage 3 provisions declining by $0.6 billion to $5.0 billion. The stage 3 cover ratio (excluding collateral) increased 2 per cent to 68 per cent, largely in Corporate & Institutional Banking from new impairment charges, repayments and transfers to stage 2.

In Corporate & Institutional Banking and Commercial Banking, gross stage 3 loans fell by $1.1 billion compared with 31 December 2018. Provisions also fell by $0.5 billion from $5.0 billion to $4.5 billion.

Inflows into stage 3 for Corporate & Institutional Banking and Commercial Banking in 2019 were 13 per cent lower compared with 2018, reflecting continued improvement in the portfolio with only the ASEAN & South Asia region showing an increase.

Retail stage 3 loans were broadly stable at $0.8 billion and Private Banking stage 3 loans increased slightly by $0.1 billion, although there was a net release in provisions relating to a single client.

Loans and advances by client segment

	2019								
		Customers							
Amortised cost	Banks $million	Corporate & Institutional Banking $million	Retail Banking $million	Commercial Banking $million	Private Banking $million	Central & other items $million	Customer Total $million	Undrawn commitments $million	Financial Guarantees $million
Stage 1	52,634	96,638	103,362	21,808	14,249	10,092	246,149	136,179	38,660
– Strong	41,053	59,920	100,709	6,181	10,145	9,961	186,916	114,976	25,631
– Satisfactory	11,581	36,718	2,653	15,627	4,104	131	59,233	21,203	13,029
Stage 2	924	13,600	2,996	3,872	284	7	20,759	9,277	3,183
– Strong	225	2,714	2,198	238	280	–	5,430	4,005	1,025
– Satisfactory	476	9,793	462	3,352	4	–	13,611	4,902	1,951
– Higher risk	223	1,093	336	282	–	7	1,718	370	207
Of which (stage 2):									
– Less than 30 days past due	2	179	462	24	–	–	665		
– More than 30 days past due	23	176	336	85	4	–	601		
Stage 3, credit-impaired financial assets	–	4,173	846	2,013	366	–	7,398	20	589
Gross balance[1]	53,558	114,411	107,204	27,693	14,899	10,099	274,306	145,476	42,432
Stage 1	(5)	(80)	(289)	(22)	(10)	(1)	(402)	(43)	(14)
– Strong	–	(29)	(182)	(1)	(8)	–	(220)	(22)	(8)
– Satisfactory	(5)	(51)	(107)	(21)	(2)	(1)	(182)	(21)	(6)
Stage 2	(4)	(152)	(173)	(51)	(1)	–	(377)	(38)	(16)
– Strong	(2)	(33)	(88)	(5)	(1)	–	(127)	(7)	(3)
– Satisfactory	(2)	(60)	(45)	(31)	–	–	(136)	(14)	(8)
– Higher risk	–	(59)	(40)	(15)	–	–	(114)	(17)	(5)
Of which (stage 2):									
– Less than 30 days past due	–	(3)	(45)	(2)	–	–	(50)		
– More than 30 days past due	–	(4)	(40)	(5)	–	–	(49)		
Stage 3, credit-impaired financial assets	–	(2,980)	(374)	(1,503)	(147)	–	(5,004)	–	(206)
Total credit impairment	(9)	(3,212)	(836)	(1,576)	(158)	(1)	(5,783)	(81)	(236)
Net carrying value	53,549	111,199	106,368	26,117	14,741	10,098	268,523		
Stage 1	0.0%	0.1%	0.3%	0.1%	0.1%	0.0%	0.2%	0.0%	0.0%
– Strong	0.0%	0.0%	0.2%	0.0%	0.1%	0.0%	0.1%	0.0%	0.0%
– Satisfactory	0.0%	0.1%	4.0%	0.1%	0.0%	0.8%	0.3%	0.1%	0.0%
Stage 2	0.4%	1.1%	5.8%	1.3%	0.4%	0.0%	1.8%	0.4%	0.5%
– Strong	0.9%	1.2%	4.0%	2.1%	0.4%	0.0%	2.3%	0.2%	0.3%
– Satisfactory	0.4%	0.6%	9.7%	0.9%	0.0%	0.0%	1.0%	0.3%	0.4%
– Higher risk	0.0%	5.4%	11.9%	5.3%	0.0%	0.0%	6.6%	4.7%	2.4%
Of which (stage 2):									
– Less than 30 days past due	0.0%	1.7%	9.7%	8.3%	0.0%	0.0%	7.5%		
– More than 30 days past due	0.0%	2.3%	11.9%	5.9%	0.0%	0.0%	8.2%		
Stage 3, credit-impaired financial assets	0.0%	71.4%	44.2%	74.7%	40.2%	0.0%	67.6%	0.0%	35.0%
Cover ratio	0.0%	2.8%	0.8%	5.7%	1.1%	0.0%	2.1%	0.1%	0.6%
Fair value through profit or loss									
Performing	21,797	45,261	238	688	–	2	46,189	–	–
– Strong	19,217	26,641	236	123	–	1	27,001	–	–
– Satisfactory	2,580	18,611	1	565	–	1	19,178	–	–
– Higher risk	–	9	1	–	–	–	10	–	–
Defaulted (CG13-14)	–	34	–	8	–	–	42	–	–
Gross balance (FVTPL)[2]	21,797	45,295	238	696	–	2	46,231	–	–
Net carrying value (incl FVTPL)	75,346	156,494	106,606	26,813	14,741	10,100	314,754		

1 Loans and advances includes reverse repurchase agreements and other similar secured lending of $1,469 million under Customers and of $1,341 million under Banks, held at amortised cost

2 Loans and advances includes reverse repurchase agreements and other similar secured lending of $39,335 million under Customers and of $18,269 million under Banks, held at fair value through profit or loss

	2018								
		Customers							
Amortised cost	Banks $million	Corporate& Institutional Banking $million	Retail Banking $million	Commercial Banking $million	Private Banking $million	Central & other items $million	Customer Total $million	Undrawn commitments $million	Financial Guarantees $million
Stage 1	60,350	93,848	98,393	21,913	12,705	10,244	237,103	137,783	38,532
– Strong	47,860	58,167	96,506	5,527	9,447	10,193	179,840	114,402	30,211
– Satisfactory	12,490	35,681	1,887	16,386	3,258	51	57,263	23,381	8,321
Stage 2	1,070	9,357	2,837	4,423	785	26	17,428	13,864	3,053
– Strong	403	1,430	1,956	270	713	–	4,369	6,996	682
– Satisfactory	665	6,827	500	3,732	–	26	11,085	5,485	1,948
– Higher risk	2	1,100	381	421	72	–	1,974	1,383	423
Of which (stage 2):									
– Less than 30 days past due	27	232	500	198	–	–	930		
– More than 30 days past due	–	190	381	99	3	–	673		
Stage 3, credit-impaired financial assets[3]	–	4,996	832	2,328	298	–	8,454	63	367
Gross balance[1]	61,420	108,201	102,062	28,664	13,788	10,270	262,985	151,710	41,952
Stage 1	(5)	(94)	(299)	(24)	(9)	–	(426)	(69)	(4)
– Strong	(2)	(32)	(149)	(1)	(9)	–	(191)	(35)	(2)
– Satisfactory	(3)	(62)	(150)	(23)	–	–	(235)	(34)	(2)
Stage 2	(1)	(192)	(132)	(92)	–	–	(416)	(39)	(13)
– Strong	–	(11)	(42)	(5)	–	–	(58)	3	–
– Satisfactory	(1)	(66)	(50)	(45)	–	–	(161)	(19)	(3)
– Higher risk	–	(115)	(40)	(42)	–	–	(197)	(23)	(10)
Of which (stage 2):									
– Less than 30 days past due	–	(34)	(50)	(9)	–	–	(93)		
– More than 30 days past due	–	(2)	(40)	(4)	–	–	(46)		
Stage 3, credit-impaired financial assets[3]	–	(3,238)	(396)	(1,789)	(163)	–	(5,586)	–	(156)
Total credit impairment	(6)	(3,524)	(827)	(1,905)	(172)	–	(6,428)	(108)	(173)
Net carrying value	61,414	104,677	101,235	26,759	13,616	10,270	256,557		
Stage 1	0.0%	0.1%	0.3%	0.1%	0.1%	0.0%	0.2%	0.1%	0.0%
– Strong	0.0%	0.1%	0.2%	0.0%	0.1%	0.0%	0.1%	0.0%	0.0%
– Satisfactory	0.0%	0.2%	7.9%	0.1%	0.0%	0.0%	0.4%	0.1%	0.0%
Stage 2	0.1%	2.1%	4.7%	2.1%	0.0%	0.0%	2.4%	0.3%	0.4%
– Strong	0.0%	0.8%	2.1%	1.9%	0.0%	–	1.3%	0.0%	0.0%
– Satisfactory	0.2%	1.0%	10.0%	1.2%	–	0.0%	1.5%	0.3%	0.2%
– Higher risk	0.0%	10.5%	10.5%	10.0%	0.0%	–	10.0%	1.7%	2.4%
Of which (stage 2):									
– Less than 30 days past due	0.0%	14.7%	10.0%	4.5%	–	–	10.0%		
– More than 30 days past due	–	1.1%	10.5%	4.0%	0.0%	–	6.8%		
Stage 3, credit-impaired financial assets[3]	–	64.8%	47.6%	76.8%	54.7%	0.0%	66.1%	–	42.5%
Cover ratio	0.0%	3.3%	0.8%	6.6%	1.2%	0.0%	2.4%	0.1%	0.4%
Fair value through profit or loss									
Performing	20,651	41,886	400	479	–	4	42,769	–	–
– Strong	19,515	33,178	395	247	–	3	33,823	–	–
– Satisfactory	1,136	8,700	4	232	–	1	8,937	–	–
– Higher risk	–	8	1	–	–	–	9	–	–
Defaulted (CG13-14)	–	12	–	33	–	–	45	–	–
Gross balance[2]	20,651	41,898	400	512	–	4	42,814	–	–
Net carrying value (incl FVTPL)	82,065	146,575	101,635	27,271	13,616	10,274	299,371		

1 Loans and advances includes reverse repurchase agreements and other similar secured lending of $3,151 million under Customers and of $3,815 million under Banks, held at amortised cost

2 Loans and advances includes reverse repurchase agreements and other similar secured lending of $37,886 million under Customers and of $16,883 million under Banks, held at fair value through profit and loss

3 Stage 3 balances have been restated to reflect interest due but unpaid together with equivalent credit impairment charges. The cover ratios have been restated as a result

Loans and advances by client segment credit quality analysis (unaudited)

			2019							
			Corporate & Institutional Banking							
			Gross				Credit impairment			
Credit grade	Regulatory 1 year PD range (%)	S&P external ratings equivalent	Stage 1	Stage 2	Stage 3	Total	Stage 1	Stage 2	Stage 3	Total
Strong			59,920	2,714	–	62,634	(29)	(33)	–	(62)
1A-2B	0 – 0.045	AA– and above	6,887	80	–	6,967	(2)	–	–	(2)
3A-4A	0.046 – 0.110	A+ to A-	19,411	913	–	20,324	(4)	(7)	–	(11)
4B-5B	0.111 – 0.425	BBB+ to BBB-/BB+	33,622	1,721	–	35,343	(23)	(26)	–	(49)
Satisfactory			36,718	9,793	–	46,511	(51)	(60)	–	(111)
6A-7B	0.426 – 1.350	BB+/BB to BB-	24,259	5,883	–	30,142	(26)	(18)	–	(44)
8A-9B	1.351 – 4.000	BB-/B+ to B+/B	8,658	2,753	–	11,411	(16)	(23)	–	(39)
10A-11C	4.001 – 15.75	B to B-/CCC	3,801	1,157	–	4,958	(9)	(19)	–	(28)
Higher risk			–	1,093	–	1,093	–	(59)	–	(59)
12	15.751 – 99.999	CCC/C	–	1,093	–	1,093	–	(59)	–	(59)
Defaulted			–	–	4,173	4,173	–	–	(2,980)	(2,980)
13-14	100	Defaulted	–	–	4,173	4,173	–	–	(2,980)	(2,980)
Total			96,638	13,600	4,173	114,411	(80)	(152)	(2,980)	(3,212)

			Commercial Banking							
			Gross				Credit impairment			
Credit grade	Regulatory 1 year PD range (%)	S&P external ratings equivalent	Stage 1	Stage 2	Stage 3	Total	Stage 1	Stage 2	Stage 3	Total
Strong			6,181	238	–	6,419	(1)	(5)	–	(6)
1A-2B	0 – 0.045	AA– and above	35	–	–	35	–	–	–	–
3A-4A	0.046 – 0.110	A+ to A-	1,749	10	–	1,759	–	–	–	–
4B-5B	0.111 – 0.425	BBB+ to BBB-/BB+	4,397	228	–	4,625	(1)	(5)	–	(6)
Satisfactory			15,627	3,352	–	18,979	(21)	(31)	–	(52)
6A-7B	0.426 – 1.350	BB+/BB to BB-	6,771	912	–	7,683	(5)	(1)	–	(6)
8A-9B	1.351 – 4.000	BB-/B+ to B+/B	6,374	1,235	–	7,609	(10)	(10)	–	(20)
10A-11C	4.001 – 15.75	B to B-/CCC	2,482	1,205	–	3,687	(6)	(20)	–	(26)
Higher risk			–	282	–	282	–	(15)	–	(15)
12	15.751 – 99.999	CCC/C	–	282	–	282	–	(15)	–	(15)
Defaulted			–	–	2,013	2,013	–	–	(1,503)	(1,503)
13-14	100	Defaulted	–	–	2,013	2,013	–	–	(1,503)	(1,503)
Total			21,808	3,872	2,013	27,693	(22)	(51)	(1,503)	(1,576)

Credit quality by geographic region (unaudited)

The following table sets out the credit quality for gross loans and advances to customers and banks, held at amortised cost, by geographic region and stage.

Loans and advances to customers

Amortised cost	Greater China & North Asia $million	ASEAN & South Asia $million	Africa & Middle East $million	Europe & Americas $million	Total $million
2019					
Stage 1	**126,438**	**71,045**	**23,906**	**24,760**	**246,149**
Stage 2	**7,547**	**6,461**	**5,541**	**1,210**	**20,759**
Gross stage 1 & stage 2 balance	**133,985**	**77,506**	**29,447**	**25,970**	**266,908**
Stage 3, credit-impaired financial assets[2]	**716**	**3,084**	**2,585**	**1,013**	**7,398**
Gross loans[1]	**134,701**	**80,590**	**32,032**	**26,983**	**274,306**

Amortised cost	Greater China & North Asia $million	ASEAN & South Asia $million	Africa & Middle East $million	Europe & Americas $million	Total $million
2018					
Stage 1	118,422	71,169	23,598	23,914	237,103
Stage 2	4,139	7,628	5,112	549	17,428
Gross stage 1 & stage 2 balance	122,561	78,797	28,710	24,463	254,531
Stage 3, credit-impaired financial assets[2, 3]	838	3,624	3,061	931	8,454
Gross loans[1]	123,399	82,421	31,771	25,394	262,985

1 Amounts gross of expected credit losses. Includes reverse repurchase agreements and other similar secured lending

2 Amounts do not include those purchased or originated credit-impaired financial assets

3 Balances have been restated to reflect interest due but unpaid together with equivalent credit impairment charges

Loans and advances to banks

Amortised cost	Greater China & North Asia $million	ASEAN & South Asia $million	Africa & Middle East $million	Europe & Americas $million	Total $million
2019					
Stage 1	**19,181**	**15,458**	**5,039**	**12,956**	**52,634**
Stage 2	**136**	**300**	**312**	**176**	**924**
Gross stage 1 & stage 2 balance	**19,317**	**15,758**	**5,351**	**13,132**	**53,558**
Stage 3, credit-impaired financial assets[2]	**–**	**–**	**–**	**–**	**–**
Gross loans[1]	**19,317**	**15,758**	**5,351**	**13,132**	**53,558**

Amortised cost	Greater China & North Asia $million	ASEAN & South Asia $million	Africa & Middle East $million	Europe & Americas $million	Total $million
2018					
Stage 1	27,801	11,095	5,374	16,080	60,350
Stage 2	59	582	199	230	1,070
Gross stage 1 & stage 2 balance	27,860	11,677	5,573	16,310	61,420
Stage 3, credit-impaired financial assets[2]	–	–	–	–	–
Gross loans[1]	27,860	11,677	5,573	16,310	61,420

1 Amounts gross of expected credit losses. Includes reverse repurchase agreements and other similar secured lending

2 Amounts do not include those purchased or originated credit-impaired financial assets

Movement in gross exposures and credit impairment for loans and advances, debt securities, undrawn commitments and financial guarantees

The tables overleaf set out the movement in gross exposures and credit impairment by stage in respect of amortised cost loans to banks and customers, undrawn committed facilities, undrawn cancellable facilities, debt securities classified at amortised cost and FVOCI and financial guarantees. The tables are presented for the Group, and the Corporate & Institutional Banking, Commercial Banking and Retail Banking segments.

Methodology

The movement lines within the tables are an aggregation of monthly movements over the year and will therefore reflect the accumulation of multiple trades during the year. The credit impairment charge in the income statement comprises the amounts within the boxes in the table below less recoveries of amounts previously written off. Discount unwind is reported in net interest income and related to stage 3 financial instruments only.

The approach for determining the key line items in the tables is set out below.

- **Transfers** – transfers between stages are deemed to occur at the beginning of a month based on prior month closing balances
- **Net remeasurement from stage changes** – the remeasurement of credit impairment provisions arising from a change in stage is reported within the stage that the assets are transferred to. For example, assets transferred into stage 2 are remeasured from a 12 month to a lifetime expected credit loss, with the effect of remeasurement reported in stage 2. For stage 3, this represents the initial remeasurement from specific provisions recognised on individual assets transferred into stage 3 in the year
- **Net changes in exposures** – new business written less repayments in the year. Within stage 1, new business written will attract up to 12 months of expected credit loss charges. Repayments of non-amortising loans (primarily within Corporate & Institutional Banking and Commercial Banking) will have low amounts of expected credit loss provisions attributed to them, due to the release of provisions over the term to maturity. In stages 2 and 3, the amounts principally reflect repayments although stage 2 may include new business written where clients are on non-purely precautionary early alert, are a credit grade 12, or when non-investment grade debt securities are acquired.
- **Changes in risk parameters** – for stages 1 and 2, this reflects changes in the probability of default (PD), loss given default (LGD) and exposure at default (EAD) of assets during the year, which includes the impact of releasing provisions over the term to maturity. It also includes the effect of changes in forecasts of macroeconomic variables during the year. In stage 3, this line represents additional specific provisions recognised on exposures held within stage 3
- **Interest due but not paid** – change in contractual amount of interest due in stage 3 financial instruments but not paid, being the net of accruals, repayments and write-offs, together with the corresponding change in credit impairment

Changes to ECL models, which incorporates changes to model approaches and methodologies, is not reported as a separate line item as it has an impact over a number of lines and stages.

Movements during the year

Stage 1 gross exposures increased by $19.9 billion, or 3 per cent, from 1 January 2019. This was largely due to higher holdings of debt securities (up $20.2 billion) as we increased holdings of corporate and government securities, which was partly offset by a reduction in Corporate & Institutional Banking, down $9.6 billion due to a net outflow to stage 2. 2018 benefitted from a number of upgrades out of stage 2 as non-purely precautionary early alert balances decreased whereas these balances were more stable in 2019. Retail Banking stage 1 gross exposures increased by $5.8 billion due to portfolio growth, with stage 1 transfers to stage 2 and transfers to stage 3 reduced compared with 2018 following the rundown of higher risk unsecured lending portfolios. Despite the increase in exposures, total stage 1 provisions fell $17 million, largely due to improvements in portfolio quality in Corporate & Institutional Banking.

Stage 2 gross exposures fell by $3.5 billion, or 8 per cent, primarily driven by debt securities which fell $2.3 billion, as securities transferred back to stage 1 (primarily due to the change in approach for stage allocations) or were repaid. In Corporate & Institutional Banking, stage 2 exposures increased by $3.5 billion, in part due to an increase in non-purely precautionary early alerts. This was largely offset by a $3.6 billion fall in Retail Banking exposures primarily due to repayments.

Consequently, stage 2 provisions were down $42 million compared with 2018, $8 million of which was due to the reduction in debt securities. Corporate & Institutional Banking provisions fell by $40 million as the impact of deteriorating macroeconomic forecasts was offset by transfers to stage 3. Changes in risk parameters within Corporate & Institutional Banking moved to a net charge in 2019 compared with a net release in 2018, as 2018 benefitted from a number of upgrades out of 'Higher risk', reductions in early alerts and improved macroeconomic forecasts. Retail Banking provisions increased by $47 million, primarily due to the impact of deteriorating macroeconomic forecasts which affected Hong Kong in particular. This was offset by lower Commercial Banking provisions, down $42 million as portfolio quality improved, with a 33 per cent reduction in 'Higher risk' balances.

Across both stage 1 and 2 for all segments, changes to macroeconomic forecasts increased provisions by $96 million. Macroeconomic forecasts in Hong Kong were downgraded in the second half of 2019 as the economy moved into recession, and this contributed to an increase in provisions in Hong Kong of approximately $46 million during the second half of the year.

Corporate & Institutional Banking was also impacted by lower forecasted growth in the Metals Composite Index.

Model changes in 2019 resulted in a reduction to the income statement charge of $13 million, primarily from changes relating to Hong Kong credit cards which was partly offset by enhancements to the Monte Carlo model.

Stage 3 exposures fell by $1.3 billion from $9.4 billion at 1 January 2019 to $8.1 billion at 31 December 2019, primarily due to a write-off in debt securities, repayments, write-offs and transfers to stage 2 within Corporate & Institutional Banking and Commercial Banking. This was also reflected in lower stage 3 provisions, which fell from $6.2 billion at 1 January 2019 to $5.3 billion at 31 December 2019.

All segments

Amortised cost and FVOCI	Stage 1 Gross balance $million	Stage 1 Total credit impairment $million	Stage 1 Net $million	Stage 2 Gross balance $million	Stage 2 Total credit impairment $million	Stage 2 Net $million	Stage 3 Gross balance $million	Stage 3 Total credit impairment $million	Stage 3 Net $million	Total Gross balance $million	Total Total credit impairment $million	Total Net $million
As at 1 January 2018[3]	565,815	(576)	565,239	52,387	(742)	51,645	11,332	(7,710)	3,622	629,534	(9,028)	620,506
Transfers to stage 1	59,776	(627)	59,149	(59,776)	627	(59,149)	–	–	–	–	–	–
Transfers to stage 2	(73,589)	136	(73,453)	73,809	(136)	73,673	(220)	–	(220)	–	–	–
Transfers to stage 3	(293)	7	(286)	(2,338)	264	(2,074)	2,631	(271)	2,360	–	–	–
Net change in exposures	50,249	(282)	49,967	(20,341)	94	(20,247)	(1,836)	527	(1,309)	28,072	339	28,411
Net remeasurement from stage changes	–	139	139	–	(136)	(136)	–	(529)	(529)	–	(526)	(526)
Changes in risk parameters	–	468	468	–	(275)	(275)	–	(971)	(971)	–	(778)	(778)
Write-offs	–	–	–	–	–	–	(2,075)	2,075	–	(2,075)	2,075	–
Interest due but unpaid[4]	–	–	–	–	–	–	(338)	338	–	(338)	338	–
Discount unwind	–	–	–	–	–	–	–	80	80	–	80	80
Exchange translation differences and other movements[1]	(9,477)	204	(9,273)	(1,417)	(196)	(1,613)	(112)	247	135	(11,006)	255	(10,751)
As at 31 December 2018[2]	592,481	(531)	591,950	42,324	(500)	41,824	9,382	(6,214)	3,168	644,187	(7,245)	636,942
Income statement ECL (charge)/ release		325			(317)			(973)			(965)	
Recoveries of amounts previously written off								312			312	
Total credit impairment (charge)/release		325			(317)			(661)			(653)	
As at 1 January 2019	**592,481**	**(531)**	**591,950**	**42,324**	**(500)**	**41,824**	**9,382**	**(6,214)**	**3,168**	**644,187**	**(7,245)**	**636,942**
Transfers to stage 1	**28,552**	**(582)**	**27,970**	**(28,552)**	**582**	**(27,970)**	**–**	**–**	**–**	**–**	**–**	**–**
Transfers to stage 2	**(67,790)**	**157**	**(67,633)**	**67,983**	**(171)**	**67,812**	**(193)**	**14**	**(179)**	**–**	**–**	**–**
Transfers to stage 3	**(121)**	**–**	**(121)**	**(2,179)**	**314**	**(1,865)**	**2,300**	**(314)**	**1,986**	**–**	**–**	**–**
Net change in exposures	**60,374**	**(256)**	**60,118**	**(40,499)**	**24**	**(40,475)**	**(1,434)**	**307**	**(1,127)**	**18,441**	**75**	**18,516**
Net remeasurement from stage changes	**–**	**196**	**196**	**–**	**(171)**	**(171)**	**–**	**(406)**	**(406)**	**–**	**(381)**	**(381)**
Changes in risk parameters	**–**	**434**	**434**	**–**	**(489)**	**(489)**	**–**	**(787)**	**(787)**	**–**	**(842)**	**(842)**
Write-offs	**–**	**–**	**–**	**–**	**–**	**–**	**(1,795)**	**1,795**	**–**	**(1,795)**	**1,795**	**–**
Interest due but unpaid	**–**	**–**	**–**	**–**	**–**	**–**	**(365)**	**365**	**–**	**(365)**	**365**	**–**
Discount unwind	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**82**	**82**	**–**	**82**	**82**
Exchange translation differences and other movements[1]	**(1,092)**	**68**	**(1,024)**	**(290)**	**(47)**	**(337)**	**187**	**(97)**	**90**	**(1,195)**	**(76)**	**(1,271)**
As at 31 December 2019[2]	**612,404**	**(514)**	**611,890**	**38,787**	**(458)**	**38,329**	**8,082**	**(5,255)**	**2,827**	**659,273**	**(6,227)**	**653,046**
Income statement ECL (charge)/ release[5]		**374**			**(636)**			**(886)**			**(1,148)**	
Recoveries of amounts previously written off								**248**			**248**	
Total credit impairment (charge)/release		**374**			**(636)**			**(638)**			**(900)**	

1 Includes fair value adjustments and amortisation on debt securities
2 Excludes Cash and balances at central banks, Accrued income, Assets held for sale and Other assets
3 Stage 3 balances at 1 January 2018 have been restated to contractual interest due but unpaid together with equivalent credit impairment charges
4 Interest due but unpaid included in gross assets and credit impairment
5 Does not include $8 million provision relating to Other assets

Of which – movement of debt securities, alternative tier one and other eligible bills

Amortised cost and FVOCI	Stage 1 Gross balance $million	Stage 1 Total credit impairment $million	Stage 1 Net $million	Stage 2 Gross balance $million	Stage 2 Total credit impairment $million	Stage 2 Net $million	Stage 3 Gross balance $million	Stage 3 Total credit impairment $million	Stage 3 Net $million	Total Gross balance $million	Total Total credit impairment $million	Total Net $million
As at 1 January 2018[2]	107,308	(25)	107,283	8,305	(57)	8,248	455	(447)	8	116,068	(529)	115,539
Transfers to stage 1	561	(18)	543	(561)	18	(543)	–	–	–	–	–	–
Transfers to stage 2	(10,626)	1	(10,625)	10,626	(1)	10,625	–	–	–	–	–	–
Transfers to stage 3	–	–	–	(36)	–	(36)	36	–	36	–	–	–
Net change in exposures	23,232	(19)	23,213	(10,827)	(7)	(10,834)	(7)	7	–	12,398	(19)	12,379
Net remeasurement from stage changes	–	5	5	–	–	–	–	(20)	(20)	–	(15)	(15)
Changes in risk parameters	–	24	24	–	4	4	–	–	–	–	28	28
Write-offs	–	–	–	–	–	–	–	–	–	–	–	–
Interest due but unpaid[3]	–	–	–	–	–	–	32	(32)	–	32	(32)	–
Exchange translation differences and other movements[1]	(1,762)	5	(1,757)	(598)	12	(586)	(18)	20	2	(2,378)	37	(2,341)
As at 31 December 2018	118,713	(27)	118,686	6,909	(31)	6,878	498	(472)	26	126,120	(530)	125,590
Income statement ECL (charge)/release		10			(3)			(13)			(6)	
Recoveries of amounts previously written off												
Total credit impairment (charge)/release		10			(3)			(13)			(6)	
As at 1 January 2019	**118,713**	**(27)**	**118,686**	**6,909**	**(31)**	**6,878**	**498**	**(472)**	**26**	**126,120**	**(530)**	**125,590**
Transfers to stage 1	**2,747**	**(38)**	**2,709**	**(2,747)**	**38**	**(2,709)**	**–**	**–**	**–**	**–**	**–**	**–**
Transfers to stage 2	**(2,359)**	**16**	**(2,343)**	**2,359**	**(16)**	**2,343**	**–**	**–**	**–**	**–**	**–**	**–**
Transfers to stage 3	**–**	**–**	**–**	**(1)**	**–**	**(1)**	**1**	**–**	**1**	**–**	**–**	**–**
Net change in exposures	**19,314**	**(52)**	**19,262**	**(1,237)**	**(9)**	**(1,246)**	**–**	**–**	**–**	**18,077**	**(61)**	**18,016**
Net remeasurement from stage changes	**–**	**27**	**27**	**–**	**(4)**	**(4)**	**–**	**–**	**–**	**–**	**23**	**23**
Changes in risk parameters	**–**	**27**	**27**	**–**	**(5)**	**(5)**	**–**	**7**	**7**	**–**	**29**	**29**
Write-offs	**–**	**–**	**–**	**–**	**–**	**–**	**(170)**	**170**	**–**	**(170)**	**170**	**–**
Interest due but unpaid	**–**	**–**	**–**	**–**	**–**	**–**	**(247)**	**247**	**–**	**(247)**	**247**	**–**
Exchange translation differences and other movements[1]	**367**	**(3)**	**364**	**(639)**	**4**	**(635)**	**(7)**	**3**	**(4)**	**(279)**	**4**	**(275)**
As at 31 December 2019	**138,782**	**(50)**	**138,732**	**4,644**	**(23)**	**4,621**	**75**	**(45)**	**30**	**143,501**	**(118)**	**143,383**
Income statement ECL (charge)/release		**2**			**(18)**			**7**			**(9)**	
Recoveries of amounts previously written off												
Total credit impairment (charge)/release		**2**			**(18)**			**7**			**(9)**	

1 Includes fair value adjustments and amortisation on debt securities

2 Stage 3 balances at 1 January 2018 have been restated to reflect contractual interest due but unpaid together with equivalent credit impairment charges

3 Interest due but unpaid included in gross assets and credit impairment

Corporate & Institutional Banking

Amortised cost and FVOCI	Stage 1			Stage 2			Stage 3			Total		
	Gross balance $million	Total credit impairment $million	Net $million	Gross balance $million	Total credit impairment $million	Net $million	Gross balance $million	Total credit impairment $million	Net $million	Gross balance $million	Total credit impairment $million	Net $million
As at 1 January 2018[1]	263,079	(114)	262,965	29,576	(409)	29,167	7,038	(4,591)	2,447	299,693	(5,114)	294,579
Transfers to stage 1	40,196	(156)	40,040	(40,196)	156	(40,040)	–	–	–	–	–	–
Transfers to stage 2	(39,490)	30	(39,460)	39,692	(30)	39,662	(202)	–	(202)	–	–	–
Transfers to stage 3	–	–	–	(1,129)	85	(1,044)	1,129	(85)	1,044	–	–	–
Net change in exposures	12,869	(183)	12,686	(8,639)	10	(8,629)	(1,064)	377	(687)	3,166	204	3,370
Net remeasurement from stage changes	–	46	46	–	(30)	(30)	–	(277)	(277)	–	(261)	(261)
Changes in risk parameters	–	101	101	–	140	140	–	(394)	(394)	–	(153)	(153)
Write-offs	–	–	–	–	–	–	(1,208)	1,208	–	(1,208)	1,208	–
Interest due but unpaid[2]	–	–	–	–	–	–	(175)	175	–	(175)	175	–
Discount unwind	–	–	–	–	–	–	–	39	39	–	39	39
Exchange translation differences and other movements	(3,418)	131	(3,287)	(252)	(157)	(409)	(133)	170	37	(3,803)	144	(3,659)
As at 31 December 2018	273,236	(145)	273,091	19,052	(235)	18,817	5,385	(3,378)	2,007	297,673	(3,758)	293,915
Income statement ECL (charge)/ release		(36)			120			(294)			(210)	
Recoveries of amounts previously written off								77			77	
Total credit impairment (charge)/release		(36)			120			(217)			(133)	
As at 1 January 2019	**273,236**	**(145)**	**273,091**	**19,052**	**(235)**	**18,817**	**5,385**	**(3,378)**	**2,007**	**297,673**	**(3,758)**	**293,915**
Transfers to stage 1	**16,555**	**(145)**	**16,410**	**(16,555)**	**145**	**(16,410)**	**–**	**–**	**–**	**–**	**–**	**–**
Transfers to stage 2	**(43,141)**	**39**	**(43,102)**	**43,326**	**(51)**	**43,275**	**(185)**	**12**	**(173)**	**–**	**–**	**–**
Transfers to stage 3	**–**	**–**	**–**	**(1,095)**	**122**	**(973)**	**1,095**	**(122)**	**973**	**–**	**–**	**–**
Net change in exposures	**18,368**	**(124)**	**18,244**	**(22,387)**	**25**	**(22,362)**	**(840)**	**205**	**(635)**	**(4,859)**	**106**	**(4,753)**
Net remeasurement from stage changes	**–**	**41**	**41**	**–**	**(70)**	**(70)**	**–**	**(219)**	**(219)**	**–**	**(248)**	**(248)**
Changes in risk parameters	**–**	**187**	**187**	**–**	**(145)**	**(145)**	**–**	**(368)**	**(368)**	**–**	**(326)**	**(326)**
Write-offs	**–**	**–**	**–**	**–**	**–**	**–**	**(658)**	**658**	**–**	**(658)**	**658**	**–**
Interest due but unpaid	**–**	**–**	**–**	**–**	**–**	**–**	**(48)**	**48**	**–**	**(48)**	**48**	**–**
Discount unwind	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**38**	**38**	**–**	**38**	**38**
Exchange translation differences and other movements	**(1,369)**	**24**	**(1,345)**	**179**	**14**	**193**	**(16)**	**(45)**	**(61)**	**(1,206)**	**(7)**	**(1,213)**
As at 31 December 2019	**263,649**	**(123)**	**263,526**	**22,520**	**(195)**	**22,325**	**4,733**	**(3,171)**	**1,562**	**290,902**	**(3,489)**	**287,413**
Income statement ECL (charge)/ release[3]		**104**			**(190)**			**(382)**			**(468)**	
Recoveries of amounts previously written off												
Total credit impairment (charge)/release		**104**			**(190)**			**(382)**			**(468)**	

1 Stage 3 balances at 1 January 2018 have been restated to reflect contractual interest due but unpaid together with equivalent credit impairment charges

2 Interest due but unpaid included in gross assets and credit impairment

3 Does not include $6 million provision relating to Other assets

Retail Banking

Amortised cost and FVOCI	Stage 1 Gross balance $million	Stage 1 Total credit impairment $million	Stage 1 Net $million	Stage 2 Gross balance $million	Stage 2 Total credit impairment $million	Stage 2 Net $million	Stage 3 Gross balance $million	Stage 3 Total credit impairment $million	Stage 3 Net $million	Total Gross balance $million	Total Total credit impairment $million	Total Net $million
As at 1 January 2018	131,280	(381)	130,899	7,964	(178)	7,786	818	(389)	429	140,062	(948)	139,114
Transfers to stage 1	5,570	(388)	5,182	(5,570)	388	(5,182)	–	–	–	–	–	–
Transfers to stage 2	(9,954)	74	(9,880)	9,954	(74)	9,880	–	–	–	–	–	–
Transfers to stage 3	(281)	8	(273)	(511)	164	(347)	792	(172)	620	–	–	–
Net change in exposures	9,858	(17)	9,841	(2,628)	78	(2,550)	(398)	–	(398)	6,832	61	6,893
Net remeasurement from stage changes	–	72	72	–	(90)	(90)	–	(12)	(12)	–	(30)	(30)
Changes in risk parameters	–	264	264	–	(373)	(373)	–	(402)	(402)	–	(511)	(511)
Write-offs	–	–	–	–	–	–	(575)	575	–	(575)	575	–
Interest due but unpaid	–	–	–	–	–	–	–	–	–	–	–	–
Discount unwind	–	–	–	–	–	–	–	20	20	–	20	–
Exchange translation differences and other movements	(2,989)	55	(2,934)	(322)	(47)	(369)	195	(14)	181	(3,116)	(6)	(3,102)
As at 31 December 2018	133,484	(313)	133,171	8,887	(132)	8,755	832	(394)	438	143,203	(839)	142,364
Income statement ECL (charge)/ release		319			(385)			(414)			(480)	
Recoveries of amounts previously written off								214			214	
Total credit impairment (charge)/release		319			(385)			(200)			(266)	
As at 1 January 2019	**133,484**	**(313)**	**133,171**	**8,887**	**(132)**	**8,755**	**832**	**(394)**	**438**	**143,203**	**(839)**	**142,364**
Transfers to stage 1	**5,301**	**(355)**	**4,946**	**(5,301)**	**355**	**(4,946)**	**–**	**–**	**–**	**–**	**–**	**–**
Transfers to stage 2	**(8,279)**	**82**	**(8,197)**	**8,279**	**(82)**	**8,197**	**–**	**–**	**–**	**–**	**–**	**–**
Transfers to stage 3	**(117)**	**1**	**(116)**	**(517)**	**165**	**(352)**	**634**	**(166)**	**468**	**–**	**–**	**–**
Net change in exposures	**9,303**	**(15)**	**9,288**	**(6,020)**	**49**	**(5,971)**	**(290)**	**–**	**(290)**	**2,993**	**34**	**3,027**
Net remeasurement from stage changes	**–**	**122**	**122**	**–**	**(86)**	**(86)**	**–**	**(81)**	**(81)**	**–**	**(45)**	**(45)**
Changes in risk parameters	**–**	**153**	**153**	**–**	**(398)**	**(398)**	**–**	**(327)**	**(327)**	**–**	**(572)**	**(572)**
Write-offs	**–**	**–**	**–**	**–**	**–**	**–**	**(586)**	**586**	**–**	**(586)**	**586**	**–**
Interest due but unpaid	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**
Discount unwind	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**28**	**28**	**–**	**28**	**28**
Exchange translation differences and other movements	**(433)**	**26**	**(407)**	**(37)**	**(50)**	**(87)**	**256**	**(20)**	**236**	**(214)**	**(44)**	**(258)**
As at 31 December 2019	**139,259**	**(299)**	**138,960**	**5,291**	**(179)**	**5,112**	**846**	**(374)**	**472**	**145,396**	**(852)**	**144,544**
Income statement ECL (charge)/ release		**260**			**(435)**			**(408)**			**(583)**	
Recoveries of amounts previously written off								**247**			**247**	
Total credit impairment (charge)/release		**260**			**(435)**			**(161)**			**(336)**	

Commercial Banking

Amortised cost and FVOCI	Stage 1 Gross balance $million	Stage 1 Total credit impairment $million	Stage 1 Net $million	Stage 2 Gross balance $million	Stage 2 Total credit impairment $million	Stage 2 Net $million	Stage 3 Gross balance $million	Stage 3 Total credit impairment $million	Stage 3 Net $million	Total Gross balance $million	Total Total credit impairment $million	Total Net $million
As at 1 January 2018[1]	28,792	(40)	28,752	5,382	(95)	5,287	2,749	(2,128)	621	36,923	(2,263)	34,660
Transfers to stage 1	12,675	(64)	12,611	(12,675)	64	(12,611)	–	–	–	–	–	–
Transfers to stage 2	(11,152)	26	(11,126)	11,171	(26)	11,145	(19)	–	(19)	–	–	–
Transfers to stage 3	(11)	–	(11)	(606)	14	(592)	617	(14)	603	–	–	–
Net change in exposures	2,163	(65)	2,098	3,660	9	3,669	(337)	138	(199)	5,486	82	5,568
Net remeasurement from stage changes	–	12	12	–	(13)	(13)	–	(217)	(217)	–	(218)	(218)
Changes in risk parameters	–	67	67	–	(33)	(33)	–	(162)	(162)	–	(128)	(128)
Write-offs	–	–	–	–	–	–	(293)	293	–	(293)	293	–
Interest due but unpaid[2]	–	–	–	–	–	–	(194)	194	–	(194)	194	–
Discount unwind	–	–	–	–	–	–	–	16	16	–	16	16
Exchange translation differences and other movements	(1,047)	29	(1,018)	(223)	(20)	(243)	(155)	77	(78)	(1,425)	86	(1,339)
As at 31 December 2018	31,420	(35)	31,385	6,709	(100)	6,609	2,368	(1,803)	565	40,497	(1,938)	38,559
Income statement ECL (charge)/release		14			(37)			(241)			(264)	
Recoveries of amounts previously written off								21			21	
Total credit impairment (charge)/release		14			(37)			(220)			(243)	
As at 1 January 2019	**31,420**	**(35)**	**31,385**	**6,709**	**(100)**	**6,609**	**2,368**	**(1,803)**	**565**	**40,497**	**(1,938)**	**38,559**
Transfers to stage 1	**3,082**	**(42)**	**3,040**	**(3,082)**	**42**	**(3,040)**	**–**	**–**	**–**	**–**	**–**	**–**
Transfers to stage 2	**(11,878)**	**20**	**(11,858)**	**11,886**	**(22)**	**11,864**	**(8)**	**2**	**(6)**	**–**	**–**	**–**
Transfers to stage 3	**(4)**	**–**	**(4)**	**(465)**	**26**	**(439)**	**469**	**(26)**	**443**	**–**	**–**	**–**
Net change in exposures	**9,186**	**(70)**	**9,116**	**(8,864)**	**(38)**	**(8,902)**	**(263)**	**96**	**(167)**	**59**	**(12)**	**47**
Net remeasurement from stage changes	**–**	**5**	**5**	**–**	**(11)**	**(11)**	**–**	**(107)**	**(107)**	**–**	**(113)**	**(113)**
Changes in risk parameters	**–**	**69**	**69**	**–**	**58**	**58**	**–**	**(124)**	**(124)**	**–**	**3**	**3**
Write-offs	**–**	**–**	**–**	**–**	**–**	**–**	**(380)**	**380**	**–**	**(380)**	**380**	**–**
Interest due but unpaid	**–**	**–**	**–**	**–**	**–**	**–**	**(87)**	**87**	**–**	**(87)**	**87**	**–**
Discount unwind	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**13**	**13**	**–**	**13**	**13**
Exchange translation differences and other movements	**465**	**18**	**483**	**(146)**	**(13)**	**(159)**	**(37)**	**(35)**	**(72)**	**282**	**(30)**	**252**
As at 31 December 2019	**32,271**	**(35)**	**32,236**	**6,038**	**(58)**	**5,980**	**2,062**	**(1,517)**	**545**	**40,371**	**(1,610)**	**38,761**
Income statement ECL (charge)/release		**4**			**9**			**(135)**			**(122)**	
Recoveries of amounts previously written off								**1**			**1**	
Total credit impairment (charge)/release		**4**			**9**			**(134)**			**(121)**	

1 Stage 3 balances at 1 January have been restated to reflect contractual interest due but unpaid together with equivalent credit impairment charges

2 Interest due but unpaid included in gross assets and credit impairment

Analysis of stage 2 balances (unaudited)

The table below analyses stage 2 gross exposures and associated expected credit provisions by the key driver that caused the exposures to be classified as stage 2 as at 31 December 2019. This may not be the same driver that caused the initial transfer into stage 2. Where multiple drivers apply, the exposure is allocated based on the table order. For example, a loan may have breached the PD thresholds and could also be on non-purely precautionary early alert; in this instance, the exposure is reported under 'increase in PD'.

	31.12.2019											
	Corporate & Institutional Banking		Retail Banking		Commercial Banking		Private Banking		Central & Other		Total	
	Gross %	ECL %	Gross %	ECL %	Gross %	ECL %	Gross %	ECL %	Gross %	ECL %	Gross %	ECL %
Increase in PD	49%	52%	94%	76%	67%	57%	–	–	43%	31%	60%	62%
Non-purely precautionary early alert	22%	12%	–	–	9%	8%	–	–	–	–	14%	6%
Higher risk (CG12)	6%	28%	–	–	5%	26%	–	–	–	–	3%	15%
Sub-investment grade	1%	3%	–	–	4%	2%	–	–	53%	63%	5%	4%
30 days past due	–	–	4%	22%	–	–	–	–	–	–	1%	9%
Others	22%	5%	2%	2%	15%	7%	100%	100%	4%	6%	17%	4%
Total stage 2	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

The majority of exposures and the associated expected credit loss provisions are in stage 2 due to increases in the probability of default. 22 per cent of the provisions held against stage 2 Retail Banking exposures arise from the application of the 30 days past due backstop, although this represents only 4 per cent of exposures.

For debt securities originated prior to 1 January 2018, those with a sub-investment rating were allocated into stage 2. For debt securities originated after 1 January 2018, significant increase in Credit risk is assessed based on the relative and absolute increases in PD.

'Others' incorporates exposures where origination data is incomplete and the exposures are allocated into stage 2. Significant increase in Credit risk for Private Banking clients is assessed by referencing the nature and level of collateral against which credit is extended.

Credit impairment charge

With effect from 1 January 2019, the liquidation portfolio has been included in the ongoing portfolio as the actions to reduce exposures in the liquidation portfolio were substantially completed in 2018. 2018 has not been restated.

The underlying credit impairment charge is 22 per cent higher at $906 million (2018: $740 million) as the benefit of lower stage 3 impairment charges was more than offset by an increase in stage 1 and 2 provisions. Just over half of the increase in stage 1 and 2 provisions was due to a deterioration in macroeconomic forecasts over the year, which includes the downward revision to Hong Kong GDP in the second half of 2019.

Corporate & Institutional Banking was $233 million higher at $475 million (2018: $242 million) due to higher stage 1 and 2 impairments as 2018 benefitted from upgrades within stage 2 as well as releases from improvements in macroeconomic forecasts. While accounts graded as 'Higher risk' stabilised in 2019, Corporate & Institutional Banking was impacted by deteriorating macroeconomic forecasts, particularly in Metals. Stage 3 provisions were slightly higher.

Retail Banking was $69 million higher at $336 million (2018: $267 million) mainly due to non-recurring impairment releases in Korea and Indonesia in 2018. Excluding these one-off releases, credit impairment was flat year-on-year. The impact of the macroeconomic downgrades for Hong Kong increased stage 1 and 2 provisions, while stage 3 provisions improved year on year mainly driven by recoveries from Korea, Singapore and the UAE.

Commercial Banking decreased 50 per cent to $121 million (2018: $244 million). This is mainly due to lower stage 3 impairments offset by lower recoveries. 2018 included significant stage 3 provisions on a few clients in Africa & Middle East and Greater China & North Asia which did not repeat.

Private Banking impairment reduced by $31 million due to net provision release of $29 million driven primarily by a stage 3 client.

Central & other segment impairments was a charge of $5 million (2018: release of $13 million) mainly driven by debt security instruments managed by Treasury.

There was a $2 million restructuring impairment on a small number of legacy positions in the Principal Finance business.

	2019[1] $million	2018 $million
Ongoing business portfolio		
Corporate & Institutional Banking	475	242
Retail Banking	336	267
Commercial Banking	121	244
Private Banking	(31)	–
Central & other items	5	(13)
Credit impairment charge	906	740
Restructuring business portfolio		
Liquidation portfolio	–	(79)
Others	2	(8)
Credit impairment charge	2	(87)
Total credit impairment charge	908	653

1 In 2019, the liquidation portfolio has been included in ongoing business. Prior periods have not been restated

Problem credit management and provisioning

Forborne and other modified loans by client segment

A forborne loan arises when a concession has been made to the contractual terms of a loan in response to a customer's financial difficulties.

The table below presents loans with forbearance measures by segment.

	2019				
Amortised cost	**Corporate & Institutional Banking $million**	**Retail Banking $million**	**Commercial Banking $million**	**Private Banking $million**	**Total $million**
All loans with forbearance measures	1,533	344	767	–	2,644
Credit impairment (stage 1 and 2)	(13)	–	(4)	–	(17)
Credit impairment (stage 3)	(748)	(169)	(558)	–	(1,475)
Net carrying value	772	175	205	–	1,152
Included within the above table					
Gross performing forborne loans	421	19	49	–	489
Modification of terms and conditions[1]	421	19	44	–	484
Refinancing[2]	–	–	5	–	5
Impairment provisions	(13)	–	(4)	–	(17)
Modification of terms and conditions[1]	(13)	–	(4)	–	(17)
Refinancing[2]	–	–	–	–	–
Net performing forborne loans	408	19	45	–	472
Collateral	62	19	22	–	103
Gross non-performing forborne loans	1,112	325	718	–	2,155
Modification of terms and conditions[1]	1,071	325	696	–	2,092
Refinancing[2]	41	–	22	–	63
Impairment provisions	(748)	(169)	(558)	–	(1,475)
Modification of terms and conditions[1]	(717)	(169)	(544)	–	(1,430)
Refinancing[2]	(31)	–	(14)	–	(45)
Net non-performing forborne loans	364	156	160	–	680
Collateral	190	156	99	–	445

	2018				
Amortised cost	Corporate & Institutional Banking $million	Retail Banking $million	Commercial Banking $million	Private Banking $million	Total $million
All loans with forbearance measures[4]	1,694	376	929	–	2,999
Credit impairment (stage 1 and 2)[3]	(14)	–	(8)	–	(22)
Credit impairment (stage 3)[4]	(766)	(174)	(647)	–	(1,587)
Net carrying value	914	202	274	–	1,390
Included within the above table					
Gross performing forborne loans	286	23	71	–	380
Modification of terms and conditions[1]	273	23	64	–	360
Refinancing[2]	13	–	7	–	20
Impairment provisions	(14)	–	(8)	–	(22)
Modification of terms and conditions[1]	(9)	–	(8)	–	(17)
Refinancing[2]	(5)	–	–	–	(5)
Net performing forborne loans	272	23	63	–	358
Collateral	16	23	28	–	67
Gross non-performing forborne loans[4]	1,408	353	858	–	2,619
Modification of terms and conditions[1,4]	1,319	353	815	–	2,487
Refinancing[2,4]	89	–	43	–	132
Impairment provisions[4]	(766)	(174)	(647)	–	(1,587)
Modification of terms and conditions[1,4]	(716)	(174)	(614)	–	(1,504)
Refinancing[2,4]	(50)	–	(33)	–	(83)
Net non-performing forborne loans	642	179	211	–	1,032
Collateral	225	163	107	–	495

1 Modification of terms is any contractual change apart from refinancing, as a result of credit stress of the counterparty, i.e. interest reductions, loan covenant waivers

2 Refinancing is a new contract to a lender in credit stress, such that they are refinanced and can pay other debt contracts that they were unable to honour

3 Credit impairment (stage 1 and 2) line added for completeness

4 Interest due but unpaid included in gross assets and credit impairment

Forborne and other modified loans by region (unaudited)

Amortised cost	Greater China & North Asia $million	ASEAN & South Asia $million	Africa & Middle East $million	Europe & Americas $million	Total $million
	2019				
Performing forborne loans	100	251	110	11	472
Stage 3 forborne loans	177	173	148	182	680
Net forborne loans	277	424	258	193	1,152

Amortised cost	Greater China & North Asia $million	ASEAN & South Asia $million	Africa & Middle East $million	Europe & Americas $million	Total $million
	2018				
Performing forborne loans[1]	112	94	111	41	358
Stage 3 forborne loans	233	344	179	276	1,032
Net forborne loans	345	438	290	317	1,390

1 Credit impairment provision for performing forborne loans included for completeness

Credit-impaired (stage 3) loans and advances by client segment

With effect from 1 January 2019, the liquidation portfolio has been included within the underlying portfolio. Prior periods have not been restated.

Gross stage 3 loans and stage 3 provisions on loans and advances have been restated to include the impact of interest in suspense of $1.5 billion in 2018.

Gross stage 3 loans for the Group are down 12 per cent in the period to $7.4 billion (31 December 2018: $8.5 billion), driven by repayments, write-offs and transfers to stage 2 mainly in the Corporate & Institutional Banking and Commercial Banking segments.

The inflows of stage 3 loans in Corporate & Institutional Banking are 6 per cent lower at $0.8 billion. The new inflows in 2019 were mainly in ASEAN & South Asia.

Stage 3 inflows in Commercial Banking reduced by 24 per cent to $0.5 billion from $0.6 billion in 2018. Inflows increased in ASEAN & South Asia offset by reductions in Africa & Middle East and Greater China & North Asia.

Gross stage 3 loans in Retail Banking were broadly stable at $0.8 billion.

Gross stage 3 loans in Private Banking marginally increased by $68 million in ASEAN & South Asia and Europe & Americas to $0.4 billion at 31 December 2019.

Stage 3 cover ratio

The stage 3 cover ratio measures the proportion of stage 3 impairment provisions to gross stage 3 loans, and is a metric commonly used in considering impairment trends. This metric does not allow for variations in the composition of stage 3 loans and should be used in conjunction with other Credit risk information provided, including the level of collateral cover.

The balance of stage 3 loans not covered by stage 3 impairment provisions represents the adjusted value of collateral held and the net outcome of any workout or recovery strategies.

Collateral provides risk mitigation to some degree in all client segments and supports the credit quality and cover ratio assessments post impairment provisions. Further information on collateral is provided in the Credit risk mitigation section.

Corporate & Institutional Banking cover ratio increased to 71 per cent from 65 per cent due to repayments, increased provisions and upgrades to stage 2. Commercial Banking cover ratio reduced to 75 per cent from 77 per cent mainly due to write-offs.

Private Banking cover ratio reduced to 40 per cent from 55 per cent in 2018 due to a small increase in stage 3 loans in ASEAN & South Asia and Europe & Americas and a reduction in provisions due to a net release on a client in ASEAN & South Asia.

Retail cover ratio decreased to 44 per cent from 48 per cent in December 2018 due to increase of Mortgage portfolio.

Amortised cost	Corporate & Institutional Banking $million	Retail Banking $million	Commercial Banking $million	Private Banking $million	Total $million
	2019[1]				
Gross credit-impaired	4,173	846	2,013	366	7,398
Credit impairment provisions	(2,980)	(374)	(1,503)	(147)	(5,004)
Net carrying value	1,193	472	510	219	2,394
Cover ratio	71%	44%	75%	40%	68%
Collateral ($ million)	497	286	263	211	1,257
Cover ratio (after collateral)	83%	78%	88%	98%	85%

1 The remaining portfolio of loans and advances to customers previously separately identified in the liquidation portfolio are now included in the ongoing business

Amortised cost	2018 Corporate & Institutional Banking $million	Retail Banking $million	Commercial Banking $million	Private Banking $million	Total $million
Gross credit-impaired[1]	4,996	832	2,328	298	8,454
Credit impairment provisions[1]	(3,238)	(396)	(1,789)	(163)	(5,586)
Net carrying value	1,758	436	539	135	2,868
Cover ratio[1]	65%	48%	77%	55%	66%
Collateral ($ million)	802	324	302	135	1,563
Cover ratio (after collateral)[1]	81%	87%	90%	100%	85%
Of the above, included in the liquidation portfolio:					
Gross credit-impaired[1]	1,337	–	130	216	1,683
Credit impairment provisions[1]	(1,088)	–	(130)	(152)	(1,370)
Net carrying value	249	–	–	64	313
Cover ratio[1]	81%	–	100%	70%	81%
Collateral ($million)	159	–	–	64	223
Cover ratio (after collateral)[1]	93%	–	100%	100%	95%

1 Balances have been restated to reflect interest due but unpaid together with equivalent credit impairment charges. The cover ratios have been restated as a result

Credit-impaired (stage 3) loans and advances by geographic region (unaudited)

Stage 3 loans decreased by $1.1 billion or 12 per cent compared with 31 December 2018. The largest decrease was in the ASEAN & South Asia region, primarily due to write-offs, settlements and transfers to stage 2.

Amortised cost	**2019** **Greater China & North Asia $million**	**ASEAN & South Asia $million**	**Africa & Middle East $million**	**Europe & Americas $million**	**Total $million**
Gross credit-impaired	**716**	**3,084**	**2,585**	**1,013**	**7,398**
Credit impairment provisions	**(360)**	**(2,087)**	**(1,899)**	**(658)**	**(5,004)**
Net carrying value	**356**	**997**	**686**	**355**	**2,394**
Cover ratio	**50%**	**68%**	**73%**	**65%**	**68%**

Amortised cost	2018 Greater China & North Asia $million	ASEAN & South Asia $million	Africa & Middle East $million	Europe & Americas $million	Total $million
Gross credit-impaired[1]	838	3,624	3,061	931	8,454
Credit impairment provisions[1]	(343)	(2,599)	(2,214)	(430)	(5,586)
Net carrying value	495	1,025	847	501	2,868
Cover ratio[1]	41%	72%	72%	46%	66%

1 Balances have been restated to reflect interest due but unpaid together with equivalent credit impairment charges. The cover ratios have been restated as a result

Movement of credit-impaired (stage 3) loans and advances provisions by client segment

Credit impairment provisions as at 31 December 2019 were $5,004 million, compared with $5,586 million at 31 December 2018. The decrease was largely due to write-offs in Corporate & Institutional Banking and Commercial Banking. Private Banking provisions fell by $16 million primarily due to a net provision release for a single client.

The following table shows the movement of credit-impaired (stage 3) provisions for each client segment.

	2019				
Amortised cost	Corporate & Institutional Banking $million	Retail Banking $million	Commercial Banking $million	Private Banking $million	Total[2] $million
Gross credit-impaired loans at 31 December	4,173	846	2,013	366	7,398
Credit impairment allowances at 1 January	3,238	396	1,789	163	5,586
Net transfers into and out of stage 3	111	166	24	–	301
New provisions charge/(release)[1]	177	81	107	–	365
Changes due to risk parameters[1]	335	327	122	(26)	758
Net change in exposures[1]	(170)	–	(96)	(6)	(272)
Amounts written off	(658)	(585)	(380)	(2)	(1,625)
Interest due but unpaid	(48)	–	(87)	17	(118)
Discount unwind	(38)	(28)	(13)	(4)	(83)
Exchange translation difference	33	17	37	5	92
Credit impairment allowances at 31 December	2,980	374	1,503	147	5,004
Net carrying value	1,193	472	510	219	2,394
Income statement charge/(release)[1]	342	408	133	(32)	851
Recoveries of amounts previously written off	–	(247)	(1)	–	(248)
Total income statement charge	342	161	132	(32)	603

	2018				
Amortised cost	Corporate & Institutional Banking $million	Retail Banking $million	Commercial Banking $million	Private Banking $million	Total[2] $million
Gross credit-impaired loans at 31 December[3]	4,996	832	2,328	298	8,454
Credit impairment allowances at 1 January[3]	4,524	389	2,118	154	7,185
Net transfers into and out of stage 3	85	172	14	–	271
New provisions charge/(release)[1]	189	12	218	3	422
Changes due to risk parameters[1]	400	402	162	13	977
Net change in exposures[1]	(379)	–	(136)	(5)	(520)
Amounts written off	(1,179)	(575)	(291)	–	(2,045)
Interest due but unpaid[3]	(175)	–	(194)	–	(369)
Discount unwind	(39)	(20)	(16)	(5)	(80)
Exchange translation difference and other movements	(188)	16	(86)	3	(255)
Credit impairment allowances at 31 December	3,238	396	1,789	163	5,586
Net carrying value	1,758	436	539	135	2,868
Income statement charge/(release)[1]	210	414	244	11	879
Recoveries of amounts previously written off	(77)	(214)	(21)	–	(312)
Total income statement charge	133	200	223	11	567

1 Components of the income statement charge/(release)

2 Excludes credit impairment relating to loan commitments and financial guarantees

3 Stage 3 balances at 1 January 2018 have been restated to reflect contractual interest due but unpaid together with equivalent credit impairment charges

Credit risk mitigation

Potential credit losses from any given account, customer or portfolio are mitigated using a range of tools such as collateral, netting arrangements, credit insurance and credit derivatives, taking into account expected volatility and guarantees.

The reliance that can be placed on these mitigants is carefully assessed in light of issues such as legal certainty and enforceability, market valuation correlation and counterparty risk of the guarantor.

Collateral

The requirement for collateral is not a substitute for the ability to repay, which is the primary consideration for any lending decisions.

The unadjusted market value of collateral across all asset types, in respect of Corporate & Institutional Banking and Commercial Banking, without adjusting for over-collateralisation, was $280 billion in 2019 (2018: $265 billion).

The collateral values in the table below (which covers loans and advances to banks and customers, excluding those held at fair value through profit or loss) are adjusted where appropriate in accordance with our risk mitigation policy and for the effect of over-collateralisation. The extent of over-collateralisation has been determined with reference to both the drawn and undrawn components of exposure as this best reflects the effect of collateral and other credit enhancements on the amounts arising from expected credit losses.

We have remained prudent in the way we assess the value of collateral, which is calibrated for a severe downturn and backtested against our prior experience. On average, across all types of non-cash collateral, the value ascribed is approximately half of its current market value.

In the Retail Banking and Private Banking segments, a secured loan is one where the borrower pledges an asset as collateral of which the Group is able to take possession in the event that the borrower defaults. Total collateral for Retail Banking has increased by $6.7 billion to $81.1 billion due to an increase in Mortgages and Secured wealth products in the Greater China & North Asia and ASEAN & South Asia regions.

Private Banking collateral is $10.3 billion, an increase of 6 per cent as compared with 2018, in line with the overall movement of the secured portfolio.

Collateral held on loans and advances

The table below details collateral held against exposures, separately disclosing stage 2 and stage 3 exposure and corresponding collateral.

	2019								
	Net amount outstanding			Collateral			Net exposure		
Amortised cost	**Total $million**	**Stage 2 financial assets $million**	**Credit-impaired financial assets (S3) $million**	**Total[2] $million**	**Stage 2 financial assets $million**	**Credit-impaired financial assets (S3) $million**	**Total $million**	**Stage 2 financial assets $million**	**Credit-impaired financial assets (S3) $million**
Corporate & Institutional Banking[1]	**164,748**	**14,368**	**1,193**	**23,502**	**2,731**	**497**	**141,246**	**11,637**	**696**
Retail Banking	**106,368**	**2,823**	**472**	**81,137**	**2,323**	**286**	**25,231**	**500**	**186**
Commercial Banking	**26,117**	**3,821**	**510**	**7,709**	**1,826**	**263**	**18,408**	**1,995**	**247**
Private Banking	**14,741**	**283**	**219**	**10,306**	**188**	**211**	**4,435**	**95**	**8**
Central & other items	**10,098**	**7**	**–**	**802**	**–**	**–**	**9,296**	**7**	**–**
Total	**322,072**	**21,302**	**2,394**	**123,456**	**7,068**	**1,257**	**198,616**	**14,234**	**1,137**

	2018								
	Net amount outstanding			Collateral			Net exposure		
Amortised cost	Total $million	Stage 2 financial assets $million	Credit-impaired financial assets (S3) $million	Total[2] $million	Stage 2 financial assets $million	Credit-impaired financial assets (S3) $million	Total $million	Stage 2 financial assets $million	Credit-impaired financial assets (S3) $million
Corporate & Institutional Banking[1]	166,091	10,234	1,758	15,882	1,314	802	150,209	8,920	956
Retail Banking	101,235	2,705	436	74,485	2,092	324	26,750	613	112
Commercial Banking	26,759	4,331	539	6,767	3,966	302	19,992	365	237
Private Banking	13,616	785	135	9,729	783	135	3,887	2	–
Central & other items	10,270	26	–	6,278	–	–	3,992	26	–
Total	317,971	18,081	2,868	113,141	8,155	1,563	204,830	9,926	1,305

1 Includes loans and advances to banks

2 Adjusted for over-collateralisation based on the drawn and undrawn components of exposures

Collateral – Corporate & Institutional Banking and Commercial Banking

Collateral held against Corporate & Institutional Banking and Commercial Banking exposures amounted to $31 billion.

Collateral taken for longer-term and sub-investment grade corporate loans remains high at 45 per cent. Our underwriting standards encourage taking specific charges on assets and we consistently seek high-quality, investment grade collateral.

76 per cent of tangible collateral held comprises physical assets or is property based, with the remainder largely in cash and investment securities.

Non-tangible collateral such as guarantees and standby letters of credit is also held against corporate exposures, although the financial effect of this type of collateral is less significant in terms of recoveries. However, this is considered when determining probability of default and other credit-related factors. Collateral is also held against off-balance sheet exposures, including undrawn commitments and trade-related instruments.

The following table provides an analysis of the types of collateral held against Corporate & Institutional Banking and Commercial Banking loan exposures.

Corporate & Institutional Banking

Amortised cost	2019 $million	2018 $million
Maximum exposure	**164,748**	166,091
Property	**6,965**	5,557
Plant, machinery and other stock	**1,134**	1,067
Cash	**2,755**	2,019
Reverse repos	**2,000**	528
A– to AA+	**756**	321
BBB– to BBB+	**439**	207
Unrated	**805**	–
Financial guarantees and insurance	**7,422**	3,697
Commodities	**136**	90
Ships and aircraft	**3,090**	2,924
Total value of collateral	**23,502**	15,882
Net exposure[1]	**141,246**	150,209

1 Adjusted for over-collateralisation based on the drawn and undrawn components of exposures

Commercial Banking

Amortised cost	2019 $million	2018 $million
Maximum exposure	**26,117**	26,759
Property	**5,029**	4,557
Plant, machinery and other stock	**1,094**	992
Cash	**836**	486
Reverse repos	**8**	72
A– to AA+	**–**	1
BBB– to BBB+	**1**	71
Unrated	**7**	–
Financial guarantees and insurance	**531**	502
Commodities	**26**	11
Ships and aircraft	**185**	147
Total value of collateral	**7,709**	6,767
Net exposure[1]	**18,408**	19,992

1 Adjusted for over-collateralisation based on the drawn and undrawn components of exposures

Collateral – Retail Banking and Private Banking

In Retail Banking and Private Banking, 85 per cent of the portfolio is fully secured. The proportion of unsecured loans remains broadly stable at 14 per cent and the remaining 1 per cent is partially secured.

The following table presents an analysis of loans to individuals by product; split between fully secured, partially secured and unsecured:

	2019				2018			
Amortised cost	Fully secured $million	Partially secured $million	Unsecured $million	Total $million	Fully secured $million	Partially secured $million	Unsecured $million	Total $million
Maximum exposure	102,612	1,257	17,240	121,109	96,534	1,383	16,934	114,851
Loans to individuals								
Mortgages	78,217	109	5	78,331	75,386	191	23	75,600
CCPL	123	8	17,092	17,223	168	102	16,692	16,962
Auto	562	–	10	572	671	–	2	673
Secured wealth products	20,275	127	–	20,402	17,721	107	172	18,000
Other	3,435	1,013	133	4,581	2,588	983	45	3,616
Total collateral[1]				91,443				84,214
Net exposure[2]				29,666				30,637
Percentage of total loans	85%	1%	14%		84%	1%	15%	

1 Collateral values are adjusted where appropriate in accordance with our risk mitigation policy and for the effect of over-collateralisation

2 Amounts net of ECL

Mortgage loan-to-value ratios by geography

Loan-to-value (LTV) ratios measure the ratio of the current mortgage outstanding to the current fair value of the properties on which they are secured.

In mortgages, the value of property held as security significantly exceeds the value of mortgage loans. The average LTV of the overall mortgage portfolio is low at 45 per cent. Hong Kong, which represents 38 per cent of the Retail Banking mortgage portfolio has an average LTV of 39.1 per cent. All of our other key markets continue to have low portfolio LTVs, (Korea, Singapore and Taiwan at 43.6 per cent, 53.3 per cent and 51.8 per cent respectively).

An analysis of LTV ratios by geography for the mortgage portfolio is presented in the mortgage LTV ratios by geography table below.

	2019				
Amortised cost	Greater China & North Asia % Gross	ASEAN & South Asia % Gross	Africa & Middle East % Gross	Europe & Americas % Gross	Total % Gross
Less than 50 per cent	67.8	43.4	21.6	10.8	59.3
50 per cent to 59 per cent	14.4	19.4	14.2	26.3	15.9
60 per cent to 69 per cent	9.2	22.5	21.0	29.4	13.2
70 per cent to 79 per cent	6.7	12.5	19.0	28.0	9.0
80 per cent to 89 per cent	1.6	1.7	11.5	4.5	2.0
90 per cent to 99 per cent	0.2	0.3	6.5	0.4	0.4
100 per cent and greater	0.1	0.2	6.2	0.6	0.3
Average portfolio loan-to-value	42.1	50.7	66.6	62.2	44.9
Loans to individuals – mortgages ($million)	55,724	18,301	2,047	2,259	78,331

	2018				
Amortised cost	Greater China & North Asia % Gross	ASEAN & South Asia % Gross	Africa & Middle East % Gross	Europe & Americas % Gross	Total % Gross
Less than 50 per cent	67.7	41.5	20.9	19.6	58.5
50 per cent to 59 per cent	14.9	18.8	15.3	21.0	16.0
60 per cent to 69 per cent	10.7	22.0	21.8	30.2	14.4
70 per cent to 79 per cent	5.0	16.0	21.6	26.8	8.8
80 per cent to 89 per cent	1.3	1.5	12.0	2.4	1.7
90 per cent to 99 per cent	0.3	0.1	4.7	–	0.3
100 per cent and greater	0.1	0.1	3.8	–	0.2
Average portfolio loan-to-value	42.0	51.5	65.2	54.2	44.8
Loans to individuals – mortgages ($million)	52,434	19,156	2,126	1,884	75,600

Collateral and other credit enhancements possessed or called upon

The Group obtains assets by taking possession of collateral or calling upon other credit enhancements (such as guarantees). Repossessed properties are sold in an orderly fashion. Where the proceeds are in excess of the outstanding loan balance the excess is returned to the borrower.

Certain equity securities acquired may be held by the Group for investment purposes and are classified as fair value through other comprehensive income, and the related loan written off.

The carrying value of collateral possessed and held by the Group as at 31 December 2019 is $37.0 million (2018: $18.2 million).

The increase in collateral value is largely due to property and plant taken possession of in Malaysia.

	2019 $million	2018 $million
Property, plant and equipment	**29.0**	8.7
Guarantees	**5.2**	8.6
Cash	**2.7**	0.6
Other	**0.1**	0.3
Total	**37.0**	18.2

Other credit risk mitigation

Other forms of Credit risk mitigation are set out below.

Credit default swaps

The Group has entered into credit default swaps for portfolio management purposes, referencing loan assets with a notional value of $14.5 billion (2018: $21 billion). These credit default swaps are accounted for as financial guarantees as per IFRS 9 as they will only reimburse the holder for an incurred loss on an underlying debt instrument. The Group continues to hold the underlying assets referenced in the credit default swaps and it continues to be exposed to related Credit and Foreign exchange risk on these assets.

Derivative financial instruments

The Group enters into master netting agreements, which in the event of default result in a single amount owed by or to the counterparty through netting the sum of the positive and negative mark-to-market values of applicable derivative transactions. These are set out in more detail under Derivative financial instruments Credit risk mitigation (page 195).

Off-balance sheet exposures

For certain types of exposures, such as letters of credit and guarantees, the Group obtains collateral such as cash depending on internal Credit risk assessments, as well as in the case of letters of credit holding legal title to the underlying assets should a default take place.

Other portfolio analysis

This section provides maturity analysis by business segment, credit quality by industry and industry and retail products analysis by region.

Maturity analysis of loans and advances by client segment

The loans and advances to the Corporate & Institutional Banking and Commercial Banking segments remain predominantly short-term, with 62 per cent of loans and advances to customers in the segments maturing in less than one year, an increase compared with 61 per cent in December 2018. 97 per cent of loans to banks are maturing in less than one year, an increase compared with 96 per cent in 2018. Shorter maturity gives us the flexibility to respond promptly to events and rebalance or reduce our exposure to clients or sectors that are facing increased pressure or uncertainty.

The Private Banking loan book also demonstrates a short-term bias, typical for loans that are secured on wealth management assets.

The Retail Banking loan book continues to be longer-term in nature with 69 per cent (2018: 70 per cent) of the loans maturing over five years, as mortgages constitute the majority of this portfolio.

Amortised cost	2019 One year or less $million	One to five years $million	Over five years $million	Total $million
Corporate & Institutional Banking	66,275	36,864	11,272	114,411
Retail Banking	17,763	15,282	74,159	107,204
Commercial Banking	21,443	5,111	1,139	27,693
Private Banking	13,893	507	499	14,899
Central & other items	10,098	–	1	10,099
Gross loans and advances to customers	129,472	57,764	87,070	274,306
Impairment provisions	(4,887)	(439)	(457)	(5,783)
Net loans and advances to customers	124,585	57,325	86,613	268,523
Net loans and advances to banks	51,871	1,678	–	53,549

Amortised cost	2018 One year or less $million	One to five years $million	Over five years $million	Total $million
Corporate & Institutional Banking[1]	61,705	36,164	10,330	108,199
Retail Banking[1]	16,372	14,091	71,600	102,063
Commercial Banking[1]	21,640	5,660	1,364	28,664
Private Banking[1]	12,773	396	618	13,787
Central & other items	10,265	7	–	10,272
Gross loans and advances to customers	122,755	56,318	83,912	262,985
Impairment provisions[1]	(5,858)	(294)	(276)	(6,428)
Net loans and advances to customers	116,897	56,024	83,636	256,557
Net loans and advances to banks	58,784	2,597	33	61,414

1 Stage 3 balances have been restated to reflect interest due but unpaid together with equivalent credit impairment charges

Credit quality by industry (unaudited)

Loans and advances

This section provides an analysis of the Group's amortised cost portfolio by industry on a gross, total credit impairment and net basis.

From an industry perspective, loans and advances increased by $5.1 billion, largely driven by five sectors namely Mining and quarrying, Commercial real estate, Transport, telecom and utilities, Government and Financing insurance and non-banking, with each sector contributing an increase of $1 billion or more. Retail Products increased by $6.3 billion primarily within secured wealth products in ASEAN & South Asia and Mortgages in Greater China & North Asia. Stage 1 loans increased by $9.0 billion compared with 2018, representing 80 per cent of the increase in total loans and advances.

	2019											
	Stage 1			Stage 2			Stage 3			Total		
Amortised cost	Gross balance $million	Total credit impairment $million	Net carrying amount $million	Gross balance $million	Total credit impairment $million	Net carrying amount $million	Gross balance $million	Total credit impairment $million	Net carrying amount $million	Gross balance $million	Total credit impairment $million	Net carrying amount $million
Industry:												
Energy	13,227	(17)	13,210	1,562	(22)	1,540	894	(758)	136	15,683	(797)	14,886
Manufacturing	20,099	(15)	20,084	3,499	(29)	3,470	970	(695)	275	24,568	(739)	23,829
Financing, insurance and non-banking	20,971	(8)	20,963	1,196	(17)	1,179	292	(183)	109	22,459	(208)	22,251
Transport, telecom and utilities	14,884	(10)	14,874	1,874	(35)	1,839	841	(599)	242	17,599	(644)	16,955
Food and household products	8,327	(8)	8,319	1,552	(18)	1,534	585	(429)	156	10,464	(455)	10,009
Commercial real estate	14,669	(18)	14,651	2,110	(33)	2,077	293	(102)	191	17,072	(153)	16,919
Mining and quarrying	6,143	(8)	6,135	1,067	(12)	1,055	320	(232)	88	7,530	(252)	7,278
Consumer durables	6,384	(5)	6,379	1,095	(15)	1,080	651	(443)	208	8,130	(463)	7,667
Construction	3,087	(5)	3,082	333	(8)	325	774	(607)	167	4,194	(620)	3,574
Trading companies & distributors	1,202	(1)	1,201	1,928	(1)	1,927	307	(218)	89	3,437	(220)	3,217
Government	14,698	(1)	14,697	702	(3)	699	–	–	–	15,400	(4)	15,396
Other	4,847	(8)	4,839	561	(10)	551	261	(218)	43	5,669	(236)	5,433
Retail Products:												
Mortgage	75,792	(10)	75,782	2,278	(12)	2,266	406	(123)	283	78,476	(145)	78,331
CCPL and other unsecured lending	16,834	(268)	16,566	620	(158)	462	404	(209)	195	17,858	(635)	17,223
Auto	570	(1)	569	2	–	2	1	–	1	573	(1)	572
Secured wealth products	19,895	(19)	19,876	336	(3)	333	354	(161)	193	20,585	(183)	20,402
Other	4,520	–	4,520	44	(1)	43	45	(27)	18	4,609	(28)	4,581
Total value (customers)[1]	246,149	(402)	245,747	20,759	(377)	20,382	7,398	(5,004)	2,394	274,306	(5,783)	268,523

1 Includes reverse repurchase agreements and other similar secured lending held at amortised cost of $1,469 million

	2018											
	Stage 1			Stage 2			Stage 3[2]			Total		
Amortised cost	Gross balance $million	Total credit impairment $million	Net carrying amount $million	Gross balance $million	Total credit impairment $million	Net carrying amount $million	Gross balance $million	Total credit impairment $million	Net carrying amount $million	Gross balance $million	Total credit impairment $million	Net carrying amount $million
Industry:												
Energy	14,530	(18)	14,512	2,198	(46)	2,152	1,052	(716)	336	17,780	(780)	17,000
Manufacturing	21,627	(23)	21,604	1,932	(86)	1,846	891	(702)	189	24,450	(811)	23,639
Financing, insurance and non-banking	20,419	(7)	20,412	379	(10)	369	288	(182)	106	21,086	(199)	20,887
Transport, telecom and utilities	12,977	(21)	12,956	2,495	(25)	2,470	978	(634)	344	16,450	(680)	15,770
Food and household products	7,558	(7)	7,551	1,851	(15)	1,836	865	(523)	342	10,274	(545)	9,729
Commercial real estate	13,516	(16)	13,500	1,299	(27)	1,272	363	(100)	263	15,178	(143)	15,035
Mining and quarrying	4,845	(7)	4,838	1,047	(29)	1,018	616	(486)	130	6,508	(522)	5,986
Consumer durables	7,328	(5)	7,323	906	(13)	893	656	(470)	186	8,890	(488)	8,402
Construction	2,565	(4)	2,561	512	(22)	490	884	(633)	251	3,961	(659)	3,302
Trading companies & distributors	2,512	(2)	2,510	385	(2)	383	444	(330)	114	3,341	(334)	3,007
Government	13,488	(1)	13,487	250	–	250	–	–	–	13,738	(1)	13,737
Other	4,639	(7)	4,632	552	(8)	544	287	(251)	36	5,478	(266)	5,212
Retail Products:												
Mortgage	73,437	(9)	73,428	1,936	(9)	1,927	343	(98)	245	75,716	(116)	75,600
CCPL and other unsecured lending	16,622	(277)	16,345	560	(117)	443	437	(263)	174	17,619	(657)	16,962
Auto	670	(2)	668	4	–	4	1	–	1	675	(2)	673
Secured wealth products	17,074	(18)	17,056	825	(5)	820	299	(175)	124	18,198	(198)	18,000
Other	3,296	(2)	3,294	297	(2)	295	50	(23)	27	3,643	(27)	3,616
Total value (customers)[1]	237,103	(426)	236,677	17,428	(416)	17,012	8,454	(5,586)	2,868	262,985	(6,428)	256,557

1 Includes reverse repurchase agreements and other similar secured lending held at amortised cost of $3,151 million

2 Stage 3 balances have been restated to reflect interest due but unpaid together with equivalent credit impairment charges

Industry and Retail Products analysis of loans and advances by geographic region (unaudited)

This section provides an analysis of the Group's amortised cost loan portfolio, net of provisions, by industry and region.

In the Corporate & Institutional Banking and Commercial Banking segments our largest industry exposure remains manufacturing, which constitutes 16 per cent of Corporate & Institutional Banking and Commercial Banking loans and advances to customers (31 December 2018: 17 per cent). The manufacturing sector group is spread across a diverse range of industries, including automobiles and components, capital goods, pharmaceuticals, biotech and life sciences, technology hardware and equipment, chemicals, paper products and packaging, with lending spread over 4,561 clients.

The financing, insurance and non-banking industry group constitutes 15 per cent of Corporate & Institutional Banking and Commercial Banking loans and advances to customers. Clients are mostly investment grade institutions and this lending forms part of the liquidity management of the Group.

Loans and advances to the energy sector reduced to 10 per cent of total loans and advances to Corporate & Institutional Banking and Commercial Banking from 12 per cent in 2018. The energy sector lending is spread across five sub-sectors and over 364 clients.

The Group provides loans to commercial real estate counterparties of $16.9 billion, which represents 6 per cent of total customer loans and advances. In total, $8.5 billion of this lending is to counterparties where the source of repayment is substantially derived from rental or sale of real estate and is secured by real estate collateral. The remaining commercial real estate loans comprise working capital loans to real estate corporates, loans with non-property collateral, unsecured loans and loans to real estate entities of diversified conglomerates. The average LTV ratio of the commercial real estate portfolio has increased to 46 per cent, compared with 43 per cent in 2018. The proportion of loans with LTV greater than 80 per cent has remained at less than 1 per cent during the same period.

The Mortgage portfolio continues to be the largest portion of the Retail Products portfolio, at 65 per cent. Credit cards and personal loans (CCPL) and other unsecured lending is broadly stable at 14 per cent of total Retail Products loans and advances.

Amortised cost	Greater China & North Asia $million	ASEAN & South Asia $million	Africa & Middle East $million	Europe & Americas $million	Total $million
			2019		
Industry:					
Energy	**2,582**	**3,769**	**2,946**	**5,589**	**14,886**
Manufacturing	**11,350**	**6,127**	**3,211**	**3,141**	**23,829**
Financing, insurance and non-banking	**9,367**	**4,314**	**988**	**7,582**	**22,251**
Transport, telecom and utilities	**6,279**	**4,014**	**5,349**	**1,313**	**16,955**
Food and household products	**2,784**	**3,651**	**2,478**	**1,096**	**10,009**
Commercial real estate	**9,820**	**4,954**	**1,783**	**362**	**16,919**
Mining and quarrying	**2,151**	**2,469**	**965**	**1,693**	**7,278**
Consumer durables	**4,516**	**2,019**	**699**	**433**	**7,667**
Construction	**1,094**	**1,220**	**1,126**	**134**	**3,574**
Trading companies and distributors	**2,602**	**296**	**198**	**121**	**3,217**
Government	**1,490**	**9,907**	**3,926**	**73**	**15,396**
Other	**1,761**	**1,870**	**836**	**966**	**5,433**
Retail Products:					
Mortgages	**55,724**	**18,301**	**2,047**	**2,259**	**78,331**
CCPL and other unsecured lending	**10,633**	**4,239**	**2,258**	**93**	**17,223**
Auto	**–**	**485**	**87**	**–**	**572**
Secured wealth products	**8,159**	**10,473**	**338**	**1,432**	**20,402**
Other	**3,754**	**121**	**705**	**1**	**4,581**
Net loans and advances to customers	**134,066**	**78,229**	**29,940**	**26,288**	**268,523**
Net loans and advances to banks	**19,313**	**15,756**	**5,350**	**13,130**	**53,549**

Amortised cost	Greater China & North Asia $million	ASEAN & South Asia $million	Africa & Middle East $million	Europe & Americas $million	Total $million
			2018		
Industry:					
Energy	2,778	5,279	2,793	6,150	17,000
Manufacturing	10,531	6,298	3,209	3,601	23,639
Financing, insurance and non-banking	8,657	4,653	915	6,662	20,887
Transport, telecom and utilities	5,712	4,177	4,703	1,178	15,770
Food and household products	1,945	4,011	2,798	975	9,729
Commercial real estate	8,148	4,865	1,854	168	15,035
Mining and quarrying	1,683	2,283	1,088	932	5,986
Consumer durables	4,892	2,255	731	524	8,402
Construction	831	1,094	1,225	152	3,302
Trading companies and distributors	1,976	624	391	16	3,007
Government	1,726	8,815	3,113	83	13,737
Other	1,686	1,899	803	824	5,212
Retail Products:					
Mortgages	52,434	19,156	2,126	1,884	75,600
CCPL and other unsecured lending	10,269	4,234	2,459	–	16,962
Auto	–	522	150	1	673
Secured wealth products	6,912	9,055	310	1,723	18,000
Other	2,616	320	679	1	3,616
Net loans and advances to customers	122,796	79,540	29,347	24,874	256,557
Net loans and advances to banks	27,858	11,676	5,573	16,307	61,414

Debt securities and other eligible bills

This section provides further detail on gross debt securities and treasury bills.

Amortised cost and FVOCI	2019 Debt securities and other eligible bills $million	2018 Debt securities and other eligible bills $million
12-month expected credit losses (stage 1)	**138,782**	118,713
AAA	**63,799**	55,205
AA– to AA+	**36,840**	35,685
A– to A+	**19,625**	13,803
BBB– to BBB+	**9,466**	9,639
Lower than BBB-	**973**	30
Unrated	**8,079**	4,351
Lifetime expected credit losses (stage 2)	**4,644**	6,909
AAA	**248**	156
AA– to AA+	**41**	115
A– to A+	**–**	54
BBB– to BBB+	**3,909**	5,486
Lower than BBB-	**241**	292
Unrated	**205**	806
Credit-impaired financial assets (stage 3)	**75**	498
Lower than BBB-	**–**	–
Unrated[1]	**75**	498
Gross balance	**143,501**	126,120

1 2018 stage 3 balance has been restated to reflect interest due but unpaid

The standard credit ratings used by the Group are those used by Standard & Poor's or its equivalent. Debt securities held that have a short-term rating are reported against the long-term rating of the issuer. For securities that are unrated, the Group applies an internal credit rating, as described under the credit rating and measurement section (page 213).

In line with the balance sheet growth, the Group strengthened its liquidity portfolio by deploying excess liquidity into highly rated securities. This is observed in the increased holdings of debt securities in the AAA rating category during the year by $8.7 billion to $64.0 billion. Increase in holdings of debt securities rated A– to A+ under stage 1 of $5.8 billion is mainly due to investing excess liquidity into securities that meet regulatory liquidity requirement and at the same time offering higher yield than Treasury bills. Increase in stage 1 unrated debt securities of $3.7 billion comprised mainly of corporate and government agency bonds.

IFRS 9 methodology

Approach for determining expected credit losses

Credit loss terminology

Component	Definition
Probability of default (PD)	The probability that a counterparty will default, over the next 12 months from the reporting date (stage 1) or over the lifetime of the product (stage 2) incorporating the impact of forward-looking economic assumptions that have an effect on Credit risk, such as interest rates, unemployment rates and GDP forecasts. The PD estimates will fluctuate in line with the economic cycle. The lifetime (or term structure) PDs are based on statistical models, calibrated using historical data and adjusted to incorporate forward-looking economic assumptions.
Loss given default (LGD)	The loss that is expected to arise on default, incorporating the impact of forward-looking economic assumptions where relevant, which represents the difference between the contractual cash flows due and those that the bank expects to receive. The Group estimates LGD based on the history of recovery rates and considers the recovery of any collateral that is integral to the financial asset, taking into account forward-looking economic assumptions where relevant.
Exposure at default (EAD)	The expected balance sheet exposure at the time of default, taking into account expected changes over the lifetime of the exposure. This incorporates the impact of drawdowns of committed facilities, repayments of principal and interest, amortisation and prepayments.

To determine the expected credit loss, these components are multiplied together (PD for the reference period (up to 12 months or lifetime) x LGD x EAD and discounted to the balance sheet date using the effective interest rate as the discount rate.

IFRS 9 expected credit loss models have been developed for the Corporate & Institutional Banking and Commercial Banking businesses on a global basis, in line with their respective portfolios. However, for some of the key countries, country-specific models have also been developed.

The calibration of forward-looking information is assessed at a country or region level to take into account local macroeconomic conditions.

Retail Banking expected credit loss models are country and product specific given the local nature of the Retail Banking business.

For less material Retail Banking portfolios, the Group has adopted less sophisticated approaches based on historical roll rates or loss rates:

- For medium-sized Retail Banking portfolios, a roll rate model is applied, which uses a matrix that gives average loan migration rate between delinquency states from period to period. A matrix multiplication is then performed to generate the final PDs by delinquency bucket over different time horizons
- For smaller Retail Banking portfolios, loss rate models are applied. These use an adjusted gross charge-off rate, developed using monthly write-off and recoveries over the preceding 12 months and total outstanding balances
- While these models do not incorporate forward looking information, to the extent that there are significant changes in the macroeconomic forecasts an assessment will be completed on whether an adjustment to the model output is required

For a limited number of exposures, proxy parameters or approaches are used where the data is not available to calculate the origination PDs for the purpose of applying the SICR criteria; or for some retail portfolios where a full history of LGD data is not available estimates based on the loss experience from similar portfolios are used. The use of proxies is monitored and will reduce over time.

The following processes are in place to assess the ongoing performance of the models:

- Quarterly model monitoring that uses recent data to compare the differences between model predictions and actual outcomes against approved thresholds
- Annual independent validations of the performance of material models by Group Model Validation (GMV); an abridged validation is completed for non-material models

Where a model's performance breaches the monitoring thresholds or validation standards then an assessment of whether an ECL Post Model Adjustment (PMA) is required to correct for the identified model issue is completed. For the year end reporting, PMAs have been applied for seven models out of the 181 in total. In aggregate the PMAs decrease the Group's impairment provisions by $13 million (0.2 per cent).

Application of lifetime

Expected credit loss is estimated based on the period over which the Group is exposed to Credit risk. For the majority of exposures this equates to the maximum contractual period. For Retail Banking credit cards and Corporate & Institutional Banking overdraft facilities however, the Group does not typically enforce the contractual period, which can be as short as one day. As a result, the period over which the Group is exposed to Credit risk for these instruments reflects their behavioural life, which incorporates expectations of customer behaviour and the extent to which credit risk management actions curtails the period of that exposure. During the year, the Group revised the approach to determining behavioural life for credit cards, assessing at an individual card rather than customer level. This has resulted in an average life of between 2 and 6 years across our footprint markets (2018: 3 to 10 years). The change in approach did not have a material impact on the 2019 income statement. Corporate overdraft facilities have a 32 month lifetime (2018: 32 months).

Key assumptions and judgements in determining expected credit loss

Incorporation of forward-looking information

The evolving economic environment is a key determinant of the ability of a bank's clients to meet their obligations as they fall due. It is a fundamental principle of IFRS 9 that the provisions banks hold against potential future Credit risk losses should depend not just on the health of the economy today, but should also take into account potential changes to the economic environment. For example, if a bank was to anticipate a sharp slowdown in the world economy over the coming year, it should hold more provisions today to absorb the credit losses likely to occur in the near future.

To capture the effect of changes to the economic environment, the PDs and LGDs used to calculate expected credit loss, incorporate forward-looking information in the form of forecasts of the values of economic variables and asset prices that are likely to have an effect on the repayment ability of the Group's clients.

The 'Base Forecast' of the economic variables and asset prices is based on management's view on the five-year outlook, supported by projections from the Group's in-house research team and outputs from a third-party model that project specific economic variables and asset prices. The research team takes consensus views into consideration and senior management review projections for some core country variables against consensus when forming their view of the outlook. For the period beyond five years, management utilises the inhouse research view and outputs and third party model outputs which allow for a reversion to long-term growth rates or norms. All projections are updated on a quarterly basis.

Forecast of key macroeconomic variables underlying the expected credit loss calculation and the impact on non-linearity

The Base Forecast – management's view of the most likely outcome – is that the expansion of the global economy will continue, characterised by soft but stabilising growth in the near term. There are some major challenges to the outlook for some of the Bank's key markets such as Hong Kong and China. The recent interest rate cuts by a number of prominent central banks, US-China trade deal and fiscal stimulus measures in key markets, such as China and India, will counter some of the headwinds to global growth including from structural drags such as debt overhang, ageing populations and anti-globalisation sentiment.

Economies are expected to reach their long-term – or potential – growth levels within the next three to five years, as the effect of current economic shocks dissipate. Countries which are going through a phase of structural transition are likely to experience a fall in their actual and potential growth at the same time. For example, China's rebalancing towards consumption and more sustainable growth is expected to slow its trend growth to around 5 per cent by the end of the decade. It will therefore take China longer to settle to a stabilised growth rate.

While the quarterly base forecasts informs the Group's strategic plan, one of the key requirements of IFRS 9 is that the assessment of provisions should consider multiple future economic environments. For example, the global economy may grow more quickly or more slowly than the Base Forecast, and these variations would have different implications for the provisions that the Group should hold today. As the negative impact of an economic downturn on credit losses tends to be greater than the positive impact of an economic upturn, if the Group sets provisions only on the expected credit loss under the Base Forecast it might maintain a level of provisions that does not appropriately capture the range of potential outcomes. To address this skewness (or non-linearity) in expected credit losses, IFRS 9 requires the ECL to be the probability-weighted ECL outcome calculated for a range of possible outcomes.

To assess the range of possible outcomes, the Group simulates a set of 50 scenarios around the Base Forecast and calculates the expected credit loss under each of them and assigns an equal weight of 2 per cent to each of the scenario outcomes. These scenarios are generated by a Monte Carlo simulation, which considers the degree of uncertainty (or volatility) around economic outcomes and how these outcomes have tended to move in relation to one another (or correlation). The use of Monte Carlo simulation is motivated by the number and spread of countries in which the Group operates.

This implies that the number of countries' macroeconomic variables to forecast is large, but more importantly the observation that a downturn in one part of the world is never perfectly synchronised with downturns everywhere else means that the Group may be challenged to capture a full range of scenarios with a handful of manually tuned scenarios.

While the 50 scenarios do not each have a specific narrative, they reflect a range of plausible hypothetical alternative outcomes for the global economy. Some imply an unwinding of the current shocks and uncertainty leading to higher global economic activity and higher asset prices, while others represent an intensification of current shocks or introduction of new shocks that raise uncertainty, leading to lower global economic activity and lower asset prices.

The table on the next page provides a summary of the Group's Base Forecast for key footprint markets, alongside the corresponding range seen across the multiple scenarios. To inform on the range within the Base Forecasts, the peak/trough amounts in the table show the highest and lowest points within the Base Forecast and the GDP graphs illustrate the shape of Base Forecast in relation to prior periods actuals and the long-term growth rates.

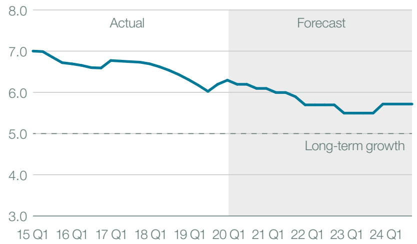
Since the start of the year global trade tensions between the US and China have affected investment sentiment and export performance across Asia. Growth in China and trade dependent countries such as Singapore and Korea have softened. While a US-China trade deal is expected to reduce the drag from the trade dispute the recent softening is reflected in the five-year average GDP growth for all three falling marginally compared to last year. Hong Kong has fallen into a recession and there has been a material downgrade in the near-term outlook. Beyond the impact of trade tensions and China slowdown, the social unrest and subsequent disruption have triggered the largest economic contraction since 2009. The current pressures on the Hong Kong economy are not expected to dissipate soon and average five year GDP growth has been reduced to 1.6 per cent from 3 per cent last year. India's economic growth has also been surprisingly weak: GDP growth fell to the slowest pace in more than six years in Q1-FY20 (April to June 2019). Weaker trade, weaker credit demand by non-bank finance companies, and significant weakness in household consumption have weighed on economic activity. However, stimulus measures by India's central bank and the government is expected to help growth pick up to close to its long-term level during 2021.

Slowing growth, lower-than-expected inflation and rising downside risks have caused central banks around the world to adopt an increasingly accommodative monetary policy stance. This is reflected by lower average interest rates across the five countries compared with a year ago.

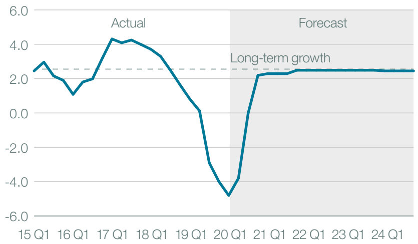
There were material revisions to the base forecast for oil prices since last year. At the end of last year oil prices were expected to average around US$85/barrel over the medium term, but by the end of 2019 that projection had been revised down to around US$71. Oil prices have been weaker than expected during the year and this is reflected in the revised projections. Trade tensions between the US and China and weakness in oil demand concentrated in the OECD have weighed on prices in 2019.

After the close of the 2019 accounts, the novel coronavirus (Covid-19) outbreak in January 2020 has increased risk aversion and uncertainty. The outbreak will likely lead to a weaker outlook for at least the Group's Asian markets in 2020.

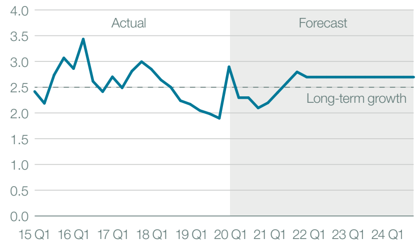
China GDP YoY%



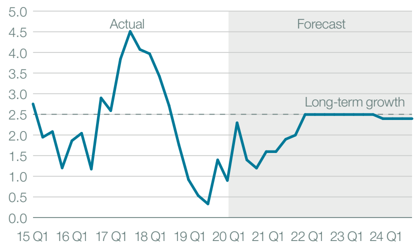
Hong Kong GDP YoY%



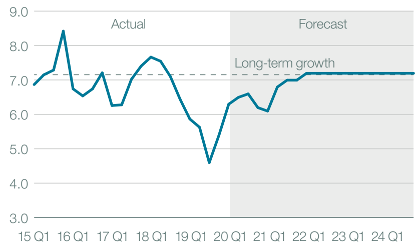
Korea GDP YoY%



Singapore GDP YoY%



India GDP YoY%



2019

	China				Hong Kong				Korea				Singapore				India			
	5 yr average base forecast	Base forecast peak/ trough	Low[2]	High[3]	5 yr average base forecast	Base forecast peak/ trough	Low[2]	High[3]	5 yr average base forecast	Base forecast peak/ trough	Low[2]	High[3]	5 yr average base forecast	Base forecast peak/ trough	Low[2]	High[3]	5 yr average base forecast	Base forecast peak/ trough	Low[2]	High[3]
GDP growth (YoY%)	**5.8**	**6.3/5.5**	**4.4**	**7.4**	**1.6**	**2.5/(4.8)**	**(2.7)[4]**	**4.4**	**2.6**	**2.9/2.1**	**0.6**	**4.8**	**2.1**	**2.5/0.9**	**(1.4)**	**5.9**	**6.9**	**7.2/6.1**	**5.0**	**9.0**
Unemployment (%)	**3.6**	**3.6/3.6**	**3.6**	**3.7**	**3.5**	**3.6/3.1**	**2.7**	**4.3**	**3.6**	**4.0/3.2**	**3.0**	**4.2**	**3.0**	**3.2/3.0**	**2.3**	**3.8**	**N/A**	**N/A**	**N/A**	**N/A**
3 month interest rates (%)	**2.6**	**2.8/2.3**	**1.8**	**3.6**	**2.4**	**3.5/1.2**	**0.9**	**4.3**	**1.7**	**2.5/1.2**	**0.8**	**2.9**	**2.0**	**2.9/1.3**	**1.1**	**3.1**	**5.2**	**5.6/4.8**	**4.3**	**6.1**
House prices (YoY%)	**6.3**	**7.6/4.2**	**4.2**	**8.3**	**3.6**	**5.7/(5.1)**	**(6.5)**	**14.6**	**2.6**	**2.8/0.7**	**0.5**	**4.8**	**3.4**	**4.4/0.4**	**(2.7)**	**9.7**	**7.8**	**8.1/6.9**	**2.4**	**13.2**

2018

	China				Hong Kong				Korea				Singapore				India			
	5 yr average base forecast	Base forecast peak/ trough	Low[2]	High[3]	5 yr average base forecast	Base forecast peak/ trough	Low[2]	High[3]	5 yr average base forecast	Base forecast peak/ trough	Low[2]	High[3]	5 yr average base forecast	Base forecast peak/ trough	Low[2]	High[3]	5 yr average base forecast	Base forecast peak/ trough	Low[2]	High[3]
GDP growth (YoY%)	6.0	6.6/5.7	4.3	7.7	3.0	3.0/3.0	0.6	5.6	2.9	3.0/2.4	0.4	5.3	2.4	2.7/2.2	(1.7)	6.4	7.7	8.0/6.7	5.6	10.1
Unemployment (%)	4.0	4.0/3.9	3.8	4.2	3.4	3.6/2.9	2.4	4.6	3.2	3.5/3.0	2.4	4.0	3.0	3.0/2.9	2.3	3.7	N/A	N/A	N/A	N/A
3 month interest rates (%)	3.1	3.2/2.9	2.0	4.3	3.0	3.4/2.8	1.8	4.2	2.6	3.0/1.9	1.4	4.0	2.4	2.4/2.0	1.3	3.8	6.9	7.3/6.4	5.1	8.9
House prices (YoY%)	5.8	7.2/3.8	3.4	8.5	2.3	9.8/(2.7)	(8.1)	12.1	3.5	4.0/1.8	1.3	6.1	4.4	6.4/3.8	(1.5)	10.6	8.4	8.8/7.9	1.4	15.1

	2019				2018			
	5 yr average base forecast	**Base forecast peak/trough**	**Low[2]**	**High[3]**	5 yr average base forecast	Base forecast peak/trough	Low[2]	High[3]
Crude price Brent, $ pb	**71**	**76/66**	**42**	**102**	85	91/76	40	118

1 N/A - not available

2 Represents the 10th percentile in the range used to determine non-linearity

3 Represents the 90th percentile in the range used to determine non-linearity

4 This value is higher than the trough in the base forecast because it is measured over the five-year range.

The final probability weighted expected credit loss reported by the Group is a simple average of the expected credit loss for each of the 50 scenarios together with the expected credit loss from the base forecast. The impact of non-linearity on expected credit loss is set out in the table below:

	Including non-linearity $million	Base forecast $million	Difference %
Total expected credit loss[1]	1,108[1]	1,079	2.7

1 Total modelled expected credit loss comprises stage 1 and stage 2 balances of $975 million and $133 million of modelled expected credit loss on stage 3 loans

The average expected credit loss under multiple scenarios is 2.7 per cent higher than the expected credit loss calculated using only the most likely scenario (the Base Forecast). Portfolios that are more sensitive to non-linearity include those with greater leverage and/or a longer tenor, such as Project and Shipping Finance and credit card portfolios. Other portfolios display minimal non-linearity owing to limited responsiveness to macroeconomic impacts for structural reasons such as significant collateralisation as with the Retail Banking mortgage portfolios.

Hong Kong

A combination of the social unrest, escalating US-China trade tensions and China's slowing economy has led to an economic recession in Hong Kong. Macroeconomic forecasts in Hong Kong were downgraded in the second half of 2019, which contributed to a $46 million increase in ECL provisions in Hong Kong have over the same period.

As one of the key drivers for the Hong Kong recession is the social unrest, there is more uncertainty in the economic forecasts as it is challenging to forecast the economic impact of possible resolutions to the social unrest. Therefore the downside risk of an economically damaging resolution may not have been fully captured in the non-linearity calculated for our Hong Kong exposures. While the Monte Carlo approach equally weights all scenarios, given the increased uncertainties in Hong Kong, we have increased the weighting placed on a Hong Kong specific downside scenario.

Stage 3

Credit-impaired assets managed by GSAM incorporate forward-looking economic assumptions in respect of the recovery outcomes identified and are assigned individual probability weightings. These assumptions are not based on a Monte Carlo simulation but are informed by the Base Forecast.

Sensitivity of expected credit loss calculation to macroeconomic variables

The expected credit loss calculation relies on multiple variables and is inherently non-linear and portfolio-dependent, which implies that no single analysis can fully demonstrate the sensitivity of the expected credit loss to changes in the macroeconomic variables. The Group has conducted a series of analyses with the aim of identifying the macroeconomic variables which might have the greatest impact on overall expected credit loss. These encompassed single variable and multi-variable exercises, using simple up/down variation and extracts from actual calculation data, as well as bespoke scenario design and assessments.

The primary conclusion of these exercises is that no individual macroeconomic variable is materially influential – that is, likely to result in an impact of at least 1 per cent of the Group's expected credit loss. The Group believes this is plausible as the number of variables used in the expected credit loss calculation is large. This does not mean that macroeconomic variables are uninfluential; rather, that the Group believes that consideration of macroeconomics should involve whole scenarios, as this aligns with the multi-variable nature of the calculation.

As the Group has Emerging Risks related to the macroeconomic outlook, a sensitivity analysis of ECL was undertaken to explore the effect of these: an extended trade war that leads to a China slowdown with spillovers to emerging markets. Two variants of the scenario were run – one with moderate escalation of trade disputes and the other more extreme. Both scenarios are characterised by current trade policy tensions between the US and China increasing dramatically. The US targets trading partners with which it has a material trade deficit and pushes through highly protectionist measures, initiating trade tensions with Asia focused on China. Indirectly, economies reliant on global trade flows are vulnerable to the trade shock. The escalating trade war creates uncertainty which reduces risk appetite, leading to a sharp decline in asset prices and lower consumption and investment across developed and emerging markets. This leads to a global downturn and a sharp fall in commodity prices. As an indication, in the more extreme version of the scenario the average growth for China annual real GDP growth over the next five years fall to 3 per cent, which is almost half the growth in the equivalent for the base projection of around 5.8 per cent. US GDP falls from just below 2 per cent down five-year average to 0.8 per cent, crude oil prices fall, and residential property indices in China and Hong Kong dip negative.

	Moderate downside		Extreme downside	
	Five year average	Peak/Trough	Five year average	Peak/Trough
China GDP	4.9%	5.6% / 3.4%	3.0%	5.3% / (2.0)%
China unemployment	4.4%	4.5% / 3.9%	5.9%	6.2% / 4.6%
China property prices	0.0%	7.1% / (7.0)%	(12.5)%	6.2% / (29.4)%
Hong Kong GDP	0.7%	2.3% / (5.5)%	(1.4)%	1.9% / (10.3)%
Hong Kong unemployment	4.3%	4.8% / 3.4%	5.9%	7.7 / 3.9%
Hong Kong property prices	0.1%	7.0% / (13.2)%	(8.1)%	18.4% / (34.8)%
US GDP	1.4%	1.8% / 0.2%	0.8%	1.9% / (2.6)%
Crude oil	$59	$71 / $51	$35	$60 / $22

Modelled expected credit loss provisions would be approximately $401 million (2018: $362 million) higher than the reported base case expected credit loss provision (excluding the impact of non-linearity) under the moderate scenario and $2.9 billion higher under the extreme scenario. The proportion of stage 2 assets would increase from 6 per cent to 8 per cent and 14 per cent under the two scenarios. This includes the impact of exposures transferring to stage 2 from stage 1 but does not consider an increase in stage 3 defaults. There was no material change in modelled stage 3 provisions as these primarily relate to unsecured Retail Banking exposures for which the LGD is not sensitive to changes in the macroeconomic forecasts. Under moderate and extreme scenarios the majority of the increase was in Corporate & Institutional Banking and Commercial Banking with the main corporate portfolios in China, Hong Kong and Singapore impacted. Around 20 per cent of the increase was in Retail Banking, with the main portfolios impacted being the Group's credit card portfolios in Hong Kong and Singapore. Note that the actual outcome of any scenario may be materially different due to, amongst other factors, the effect of management actions to mitigate potential increases in risk and changes in the underlying portfolio.

Modelled provisions

	Moderate downside increase $m	Extreme downside increase $m
Corporate & Institutional Banking	252	1,786
Retail Banking	84	503
Commercial Banking	53	348
Private Banking	8	255
Central & other items	4	16
Total	401	2,908

Proportion of assets in stage 2[1]

	Base Forecast %	Moderate downside scenario %	Extreme downside scenario %
Corporate & Institutional Banking	7.7%	12.0%	20.6%
Retail Banking	3.6%	3.8%	12.5%
Commercial Banking	15.0%	25.1%	41.8%
Private Banking	0.1%	0.1%	0.1%
Central & other items	3.2%	3.2%	3.2%
Total	**5.9%**	**8.0%**	**13.9%**

1 Excludes cash and balances at central banks, accrued income, assets held for sale and other assets

Significant increase in credit risk (SICR)

Quantitative criteria

SICR is assessed by comparing the risk of default at the reporting date with the risk of default at origination. Whether a change in the risk of default is significant or not is assessed using quantitative and qualitative criteria. These quantitative significant deterioration thresholds have been separately defined for each business and where meaningful are consistently applied across business lines.

Assets are considered to have experienced SICR if they have breached both relative and absolute thresholds for the change in the average annualised lifetime probability of default over the residual term of the exposure.

The absolute measure of increase in Credit risk is used to capture instances where the PDs on exposures are relatively low at initial recognition as these may increase by several multiples without representing a significant increase in Credit risk. Where PDs are relatively high at initial recognition, a relative measure is more appropriate in assessing whether there is a significant increase in Credit risk, as the PDs increase more quickly.

The SICR thresholds have been calibrated based on the following principles:

- Stability – The thresholds are set to achieve a stable stage 2 population at a portfolio level, trying to minimise the number of accounts moving back and forth between stage 1 and stage 2 in a short period of time
- Accuracy – The thresholds are set such that there is a materially higher propensity for stage 2 exposures to eventually default than is the case for stage 1 exposures
- Dependency from backstops – The thresholds are stringent enough such that a high proportion of accounts transfer to stage 2 due to movements in forward-looking PD rather than relying on backward-looking backstops such as arrears
- Relationship with business and product risk profiles – The thresholds reflect the relative risk differences between different products, and are aligned to business processes

For Corporate & Institutional Banking and Commercial Banking clients, the relative threshold is a 100 per cent increase in PD and the absolute change in PD is between 50 and 100 bps.

For Retail Banking clients, the relative threshold is a 100 per cent increase in PD and the absolute change in PD is between 100 and 350 bps depending on the product. Certain counties have a higher absolute threshold reflecting the lower default rate within their personal loan portfolios compared with the Group's other personal loan portfolios.

Private Banking clients are assessed qualitatively, based on a delinquency measure relating to collateral top-ups or sell-downs.

Debt securities originated before 1 January 2018 with an internal credit rating mapped to an investment grade equivalent are allocated to stage 1 and all other debt securities to stage 2. Debt securities originated after 1 January 2018 apply the same approach and thresholds as for Corporate & Institutional Banking and Commercial Banking clients.

Qualitative criteria

Qualitative factors that indicate that there has been a significant increase in Credit risk include processes linked to current risk management, such as placing loans on non-purely precautionary Early Alert.

Backstop

Across all portfolios, accounts that are 30 or more days past due (DPD) on contractual payments of principal and/or interest that have not been captured by the criteria above are considered to have experienced a significant increase in Credit risk.

Expert credit judgement may be applied in assessing significant increase in Credit risk to the extent that certain risks may not have been captured by the models or through the above criteria. Such instances are expected to be rare, for example due to events and material uncertainties arising close to the reporting date.

Corporate & Institutional Banking and Commercial Banking clients

Quantitative criteria

Exposures are assessed based on both the absolute and the relative movement in the PD from origination to the reporting date as described above.

To account for the fact that the mapping between internal credit grades (used in the origination process) and PDs is non-linear (e.g. a one-notch downgrade in the investment grade universe results in a much smaller PD increase than in the sub-investment grade universe), the absolute thresholds have been differentiated by credit quality at origination, as measured by internal credit grades being investment grade or sub-investment grade.

Qualitative criteria

All assets of clients that have been placed on Early Alert (for non-purely precautionary reasons) are deemed to have experienced a significant increase in Credit risk.

An account is placed on non-purely precautionary Early Alert if it exhibits risk or potential weaknesses of a material nature requiring closer monitoring, supervision or attention by management. Weaknesses in such a borrower's account, if left uncorrected, could result in deterioration of repayment prospects and the likelihood of being downgraded. Indicators could include a rapid erosion of position within the industry, concerns over management's ability to manage operations, weak/deteriorating operating results, liquidity strain and overdue balances among other factors.

All client assets that have been assigned a CG12 rating, equivalent to 'Higher risk', are deemed to have experienced a significant increase in Credit risk. Accounts rated CG12 are managed by the GSAM unit. All Corporate & Institutional Banking and Commercial Banking clients are placed on CG12 when they are 30 DPD unless they are granted a waiver through a strict governance process.

Retail Banking clients

Quantitative criteria

Material portfolios (defined as a combination of country and product, for example Hong Kong mortgages, Taiwan credit cards) for which a statistical model has been built, are assessed based on both the absolute and relative movement in the PD from origination to the reporting date as described previously (page 187). For these portfolios, the original lifetime PD term structure is determined based on the original Application Score or Risk Segment of the client.

Qualitative criteria

Accounts that are 30 DPD that have not been captured by the quantitative criteria are considered to have experienced a significant increase in Credit risk. For less material portfolios, which are modelled based on a roll-rate or loss-rate approach, significant increase in credit risk is primarily assessed through the 30 DPD trigger.

Private Banking clients

For Private Banking clients, significant increase in Credit risk is assessed by referencing the nature and the level of collateral against which credit is extended (known as 'Classes of Risk').

Qualitative criteria

For all Private Banking Classes, in line with risk management practice, an increase in Credit risk is deemed to have occurred where margining or loan-to-value covenants have been breached.

For Class I assets (lending against diversified liquid collateral), if these margining requirements have not been met within 30 days of a trigger, a significant increase in Credit risk is assumed to have occurred.

For Class I and Class III assets (real-estate lending), a significant increase in credit risk is assumed to have occurred where the bank is unable to 'sell down' the applicable assets to meet revised collateral requirements within five days of a trigger.

Class II assets are typically unsecured or partially secured, or secured against illiquid collateral such as shares in private companies. Significant credit deterioration of these assets is deemed to have occurred when any Early Alert trigger has been breached.

Debt Securities

Quantitative criteria

For debt securities originated before 1 January 2018, the bank is utilising the low Credit risk simplified approach, where debt securities with an internal credit rating mapped to an investment grade equivalent are allocated to stage 1 and all other debt securities are allocated to stage 2. Debt securities originated after 1 January 2018 are assessed based on the absolute and relative movements in PD from origination to the reporting date.

Qualitative criteria

Debt securities utilise the same qualitative criteria as the Corporate & Institutional Banking and Commercial Banking client segments, including being placed on Early Alert or being classified as CG12.

Assessment of credit-impaired financial assets

Retail Banking clients

The core components in determining credit-impaired expected credit loss provisions are the value of gross charge off and recoveries. Gross charge off and/or loss provisions are recognised when it is established that the account is unlikely to pay through the normal process. Recovery of unsecured debt post credit impairment is recognised based on actual cash collected, either directly from clients or through the sale of defaulted loans to third-party institutions. Release of credit impairment provisions for secured loans is recognised if the loan outstanding is paid in full (release of full provision), or the provision is higher than the loan outstanding (release of the excess provision).

Corporate & Institutional Banking, Commercial Banking and Private Banking clients

Credit-impaired accounts are managed by the Group's specialist recovery unit, GSAM, which is independent from its main businesses. Where any amount is considered irrecoverable, a stage 3 credit impairment provision is raised. This stage 3 provision is the difference between the loan-carrying amount and the probability-weighted present value of estimated future cash flows, reflecting a range of scenarios (typically the best, worst and most likely recovery outcomes). Where the cash flows include realisable collateral, the values used will incorporate the impact of forward-looking economic information.

The individual circumstances of each client are considered when GSAM estimates future cash flows and timing of future recoveries which involve significant judgement. All available sources, such as cash flow arising from operations, selling assets or subsidiaries, realising collateral or payments under guarantees are considered. In any decision relating to the raising of provisions, the Group attempts to balance economic conditions, local knowledge and experience, and the results of independent asset reviews.

Write-offs

Where it is considered that there is no realistic prospect of recovering a portion of an exposure against which an impairment provision has been raised, that amount will be written off.

Governance and application of expert credit judgement in respect of expected credit losses

The Group's Credit Policy and Standards framework details the requirements for continuous monitoring to identify any changes in credit quality and resultant ratings, as well as ensuring a consistent approach to monitoring, managing and mitigating credit risks. The framework aligns with the governance of ECL estimation through the early recognition of significant deteriorations in ratings which drive stage 2 and 3 ECL.

The models used in determining expected credit losses are reviewed and approved by the Group Credit Model Assessment Committee (CMAC) which is appointed by the Model Risk Committee. CMAC has the responsibility to assess and approve the use of models and to review all IFRS 9 interpretations related to models. CMAC also provides oversight on operational matters related to model development, performance monitoring and model validation activities including standards, regulatory and Group Internal Audit matters.

Prior to submission to CMAC for approval, the models have been validated by Group Model Validation (GMV), a function which is independent of the business and the model developers. GMV's analysis comprises review of model documentation, model design and methodology; data validation; review of model development and calibration process; out-of-sample performance testing; and assessment of compliance review against IFRS 9 rules and internal standards.

A quarterly model monitoring process is in place that uses recent data to compare the differences between model predictions and actual outcomes against approved thresholds. Where a model's performance breaches the monitoring thresholds then an assessment is completed of whether a Post Model Adjustment (PMA) is required to correct for the identified model issues.

Key inputs into the calculation and resulting expected credit loss provisions are subject to review and approval by the IFRS 9 Impairment Committee which is appointed by the Group Risk Committee. The IFRS 9 Impairment Committee consists of senior representatives from Risk, Finance, and Group Economic Research. It meets at least twice every quarter, once before the models are run to approve key inputs into the calculation, and once after the models are run to approve the expected credit loss provisions and any judgemental overrides that may be necessary.

The IFRS 9 Impairment Committee:

- Oversees the appropriateness of all Business Model Assessment and Solely Payments of Principal and Interest tests
- Reviews and approves expected credit loss for financial assets classified as stages 1, 2 and 3 for each financial reporting period
- Reviews and approves stage allocation rules and thresholds
- Approves material adjustments in relation to expected credit loss for fair value through other comprehensive income (FVOCI) and amortised cost financial assets
- Reviews, challenges and approves base macroeconomic forecasts and (the multiple macroeconomic scenarios approach) that are utilised in the forward-looking expected credit loss calculations

The IFRS 9 Impairment Committee is supported by an Expert Panel which reviews and challenges the full extended version of base case projections and multiple macroeconomic scenarios. The Expert Panel consists of members of Enterprise Risk Management (which includes the Scenario Design team), Finance, Group Economic Research and country representatives of major jurisdictions.

PMAs may be applied to account for identified weaknesses in model estimates. The processes for identifying the need for, calculating the level of, and approving PMAs are prescribed in the Credit Risk IFRS 9 ECL Model Family Standards which are approved by CMAC. PMA calculation methodologies are reviewed by GMV and submitted to CMAC as the model approver. As part of the governance framework Model Risk Oversight review that PMAs adhere to the requirements given in the standards. All PMAs have a remediation plan to fix the identified model weakness, and these plans are reported to and tracked at CMAC.

In addition, Risk Event Overlays account for events that are sudden and therefore not captured in the Base Case Forecast or the resulting ECL calculated by the models. All Risk Event Overlays must be approved by the IFRS 9 Impairment Committee (IIC) having considered the nature of the event, why the risk is not captured in the model, and the basis on which the quantum of the overlay has been calculated. Risk Event Overlays are subject to quarterly review and re-approval by the IIC.

Country Risk (unaudited)

During 2019, the Group has expanded its definition of Country Risk beyond a historical focus on Country Cross-Border Risk. The Group now monitors Gross Country Risk (GCR), which is an aggregate of two distinct risk types:

- Transfer and Convertibility Risk (TCR), which is the potential for losses on cross-border or foreign currency obligations arising from the possibility that a government is unable or unwilling to make foreign currency available for remittance out of the country
- Local Currency Risk (LCR), which is the potential for losses on local currency obligations arising from operating in a volatile domestic economic and political environment

The profile of the Group's largest Gross Country Risk exposures as at 31 December 2019 is consistent with its strategic focus on core franchise countries. Changes in the pace of economic activity and portfolio management activity had an impact on the growth of Country Risk exposure for certain markets.

There has been a significant increase in exposure to the US, driven by increased purchases of medium-term domestic government securities and higher lending, especially to domestic financial institutions.

Exposure to Hong Kong increased during the year due to an increase in retail assets as well as increased cross-border lending to corporates. This was balanced by a reduction in short-term domestic government securities.

The overall exposure to South Korea has increased due to growth in the retail portfolio and higher nostros balances. This was partially offset by a reduction in domestic government securities and trade contingents.

Exposure to China decreased slightly due to lower nostros balances along with a reduction in derivative exposure. This was partially offset by increased lending and trade finance activity.

The slight increase in exposure to Singapore is due to increased purchases of short-term domestic government securities. This was partially offset by reduced corporate cross-border exposure.

Domestic and cross-border exposure to the UK grew due to an increase in lending, particularly to corporates, along with an increase in the Private Banking portfolio.

Exposure to India decreased slightly, due to a reduction in cross-border trade finance volumes as well as lower nostros balances. Domestic exposure to non-financial corporates notably increased during the year.

Exposure to the UAE decreased due to a decline in cross-border lending, particularly to non-financial corporates, along with a reduction in the retail portfolio.

The increase in exposure to Japan has been driven by higher purchases of government securities, particularly in off-shore locations, resulting in significant growth of overall cross-border exposure.

Overall exposure to Taiwan reduced during the year due to lower nostros balances and a reduction in domestic government securities, which exceeded incremental growth in lending and the retail portfolio.

The table below, which is based on the Group's internal Country Risk reporting requirements, shows the 10 largest country/market exposures across the Group.

	2019			2018[1]		
	TCR $million	LCR $million	GCR $million	TCR $million	LCR $million	GCR $million
United States	25,966	58,930	84,896	23,757	46,254	70,011
Hong Kong	21,361	63,214	84,575	20,194	61,897	82,091
South Korea	17,809	49,351	67,160	16,663	47,430	64,093
China	36,469	20,977	57,446	37,555	20,717	58,272
Singapore	18,304	34,046	52,350	18,573	32,606	51,179
United Kingdom	27,563	16,782	44,345	25,539	14,992	40,531
India	14,008	20,305	34,313	15,392	19,347	34,739
United Arab Emirates	16,461	6,145	22,606	17,591	6,106	23,697
Japan	9,341	10,393	19,734	4,546	12,312	16,858
Taiwan	2,733	14,827	17,560	2,876	15,292	18,168

1 The 2018 figures have been restated to encompass the change in methodology from reporting Country Cross-Border Risk to Gross Country Risk

Traded Risk

Traded Risk is the potential for loss resulting from activities undertaken by the Group in financial markets. Under the Enterprise Risk Management Framework, the Traded Risk Framework brings together all risk types exhibiting risk features common to Traded Risk.

These risk types include Market Risk, Counterparty Credit Risk, Issuer Risk, XVA, Algorithmic Trading and Pension Risk. Traded Risk Management (TRM) is the core risk management function supporting market-facing businesses, specifically Financial Markets and Treasury Markets.

Market Risk

Market Risk is the potential for loss of economic value due to adverse changes in financial market rates or prices. The Group's exposure to Market Risk arises predominantly from the following sources:

- **Trading book:**
  - The Group provides clients access to financial markets, facilitation of which entails the Group taking moderate Market Risk positions. All trading teams support client activity; there are no proprietary trading teams. Hence, income earned from Market Risk-related activities is primarily driven by the volume of client activity rather than risk-taking.
- **Non-trading book:**
  - The Treasury Markets desk is required to hold a liquid assets buffer, much of which is held in high-quality marketable debt securities
  - The Group has capital invested and related income streams denominated in currencies other than US dollars. To the extent that these are not hedged, the Group is subject to Structural Foreign Exchange Risk which is reflected in reserves

A summary of our current policies and practices regarding Market Risk management is provided in the Principal Risks section (page 212).

The primary categories of Market Risk for the Group are:

- Interest Rate Risk: arising from changes in yield curves, credit spreads and implied volatilities on interest rate options
- Foreign Exchange Rate Risk: arising from changes in currency exchange rates and implied volatilities on foreign exchange options
- Commodity Risk: arising from changes in commodity prices and implied volatilities on commodity options; covering energy, precious metals, base metals and agriculture as well as commodity baskets
- Equity Risk: arising from changes in the prices of equities, equity indices, equity baskets and implied volatilities on related options

Market Risk changes

The average level of total trading and non-trading VaR in 2019 was $30.2 million, 47 per cent higher than in 2018 ($20.6 million). The actual level of total trading and non-trading VaR in 2019 was $34.4 million, 35 per cent higher than in 2018 ($25.5 million). The increase in total average VaR was driven by the non-trading book, which has seen an increase in the bond inventory size in high-quality assets from Treasury Markets business.

For the trading book, the average level of VaR in 2019 was $11 million, 12 per cent higher than in 2018 ($9.8 million). Trading activities have remained relatively unchanged and client-driven.

Daily value at risk (VaR at 97.5%, one day)

	2019				2018			
Trading and non-trading	**Average $million**	**High[1] $million**	**Low[1] $million**	**Actual[2] $million**	Average $million	High[1] $million	Low[1] $million	Actual[2] $million
Interest Rate Risk[3]	**28.9**	**35.2**	**24.1**	**34.2**	19.2	25.9	16.6	25.9
Foreign Exchange Risk	**4.3**	**8.5**	**2.3**	**5.1**	4.4	8.6	2.5	7.7
Commodity Risk	**1.3**	**2.2**	**0.8**	**1.4**	1.3	2.1	0.8	1.2
Equity Risk	**3.5**	**4.6**	**2.5**	**2.5**	4.8	6.8	2.6	2.7
Total[4]	**30.2**	**37.1**	**24.1**	**34.4**	20.6	26.1	16.4	25.5

	2019				2018			
Trading[5]	**Average $million**	**High[1] $million**	**Low[1] $million**	**Actual[2] $million**	Average $million	High[1] $million	Low[1] $million	Actual[2] $million
Interest Rate Risk[3]	**8.0**	**11.8**	**6.3**	**7.0**	8.0	11.7	6.0	7.9
Foreign Exchange Risk	**4.3**	**8.5**	**2.3**	**5.1**	4.4	8.6	2.5	7.7
Commodity Risk	**1.3**	**2.2**	**0.8**	**1.4**	1.3	2.1	0.8	1.2
Equity Risk	**–**	**0.1**	**–**	**–**	0.1	0.1	–	–
Total[4]	**11.0**	**14.0**	**8.8**	**10.0**	9.8	13.8	7.5	13.6

	2019				2018			
Non-trading	**Average $million**	**High[1] $million**	**Low[1] $million**	**Actual[2] $million**	Average $million	High[1] $million	Low[1] $million	Actual[2] $million
Interest Rate Risk[3]	**26.2**	**33.3**	**21.2**	**33.3**	16.8	20.7	14.1	20.7
Equity Risk[6]	**3.5**	**4.6**	**2.5**	**2.5**	4.7	6.8	2.6	2.7
Total[4]	**26.7**	**33.4**	**20.6**	**32.0**	17.2	21.3	15.3	21.3

1 Highest and lowest VaR for each risk factor are independent and usually occur on different days

2 Actual one-day VaR at year-end date

3 Interest Rate Risk VaR includes Credit Spread Risk arising from securities accounted for as fair value through profit or loss (FVTPL) or fair value through other comprehensive income (FVOCI)

4 The total VaR shown in the tables above is not equal to the sum of the component risks due to offsets between them

5 Trading book for Market Risk is defined in accordance with the EU Capital Requirements Regulation (CRD IV/CRR) Part 3 Title I Chapter 3, which restricts the positions permitted in the trading book

6 Non-trading Equity Risk VaR includes only listed equities

The following table sets out how trading and non-trading VaR is distributed across the Group's products:

	2019				2018			
	Average $million	High[1] $million	Low[1] $million	Actual[2] $million	Average $million	High[1] $million	Low[1] $million	Actual[2] $million
Trading and non-trading	**30.2**	**37.1**	**24.1**	**34.4**	20.6	26.1	16.4	25.5
Trading[4]								
Rates	**5.4**	**7.6**	**4.0**	**5.1**	5.0	7.1	3.8	5.8
Global Foreign Exchange	**4.3**	**8.5**	**2.3**	**5.1**	4.4	8.6	2.5	7.7
Credit Trading & Capital Markets	**4.2**	**7.9**	**1.9**	**4.6**	3.8	6.1	1.8	2.9
Commodities	**1.3**	**2.2**	**0.8**	**1.4**	1.3	2.1	0.8	1.2
Equities	**–**	**0.1**	**–**	**–**	0.1	0.1	–	–
XVA	**4.0**	**6.8**	**1.8**	**2.8**	3.1	4.1	2.3	3.5
Total[3]	**11.0**	**14.0**	**8.8**	**10.0**	9.8	13.8	7.5	13.6
Non-trading								
Treasury Markets	**26.2**	**33.3**	**21.2**	**33.3**	16.8	20.7	14.1	20.7
Listed private equity	**3.5**	**4.6**	**2.5**	**2.5**	4.7	6.8	2.6	2.7
Total[3]	**26.7**	**33.4**	**20.6**	**32.0**	17.2	21.3	15.3	21.3

1 Highest and lowest VaR for each risk factor are independent and usually occur on different days

2 Actual one-day VaR at year-end date

3 The total VaR shown in the tables above is not a sum of the component risks due to offsets between them

4 Trading book for Market Risk is defined in accordance with the EU Capital Requirements Regulation (CRD IV/CRR) Part 3 Title I Chapter 3, which restricts the positions permitted in the trading book

Risks not in VaR (unaudited)

In 2019, the main Market Risk not reflected in VaR was Currency Risk where the exchange rate is currently pegged or managed. The historical one-year VaR observation period does not reflect the future possibility of a change in the currency regime such as sudden depegging. The other material Market Risk not reflected in VaR was associated with basis risks where historical market price data for VaR is sometimes more limited and therefore proxied, generating a potential basis risk. Additional capital is set aside to cover such 'risks not in VaR'. For further details on Market Risk capital see the Standard Chartered PLC Pillar 3 Disclosures for 31 December 2019 section on Market Risk.

Backtesting (unaudited)

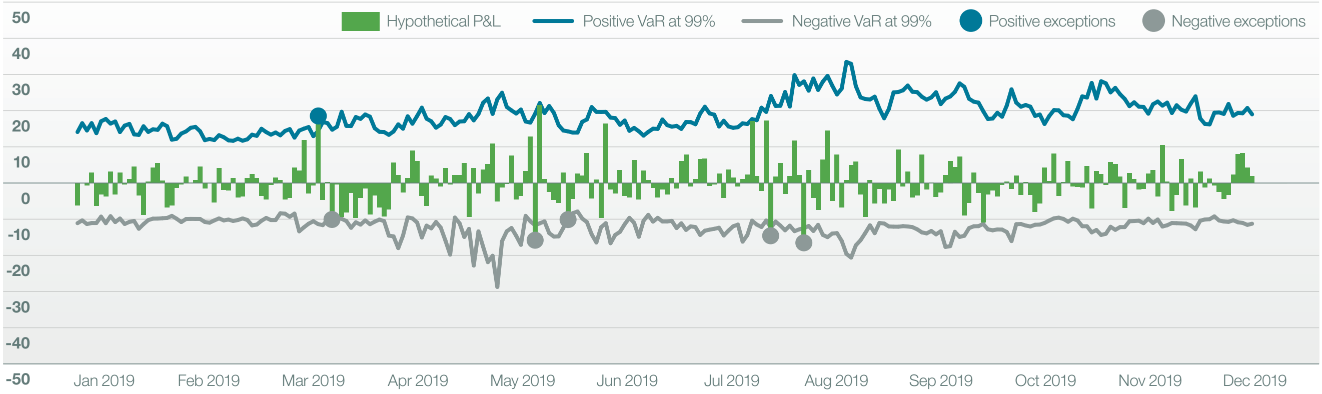
In 2019, there were five regulatory backtesting negative exceptions at Group level (in 2018, there were two regulatory backtesting negative exceptions at Group level). These exceptions occurred on:

- 1 April: when markets rallied following the release of strong Chinese manufacturing data
- 30 May: driven by a reduction in US dollar yields and implied volatility which reversed an increase of the previous day
- 10 June: when US Treasury yields rallied following reports that proposed tariffs on goods from Mexico to the US would not be implemented
- 8 August: stronger than expected Chinese renminbi fixing eased concerns over US-China trade tensions and new Chinese economic data signalled some recovery for China's export-heavy economy. US dollar and US Treasury yields rose
- 19 August: US and Mexico reached agreement on illegal migration. President Trump announced suspension of proposed tariffs on Mexican goods. US dollar yields rose

In total, there have been five Group exceptions in the previous 250 business days which is within the 'amber zone' applied internationally to internal models by bank supervisors (Basel Committee on Banking Supervision, *Supervisory framework for the use of backtesting in conjunction with the internal models approach to market risk capital requirements,* January 1996).

The graph below illustrates the performance of the VaR model used in capital calculations. It compares the 99 percentile loss confidence level given by the VaR model with the hypothetical profit and loss of each day given the actual market movement without taking into account any intra-day trading activity.

2019 Backtesting chart
Internal model approach regulatory trading book at Group level
Hypothetical profit and loss (P&L) versus VaR (99 per cent, one day)



Financial Markets loss days

	2019	2018
Number of loss days reported for Financial Markets trading book total product income[1]	**1**	8

1 Reflects total product income for Financial Markets:
- → Including credit valuation adjustment (CVA) and funding valuation adjustment (FVA) risk
- → Excluding Treasury Markets business (non-trading) and periodic valuation changes for Capital Markets, expected loss provisions and overnight indexed swap (OIS) discounting

Average daily income earned from Market Risk-related activities[1]

Trading	2019 $million	2018 $million
Interest Rate Risk	**3.6**	3.1
Foreign Exchange Risk	**4.5**	3.9
Commodity Risk	**0.6**	0.8
Equity Risk	**–**	–
Total	**8.7**	7.8
Non-trading		
Interest Rate Risk	**1.7**	2.4
Equity Risk	**0.3**	0.4
Total	**2.0**	2.8

1 Reflects total product income which is the sum of client income and own account income. Includes elements of trading income, interest income and other income which are generated from Market Risk-related activities. XVA income is included under Interest Rate Risk

Mapping of Market Risk items to the balance sheet (unaudited)

Market Risk contributes 7.9 per cent of the Group's regulatory capital risk-weighted asset (RWA) requirement (refer to risk-weighted assets tables (page 239). As highlighted in the VaR disclosure, during 2019 the majority of Market Risk was managed within Treasury Markets and Financial Markets, which span both the trading book and non-trading book. The non-trading equity Market Risk is generated by listed private equity holdings within Principal Finance. Treasury manages the market risk associated with debt and equity capital issuance.

	Amounts as per financial statements $million	Exposure to Trading Risk $million	Exposure to Non-Trading Risk $million	Market Risk type
Financial assets				
Derivative financial instruments	47,212	47,201	11	Interest Rate, Foreign Exchange, Commodity or Equity Risk
Loans and advances to banks	75,346	22,478	52,868	Interest Rate or Foreign Exchange Risk
Loans and advances to customers	314,754	43,264	271,490	Interest Rate or Foreign Exchange Risk
Debt securities and other eligible bills	165,761	22,740	143,021	Interest Rate mainly, but also Foreign Exchange or Equity Risk
Equities	2,760	2,208	552	Equities Risk mainly, but also Interest or Foreign Exchange Risk
Other assets	42,022	–	42,022	Interest Rate, Foreign Exchange, Commodity or Equity Risk
Total	647,855	137,891	509,964	
Financial liabilities				
Deposits by banks	37,432	–	37,432	Interest Rate or Foreign Exchange Risk
Customer accounts	452,733	–	452,733	Interest Rate or Foreign Exchange Risk
Debt securities in issue	61,535	–	61,535	Interest Rate mainly, but also Foreign Exchange or Equity Risk
Derivative financial instruments	48,484	48,472	12	Interest Rate, Foreign Exchange, Commodity or Equity Risk
Short positions	4,153	–	4,153	Interest Rate, Foreign Exchange, Commodity or Equity Risk
Total	604,337	48,472	555,865	

Structural foreign exchange exposures

The table below sets out the principal structural foreign exchange exposures (net of investment hedges) of the Group.

	2019 $million	2018 $million
Hong Kong dollar	**8,432**	7,792
Indian rupee	**3,930**	3,819
Renminbi	**3,344**	2,900
Singapore dollar	**2,531**	2,852
Korean won	**2,393**	2,148
Taiwanese dollar	**1,418**	1,238
UAE dirham	**1,994**	1,852
Malaysian ringgit	**1,557**	1,513
Thai baht	**929**	1,304
Indonesian rupiah	**1,139**	999
Pakistani rupee	**441**	458
Other	**4,558**	3,999
	32,666	30,874

As at 31 December 2019, the Group had taken net investment hedges using derivative financial investments of $1,997 million (31 December 2018: $2,137 million) to partly cover its exposure to the Korean won, $789 million (31 December 2018: $800 million) to partly cover its exposure to the Taiwanese dollar, $1,565 million (31 December 2018: $1,606 million) to partly cover its exposure to the renminbi and $713 million (31 December 2018: $712 million) to partly cover its exposure to the Indian rupee. An analysis has been performed on these exposures to assess the impact of a 1 per cent fall in the US dollar exchange rates, adjusted to incorporate the impacts of correlations of these currencies to the US dollar. The impact on the positions above would be an increase of $358 million (31 December 2018: $336 million). Changes in the valuation of these positions are taken to reserves.

For analysis of the Group's capital position and requirements, refer to the Capital Review (page 236).

Counterparty Credit Risk

Counterparty Credit Risk is the potential for loss in the event of the default of a derivative counterparty, after taking into account the value of eligible collaterals and risk mitigation techniques. The Group's counterparty credit exposures are included in the Credit Risk section.

Derivative financial instruments Credit Risk mitigation

The Group enters into master netting agreements, which in the event of default result in a single amount owed by or to the counterparty through netting the sum of the positive and negative mark-to-market values of applicable derivative transactions. The value of exposure under master netting agreements is $28,659 million (2018: $32,283 million).

In addition, the Group enters into credit support annexes (CSAs) with counterparties where collateral is deemed a necessary or desirable mitigant to the exposure. Cash collateral includes collateral called under a variation margin process from counterparties if total uncollateralised mark-to-market exposure exceeds the threshold and minimum transfer amount specified in the CSA. With certain counterparties, the CSA is reciprocal and requires us to post collateral if the overall mark-to-market values of positions are in the counterparty's favour and exceed an agreed threshold.

Liquidity and Funding Risk

Liquidity and Funding Risk is the risk that we may not have sufficient stable or diverse sources of funding to meet our obligations as they fall due.

The Group's Liquidity and Funding Risk framework requires each country to ensure that it operates within predefined liquidity limits and remains in compliance with Group liquidity policies and practices, as well as local regulatory requirements.

The Group achieves this through a combination of setting risk appetite and associated limits, policy formation, risk measurement and monitoring, prudential and internal stress testing, governance and review. In 2019 the Global Cross Border and Remote Booking Model Policy was implemented to set out the overall risk management approach for cross border booking of assets and liabilities.

In April 2019, the Group resolved the previously disclosed investigations by the US Authorities and the Financial Conduct Authority related to historical sanctions compliance and financial crime controls. These legacy investigation issues were the main regulatory uncertainties facing the Group. We will continue to maintain a strong liquidity position and would continue to optimise this where possible subject to a number of factors including market conditions and current and future regulatory requirements.

The Group has relatively low levels of sterling and euro funding and exposures within the context of the overall Group balance sheet. The result of the UK referendum to leave the EU has therefore not had a material first order liquidity impact to date. A new subsidiary has been established in Germany (Standard Chartered Bank AG) to grow our continental Europe franchise.

Primary sources of funding

The Group's funding strategy is largely driven by its policy to maintain adequate liquidity at all times, in all geographic locations and for all currencies, and hence to be in a position to meet all obligations as they fall due. The Group's funding profile is therefore well diversified across different sources, maturities and currencies.

A substantial portion of our assets are funded by customer deposits aligned with our policy to fund customer assets predominantly using customer deposits. Wholesale funding is diversified by type and maturity and represents a stable source of funds for the Group.

We maintain access to wholesale funding markets in all major financial centres in which we operate. This seeks to ensure that we have market intelligence, maintain stable funding lines and can obtain optimal pricing when performing our interest rate risk management activities.

In 2019, the Group issued approximately $6.1 billion of senior debt securities and $1 billion of subordinated debt securities and $0.5 billion of Additional Tier 1 securities from its holding company (HoldCo) Standard Chartered PLC. (2018: $4.6 billion of term senior debt and $0.5 billion of subordinated debt securities).

Debt refinancing levels are low. In the next 12 months approximately $6.8 billion of the Group's senior debt, subordinated debt and Additional Tier 1 securities in total are falling due for repayment either contractually or callable by the Group.

The information presented in the Liquidity Pool section (page 198) is on a financial view. This is the location in which the transaction or balance was booked and provides a more accurate view of where liquidity risk is actually located.

The chart below shows the composition of liabilities in which customer deposits make up 62.8 per cent of total liabilities and equity as at 31 December 2019, the majority of which are current accounts, savings accounts and time deposits. Our largest customer deposit base by geography is Greater China & North Asia (in particular Hong Kong), which holds 45 per cent of Group customer accounts.

Group's composition of liabilities 31 December 2019

Liquidity and Funding risk metrics

We monitor key liquidity metrics regularly, both on a country basis and in aggregate across the Group.

The following liquidity and funding Board Risk Appetite metrics define the maximum amount and type of risk that the Group is willing to assume in pursuit of its strategy: liquidity coverage ratio (LCR), liquidity stress survival horizons, external wholesale borrowing, and advances-to-deposits ratio.

Liquidity coverage ratio (LCR) (unaudited)

The LCR is a regulatory requirement set to ensure that the Group has sufficient unencumbered high-quality liquid assets to meet its liquidity needs in a 30-calendar-day liquidity stress scenario.

The Group monitors and reports its liquidity position under European Commission Delegated Regulation 2015/61 and has maintained its liquidity position above the prudential requirement.

At the reporting date, the Group LCR was 144 per cent (2018: 154 per cent) with a prudent surplus to both Board-approved Risk Appetite and regulatory requirements. Both the liquidity buffer and cash outflows grew during the year in line with the overall balance sheet growth. However, higher net outflows, mainly due to reduced inflows, exceeded the growth in high-quality liquid assets (HQLA) resulting in an overall decrease in the ratio as we looked to optimise our liquidity position.

We also held adequate liquidity across our footprint to meet all local prudential LCR requirements where applicable.

	2019 $million	2018 $million
Liquidity buffer	158,415	149,602
Total net cash outflows	110,269	97,443
Liquidity coverage ratio	144%	154%

Stressed coverage (unaudited)

The Group intends to maintain a prudent and sustainable funding and liquidity position, in all countries and currencies, such that it can withstand a severe but plausible liquidity stress.

Our approach to managing liquidity and funding is reflected in the following Board-level Risk Appetite Statement:

"The Group should hold an adequate buffer of high-quality liquid assets to survive extreme but plausible liquidity stress scenarios for at least 60 days without recourse to extraordinary central bank support."

The Group's internal liquidity stress testing framework covers the following stress scenarios:

- Standard Chartered-specific – This scenario captures the liquidity impact from an idiosyncratic event affecting the Group only i.e. the rest of the market is assumed to operate normally.
- Market wide – This scenario captures the liquidity impact from a market wide crisis affecting all participants in a country, region or globally.
- Combined – This scenario assumes both Standard Chartered-specific and Market-wide events affecting the Group simultaneously and hence is the most severe scenario.

All scenarios include, but are not limited to, modelled outflows for retail and wholesale funding, off-balance sheet funding risk, cross currency funding risk, intraday risk, franchise risk and risks associated with a deterioration of a firm's credit rating.

Stress testing results show that a positive surplus was maintained under all scenarios at 31 December 2019, i.e. respective countries are able to survive for a period of time as defined under each scenario. The combined scenario at 31 December 2019 showed the Group maintained liquidity resources to survive greater than 60 days, as per our Board Risk Appetite. The results take into account currency convertibility and portability constraints across all major presence countries.

Standard Chartered Bank's credit ratings as at 31 December 2019 were A+ with stable outlook (Fitch), A with stable outlook (S&P) and A1 with stable outlook (Moody's). A downgrade in the Group's long-term credit ratings would increase derivative collateral requirements and outflows due to rating-linked liabilities. At 31 December 2019, the estimated contractual outflow of a two-notch long-term ratings downgrade is $1.3 billion.

External wholesale borrowing

The Board sets a risk limit to prevent excessive reliance on wholesale borrowing. Limits are applied to all branches and operating subsidiaries in the Group and as at the reporting date the Group remained within Board Risk Appetite.

Advances-to-deposits ratio

This is defined as the ratio of total loans and advances to customers relative to total customer accounts. An advances-to-deposits ratio of below 100 per cent demonstrates that customer deposits exceed customer loans as a result of the emphasis placed on generating a high level of funding from customers.

The advances-to-deposits ratio remained broadly unchanged from last year at 64.2 per cent (2018: 63.1 per cent).

	2019 $million	2018 $million
Total loans and advances to customers[1,2]	**264,841**	250,922
Total customer accounts[3]	**412,303**	397,764
Advances-to-deposits ratio	**64.2%**	63.1%

1 Excludes reverse repurchase agreement and other similar secured lending of $1,469 million and includes loans and advances to customers held at fair value through profit and loss of $6,896 million

2 Loans and advances to customers for the purpose of the advances-to-deposits ratio excludes $9,109 million of approved balances held with central banks, confirmed as repayable at the point of stress. The loans and advances to customers balance at 31 December 2018 used in the advances-to-deposits ratio at 31 December 2018 has decreased by $7,412 million from $258,334 million to $250,922 million to exclude approved balances held with central banks. The advances-to-deposits ratio has been restated from 64.9 per cent to 63.1 per cent as a result

3 Includes customer accounts held at fair value through profit or loss of $6,947 million (31 December 2018: $6,751 million)

Net stable funding ratio (NSFR) (unaudited)

On 23 November 2016, the European Commission, as part of a package of risk-reducing measures, proposed a binding requirement for stable funding (net stable funding ratio (NSFR)) at European Union level. The proposal aims to implement the European Banking Authority's interpretation of the Basel standard on NSFR (BCBS295). The NSFR is due to become a binding regulatory requirement in June 2021 with a minimum of 100 per cent. Pending implementation of the final rules, the Group continues to monitor NSFR in line with the BCBS' final recommendation (BCBS295).

The NSFR is a balance sheet metric which requires institutions to maintain a stable funding profile in relation to the characteristics of their assets and off-balance sheet activities over a one-year horizon. It is the ratio between the amount of available stable funding (ASF) and the amount of required stable funding (RSF). ASF factors are applied to balance sheet liabilities and capital, based on their perceived stability and the amount of stable funding they provide. Likewise, RSF factors are applied to assets and off-balance sheet exposures according to the amount of stable funding they require. At the last reporting date, the Group NSFR remained above 100 per cent.

Liquidity pool (unaudited)

The liquidity value of the Group's LCR eligible liquidity pool at the reporting date was $158 billion. The figures in the below table account for haircuts, currency convertibility and portability constraints, and therefore are not directly comparable with the consolidated balance sheet. The pool is held to offset stress outflows as defined in European Commission Delegated Regulation 2015/61. Cash and balances at central banks at 31 December 2019 in the table below has increased compared to year end as a result of the inclusion of approved term amounts confirmed as repayable at the point of stress.

	2019				
	Greater China & North East Asia $million	ASEAN & South Asia $million	Africa & Middle East $million	Europe & Americas $million	Total $million
Level 1 securities					
Cash and balances at central banks	15,109	11,535	1,265	24,326	52,235
Central banks, governments/public sector entities	31,735	7,952	2,201	39,136	81,024
Multilateral development banks and international organisations	2,761	1,183	160	7,448	11,552
Other	–	–	14	1,104	1,118
Total Level 1 securities	49,605	20,670	3,640	72,014	145,929
Level 2A securities	4,824	1,928	63	3,217	10,032
Level 2B securities	–	343	–	2,111	2,454
Total LCR eligible assets	54,429	22,941	3,703	77,342	158,415

	2018				
	Greater China & North East Asia $million	ASEAN & South Asia $million	Africa & Middle East $million	Europe & Americas $million	Total $million
Level 1 securities					
Cash and balances at central banks	16,267	2,645	1,416	28,232	48,560
Central banks, governments/public sector entities	33,462	9,900	1,540	30,166	75,068
Multilateral development banks and international organisations	1,543	1,451	195	8,487	11,676
Other	–	–	–	1,125	1,125
Total Level 1 securities	51,272	13,996	3,151	68,010	136,429
Level 2 A securities	3,943	1,083	60	5,296	10,382
Level 2 B securities	–	1,264	–	1,527	2,791
Total LCR eligible assets	55,215	16,343	3,211	74,833	149,602

Encumbrance (unaudited)

Encumbered assets

Encumbered assets represent on-balance sheet assets pledged or subject to any form of arrangement to secure, collateralise or credit enhance a transaction from which it cannot be freely withdrawn. Cash collateral pledged against derivatives and Hong Kong government certificates of indebtedness, which secure the equivalent amount of Hong Kong currency notes in circulation, are included within Other assets.

Unencumbered – readily available for encumbrance

Unencumbered assets that are considered by the Group to be readily available in the normal course of business to secure funding, meet collateral needs, or be sold to reduce potential future funding requirements and are not subject to any restrictions on their use for these purposes.

Unencumbered – other assets capable of being encumbered

Unencumbered assets that, in their current form, are not considered by the Group to be readily realisable in the normal course of business to secure funding, meet collateral needs, or be sold to reduce potential future funding requirements and are not subject to any restrictions on their use for these purposes. Included within this category are loans and advances which would be suitable for use in secured funding structures such as securitisations.

Unencumbered – cannot be encumbered

Unencumbered assets that have not been pledged and cannot be used to secure funding, meet collateral needs, or be sold to reduce potential/future funding requirements, as assessed by the Group.

Derivatives, reverse repurchase assets and stock lending

These assets are shown separately as these on-balance sheet amounts cannot be pledged. However, these assets can give rise to off-balance sheet collateral which can be used to raise secured funding or meet additional funding requirements.

The following table provides a reconciliation of the Group's encumbered assets to total assets.

	2019									
		Assets encumbered as a result of transactions with counterparties other than central banks			Other assets (comprising assets encumbered at the central bank and unencumbered assets)					
						Assets not positioned at the central bank				
	Assets $million	As a result of securitisations $million	Other $million	Total $million	Assets positioned at the central bank (i.e. pre-positioned plus encumbered) $million	Readily available for encumbrance $million	Other assets that are capable of being encumbered $million	Derivatives and reverse repo/stock lending $million	Cannot be encumbered $million	Total $million
Cash and balances at central banks	52,728	–	–	–	9,843	42,885	–	–	–	52,728
Derivative financial instruments	47,212	–	–	–	–	–	–	47,212	–	47,212
Loans and advances to banks	75,346	326	73	399	–	40,600	13,341	19,610	1,396	74,947
Loans and advances to customers	314,754	298	1,082	1,380	–	–	259,061	40,804	13,509	313,374
Investment securities	168,521	–	7,919	7,919	1,284	108,209	47,399	–	3,710	160,602
Other assets	42,022	–	16,080	16,080	–	–	14,516	–	11,426	25,942
Current tax assets	539	–	–	–	–	–	–	–	539	539
Prepayments and accrued income	2,700	–	–	–	–	–	1,530	–	1,170	2,700
Interests in associates and joint ventures	1,908	–	–	–	–	–	–	–	1,908	1,908
Goodwill and intangible assets	5,290	–	–	–	–	–	–	–	5,290	5,290
Property, plant and equipment	6,220	–	–	–	–	–	444	–	5,776	6,220
Deferred tax assets	1,105	–	–	–	–	–	–	–	1,105	1,105
Assets classified as held for sale	2,053	–	–	–	–	–	–	–	2,053	2,053
Total	720,398	624	25,154	25,778	11,127	191,694	336,291	107,626	47,882	694,620

	2018									
		Assets encumbered as a result of transactions with counterparties other than central banks			Other assets (comprising assets encumbered at the central bank and unencumbered assets)					
					Assets positioned at the central bank (i.e. pre-positioned plus encumbered)	Assets not positioned at the central bank				
	Assets $million	As a result of securitisations $million	Other $million	Total $million	$million	Readily available for encumbrance $million	Other assets that are capable of being encumbered $million	Derivatives and reverse repo/stock lending $million	Cannot be encumbered $million	Total $million
Cash and balances at central banks	57,511	–	–	–	8,152	49,359	–	–	–	57,511
Derivative financial instruments	45,621	–	–	–	–	–	–	45,621	–	45,621
Loans and advances to banks	82,065	447	–	447	–	45,623	13,918	20,698	1,379	81,618
Loans and advances to customers	299,371	497	7	504	–	–	243,802	41,037	14,028	298,867
Investment securities	149,568	–	7,521	7,521	–	95,523	40,591	–	5,933	142,047
Other assets	35,401	–	16,287	16,287	–	–	11,440	–	7,674	19,114
Current tax assets	492	–	–	–	–	–	–	–	492	492
Prepayments and accrued income	2,505	–	–	–	–	–	1,356	–	1,149	2,505
Interests in associates and joint ventures	2,307	–	–	–	–	–	–	–	2,307	2,307
Goodwill and intangible assets	5,056	–	–	–	–	–	–	–	5,056	5,056
Property, plant and equipment	6,490	–	–	–	–	–	400	–	6,090	6,490
Deferred tax assets	1,047	–	–	–	–	–	–	–	1,047	1,047
Assets classified as held for sale	1,328	–	–	–	–	–	–	–	1,328	1,328
Total	688,762	944	23,815	24,759	8,152	190,505	311,507	107,356	46,483	664,003

The Group received $85,415 million (31 December 2018: $82,534 million) as collateral under reverse repurchase agreements that was eligible for repledging; of this the Group sold or repledged $44,530 million (31 December 2018: $40,552 million) under repurchase agreements.

Liquidity analysis of the Group's balance sheet

Contractual maturity of assets and liabilities

The following table presents assets and liabilities by maturity groupings based on the remaining period to the contractual maturity date as at the balance sheet date on a discounted basis. Contractual maturities do not necessarily reflect actual repayments or cashflows.

Within the tables below, cash and balances with central banks, interbank placements and investment securities that are fair value through other comprehensive income are used by the Group principally for liquidity management purposes.

As at the reporting date, assets remain predominantly short-dated, with 56 per cent maturing in under one year. Our less than three-month cumulative net funding gap increased from the previous year, largely due to an increase in customer accounts as the Group focused on improving the quality of its deposit base. In practice, these deposits are recognised as stable and have behavioural profiles that extend beyond their contractual maturities.

	2019								
	One month or less $million	Between one month and three months $million	Between three months and six months $million	Between six months and nine months $million	Between nine months and one year $million	Between one year and two years $million	Between two years and five years $million	More than five years and undated $million	Total $million
Assets									
Cash and balances at central banks	42,885	–	–	–	–	–	–	9,843	52,728
Derivative financial instruments	6,643	5,751	3,835	2,714	1,860	3,955	9,439	13,015	47,212
Loans and advances to banks[1,2]	33,133	19,030	11,069	5,150	3,464	1,701	1,366	433	75,346
Loans and advances to customers[1,2]	86,927	37,322	20,849	10,088	12,640	21,517	38,624	86,787	314,754
Investment securities	11,968	11,837	17,180	11,789	7,070	34,859	44,488	29,330	168,521
Other assets	20,689	18,223	1,433	105	75	264	133	20,915	61,837
Total assets	202,245	92,163	54,366	29,846	25,109	62,296	94,050	160,323	720,398
Liabilities									
Deposits by banks[1,3]	31,873	2,931	1,079	361	528	174	486	–	37,432
Customer accounts[1,4]	349,992	50,546	25,552	10,270	9,545	2,622	1,553	2,653	452,733
Derivative financial instruments	7,086	5,922	4,249	2,990	2,031	5,007	10,069	11,130	48,484
Senior debt	325	1,373	2,870	607	495	3,083	11,248	11,318	31,319
Other debt securities in issue[1]	5,612	12,234	8,766	895	1,449	280	56	924	30,216
Other liabilities	17,701	17,206	3,039	600	908	1,866	835	11,191	53,346
Subordinated liabilities and other borrowed funds	–	17	754	–	–	–	5,523	9,913	16,207
Total liabilities	412,589	90,229	46,309	15,723	14,956	13,032	29,770	47,129	669,737
Net liquidity gap	(210,344)	1,934	8,057	14,123	10,153	49,264	64,280	113,194	50,661

1 Loans and advances, investment securities, deposits by banks, customer accounts and debt securities in issue include financial instruments held at fair value through profit or loss, see Note 13 Financial instruments (pages 285 to 307)

2 Loans and advances include reverse repurchase agreements and other similar secured lending of $60.4 billion

3 Deposits by banks include repurchase agreements and other similar secured borrowing of $7.8 billion

4 Customer accounts include repurchase agreements and other similar secured borrowing of $40.4 billion

	2018								
	One month or less $million	Between one month and three months $million	Between three months and six months $million	Between six months and nine months $million	Between nine months and one year $million	Between one year and two years $million	Between two years and five years $million	More than five years and undated $million	Total $million
Assets									
Cash and balances at central banks	49,359	–	–	–	–	–	–	8,152	57,511
Derivative financial instruments	6,902	5,861	5,827	3,509	2,333	4,458	8,079	8,652	45,621
Loans and advances to banks[1,2]	38,331	20,549	11,209	5,214	2,835	2,584	1,064	279	82,065
Loans and advances to customers[1,2]	84,846	33,756	18,133	11,641	10,321	17,519	39,306	83,849	299,371
Investment securities	15,297	13,589	14,131	14,300	17,402	25,695	31,303	17,851	149,568
Other assets	21,155	8,909	2,385	224	135	96	155	21,567	54,626
Total assets	215,890	82,664	51,685	34,888	33,026	50,352	79,907	140,350	688,762
Liabilities									
Deposits by banks[1,3]	30,368	2,593	572	553	397	244	230	60	35,017
Customer accounts[1,4]	331,633	51,553	23,643	10,966	11,634	3,631	1,154	2,967	437,181
Derivative financial instruments	7,467	6,072	6,136	3,544	2,140	5,257	8,886	7,707	47,209
Senior debt	1,259	959	509	5,087	667	2,878	6,327	10,093	27,779
Other debt securities in issue[1]	4,893	9,792	8,062	177	715	1,030	16	1,395	26,080
Other liabilities	22,835	8,698	4,130	852	536	868	401	11,823	50,143
Subordinated liabilities and other borrowed funds	23	17	–	–	–	2,522	4,421	8,018	15,001
Total liabilities	398,478	79,684	43,052	21,179	16,089	16,430	21,435	42,063	638,410
Net liquidity gap	(182,588)	2,980	8,633	13,709	16,937	33,922	58,472	98,287	50,352

1 Loans and advances, investment securities, deposits by banks, customer accounts and debt securities in issue include financial instruments held at fair value through profit or loss, see Note 13 Financial instruments (pages 285 to 307)

2 Loans and advances include reverse repurchase agreements and other similar secured lending of $61.7 billion

3 Deposits by banks include repurchase agreements and other similar secured borrowing of $5.0 billion

4 Customer accounts include repurchase agreements and other similar secured borrowing of $39.4 billion

Behavioural maturity of financial assets and liabilities

The cashflows presented in the previous section reflect the cashflows that will be contractually payable over the residual maturity of the instruments. However, contractual maturities do not necessarily reflect the timing of actual repayments or cashflow. In practice, certain assets and liabilities behave differently from their contractual terms, especially for short-term customer accounts, credit card balances and overdrafts, which extend to a longer period than their contractual maturity. On the other hand, mortgage balances tend to have a shorter repayment period than their contractual maturity date. Expected customer behaviour is assessed and managed on a country basis using qualitative and quantitative techniques, including analysis of observed customer behaviour over time.

Maturity of financial liabilities on an undiscounted basis

The following table analyses the contractual cashflows payable for the Group's financial liabilities by remaining contractual maturities on an undiscounted basis. The financial liability balances in the table below will not agree to the balances reported in the consolidated balance sheet as the table incorporates all contractual cashflows, on an undiscounted basis, relating to both principal and interest payments. Derivatives not treated as hedging derivatives are included in the 'On demand' time bucket and not by contractual maturity.

Within the 'More than five years and undated' maturity band are undated financial liabilities, the majority of which relate to subordinated debt, on which interest payments are not included as this information would not be meaningful, given the instruments are undated. Interest payments on these instruments are included within the relevant maturities up to five years.

	2019								
	One month or less $million	Between one month and three months $million	Between three months and six months $million	Between six months and nine months $million	Between nine months and one year $million	Between one year and two years $million	Between two years and five years $million	More than five years and undated $million	Total $million
Deposits by banks	**33,034**	**2,977**	**1,112**	**381**	**588**	**189**	**502**	**–**	**38,783**
Customer accounts	**350,679**	**50,908**	**26,552**	**10,415**	**9,839**	**2,694**	**1,625**	**3,127**	**455,839**
Derivative financial instruments[1]	**47,000**	**5**	**18**	**170**	**314**	**355**	**512**	**110**	**48,484**
Debt securities in issue	**5,951**	**13,615**	**11,886**	**1,559**	**2,210**	**3,882**	**12,431**	**13,557**	**65,091**
Subordinated liabilities and other borrowed funds	**–**	**–**	**1,009**	**26**	**395**	**641**	**7,140**	**15,124**	**24,335**
Other liabilities	**15,341**	**16,870**	**3,046**	**601**	**865**	**1,876**	**885**	**12,376**	**51,860**
Total liabilities	**452,005**	**84,375**	**43,623**	**13,152**	**14,211**	**9,637**	**23,095**	**44,294**	**684,392**

	2018								
	One month or less $million	Between one month and three months $million	Between three months and six months $million	Between six months and nine months $million	Between nine months and one year $million	Between one year and two years $million	Between two years and five years $million	More than five years and undated $million	Total $million
Deposits by banks	30,467	2,609	593	569	409	267	250	62	35,226
Customer accounts	332,115	51,845	24,686	11,094	11,780	3,700	1,226	3,552	439,998
Derivative financial instruments[1]	45,665	137	141	9	91	31	679	456	47,209
Debt securities in issue	6,169	11,345	8,786	5,310	1,628	3,685	7,104	13,000	57,027
Subordinated liabilities and other borrowed funds	23	–	255	–	414	3,169	6,154	13,865	23,880
Other liabilities	19,746	8,757	4,129	892	520	885	407	12,302	47,638
Total liabilities	434,185	74,693	38,590	17,874	14,842	11,737	15,820	43,237	650,978

1 Derivatives are on a discounted basis

Interest Rate Risk in the Banking Book (unaudited)

The following table provides the estimated impact on the Group's earnings of a 50 basis point parallel shock (up and down) across all yield curves. The sensitivities shown represent the estimated change in base case projected net interest income (NII), plus the change in interest rate implied income and expense from FX swaps used to manage Banking Book currency positions, under the two interest rate shock scenarios.

The interest rate sensitivities are indicative and based on simplified scenarios, estimating the aggregate impact of an instantaneous 50 basis point parallel shock across all yield curves over a one-year horizon, including the time taken to implement changes to pricing before becoming effective. The assessment assumes that non-interest rate sensitive aspects of the size and mix of the balance sheet remain constant and that there are no specific management actions in response to the change in rates. No assumptions are made in relation to the impact on credit spreads in a changing rate environment.

Significant modelling and behavioural assumptions are made regarding scenario simplification, market competition, pass-through rates, asset and liability repricing tenors, and price flooring. In particular, the assumption that interest rates of all currencies and maturities shift by the same amount concurrently, and that no actions are taken to mitigate the impacts arising from this are considered unlikely. Reported sensitivities will vary over time due to a number of factors including changes in balance sheet composition, market conditions, customer behaviour and risk management strategy and should therefore not be considered an income or profit forecast.

	2019			
Estimated one-year impact to earnings from a parallel shift in yield curves at the beginning of the period of:	**USD bloc $million**	**HKD, SGD & KRW bloc $million**	**Other currency bloc $million**	**Total $million**
+ 50 basis points	**(10)**	**60**	**90**	**140**
- 50 basis points	**10**	**(40)**	**(90)**	**(120)**

	2018			
Estimated one-year impact to earnings from a parallel shift in yield curves at the beginning of the period of:	USD bloc $million	HKD, SGD & KRW bloc $million	Other currency bloc $million	Total $million
+ 50 basis points	10	110	90	210
- 50 basis points	(20)	(70)	(90)	(180)

As at 31 December 2019, the Group estimates the one-year impact of an instantaneous, parallel increase across all yield curves of 50 basis points to be an earnings benefit of $140 million. The corresponding impact from a parallel decrease of 50 basis points would result in an earnings reduction of $120 million.

The benefit from rising interest rates is primarily from reinvesting at higher yields and from assets repricing faster and to a greater extent than deposits. The asymmetry between the up and down shock is primarily driven by differing behavioural assumptions, which are scenario specific. Overall NII sensitivity under both the up and down shock has reduced versus 31 December 2018, driven by Treasury Markets risk management activity to mitigate the risk to income in falling rate environment.

The US dollar sensitivity is dampened further by the impact of funding trading book assets with Banking Book liabilities. The reported sensitivities include the cost of Banking Book liabilities used to fund the Trading Book, however the revenue associated with the Trading Book positions is recognised in Trading Book income and is excluded from the reported sensitivities. If this were to be included, it would make the US dollar earnings sensitivity positively correlated with changes in US dollar interest rates. Further information on the impact of changes in interest rates on Trading Book is set out in the Market Risk section (pages 190 to 195).

Operational Risk (unaudited)

Operational Risks arise from the processes executed within the Group. Risks associated with these processes are mapped into a Group Process Universe where the Control Assessment Standards are applied. The Standards are benchmarked against regulatory requirements.

Operational Risk profile

The Operational Risk profile is the Group's overall exposure to non-financial risk, at a given point in time, covering all Principal Risk Types. The Operational Risk profile comprises both Operational Risk events (including losses) and the current exposures to non-financial risks.

Operational Risk events and losses

Operational losses are one indicator of the effectiveness and robustness of the non-financial risk control environment. As at 31 December 2019, recorded operational losses for 2019 excluding monetary penalties to the US authorities and the Financial Conduct Authority (FCA) for legacy conduct and control issues are lower than 2018. Operational losses in 2019 comprise unrelated non-systemic events which were not individually significant.

Losses in 2018 include incremental events that were recognised in 2019. As at 31 December 2019, the largest loss recorded for 2018 relates to a regulatory settlement on historic conduct and control issues related to the Group's Foreign Exchange trading and sales business of $40.0 million in the Trading and Sales Basel business line.

The Group's profile of operational loss events in 2019 and 2018 is summarised in the table below. It shows the percentage distribution of gross operational losses by Basel business line.

	% Loss	
Distribution of operational losses by Basel business line	2019[1]	2018[2]
Agency services	0.3%	0.8%
Asset management	–	–
Commercial Banking	14.0%	8.9%
Corporate Finance	–	–
Corporate items	16.2%	3.2%
Payment and settlements	4.7%	9.0%
Retail Banking	53.0%	31.9%
Retail brokerage	0.2%	–
Trading and sales	11.6%	46.2%

1 Excludes monetary penalties to the US authorities and the FCA

2 Losses in 2018 have been restated to include incremental events recognised in 2019

The Group's profile of operational loss events in 2019 and 2018 is also summarised by Basel event type in the table below. It shows the percentage distribution of gross operational losses by Basel event type.

	% Loss	
Distribution of operational losses by Basel event type	2019[1]	2018[2]
Business disruption and system failures	1.8%	3.8%
Clients products and business practices	3.6%	37.8%
Damage to physical assets	–	0.1%
Employment practices and workplace safety	–	0.1%
Execution delivery and process management	58.2%	37.6%
External fraud	35.5%	18.3%
Internal fraud	0.9%	2.3%

1 Excludes monetary penalties to the US authorities and the FCA

2 Losses in 2018 have been restated to include incremental events recognised in 2019

Other principal risks (unaudited)

Losses arising from operational failures for other principal risks (for example: Compliance, Conduct, Reputational, Information and Cyber Security and Financial Crime Risk) are reported as operational losses. Operational losses do not include Operational Risk-related credit impairments.

Enterprise Risk Management Framework

Effective risk management is essential in delivering consistent and sustainable performance for all of our stakeholders and is therefore a central part of the financial and operational management of the Group. The Group adds value to clients and the communities in which they operate by taking and managing appropriate levels of risk, which in turn generates returns for shareholders.

The Enterprise Risk Management Framework (ERMF) enables the Group to manage enterprise-wide risks, with the objective of maximising risk-adjusted returns while remaining within our Risk Appetite. The ERMF has been designed with the explicit goal of improving the Group's risk management, and since its launch in January 2018, it has been embedded across the Group and rolled out to its branches and subsidiaries.

In 2019, we completed a comprehensive review of the ERMF and the following changes were approved by the Board:

- Model Risk was elevated to a Principal Risk Type (effective in 2020) with enhancements to the Group's approach to Model Risk management
- Climate Risk was introduced as a material cross-cutting risk that, while not a Principal Risk Type in itself, manifests through other relevant Principal Risk Types
- A process of self-assessments performed by the branches and subsidiaries to assess the overall adoption and effectiveness of the ERMF locally was formalised
- Our existing Principal Risk Types were updated as follows:
  - Country Risk coverage was expanded from Country Cross-Border Risk to Gross Country Risk
  - Principles related to environment and social risks, defence and dual use goods were incorporated under Reputational Risk
  - Fraud Risk was reclassified as a risk sub-type from Operational Risk to Financial Crime

The revised ERMF was approved on 12 December 2019 and became effective in January 2020.

Risk culture

The Group's risk culture provides guiding principles for the behaviours expected from our people when managing risk. The Board has approved a risk culture statement that encourages the following behaviours and outcomes:

- An enterprise-level ability to identify and assess current and future risks, openly discuss these and take prompt actions
- The highest level of integrity by being transparent and proactive in disclosing and managing all types of risks
- A constructive and collaborative approach in providing oversight and challenge, and taking decisions in a timely manner
- Everyone to be accountable for their decisions and feel safe in using their judgement to make these considered decisions

We acknowledge that banking inherently involves risk-taking and undesired outcomes will occur from time to time; however, we shall take the opportunity to learn from our experience and formalise what we can do to improve. We expect managers to demonstrate a high awareness of risk and control by self-identifying issues and managing them in a manner that will deliver lasting change.

Strategic risk management

The Group approaches strategic risk management as follows:

- As part of the strategy review process, conducting an impact analysis on the risk profile from growth plans, strategic initiatives and business model vulnerabilities with the aim of proactively identifying and managing new risks or existing risks that need to be reprioritised
- As part of the strategy review process, confirming that growth plans and strategic initiatives can be delivered within the approved Risk Appetite and/or proposing additional Risk Appetite for Board consideration
- Validating the Corporate Plan against the approved or proposed Risk Appetite Statement to the Board. The Board approves the strategy review and the five-year Corporate Plan with a confirmation from the Group Chief Risk Officer that it is aligned with the ERMF and the Group Risk Appetite Statement where projections allow

Roles and responsibilities

Senior Managers Regime

Roles and responsibilities under the ERMF are aligned to the objectives of the Senior Managers Regime. The Group Chief Risk Officer is responsible for the overall development and maintenance of the Group's ERMF and for identifying material risk types to which the Group may be potentially exposed. The Group Chief Risk Officer delegates effective implementation of the Risk Type Frameworks to Risk Framework Owners who provide second line of defence oversight for the Principal Risk Types. In addition, the Group Chief Risk Officer has been formally identified as the relevant Senior Manager responsible for Climate Risk management as it relates to financial and non-financial risks to the Group arising from climate change. This does not include elements of corporate social responsibility, the Group's contribution to climate change and/or Sustainable Finance strategy in supporting a low-carbon transition, which are the responsibility of other relevant Senior Managers.

The Risk function

The Risk function is responsible for the sustainability of our business through good management of risk across the Group by providing oversight and challenge, thereby ensuring that business is conducted in line with regulatory expectations.

The Group Chief Risk Officer directly manages the Risk function, which is separate and independent from the origination, trading and sales functions of the businesses. The Risk function is responsible for:

- Maintaining the ERMF, ensuring that it remains relevant and appropriate to the Group's business activities, and is effectively communicated and implemented across the Group, and administering related governance and reporting processes
- Upholding the overall integrity of the Group's risk and return decisions to ensure that risks are properly assessed, that these decisions are made transparently on the basis of this proper assessment and that risks are controlled in accordance with the Group's standards and Risk Appetite
- Overseeing and challenging the management of Principal Risk Types under the ERMF

The independence of the Risk function ensures that the necessary balance in making risk and return decisions is not compromised by short-term pressures to generate revenues.

In addition, the Risk function is a centre of excellence that provides specialist capabilities of relevance to risk management processes in the broader organisation.

The Risk function supports the Group's commitment to be Here for good by building a sustainable framework that places regulatory and compliance standards and a culture of appropriate conduct at the forefront of the Group's agenda, in a manner proportionate to the nature, scale and complexity of the Group's business.

In January 2019, we integrated Conduct, Financial Crime and Compliance (CFCC) risks under a single function under the Management Team leadership of the Group Head, Corporate Affairs, Brand & Marketing and CFCC. CFCC works alongside the Risk function within the framework of the ERMF to deliver a unified second line of defence.

Three lines of defence model

Roles and responsibilities for risk management are defined under a three lines of defence model. Each line of defence has a specific set of responsibilities for risk management and control as shown in the table below.

Lines of defence	Definition	Key responsibilities include
1st	The businesses and functions engaged in or supporting revenue-generating activities that own and manage the risks	→ Propose the risks required to undertake revenue-generating activities → Identify, assess, monitor and escalate risks and issues to the second line and senior management[1] and promote a healthy risk culture and good conduct → Manage risks within Risk Appetite, set and execute remediation plans and ensure laws and regulations are being complied with → Ensure systems meet risk data aggregation, risk reporting and data quality requirements set by the second line
2nd	The control functions independent of the first line that provide oversight and challenge of risk management to provide confidence to the Group Chief Risk Officer, senior management and the Board	→ Identify, monitor and escalate risks and issues to the Group Chief Risk Officer, senior management and the Board and promote a healthy risk culture and good conduct → Oversee and challenge first line risk-taking activities and review first line risk proposals → Propose Risk Appetite to the Board, monitor and report adherence to Risk Appetite and intervene to curtail business if it is not in line with existing or adjusted Risk Appetite, there is material non-compliance with policy requirements or when operational controls do not effectively manage risk → Set risk data aggregation, risk reporting and data quality requirements → Ensure that there are appropriate controls to comply with applicable laws and regulations, and escalate significant non-compliance matters to senior management and the appropriate committees
3rd	The Internal Audit function provides independent assurance on the effectiveness of controls that support first line's risk management of business activities, and the processes maintained by the second line	→ Independently assess whether management has identified the key risks in the businesses and whether these are reported and governed in line with the established risk management processes → Independently assess the adequacy of the design of controls and their operating effectiveness

1 Individuals designated as senior management functions under the FCA and PRA Senior Managers Regime

Risk appetite and profile

We recognise the following constraints which determine the risks that we are willing to take in pursuit of our strategy and the development of a sustainable business:

- **Risk capacity** is the maximum level of risk the Group can assume, given its current capabilities and resources, before breaching constraints determined by capital and liquidity requirements and internal operational capability (including but not limited to technical infrastructure, risk management capabilities, expertise), or otherwise failing to meet the expectations of regulators and law enforcement agencies
- **Risk appetite** is defined by the Group and approved by the Board. It is the maximum amount and type of risk the Group is willing to assume in pursuit of its strategy. Risk Appetite cannot exceed risk capacity

The Board has approved a Risk Appetite Statement which is underpinned by a set of financial and operational control parameters known as Risk Appetite metrics and their associated thresholds. These directly constrain the aggregate risk exposures that can be taken across the Group. The Group Risk Appetite is reviewed at least on an annual basis to ensure that it is fit for purpose and aligned with strategy, and focus is given to emerging or new risks. The Risk Appetite Statement is supplemented by an overarching statement outlining the Group's Risk Appetite principles.

Risk appetite principles

The Group Risk Appetite is defined in accordance with risk management principles that inform our overall approach to risk management and our risk culture. We follow the highest ethical standards and ensure a fair outcome for our clients, as well as facilitating the effective operation of financial markets, while at the same time meeting expectations of regulators and law enforcement agencies. We set our Risk Appetite to enable us to grow sustainably and to avoid shocks to earnings or our general financial health, as well as manage our Reputational Risk in a way that does not materially undermine the confidence of our investors and all internal and external stakeholders.

Risk Appetite Statement

The Group will not compromise adherence to its Risk Appetite in order to pursue revenue growth or higher returns.

The Group Risk Appetite is supplemented by risk control tools such as granular level limits, policies, standards and other operational control parameters that are used to keep the Group's risk profile within Risk Appetite. The Group's risk profile is its overall exposure to risk at a given point in time, covering all applicable risk types. Status against Risk Appetite is reported to the Board, Board Risk Committee and the Group Risk Committee, including the status of breaches and remediation plans where applicable. To keep the Group's risk profile within Risk Appetite (and therefore also risk capacity), we have cascaded critical Group Risk Appetite metrics across our Principal Risk Types to our footprint markets with significant business operations. Country Risk Appetite is managed at a country or local level with Group and regional oversight. In addition to Risk Appetite Statements for the Principal Risk Types, the Group also has a Risk Appetite Statement for Climate Risk which is a material cross-cutting risk that can manifest through other risk types. The Group aims to measure and manage financial and non-financial risks from climate change, and reduce emissions related to our own activities and those related to the financing of clients in alignment with the Paris Agreement.

The Group Risk Committee, the Group Financial Crime Risk Committee, the Group Non-Financial Risk Committee and the Group Asset and Liability Committee are responsible for ensuring that our risk profile is managed in compliance with the Risk Appetite set by the Board. The Board Risk Committee and the Board Financial Crime Risk Committee (for Financial Crime Compliance) advise the Board on the Risk Appetite Statement and monitor the Group's compliance with it.

The individual Principal Risk Types' Risk Appetite Statements approved by the Board are set out in the Principal risks section (pages 212 to 227)

Risk identification and assessment

Identification and assessment of potentially adverse risk events is an essential first step in managing the risks of any business or activity. To ensure consistency in communication we use Principal Risk Types to classify our risk exposures. Nevertheless, we also recognise the need to maintain an overall perspective since a single transaction or activity may give rise to multiple types of risk exposure, risk concentrations may arise from multiple exposures that are closely correlated, and a given risk exposure may change its form from one risk type to another. There are also sources of risk that arise beyond our own operations such as the Group's dependency on suppliers for the provision of services and technology. As the Group remains accountable for risks arising from the actions of such third parties, failure to adequately monitor and manage these relationships could materially impact the Group's ability to operate and could have an impact on our ability to continue to provide services that are material to the Group.

To facilitate risk identification and assessment, the Group maintains a dynamic risk-scanning process with inputs from the internal and external risk environment, as well as potential threats and opportunities from the business and client perspectives. The Group maintains an inventory of the Principal Risk Types and risk sub-types that are inherent to the strategy and business model; and emerging risks that include near-term as well as longer-term uncertainties. Near-term risks are those that are on the horizon and can be measured and mitigated to some extent, while uncertainties are longer-term matters that should be on the radar but are not yet fully measurable.

The Group Chief Risk Officer and the Group Risk Committee review regular reports on the risk profile for the Principal Risk Types, adherence to the approved Risk Appetite and the Group risk inventory including emerging risks. They use this information to escalate material developments in each risk event and make recommendations to the Board on any potential changes to our Corporate Plan.

Stress testing

The objective of stress testing is to support the Group in assessing that it:

- Does not have a portfolio with excessive risk concentration that could produce unacceptably high losses under severe but plausible scenarios
- Has sufficient financial resources to withstand severe but plausible scenarios
- Has the financial flexibility to respond to extreme but plausible scenarios
- Understands the key business model risks and considers what kind of event might crystallise those risks – even if extreme with a low likelihood of occurring – and identifies as required, actions to mitigate the likelihood or impact as required

Enterprise stress tests include Capital and Liquidity Adequacy Stress Tests, including in the context of recovery and resolution, and stress tests that assess scenarios where our business model becomes unviable, such as reverse stress tests.

Stress tests are performed at Group, country, business and portfolio level. Bespoke scenarios are applied to our traded and liquidity positions as described in the sections on Traded Risk (page 215), and Capital and Liquidity Risk (page 217). In addition to these, our stress tests also focus on the potential impact of macroeconomic, geopolitical and physical events on relevant regions, client segments and risk types.

The Board delegates approval of stress test submissions to the Bank of England to the Board Risk Committee, who review the recommendations from the Stress Testing Committee. The Stress Testing Committee is appointed by the Group Risk Committee to review and challenge the stress test scenarios, assumptions and results.

Based on the stress test results, the Group Chief Risk Officer and Group Chief Financial Officer can recommend strategic actions to the Board to ensure that the Group strategy remains within the Board-approved Risk Appetite.

Principal Risk Types

Principal Risk Types are risks that are inherent in our strategy and business model and have been formally defined in the Group's ERMF. These risks are managed through distinct Risk Type Frameworks (RTFs) which are approved by the Group Chief Risk Officer. The Principal Risk Types and associated Risk Appetite Statements are approved by the Board.

In 2019, we performed a review of our Principal Risk Types and elevated Model Risk to a Principal Risk Type (effective in 2020) and implemented enhancements undertaken to the Group's approach to Model Risk management. In addition to Principal Risk Types, the Group may be exposed to material cross-cutting risks that manifest through other Principal Risk Types. The Group Chief Risk Officer can direct risk management frameworks and appoint Risk Framework Owners to perform second line of defence activities for such cross-cutting risks. The Group currently recognises Climate Risk as a material cross-cutting risk. Climate Risk is defined as the potential for financial loss and non-financial detriments arising from climate change and society's response to it.

In the coming years we will consider if existing Principal Risk Types or incremental risks should be treated as cross-cutting risks. The table below shows the Group's current Principal Risk Types.

Principal Risks Types	Definition
Credit Risk	→ Potential for loss due to the failure of a counterparty to meet its agreed obligations to pay the Group
Traded Risk	→ Potential for loss resulting from activities undertaken by the Group in financial markets
Capital and Liquidity Risk	→ Capital: Potential for insufficient levels, composition or distribution of capital to support our normal activities
	→ Liquidity: Risk that we may not have sufficient stable or diverse sources of funding to meet our obligations as they fall due
Country Risk	→ Potential for losses due to political or economic events in a country
Reputational Risk	→ Potential for damage to the franchise, resulting in loss of earnings or adverse impact on market capitalisation because of stakeholders taking a negative view of the organisation, its actions or inactions – leading stakeholders to change their behaviour
Operational Risk	→ Potential for loss resulting from inadequate or failed internal processes and systems, human error, or from the impact of external events (including legal risks)
Compliance Risk	→ Potential for penalties or loss to the Group, or for an adverse impact to our clients, stakeholders or to the integrity of the markets in which we operate through a failure on our part to comply with laws or regulations
Conduct Risk	→ Risk of detriment to the Group's clients, investors, shareholders, market integrity, competition and counterparties or risk of detriment from the inappropriate supply of financial services, including instances of willful or negligent misconduct
Financial Crime Risk	→ Potential for legal or regulatory penalties, material financial loss or reputational damage resulting from the failure to comply with applicable laws and regulations relating to international sanctions, anti-money laundering, anti-bribery and corruption, and fraud
Information and Cyber Security Risk	→ Potential for loss from a breach of confidentiality, integrity and availability of the Group's information systems and assets through cyber attack, insider activity, error or control failure
Model Risk*	→ Potential loss that may occur as a consequence of decisions or the risk of mis-estimation that could be principally based on the output of models, due to errors in the development, implementation or use of such models

* Effective from January 2020

Further details of our principal risks and how these are being managed are set out in the Principal risks section (pages 212 to 227)

ERMF effectiveness reviews

The Group Chief Risk Officer is responsible for annually affirming the effectiveness of the ERMF to the Board Risk Committee. To facilitate this, an ERMF effectiveness review was established in 2018, which follows the principle of evidence-based self-assessments for all the Risk Type Frameworks and relevant policies.

The annual ERMF effectiveness review, first introduced in 2018, was conducted in 2019 and enables measurement of progress against the 2018 baseline. The 2019 effectiveness review has shown that:

- Since the launch of the ERMF in 2018, the focus in 2019 has been on effective embedding of the framework across the organisation and we have made progress on overall effectiveness
- We have an established risk taxonomy through the Principal Risk Types and risk sub-types which provides a common risk language across the three lines of defence and ultimate risk oversight by senior management and the Board. There is also stronger first line ownership of risks
- In 2019, risk management for both financial and non-financial risks improved year-on-year. Financial risks continue to be managed more effectively on a relative basis as compared with the non-financial risks. This reflects the maturity of these Risk Type Frameworks and the underlying risk management practices
- Self-assessments performed in our footprint markets reflect the use of the ERMF and Principal Risk Types, with reinforced first line ownership of risks. Country and regional risk committees are playing a more active role in managing and overseeing material issues arising in countries. Automation opportunities for manual risk oversight processes will continue to be explored in 2020

Ongoing structured ERMF effectiveness reviews enable us to identify improvement opportunities and proactively build plans to address them. Over the course of 2020, the Group aims to further strengthen its risk management practices and target improvements in the management of non-financial risk types.

Executive and Board risk oversight

Overview

The Board has ultimate responsibility for risk management and is supported by the six Board-level committees. The Board approves the ERMF based on the recommendation from the Board Risk Committee, which also recommends the Group Risk Appetite Statement for all Principal Risk Types other than Financial Crime Risk. Financial Crime Risk Appetite is reviewed and recommended to the Board by the Board Financial Crime Risk Committee.

In addition, the Brand Values and Conduct Committee oversees the brand, valued behaviours, reputation and conduct of the Group. The Committee reviews the effectiveness of the Group's Conduct Risk Type Framework and manages Reputational Risk in line with the Reputational Risk Type Framework.

Board and Executive level risk committee governance structure

BOARD OF DIRECTORS

BOARD LEVEL COMMITTEES

- Board Risk Committee
- Board Financial Crime Risk Committee
- Brand Values and Conduct Committee
- Remuneration Committee
- Governance and Nomination Committee
- Audit Committee

EXECUTIVE LEVEL COMMITTEES

Group Risk Committee

- Group Non-Financial Risk Committee
- Group Financial Crime Risk Committee
- Group Reputational Risk Committee
- Stress Testing Committee
- IFRS 9 Impairment Committee
- Model Risk Committee
- Corporate, Commercial and Institutional Banking Risk Committee
- Private Banking Process Governance and Risk Committee
- ASEAN & South Asia Risk Committee
- Africa and Middle East Risk Committee
- Investment Committee for Transportation Assets
- Investment Committee

Group Asset and Liability Committee

- Operational Balance Sheet Committee
- Global Capital & Liquidity Optimisation Committee

The committee governance structure ensures that risk-taking authority and risk management policies are cascaded down from the Board to the appropriate functional, client segment and country-level senior management and committees. Information regarding material risk issues and compliance with policies and standards is communicated to the appropriate country, client segment, functional and Group-level senior management and committees.

Further details on the role of the Board and its committees in matters of risk governance are covered in the Directors' report (pages 68 to 145)

1 The Corporate, Commercial and Institutional Banking Risk Committee provides governance oversight over key matters in Europe and Americas. Greater China North Asia Regional Committee derives authority from the Standard Chartered Hong Kong Board but also escalates matters to the Group Risk Committee

Group Risk Committee

The Group Risk Committee, which derives its authority from the Group Chief Risk Officer, is responsible for ensuring the effective management of risk throughout the Group in support of the Group's strategy. The Group Chief Risk Officer chairs the Group Risk Committee, whose members are drawn from the Group's Management Team. The Committee determines the ERMF and oversees its effective implementation across the Group, including the delegation of any part of its authorities to appropriate individuals or properly constituted sub-committees.

Group Risk Committee sub-committees

The Group Non-Financial Risk Committee, chaired by the Global Head of Risk, Functions and Operational Risk, governs the non-financial Principal Risk Types across clients, businesses, products and functions. The non-financial Principal Risk Types in scope are Operational Risk, Compliance Risk, Conduct Risk, Information and Cyber Security Risk and Reputational Risk that is consequential in nature arising from potential failures of Principal Risk Types. The Committee also reviews the adequacy of the internal control systems across all Principal Risk Types.

The Group Financial Crime Risk Committee, chaired by the Group Head, Corporate Affairs, Brand & Marketing and CFCC, as the Compliance and Money Laundering Reporting Officer, governs the Financial Crime Risk Type Framework across the Group. The committee ensures that the Financial Crime risk profile is managed within approved Risk Appetite and policies. The Committee is also responsible for recommending the Financial Crime Risk Appetite Statement and Risk Appetite metrics to the Board Financial Crime Risk Committee.

The Group Reputational Risk Committee, chaired by the Group Head, Corporate Affairs, Brand & Marketing and CFCC, ensures the effective management of Reputational Risk across the Group. This includes providing oversight of matters arising from clients, products, transactions and strategic coverage- related decisions (i.e. primary Reputational Risk sources) and matters escalated by the respective Risk Framework Owners (i.e. secondary Reputational Risk sources).

The Stress Testing Committee, chaired by the Global Head, Enterprise Risk Management, ensures the effective management of enterprise stress testing in line with the Group's enterprise stress testing policy and applicable regulatory requirements. In addition, the Committee reviews, challenges and approves scenarios for stress tests and stress test results prior to management actions.

The IFRS 9 Impairment Committee, chaired by the Global Head, Enterprise Risk Management, ensures the effective management of expected credit loss computations as well as stage allocation of financial assets for quarterly financial reporting within the authorities set by the Group Risk Committee.

The Model Risk Committee, chaired by the Global Head, Enterprise Risk Management, ensures the effective measurement and management of Model Risk in line with internal policies and Model Risk Appetite.

The Corporate, Commercial and Institutional Banking Risk Committee, chaired by the Chief Risk Officer, Business, ensures the effective management of risk throughout Corporate & Institutional Banking and Commercial Banking, in support of the Group's strategy. The Committee also provides governance oversight over key matters in Europe and Americas.

The Private Banking Process Governance and Risk Committee ensures the effective management of risk throughout Private Banking with Group Risk Appetite. The committee is chaired jointly by the Chief Risk Officer, Commercial Banking and Private Banking and the Global Head, Private Banking and Wealth Management.

The two regional risk committees are chaired by the Chief Risk Officer for the respective region. These ensure the effective management of risk in the regions in support of the Group's strategy.

The Investment Committee for Transportation Assets, chaired by the Chief Risk Officer, Business, ensures the optimisation of the Group's investment in aviation and shipping operating lease assets, with the aim of delivering better returns through the cycle.

The Investment Committee ensures the optimised wind-down of the Group's existing direct investment activities in equities, quasi-equities (excluding mezzanine), funds and other alternative investments (excluding debt/debt-like instruments). The Committee is chaired by a representative of the Risk function (which includes the Group Chief Risk Officer, Global Head, Enterprise Risk Management and Chief Risk Officer, Business).

Group Asset and Liability committee

The Group Asset and Liability Committee is chaired by the Group Chief Financial Officer. Its members are drawn principally from the Management Team. The Committee is responsible for determining the Group's approach to balance sheet strategy and recovery planning. The Committee is also responsible for ensuring that, in executing the Group's strategy, the Group operates within internally approved Risk Appetite and external requirements relating to capital, loss-absorbing capacity, liquidity, leverage, Interest Rate Risk in the Banking Book, Banking Book Basis Risk and Structural Foreign Exchange Risk, and meets internal and external recovery planning requirements.

Principal risks

We manage and control our Principal Risk Types through distinct Risk Type Frameworks, policies and Board-approved Risk Appetite.

Credit Risk

The Group defines Credit Risk as the potential for loss due to the failure of a counterparty to meet its agreed obligations to pay the Group

Risk Appetite Statement

The Group manages its credit exposures following the principle of diversification across products, geographies, client segments and industry sectors

Roles and responsibilities

The Credit Risk Type Frameworks for the Group are set and owned by the Chief Risk Officers for the business segments. The Credit Risk function is the second line control function responsible for independent challenge, monitoring and oversight of the Credit Risk management practices of the business and functions engaged in or supporting revenue-generating activities which constitute the first line of defence. In addition, they ensure that Credit Risks are properly assessed and transparent; and that credit decisions are controlled in accordance with the Group's Risk Appetite, credit policies and standards. For the Retail Banking segment, the Retail Risk function is also responsible for specific activities such as collections.

Mitigation

Segment-specific policies are in place for the management of Credit Risk.

The Credit Policy for Corporate & Institutional Banking and Commercial Banking sets the principles that must be followed for the end-to-end credit process including credit initiation, credit grading, credit assessment, structuring of product, Credit Risk mitigation, monitoring and control, and documentation.

The Retail Credit Risk Management Policy sets the principles for the management of retail and business banking lending, account and portfolio monitoring, collections management and forbearance programmes. In addition, there are other Group-wide policies integral to Credit Risk management such as those relating to Risk Appetite, Model Risk, stress testing, and impairment provisioning.

The Group also set out standards for the eligibility, enforceability and effectiveness of Credit Risk mitigation arrangements. Potential credit losses from a given account, client or portfolio are mitigated using a range of tools i.e. collateral, netting agreements, credit insurance, credit derivatives and guarantees.

Risk mitigants are also carefully assessed for their market value, legal enforceability, correlation and counterparty risk of the protection provider.

Collateral must be valued prior to drawdown and regularly thereafter as required to reflect current market conditions, the probability of recovery and the period of time to realise the collateral in the event of liquidation. The Group also seeks to diversify its collateral holdings across asset classes and markets.

Where guarantees, credit insurance, standby letters of credit or credit derivatives are used as Credit Risk mitigation, the creditworthiness of the protection provider is assessed and monitored using the same credit approval process applied to the obligor.

Governance committee oversight

At the Board level, the Board Risk Committee oversees the effective management of Credit Risk.

At the executive level, the Group Risk Committee appoints sub-committees for the management of Credit Risk – in particular the Corporate, Commercial and Institutional Banking Risk Committee (CCIBRC), the Private Banking Process Governance and Risk Committee, and the regional risk committees for ASEAN & South Asia and Africa & Middle East. These committees are responsible for overseeing the Credit Risk profile of the Group within the respective business areas and regions. Meetings are held regularly, and the committees monitor all material Credit Risk exposures, as well as key internal developments and external trends, and ensure that appropriate action is taken.

Decision-making authorities and delegation

The Credit Risk Type Frameworks are the formal mechanism which delegate Credit Risk authorities cascading from the Group Chief Risk Officer, as the Senior Manager of the Credit Risk Type, to individuals such as the business segments' Chief Risk Officers. Named individuals further delegate credit authorities to individual credit officers by applying delegated credit authority matrices, which determine the maximum limits based on risk-adjusted scales by customer type or portfolio.

Credit Risk authorities are reviewed at least annually to ensure that they remain appropriate. In Corporate & Institutional Banking, Commercial Banking and Private Banking, the individuals delegating the Credit Risk authorities perform oversight by reviewing a sample of the limit applications approved by the delegated credit officers on a monthly basis. In Retail Banking, credit decision systems and tools (e.g., application scorecards) are used for credit decisioning. Where manual credit decisions are applied, these are subject to periodic quality control assessment and assurance checks.

Monitoring

We regularly monitor credit exposures, portfolio performance, and external trends that may impact risk management outcomes. Internal risk management reports that are presented to risk committees contain information on key political and economic trends across major portfolios and countries; portfolio delinquency and loan impairment performance.

In 2019, the Group introduced an Industry Portfolio Mandate (IPM), developed jointly by the Corporate & Institutional Banking and Commercial Banking Business and Risk function to provide a forward-looking assessment of risk and simplification of processes while increasing focus on clients. The IPM is a single platform from which business strategy, risk considerations and client planning are performed with one consensus view which comprises external industry outlook, portfolio overviews, Risk Appetite, underwriting principles and stress test insights.

In Corporate & Institutional Banking and Commercial Banking, clients and portfolios are subjected to additional review when they display signs of actual or potential weakness; for example, where there is a decline in the client's position within the industry, financial deterioration, a breach of covenants, or non-performance of an obligation within the stipulated period. Such accounts are subjected to a dedicated process overseen by the Credit Issues Committees in the relevant countries where client account strategies and credit grades are re-evaluated. In addition, remedial actions including exposure reduction, security enhancement, or exiting the account could be undertaken, and certain accounts could also be transferred into the control of Group Special Assets Management (GSAM), which is our specialist recovery unit for Corporate & Institutional Banking and Commercial Banking, and Private Banking that operates independently from our main business.

For Retail Banking exposures, portfolio delinquency trends are monitored on an ongoing basis. Account monitoring is based on behaviour scores and bureau performance (where available). Accounts that are past due (or perceived as high risk and not yet past due) are subject to a collections or recovery process managed by a specialist function independent from the origination function. In some countries, aspects of collections and recovery activities are outsourced.

Credit rating and measurement

All credit proposals are subject to a robust Credit Risk assessment. It includes a comprehensive evaluation of the client's credit quality, including willingness, ability and capacity to repay. The primary lending consideration is based on the client's credit quality and the repayment capacity from operating cashflows for counterparties; and personal income or wealth for individual borrowers. The risk assessment gives due consideration to the client's liquidity and leverage position. Where applicable, the assessment includes a detailed analysis of the Credit Risk mitigation arrangements to determine the level of reliance on such arrangements as the secondary source of repayment in the event of a significant deterioration in a client's credit quality leading to default.

Risk measurement plays a central role, along with judgement and experience, in informing risk-taking and portfolio management decisions. Since 1 January 2008, we have used the advanced internal ratings-based approach under the Basel regulatory framework to calculate Credit Risk capital requirements. The Group has also established a global programme to undertake a comprehensive assessment of capital requirements necessary to be implemented to meet the latest revised Basel III finalisation (Basel IV) regulations.

A standard alphanumeric Credit Risk grade system is used for Corporate & Institutional Banking and Commercial Banking. The numeric grades run from 1 to 14 and some of the grades are further sub-classified. Lower numeric credit grades are indicative of a lower likelihood of default. Credit grades 1 to 12 are assigned to performing customers, while credit grades 13 and 14 are assigned to non-performing or defaulted customers.

Retail Banking internal ratings-based portfolios use application and behavioural credit scores that are calibrated to generate a probability of default and then mapped to the standard alphanumeric Credit Risk grade system. We refer to external ratings from credit bureaus (where these are available); however, we do not rely solely on these to determine Retail Banking credit grades.

Advanced internal ratings-based models cover a substantial majority of our exposures and are used in assessing risks at a customer and portfolio level, setting strategy and optimising our risk-return decisions. Material internal ratings-based risk measurement models are approved by the Model Risk Committee. Prior to review and approval, all internal ratings-based models are validated in detail by a model validation team which is separate from the teams that develop and maintain the models. Models undergo annual validation by the model validation team. Reviews are also triggered if the performance of a model deteriorates materially against predetermined thresholds during the ongoing model performance monitoring process which takes place between the annual validations.

Credit Concentration Risk

Credit Concentration Risk may arise from a single large exposure to a counterparty or a group of connected counterparties, or from multiple exposures across the portfolio that are closely correlated. Large exposure Concentration Risk is managed through concentration limits set for a counterparty or a group of connected counterparties based on control and economic dependence criteria. Risk Appetite metrics are set at portfolio level and monitored to control concentrations, where appropriate, by industry, specific products, tenor, collateralisation level, top 20 concentration and exposure to holding companies. Single name credit concentration thresholds are set by client group depending on credit grade, and by customer segment. For concentrations that are material at a Group level, breaches and potential breaches are monitored by the respective governance committees and reported to the Group Risk and Board Risk Committees.

Credit impairment

Expected credit losses are determined for all financial assets that are classified as amortised cost or fair value through other comprehensive income. Expected credit losses are computed as an unbiased, probability-weighted amount determined by evaluating a range of plausible outcomes, the time value of money, and considering all reasonable and supportable information including that which is forward looking. When determining forward looking expected credit losses, the Group also considers a set of critical global or country-specific macroeconomic variables that influence Credit Risk. For more detailed information on macroeconomic data feeding into IFRS 9 expected credit losses calculations, please refer to page 182.

At the time of origination or purchase of a non-credit-impaired financial asset (stage 1), expected credit losses represent cash shortfalls arising from possible default events up to 12 months into the future from the balance sheet date. Expected credit losses continue to be determined on this basis until there is a significant increase in the Credit Risk of the asset (stage 2), in which case an expected credit loss provision is recognised for default events that may occur over the lifetime of the asset. If there is observed objective evidence of credit impairment or default (stage 3), expected credit losses continue to be measured on a lifetime basis.

In 2019, the Board approved a new Risk Appetite metric to monitor the stage 1 and stage 2 expected credit losses from assets originated in the last 12 months. The Risk Appetite metric provided the Board with oversight of the quality of assets being originated and to ensure that they are aligned to the Group's strategy.

The Group's definition of default is aligned with the regulatory definition of default as set out in European Capital Requirements Regulation (CRR178) and related guidelines, where the obligor is at least 90 days past due in respect of principal and/or interest. A loan is considered past due (or delinquent), when the customer has failed to make a principal or interest payment in accordance with the loan contract. Financial assets are also considered to be credit-impaired where the obligors are unlikely to pay on the occurrence of one or more observable events that have a detrimental impact on the estimated future cashflows of the financial asset.

In Corporate & Institutional Banking, Commercial Banking and Private Banking, a loan is considered credit-impaired where analysis and review indicate that full payment of either interest or principal, including the timeliness of such payment, is questionable, or as soon as payment of interest or principal is 90 days overdue. These credit-impaired accounts are managed by our specialist recovery unit (GSAM). Where appropriate, the non-material credit impaired accounts are co-managed with the business under the supervision of GSAM.

In Retail Banking, a loan is considered credit-impaired as soon as payment of interest or principal is 90 days overdue or meets other objective evidence of impairment such as bankruptcy, debt restructuring, fraud or death. Financial assets are written off when there is no realistic prospect of recovery and the amount of loss has been determined. For Retail Banking assets, a financial asset is written off when it meets certain threshold conditions which are set at the point where empirical evidence suggests that the client is unlikely to meet their contractual obligations, or a loss of principal is expected.

Estimating the amount and timing of future recoveries involves significant judgement and considers the assessment of matters such as future economic conditions and the value of collateral, for which there may not be a readily accessible market. The total amount of the Group's impairment provision is inherently uncertain, being sensitive to changes in economic and credit conditions across the regions in which the Group operates. For further details on sensitivity analysis of expected credit losses under IFRS 9, please refer to page 182.

Stress testing

Stress testing is a forward-looking risk management tool that constitutes a key input into the identification, monitoring and mitigation of Credit Risk, as well as contributing to Risk Appetite calibration. Periodic stress tests are performed on the credit portfolio/segment to anticipate vulnerabilities from stressed conditions and initiate timely right-sizing and mitigation plans. Additionally, multiple enterprise-wide and country-level stress tests are mandated by regulators to assess the ability of the Group and its subsidiaries to continue to meet their capital requirements during a plausible, adverse shock to the business. These regulatory stress tests are conducted in line with the principles stated in the Enterprise Stress Testing Policy. The Group's enterprise stress testing programme adopted IFRS 9 in full in 2018 and all enterprise stress tests conducted during 2019 were performed on an IFRS 9 basis. Stress tests for key portfolios are reviewed by the Credit Risk Type Framework Owners (or delegates) as part of portfolio oversight; and matters considered material to the Group are escalated to the Group Chief Risk Officer and respective regional risk committees.

Traded Risk

The Group defines Traded Risk as the potential for loss resulting from activities undertaken by the Group in financial markets

Risk Appetite Statement

The Group should control its trading portfolio and activities to ensure that Traded Risk losses (financial or reputational) do not cause material damage to the Group's franchise

The Traded Risk Type Framework (TRTF) brings together all risk types exhibiting risk features common to Traded Risk. These risk sub-types include Market Risk, Counterparty Credit Risk, Issuer Risk, XVA, Algorithmic Trading and Pension Risk. Traded Risk Management (TRM) is the core risk management function supporting market-facing businesses, specifically Financial Markets and Treasury Markets.

Roles and responsibilities

The TRTF, which sets the roles and responsibilities in respect of Traded Risk for the Group, is owned by the Global Head, Traded Risk Management. The front office, acting as first line of defence, is responsible for the effective management of risks within the scope of its direct organisational responsibilities set by the Board. The TRM function is the second line control function that performs independent challenge, monitoring and oversight of the Traded Risk management practices of the first line of defence. The first and second lines of defence are supported by the organisation structure, job descriptions and authorities delegated by Traded Risk control owners.

Mitigation

The Group controls its trading portfolio and activities within Risk Appetite by assessing the various Traded Risk factors. These are captured and analysed using proprietary and custom-built analytical tools, in addition to risk managers' specialist market and product knowledge.

TRM has a framework, policies and standards in place ensuring that appropriate Traded Risk limits are implemented. The Group's Traded Risk exposure is aligned with its appetite for Traded Risk, and assessment of potential losses that might be incurred by the Group as a consequence of extreme but plausible events.

Traded Risk limits are applied as required by the TRTF and related standards.

All businesses incurring Traded Risk must do so in compliance with the TRTF. The TRTF requires that Traded Risk limits are defined at a level appropriate to ensure that the Group remains within Traded Risk Appetite. All exposures throughout the Group that the TRM function is responsible for aggregate up to TRM's Group-level reporting. This aggregation approach ensures that the limits structure across the Group is consistent with the Group's Risk Appetite.

The TRTF and Enterprise Stress Testing Policy ensure that adherence to stress-related Risk Appetite metrics is achieved. Stress testing aims at supplementing other risk metrics used within the Group by providing a forward-looking view of positions and an assessment of their resilience to stressed market conditions. Stress testing is performed on all Group businesses with Traded Risk exposures, either where the risk is actively traded or where material risk remains. This additional information is used to inform the management of the Traded Risks taken within the Group. The outcome of stress tests is discussed across the various business lines and management levels so that existing and potential risks can be reviewed, and related management actions can be decided upon where appropriate.

Policies are reviewed and approved by the Global Head, TRM annually to ensure their ongoing effectiveness and sustainability.

Governance committee oversight

At the Board level, the Board Risk Committee oversees the effective management of Traded Risk. At the executive level, the Group Risk Committee delegates responsibilities to the CCIBRC to act as the primary risk governance body for Traded Risk, and to the Stress Testing Committee for stress testing and the Model Risk Committee for Model Risk. Where Traded Risk limits are set at a country level, committee governance is:

- Subsidiary authority for setting Traded Risk limits, where applicable, is delegated from the local Board to the local risk committee, Country Chief Risk Officer and Traded Risk managers
- Branch authority for setting Traded Risk limits remains with TRM which retains responsibility for monitoring and reporting excesses
- Joint ventures (JV), e.g. Permata, are formally managed independently from the Group. However, if Standard Chartered exerts significant management influence in practice, such as through senior functional appointments, then the Group regulator (UK PRA) may require the risks to be fully consolidated, just as though it was a subsidiary

Decision-making authorities and delegation

The Group's Risk Appetite Statement, along with the key associated Risk Appetite metrics, is approved by the Board with responsibility for Traded Risk limits, then tiered accordingly.

Subject to the Group's Risk Appetite for Traded Risk, the Group Risk Committee sets Group-level Traded Risk limits, via delegation to the Group Chief Risk Officer. The Group Chief Risk Officer delegates authority for the major business limits and for all other Traded Risk limits to the TRTF Owner (Global Head, TRM) who in turn delegates approval authorities to individual Traded Risk managers.

Additional limits are placed on specific instruments, positions, and portfolio concentrations where appropriate. Authorities are reviewed at least annually to ensure that they remain appropriate and to assess the quality of decisions taken by the authorised person. Key risk-taking decisions are made only by certain individuals with the skills, judgement and perspective to ensure that the Group's control standards and risk-return objectives are met. Authority delegators are responsible for monitoring the quality of the risk decisions taken by their delegates and the ongoing suitability of their authorities.

Market Risk – value at risk

The Group applies VaR as a measure of the risk of losses arising from future potential adverse movements in market rates, prices and volatilities. VaR is a quantitative measure of Market Risk that applies recent historical market conditions to estimate the potential future loss in market value that will not be exceeded in a set time period at a set statistical confidence level. VaR provides a consistent measure that can be applied across trading businesses and products over time and can be set against actual daily trading profit and loss outcomes.

VaR is calculated for expected movements over a minimum of one business day and to a confidence level of 97.5 per cent.

VaR is calculated on our exposure as at the close of business, generally UK time. Intra-day risk levels may vary from those reported at the end of the day.

The Group applies two VaR methodologies:

- Historical simulation: this involves the revaluation of all existing positions to reflect the effect of historically observed changes in Market Risk factors on the valuation of the current portfolio. This approach is applied for general Market Risk factors and the majority of specific (credit spread) risk VaRs
- Monte Carlo simulation: this methodology is similar to historical simulation but with considerably more input risk factor observations. These are generated by random sampling techniques, but the results retain the essential variability and correlations of historically observed risk factor changes. This approach is applied for some of the specific (credit spread) risk VaR in relation to idiosyncratic exposures in credit markets

In both methods, a historical observation period of one year is chosen and applied.

A small proportion of Market Risk generated by trading positions is not included in VaR or cannot be appropriately captured by VaR. This is recognised through a Risks-not-in-VaR Framework, which estimates these risks and applies capital add-ons.

To assess their ongoing performance, VaR models are backtested against actual results.

An analysis of VaR and backtesting results in 2019 is available in the Risk profile section (pages 191 to 193).

Counterparty Credit Risk

Credit Risk from traded products derives from the positive mark-to market value of the underlying instruments, and an additional component to cater for potential future market movements. This Counterparty Credit Risk is managed within the Group's overall Traded Risk Appetite for corporate and financial institutions. In addition to analysing potential future movements, the Group uses various single factor or multi-risk factor stress test scenarios to identify and manage Counterparty Credit Risk across derivatives and securities financing transactions.

Underwriting

The underwriting of securities and loans is in scope of the Risk Appetite set by the Group for Traded Risk. Additional limits approved by the Group Chief Risk Officer are set on the underwriting portfolio stress loss, and the maximum holding period. The Underwriting Committee, under the authority of the Group Chief Risk Officer, approves individual proposals to underwrite new security issues and loans for our clients.

Day-to-day Credit Risk management activities for traded securities are carried out by a specialist team within TRM whose activities include oversight and approval within the levels delegated by the Underwriting Committee. Issuer Credit Risk, including Settlement and Pre-Settlement Risk, and price risks are controlled by TRM. Where an underwritten security is held for a period longer than the target sell-down period, the final decision on whether to sell the position rests with TRM.

Monitoring

TRM monitors the overall portfolio risk and ensures that it is within specified limits and therefore Risk Appetite. The annual and mid-year limit review processes provide opportunities for the business and TRM to review risk in light of performance. Monitoring and breach escalation procedures for Traded Risk are aligned with the processes set by the Enterprise Risk Management Risk Appetite unit.

Traded Risk exposures are monitored daily against approved limits. Traded Risk limits apply at end-of-day and at all other times, unless separate intra-day limits have been set. Limit excess approval decisions are informed by factors such as an assessment of the returns that will result from an incremental increase to the business risk exposure. Limits and excesses can only be approved by a Traded Risk manager with the appropriate delegated authority. Financial Markets traders may adjust their Traded Risk exposures within approved limits and assess risk and reward trade-offs according to market conditions.

TRM reports and monitors limits applied to stressed exposures. Stress scenario analysis is performed on all Traded Risk exposures in Financial Markets and in portfolios outside Financial Markets such as syndicated loans and principal finance. Stress loss excesses are discussed with the business and approved where appropriate, based on delegated authority levels.

Stress testing

The VaR measurement is complemented by weekly stress testing of Market Risk exposures to highlight the potential risk that may arise from extreme market events that are deemed rare but plausible.

Stress testing is an integral part of the Traded Risk management framework and considers both historical market events and forward-looking scenarios. A consistent stress testing methodology is applied to trading and non-trading books. The stress testing methodology assumes that scope for management action would be limited during a stress event, reflecting the decrease in market liquidity that often occurs.

Stress scenarios are regularly updated to reflect changes in risk profile and economic events. The TRM function reviews stress testing results and, where necessary, enforces reductions in overall Market Risk exposure. The Group Risk Committee considers the results of stress tests as part of its supervision of Risk Appetite.

Regular stress test scenarios are applied to interest rates, credit spreads, exchange rates, commodity prices and equity prices. This covers all asset classes in the Financial Markets banking and trading books, including XVA (CVA and FVA). Ad hoc scenarios are also prepared, reflecting specific market conditions and for particular concentrations of risk that arise within the business.

Where required by local statute or regulation, TRM's Group and business-wide stress and scenario testing will be supplemented by entity stress testing at a country level. This stress testing is coordinated at the country level and subject to the relevant local governance.

Capital and Liquidity Risk

The Group defines Capital Risk as the potential for insufficient level, composition or distribution of capital to support our normal activities, and Liquidity Risk as the risk that we may not have sufficient stable or diverse sources of funding to meet our obligations as they fall due

Risk Appetite Statement

The Group should maintain a strong capital position including the maintenance of management buffers sufficient to support its strategic aims and hold an adequate buffer of high-quality liquid assets to survive extreme but plausible liquidity stress scenarios for at least 60 days without recourse to extraordinary central bank support

Roles and responsibilities

The Treasurer is responsible for developing a Risk Type Framework for Capital and Liquidity Risk and for complying with regulatory requirements at a Group level. The Treasury and Finance functions, as the second line of defence, provide independent challenge and oversight of the first line risk management activities relating to Capital and Liquidity Risk. In country, the Treasurer is supported by Treasury and Finance in implementing the Capital and Liquidity Risk Type Framework.

Mitigation

The Group develops policies to address material Capital and Liquidity risks and aims to maintain its risk profile within Risk Appetite. In order to do this, metrics are set against Capital Risk, Liquidity and Funding Risk and Interest Rate Risk in the Banking Book. Risk Appetite metrics are also cascaded down to regions and countries in the form of limits and management action triggers.

The Group also maintains a Recovery Plan which is a live document to be used by management in a liquidity or solvency stress. The Recovery Plan includes a set of Recovery Indicators, an escalation framework and a set of management actions capable of being implemented in a stress. A Recovery Plan is also maintained within each major country.

Capital Risk

In order to manage Capital Risk, strategic business and capital plans are drawn up covering a five-year horizon and are approved by the Board annually. The capital plan ensures that adequate levels of capital, including loss- absorbing capacity, and an efficient mix of the different components of capital are maintained to support our strategy and business plans. Treasury is responsible for the ongoing assessment of the demand for capital and the updating of the Group's capital plan.

Capital planning takes the following into account:

- Current regulatory capital requirements and our assessment of future standards and how these might change
- Demand for capital due to the business and loan impairment outlook and potential market shocks or stresses
- Available supply of capital and capital raising options, including ongoing capital accretion from the business

Additionally, Risk Appetite metrics including leverage ratios and Tier 1 ratios (in both regular and stressed conditions) and metrics relating to structural FX positions, minimum requirement for own funds and eligible liability (MREL) are being assessed within the Corporate Plan to ensure that our business plan can be achieved within risk tolerances.

Structural FX Risk

The Group's structural position results from the Group's non-US dollar investment in the share capital and reserves of subsidiaries and branches. The FX translation gains or losses are recorded in the Group's Translation Reserves with a direct impact on the Group's Common Equity Tier 1 ratio.

The Group contracts hedges to manage its structural FX position in accordance with the Board-approved Risk Appetite, and as a result the Group has taken net investment hedges to partially cover its exposure to the Korean won, Chinese renminbi, Taiwanese dollar and Indian rupee to mitigate the FX impact of such positions on its capital ratios.

Liquidity Risk

At Group and country level we implement various business-as-usual and stress risk metrics and monitor these against limits and management action triggers. This ensures that the Group maintains an adequate and well-diversified liquidity buffer as well as a stable funding base, and that it meets its liquidity and funding regulatory requirements. The approach to managing risks and the Board Risk Appetite are assessed annually through the Internal Liquidity Adequacy Assessment Process. A funding plan is also developed for efficient liquidity projections to ensure that the Group is adequately funded in the required currencies, to meet its obligations and client funding needs.

Interest Rate Risk in the Banking Book

The Group defines Interest Rate Risk in the Banking Book (IRRBB) as the potential for a reduction in future earnings or economic value due to changes in interest rates. This risk arises from differences in the repricing profile, interest rate basis, and optionality of banking book assets, liabilities and off-balance sheet items. IRRBB represents an economic and commercial risk to the Group and its capital adequacy. The Group monitors IRRBB against a Board-approved Risk Appetite.

Governance committee oversight

At the Board level, the Board Risk Committee oversees the effective management of Capital and Liquidity Risk. At the executive level, the Group Asset and Liability Committee ensures the effective management of risk throughout the Group in support of the Group's strategy, guides the Group's strategy on balance sheet optimisation and ensures that the Group operates within the internally approved Risk Appetite and other internal and external capital and liquidity requirements.

The Group Asset and Liability Committee delegates part of this responsibility to the Operational Balance Sheet Committee to ensure alignment with business objectives.

Country oversight under the capital and liquidity framework resides with country Asset and Liability Committees. Countries must ensure that they remain in compliance with Group capital and liquidity policies and practices, as well as local regulatory requirements.

The Stress Testing Committee ensures the effective management of capital and liquidity-related enterprise stress testing in line with the Group's Enterprise Stress Testing Policy and applicable regulatory requirements. The Stress Testing Committee reviews, challenges and approves stress scenarios, results and management actions for all enterprise stress tests. Insights gained from the stress tests are used to inform underwriting decisions, risk management, capital and liquidity planning and strategy.

Decision-making authorities and delegation

The Group Chief Financial Officer has responsibility for capital, funding and liquidity under the Senior Managers Regime. The Group Chief Risk Officer has delegated the Risk Framework Owner responsibilities associated with Capital and Liquidity Risk to the Treasurer. The Treasurer delegates second line oversight and challenge responsibilities to relevant and suitably qualified Treasury and Finance individuals.

Monitoring

On a day-to-day basis, the management of Capital and Liquidity Risk at the country level is performed by the Country Chief Executive Officer and Treasury Markets respectively. The Group regularly reports and monitors Capital and Liquidity Risk inherent in its business activities and those that arise from internal and external events. The management of capital and liquidity is monitored by Treasury and Finance with appropriate escalation processes in place.

Internal risk management reports covering the balance sheet and the capital and liquidity position of the Group are presented to the Operational Balance Sheet Committee and the Group Asset and Liability Committee. The reports contain key information on balance sheet trends, exposures against Risk Appetite and supporting risk measures which enable members to make informed decisions around the overall management of the Group's balance sheet. Oversight at a country level is provided by the country Asset and Liability Committee, with a focus on the local capital and liquidity risks, local prudential requirements and risks that arise from local internal and external events.

Stress testing

Stress testing and scenario analysis are an integral part of the capital and liquidity framework and are used to ensure that the Group's internal assessment of capital and liquidity considers the impact of extreme but plausible scenarios on its risk profile. A number of stress scenarios, some designed internally, some required by regulators, are run periodically. They provide an insight into the potential impact of significant adverse events on the Group's capital and liquidity position and how this could be mitigated through appropriate management actions to ensure that the Group remains within the approved Risk Appetite and regulatory limits. Daily liquidity stress scenarios are also run to ensure the Group holds sufficient high-quality liquid assets to withstand extreme liquidity events.

Country Risk

The Group defines Country Risk as the potential for losses due to political or economic events in a country

Risk Appetite Statement

The Group manages its Country Risk exposures following the principle of diversification across geographies and controls business activities in line with the level of jurisdiction risk

Roles and responsibilities

The Country Risk Type Framework provides clear accountability and roles for managing risk through the three lines of defence model. The Global Head, Enterprise Risk Management is responsible for the management and control of Country Risk across the Group and is supported by the regional and country Chief Risk Officers who provide second line oversight and challenge to the first line Country Risk management activities. The first line ownership of Country Risk resides with the regional and country Chief Executive Officers who are responsible for the application of the framework; identification of Country Risk sub-types; and contributing to the limit setting approach by providing insight into the country business strategy. The first line also has responsibilities for ensuring that exposures remain within approved limits and in the event of any breaches, for putting in place appropriate remediation plans in a timely manner.

Mitigation

Standards are developed and deployed to implement requirements and controls that all countries must follow to ensure effective management of Country Risk. The standards outline the process for Country Risk limit setting, monitoring and reporting exposures. In response to growing concerns over the Country Risk outlook for a particular country, sovereign ratings may be downgraded, and country limits may also be reduced.

Governance committee oversight

At the Board level, the Board Risk Committee oversees the effective management of Country Risk. At the executive level, the Group Risk Committee is responsible for approving policies and control risk parameters, monitoring material risk exposures and directing appropriate action in response to material risk issues or themes that come to the Committee's attention that relate to Country Risk. At a country level, the Country Risk Committee (or Executive Risk Committee for subsidiaries) is responsible for monitoring all risk issues for the respective country, including Country Risk.

Decision-making authorities and delegation

The Country Risk Type Framework is the formal mechanism through which the delegation of Country Risk authorities is made. Approval authorities for Country Risk limits have been set based on the size of the proposed limit and the sovereign rating. The key principle is that large nominal limits, as well as higher risk jurisdictions, will require escalation for approval based on set levels per the delegated authorities approval matrix.

Monitoring

In 2019, risk coverage of Country Risk was expanded from Country Cross-Border Risk to Gross Country Risk which is an aggregate of Transfer and Convertibility Risk and Local Currency Risk . This is to provide a more holistic and enhanced approach to Country Risk.

Monitoring and reporting of Country Risk is included in the standards and covers the monitoring of exposures relative to Risk Appetite thresholds and limits, as well as the reporting of material exposures to internal committees and externally where appropriate. Risk Appetite focusses on monitoring Gross Country Risk exposure to a single country as a percentage of aggregated Gross Country Risk exposure across all countries. The Group Risk Committee monitors Risk Appetite thresholds on a traffic-light indicator basis, and these provide an early warning signal of stress and concentration risk. An escalation process to the Board Risk Committee is in place based on the traffic-light indicators monitoring system.

Enhanced capabilities have been established with the Country Risk Dashboard to monitor and manage Country Risk exposures for the expanded scope of Country Risk.

Stress testing

The Group Country Risk team produces stressed sovereign ratings which are used by the relevant Credit and Traded Risk teams in calculating risk-weighted assets during described extreme but plausible stress scenarios.

Reputational Risk

The Group defines Reputational Risk as the potential for damage to the franchise, resulting in loss of earnings or adverse impact on market capitalisation because of stakeholders taking a negative view of the organisation, its actions or inactions – leading stakeholders to change their behaviour.

Risk Appetite Statement

The Group aims to protect the franchise from material damage to its reputation by ensuring that any business activity is satisfactorily assessed and managed by the appropriate level of management and governance oversight

Roles and responsibilities

The Global Head, Enterprise Risk Management is the Risk Framework Owner for Reputational Risk under the Group's Enterprise Risk Management Framework. For primary risks, the responsibility of Reputational Risk management at country level is delegated to Country Chief Risk Officers. Both the Global Head, Enterprise Risk Management and Country Chief Risk Officers constitute the second line of defence, overseeing and challenging the first line which resides with the Chief Executive Officers, Business Heads and Product Heads in respect of risk management activities of reputational-related risks. The Group recognises that there is also the potential for consequential Reputational Risk should it fail to control other principal risks. Such secondary Reputational Risks are managed by the Risk Framework Owners of each principal risk who are responsible for enhancing existing risk management frameworks to incorporate Reputational Risk management approaches.

Mitigation

The Group's Reputational Risk policy sets out the principal sources of Reputational Risk and the responsibilities and procedures for identifying, assessing and escalating primary and secondary Reputational Risks. The policy also defines the control and oversight standards to effectively manage Reputational Risk. The Group takes a structured approach to the assessment of risks associated with how individual client, transaction, product and strategic coverage decisions may affect perceptions of the organisation and its activities, including, but not limited to, explicit principles related to environment and social risks and defence and dual use goods. Wherever a potential for stakeholder concerns is identified, issues are subject to prior approval by a management authority commensurate with the materiality of matters being considered. Such authorities may accept or decline the risk or impose conditions upon proposals, to protect the Group's reputation. Secondary Reputational Risk mitigation derives from the effective management of other principal risks.

Governance committee oversight

The Brand, Values and Conduct Committee retains Board-level oversight responsibility for Reputational Risk. Oversight from an operational perspective falls under the remit of the Group Risk Committee and the Board Risk Committee. The Group Reputational Risk Committee ensures the effective management of primary Reputational Risk across the Group.

The Group Reputational Risk Committee's remit is to:

- Challenge, constrain and, if required, stop business activities where risks are not aligned with the Group's Risk Appetite
- Make decisions on Reputational Risk matters assessed as high or very high based on the Group's primary Reputational Risk materiality assessment matrix, and matters escalated from the regions or client businesses
- Provide oversight of material Reputational Risk and/or thematic issues arising from the potential failure of other risk types

The Group Non-Financial Risk Committee has oversight of the effective management of secondary Reputational Risk.

Decision-making authorities and delegation

The Group Risk Committee provides Group-wide oversight on Reputational Risk, approves policy and monitors material risks. The Group Reputational Risk Committee is authorised to approve or decline Reputational Risk aspects of any business transaction, counterparty, client, product, line of business and market within the boundaries of the Group's Risk Appetite, and any limits and policies set by authorised bodies of the Group.

Monitoring

Reputational Risk policies and standards are applicable to all Group entities. However, local regulators in some markets may impose additional requirements on how banks manage and track Reputational Risk. In such cases, these are complied with in addition to Group policies and standards. Exposure to Reputational Risk is monitored through:

- A requirement that process owners establish triggers to prompt consideration of Reputational Risk and escalation where necessary
- The tracking of risk acceptance decisions
- The tracking of thematic trends in secondary risk arising from other principal risks
- The analysis of prevailing stakeholder concerns and industries with greater exposure to environmental, social and governance issues

In 2019, enhanced capabilities have been established to integrate risk identification and assessment into the client on-boarding and review process, and transaction reviews. In addition, web-scraping technology has been combined with internal data to provide detailed risk monitoring, analytics and drill down capabilities.

Stress testing

Although Reputational Risk is not an explicit separate regulatory factor in enterprise stress tests, it is incorporated into the Group's stress testing scenarios. For example, the Group may consider what impact a hypothetical event leading to loss of confidence among liquidity providers in a particular market might have, or what the implications might be for supporting part of the organisation in order to protect the brand.

Operational Risk

The Group defines Operational Risk as the potential for loss resulting from inadequate or failed internal processes and systems, human error or from the impact of external events (including legal risks).

Risk Appetite Statement

The Group aims to control operational risks to ensure that operational losses (financial or reputational), including any related to conduct of business matters, do not cause material damage to the Group's franchise

Roles and responsibilities

The Operational Risk Type Framework (ORTF) is set by the Global Head of Risk, Functions and Operational Risk and is applicable enterprise-wide. This Framework defines and collectively groups operational risks which have not been classified as principal risks into non-Principal Risk Types (non-PRTs) and sets standards for the identification, control, monitoring and treatment of risks. These standards are applicable across all PRTs and non-PRTs. The non-PRTs relate to execution capability, governance, reporting and obligations, legal enforceability, and operational resilience (including client service, third party vendor services, change management, safety and security and system availability).

The ORTF reinforces clear accountability for managing risk throughout the Group and delegates second line of defence responsibilities to identified subject matter experts. For each non-PRT, the expert sets policies for the organisation to comply with, and provides guidance, oversight and challenge over the activities of the Group. They ensure that key risk decisions are only taken by individuals with the requisite skills, judgement, and perspective to ensure that the Group's risk-return objectives are met.

Mitigation

The ORTF sets out the Group's overall approach to the management of Operational Risk in line with the Group's Operational Risk Appetite. This is supported by Control Assessment Standards (CAS) which define roles and responsibilities for the identification, control and monitoring of risks (applicable to all non-PRTs and PRTs).

The CAS are used to determine the design strength and reliability of each process, and require:

- The recording of processes run by client segments, products, and functions into a process universe
- The identification of potential breakdowns to these processes and the related risks of such breakdowns
- An assessment of the impact of the identified risks based on a consistent scale
- The design and monitoring of controls to mitigate prioritised risks
- Assessments of residual risk and timely actions for elevated risks

Risks that exceed the Group's Operational Risk Appetite require treatment plans to address underlying causes.

Governance committee oversight

At the Board level, the Board Risk Committee oversees the effective management of Operational Risk. At the executive level, the Group Risk Committee delegates authority primarily to the Group Non-Financial Risk Committee (GNFRC) to monitor the Group's Operational Risk Appetite and to oversee the Group's Operational Risk profile. The GNFRC has the authority to challenge, constrain and, if required, stop business activities where risks are not aligned with the Group's Operational Risk Appetite.

Regional, business-segments and functional committees also provide enterprise oversight of their respective processes and related operational risks. In addition, Country Non-Financial Risk Committees (CNFRCs) oversee the management of Operational Risks at the country (or entity) level. In smaller countries, the responsibilities of the CNFRC may be exercised directly by the Country Risk Committee (for branches) or Executive Risk Committee (for subsidiaries).

Monitoring

To deliver services to clients and to participate in the financial services sector, the Group runs processes which are exposed to operational risks. The Group prioritises and manages risks which are significant to clients and to the financial services sectors. Control indicators are regularly monitored to determine the residual risk the Group is exposed to. The residual risk assessments and reporting of events form the Group's Operational Risk profile. The completeness of the Operational Risk profile ensures appropriate prioritisation and timeliness of risk decisions, including risk acceptances with treatment plans for risks that exceed acceptable thresholds.

The Board is informed on adherence to Operational Risk Appetite through metrics reported for selected risks. These metrics are monitored, and escalation thresholds are devised based on the materiality and significance of the risk. These Operational Risk Appetite metrics are consolidated on a regular basis and reported at relevant Group committees. This provides senior management with the relevant information to inform their risk decisions.

Stress testing

Stress testing and scenario analysis are used to assess capital requirements for operational risks. This approach considers the impact of extreme but plausible scenarios on the Group's Operational Risk profile. A number of scenarios have been identified to test the robustness of the Group's processes, and assess the potential impact on the Group. These scenarios include anti-money laundering, sanctions, as well as information and cyber security.

Compliance Risk

The Group defines Compliance Risk as the potential for penalties or loss to the Group, or for an adverse impact to our clients, stakeholders or to the integrity of the markets in which we operate through a failure on our part to comply with laws or regulations

Risk Appetite Statement

The Group has no appetite for breaches in laws and regulations; whilst recognising that regulatory non-compliance cannot be entirely avoided, the Group strives to reduce this to an absolute minimum

Roles and responsibilities

The Group Head, Corporate Affairs, Brand & Marketing and Conduct, Financial Crime and Compliance (Group Head, CABM & CFCC) as Risk Framework Owner for Compliance Risk provides support to senior management on regulatory and compliance matters by:

- Providing interpretation and advice on regulatory requirements and their impact on the Group
- Setting enterprise-wide standards for compliance, through the establishment and maintenance of a risk-based compliance framework, the Compliance Risk Type Framework (Compliance RTF)
- Setting a programme for monitoring Compliance Risk

The Compliance RTF sets out the Group's overall approach to the management of Compliance Risk and the roles and responsibilities in respect of Compliance Risk for the Group. All activities that the Group engages in must be designed to comply with the applicable laws and regulations in the countries in which we operate. The CFCC function is the second line that provides oversight and challenge of the first line risk management activities that relate to Compliance Risk.

The Compliance RTF defines Compliance Risk sub-types. Where Compliance Risk arises, or could arise, from failure to manage another principal risk or risk sub-type, the oversight and management processes for that specific principal risk or risk sub-type must be followed and the responsibility rests with the other Risk Framework Owner or control function to ensure that effective oversight and challenge of the first line can be provided by the appropriate second line function.

Each of the assigned second line functions has responsibilities including monitoring relevant regulatory developments from Non-Financial Services regulators at both Group and country levels, policy development, implementation, and validation as well as oversight and challenge of first line processes and controls.

In addition, the CFCC leadership team was strengthened in 2019 by bringing in new skills and breadth of experience. Notably, there is a new Group Regulatory and Public Affairs team to monitor regulatory reforms in key markets and establish a protocol of horizon scanning for emerging Compliance Risk. This protocol helps to ensure that regulatory reforms with the potential to affect the Group in multiple markets are identified and steps taken in good time to help ensure compliance.

Mitigation

The CFCC function develops and deploys relevant policies and standards setting out requirements and controls for adherence by the Group to ensure continued compliance with applicable laws and regulations. Through a combination of risk assessment, control standard setting, control monitoring and compliance assurance activities, the Compliance Risk Framework Owner seeks to ensure that all policies are operating as expected to mitigate the risk that they cover. The installation of appropriate processes and controls is the primary tool for the mitigation of Compliance Risk. In this, the requirements of the Operational Risk Type Framework are followed to ensure a consistent approach to the management of processes and controls. Several material technological solutions were deployed in 2019 to improve efficiencies and simplify processes. These include implementation of an enhanced systems to better track matters raised by our regulators and breaches of regulations, and digital portals and chatbots providing improved access to compliance advice.

Governance committee oversight

Compliance Risk and the risk of non-compliance with laws and regulations resulting from failed processes and controls are overseen by Business, Product and Function Non-Financial Risk Committees. The Conduct and Compliance Non-Financial Risk Committee has a consolidated view of these risks and helps to ensure that appropriate governance is in place for these. In addition, the Committee helps to ensure that elevated levels of Compliance Risk are reported to the Group Non-Financial Risk Committee, Group Risk Committee and Board Audit Committee. Within each country, oversight of Compliance Risk is delegated through the Country Non-Financial Risk Committee.

Decision-making authorities and delegation

Decision-making and approval authorities follow the Enterprise Risk Management Framework approach and risk thresholds. The Group Head, CABM & CFCC has the authority to delegate second line responsibilities within the CFCC function to relevant and suitably qualified individuals.

Monitoring

The monitoring of controls designed to mitigate the risk of regulatory non-compliance in processes are governed in line with the Operational Risk Type Framework. The Group has a monitoring and reporting process in place for Compliance Risk, which includes escalation and reporting to Conduct and Compliance Non-Financial Risk Committee, Group Risk Committee and Board Audit Committee as appropriate. In 2019, monitoring of Compliance Risk was further enhanced with the introduction of new Risk Appetite metrics.

Stress testing

Stress testing and scenario analysis are used to assess capital requirements for Compliance Risk and form part of the overall scenario analysis portfolio managed under the Operational Risk Type Framework. Specific scenarios are developed annually with collaboration between the business, which owns and manages the risk, and the CFCC function, which is second line to incorporate significant Compliance Risk tail events. This approach considers the impact of extreme but plausible scenarios on the Group's Compliance Risk profile.

Conduct Risk

The Group defines Conduct Risk as the risk of detriment to the Group's clients, investors, shareholders, market integrity, competition and counterparties, or risk of detriment from the inappropriate supply of financial services, including instances of wilful or negligent misconduct.

Risk Appetite Statement

The Group has no appetite for negative Conduct Risk outcomes arising from negligent or wilful actions by the Group or individuals, recognising that whilst incidents are unwanted, they cannot be entirely avoided

In addition to the Group's external stakeholders, Conduct Risk may also arise in respect to our behaviour towards each other as colleagues. The Group believes that all employees are entitled to a fair and safe working environment that is free from discrimination, exploitation, bullying, harassment or inappropriate language.

Roles and responsibilities

Conduct Risk management and abiding by the Group Code of Conduct is the responsibility of all employees in the Group.

The first line of defence is required to ensure that potential Conduct Risks arising in the business, functions and countries are identified, assessed and managed appropriately. Senior management in the first line of defence are accountable for embedding the right culture relating to Conduct Risk. The CFCC function is the second line for Conduct Risk, and is responsible for providing independent guidance, oversight, and challenge to the first line as well as setting the risk management standards that the first line must adhere to. The Group Head of Corporate Affairs, Brand & Marketing (CABM) and CFCC is the Risk Framework owner for Conduct Risk. As Conduct Risk may be derived from the other principal risks and their risk sub-types, no specific Conduct Risk sub-types have been defined. Where Conduct Risk is derived through the crystallisation of risks under the other principal risks, the potential Conduct Risk is evaluated and considered through the other principal risks. Any materialised or forward-looking risks defined in the various principal risks which do not meet the Group's Conduct standards are included in the Conduct Plans.

Conduct Plans

The Conduct Plans are used for the end-to-end process of risk identification and assessment of Conduct Risk against the Conduct Outcomes, and remediation actions. Action plans to mitigate Conduct Risks are identified and documented in the Conduct Plan. It is a live and dynamic document and must be kept regularly updated, including as and when there are potential or materialised conduct risks identified through other principal risks. Identified conduct risks and the corresponding mitigation should be monitored by relevant governance forums to ensure effective and timely resolution. The Conduct Plans should meet minimum standards as follows:

- Conduct Plans are owned by the management of each country, region, business and function within the Group. As the first line of defence, management is responsible to ensure that the Conduct Plans are regularly reviewed and updated. The CFCC function as the second line of defence and Risk Framework Owner is responsible for challenging management on the quality and completeness of the plan, as well as the effectiveness and timeliness of the remediation strategy
- Conduct Plans highlight the key conduct risks that are inherent in the processes and activities performed or impacted within a country, region, business or function
- The Group Conduct Management Principles, which highlight various conduct outcomes, should be used as a guide to help with the process of identifying relevant conduct risks
- For each of the risks identified, appropriate remediation action, enhancements to the control environment, responsible action owners and timeframes for resolution must be clearly recorded within the Conduct Plan
- Regular engagement should take place between owners of the Group and geographic Conduct Plans to ensure appropriate escalation and communications related to conduct risks and the mitigation strategy applied
- Conduct Plans should also reflect Conduct Risks based on one-off projects, adverse trends from conduct management information, internal conduct incidents, deficiencies identified through internal assurance activities across the three lines of defence, emerging risks/trends and external developments

Governance committee oversight

The Board Risk Committee, Brand Values and Conduct Committee, Group Risk Committee, Group Non-Financial Risk Committee and the Conduct and Compliance Non-Financial Risk Committee are responsible for ensuring that the Group effectively manages its Conduct Risk. As Risk Framework Owner for Conduct Risk, the Group Head, CABM & CFCC sets reporting thresholds for escalation of Conduct Risk to the Conduct and Compliance Non-Financial Risk Committee, Group Non-Financial Risk Committee and Group Risk Committee. The Board Risk Committee and the Brand Values and Conduct Committee receive periodic reports that provide updates relating to the Group's approach to managing Conduct Risk across our countries, regions, businesses and functions.

Decision-making authorities and delegation

Conduct Risk challenge and acceptance authority is exercised by the Group Head, CABM & CFCC, and delegated within the CFCC function as second line.

Monitoring and mitigation

Conduct Risk monitoring is done by the businesses, functions, regions and countries based on identified conduct metrics and other principal risk assessment activities. Following the end of each quarter, all businesses, functions, regions and countries are required to self-assess and report their progress against the agreed actions as set out in Conduct Plans to their respective CFCC second line delegate to validate. This responsibility rests with the respective business head, function head or Chief Executive Officer.

To provide a view of the key Conduct Risks facing the Group, three revised Group-level Risk Appetite metrics will be used. These relate to the Group's main Conduct Risk outcomes: Fair Outcomes for Clients; Employee Welfare and Relations; and Effective Markets and Stakeholder Confidence (e.g. regulators and investors). The Group Risk Assessment Matrix (GRAM) will be used to rate the key drivers for each of the three categories. The use of the GRAM will help to ensure that a consistent approach is followed when assessing the impact and likelihood of potential Conduct Risk outcomes.

Stress testing

The assessment of Conduct Risk vulnerabilities under stressed conditions or extreme events with a low likelihood of occurring are carried out through enterprise stress testing. This is currently covered primarily through Operational Risk driven stress scenarios.

Financial Crime Risk

The Group defines Financial Crime Risk as the potential for legal or regulatory penalties, material financial loss or reputational damage resulting from the failure to comply with applicable laws and regulations relating to international sanctions, anti-money laundering, anti-bribery and corruption, and fraud.

Risk Appetite Statement

The Group has no appetite for breaches in laws and regulations related to financial crime, recognising that while incidents are unwanted, they cannot be entirely avoided

Roles and responsibilities

The Group Head, CABM & CFCC has overall responsibility for Financial Crime Risk and is responsible for the establishment and maintenance of effective systems and controls to meet legal and regulatory obligations in respect of Financial Crime Risk. The Group Head, CABM & CFCC is the Group's Compliance and Money-Laundering Reporting Officer and performs the Financial Conduct Authority (FCA) controlled function and senior management function in accordance with the requirements set out by the FCA, including those set out in their handbook on systems and controls. As the first line, the business unit process owners have responsibility for the application of policy controls and the identification and measurement of risks relating to financial crime. Business units must communicate risks and any policy non-compliance to the second line for review and approval following the model for delegation of authority.

In 2019, Fraud Risk, previously a risk sub-type under Operational Risk Type Framework (ORTF), was transferred to Financial Crime Risk. Second line of defence activities for Fraud Risk lie with the Global Head, Fraud.

Mitigation

There are four Group policies in support of the Financial Crime Risk Type Framework:

- Anti-bribery and corruption as set out in the Group Anti-Bribery and Corruption Policy
- Anti-money laundering and countering terrorists financing as set out in the Group Anti-Money Laundering and Counter Terrorist Financing Policy
- Sanctions as set out in the Group Sanctions Policy
- Fraud as set out in the Group Fraud Risk Management Policy

The Group operates risk-based assessments and controls in support of its Financial Crime Risk programme, including (but not limited to):

- Group Risk Assessment - a Group-wide Financial Crime Risk assessment that is undertaken annually to assess the inherent Financial Crime Risk exposures and the effectiveness of the implemented controls by which these exposures are mitigated, so that the Group can direct and allocate appropriate mitigating resources
- Country Risk Assessment (Geographic Risk Rating) – an assessment and measurement of the inherent Financial Crime Risk within specific countries or jurisdictions based on political, economic and criminal factors
- Product Risk Assessment – an assessment of the inherent Financial Crime Risks within the products offered by the Group
- Client Risk Assessment – a model, calibrated and monitored using Group Model Validation standards, designed to dynamically measure the inherent Financial Crime Risks posed by a client relationship
- Financial Crime Surveillance – risk-based systems and processes to prevent and detect financial crime

The strength of controls is tested and assessed through the Group's ORTF, in addition to oversight by CFCC Assurance and Group Internal Audit.

Governance committee oversight

Financial Crime Risk within the Group is governed by the Group Financial Crime Risk Committee; and the Group Non-Financial Risk Committee for Fraud Risk which is appointed by and reports into the Group Risk Committee. Both committees are responsible for ensuring the effective management of Operational Risk relating to Financial Crime Risk and Fraud Risk compliance throughout the Group. The Board appoints the Board Financial Crime Risk Committee to provide oversight on anti-bribery and corruption, anti-money laundering (and terrorist financing) and sanctions; and the Board Risk Committee for oversight on Fraud Risk.

The Committees provide oversight of the effectiveness of the Group's policies, procedures, systems, controls and assurance mechanisms designed to identify, assess, manage, monitor, detect or prevent money laundering, non-compliance with sanctions, bribery, corruption, internal/external fraud and tax crime by third parties.

Decision-making authorities and delegation

The Group Head, CABM & CFCC is the Risk Framework Owner for Financial Crime Risk under the Group's Enterprise Risk Management Framework and has delegated authorities to effectively implement the Financial Crime Risk Type Framework, to the Co-Heads, Financial Crime Compliance. Certain aspects of Financial Crime Compliance, second line oversight and challenge, are further delegated within the CFCC function. Approval frameworks are in place to allow for risk-based decisions on client on-boarding, potential breaches of sanctions regulation or policy, and situations of potential money laundering (and terrorist financing), bribery and corruption or internal and external fraud.

Monitoring

The Group monitors Financial Crime Risk compliance against a set of Risk Appetite metrics that are approved by the Board. These metrics are reviewed periodically and reported regularly to the Group Financial Crime Risk Committee, Group Non-Financial Risk Committee, Board Risk Committee and Board Financial Crime Risk Committee.

In 2019, new metrics were being introduced, including for internal and external fraud losses, and these Group Risk Appetite metrices are being cascaded to countries for local adoption and close monitoring.

Stress testing

The assessment of Financial Crime vulnerabilities under stressed conditions or extreme events with a low likelihood of occurring is carried out through enterprise stress testing.

Information and Cyber Security Risk

The Group defines Information and Cyber Security Risk as the potential for loss from a breach of confidentiality, integrity or availability of the Group's information systems and assets through cyber attack, insider activity, error or control failure

Risk Appetite Statement

The Group seeks to avoid risk and uncertainty for our critical information assets and systems and has a low appetite for material incidents affecting these or the wider operations and reputation of the Group

Roles and responsibilities

In 2019, the Group consolidated its information and cyber security (ICS) efforts to withstand cyber threats, eliminate duplication and improve clarity of roles. The Group Chief Operating Officer has been given overall first line of defence responsibility for ICS Risk and holds full accountability for the Group's end-to-end ICS strategy. In order to create a more business and client-aligned ICS support team, the role of the Chief Information Security Officer (CISO) position moved to the first line and the second line role has been re-framed as the Chief Information Security Risk Officer (CISRO).

The Group CISRO continues to operate as the second line of defence, having overall responsibility for governance, oversight and challenge of ICS Risk and providing insight to senior management and the Board on the Group's ICS Risk management.

The ICS Risk Type Framework (RTF) emphasises business ownership and individual accountability for managing ICS Risk. It defines the first line roles of Information Asset Owners, Information System Owners and Information Custodians as named individuals within each business, and the accountability for classifying and managing risks to the information assets and systems. The Heads of ICS, within Group CISO, provide Information Asset and System Owners a centralised first line point of contact to ensure controls are embedded effectively and consistently across the Group.

Mitigation

ICS Risk is managed through a structured ICS policy framework comprising a risk assessment methodology and supporting policies and standards which are aligned to industry best practice models.

The CISRO function monitors compliance to the ICS policy framework through an assessment of each key control domain as defined by the ICS RTF through the ICS Risk profile report. Within the ICS Risk profile, appropriate mitigating activity for each key control domain is identified, undertaken and reported against by the business.

In 2019, the Board approved a refreshed ICS strategy supporting the overall Group strategy and delivery of the ICS RTF risk management principles. A key part is investing in digitisation and partnerships to better serve our clients.

Governance committee oversight

ICS Risk within the Group is currently governed via the Board Risk Committee which has responsibility for approving the definition of ICS Risk and the Group Risk Appetite. In addition, the Group Risk Committee (GRC) has delegated authority to the Group Non-Financial Risk Committee (GNFRC) to ensure effective implementation of the ICS RTF. The GRC and GNFRC retain responsibility for oversight of ICS Risk control domains rated very high and high respectively. Sub-committees of the GNFRC have oversight of ICS Risk management arising from business, country and functional areas.

These governance committees have responsibility for providing oversight of ICS Risk against Risk Appetite and measuring performance of ICS Risk management activities across the first line. Chairs of governance committees ensure adequate representation for all business units and countries across the Group who are responsible for managing ICS Risk. Escalation of ICS risks which fall outside the defined appetite for the Group are overseen by these committees to ensure effective mitigation.

At a management level, the Group has also created the Cyber Security Advisory Forum, chaired by the Group Chief Executive, as a way of ensuring the Management Team, the Chairman and several non-executive directors are well informed on ICS Risk, and to increase business understanding and awareness so that business priorities drive the security and cyber resilience agenda.

Decision-making authorities and delegation

The ICS RTF is the formal mechanism through which the delegation of ICS Risk authorities is made. The Group Chief Risk Officer has delegated the ICS Risk Framework Owner authority to the CISRO. The CISRO has, where appropriate, delegated second line authority to Information Security Risk Officers to assume the responsibilities for approval for business, functions, and countries.

Approval of ICS Risk ratings follow an approval matrix defined by the ICS RTF where the Group Chief Risk Officer and Group CISRO sign off very high and high risks respectively.

Information Asset Owners, Information System Owners and Information Custodians are responsible for the identification, creation and implementation of processes as required to comply with the ICS policy framework.

Monitoring

Monitoring and reporting on the ICS Risk Appetite profile ensures that performance which falls outside the approved Risk Appetite is highlighted and reviewed at the appropriate governance committee or authority levels and ensures that adequate remediation actions are in place where necessary.

Identification of ICS risks are performed through the following processes:

- Dynamic ICS Risk scanning is carried out through industry and specialist activities; inputs from legal, regulatory and mandatory bodies; changes to information and technology use in society, opportunities or incidents; and identifying emerging threats to the Group's information assets and systems
- An ICS Risk profile assessment exercise is performed to identify and ascertain severity ratings of risks to information assets and systems. Risks identified within the key control domains are documented within ICS Risk profiles and reviewed monthly as part of risk governance to ensure effective mitigation against the approved appetite. During these reviews, the status of each risk is assessed to identify any changes to materiality and likelihood, which in turn affect the overall risk score and rating. Risks which exceed defined thresholds are escalated to appropriate governance bodies. Group CISRO performs a consolidation of completed ICS Risk profiles for the Group and produces a holistic aggregated risk position with appropriate key control and risk indicators, which are used to govern the overall ICS Risk

Stress testing

Group CISRO determines ICS Risk controls to be subjected to scenario-based resiliency stress testing and sensitivity analysis, which is aimed to either ensure robustness of control or ability to respond should a control fail. The Group's stress testing approach entails:

- Group CISRO oversees all ICS risk-related stress testing the Group carries out to meet regulatory requirements
- Incident scenarios affecting information assets and systems are periodically tested to assess the incident management capability in the Group
- Penetration testing and vulnerability scanning are performed against the Group's internet-facing services and critical information assets/systems

Emerging Risks

In addition to our Principal Risk Types that we manage through Risk Type Frameworks, policies and Risk Appetite, we also maintain an inventory of emerging risks. Emerging risks refer to unpredictable and uncontrollable outcomes from events which may have the potential to materially impact our business. These include near-term risks that are on the horizon and can be measured or mitigated to some extent, as well as longer-term uncertainties that are on the radar but not yet fully measurable.

In 2019, we undertook a thorough review of our Emerging Risks, using the approach described in the Enterprise Risk Management Framework section (page 206 to 211). The key results of the review are detailed below.

Populism is on the rise globally. Policies such as income redistribution, public spending increases, a rise in trade barriers and tariffs, tax cuts, restrictions on immigration, and pro-nationalist or anti-global rhetoric pose a risk to long-term economic progression and overlay the majority of our Emerging Risks.

Key changes to our Emerging Risks:

The following items have been removed as emerging risks:

- 'Emerging Markets (EM) – upcoming elections, interest rate rises, and FX risks' – Due to the successful completion of elections this year in key markets such as Indonesia, India, Malaysia, Brazil and Sri Lanka and the significant reduction in the likelihood of interest rate rises this risk has decreased and is no longer considered an Emerging Risk. However, we continue monitoring at regional and country level to detect horizon risks and analyse potential adverse developments.

The following items have been amended or added as new emerging risks:

- 'China slowdown and impact on regional economies with close ties to China' – The novel coronavirus (Covid-19) outbreak has raised concerns over growth prospects in China and the risk this poses to the broader Asian and global outlook
- 'Hong Kong social unrest' – The ongoing social unrest since the Fugitive Offenders and Mutual Legal Assistance in Criminal Matters Legislation Bill ('Extradition Bill') was proposed in February 2019 have resulted in increased concern and elevated risk
- 'Interbank Offered Rate (IBOR) discontinuation and transition' – There are concerns regarding the impact of the discontinuation of the IBOR benchmarks and the transition to risk-free rates (RFRs)
- 'Japan Korea diplomatic dispute' – The disagreement over wartime labour compensation has escalated and may affect the trade of critical raw materials

Our list of emerging risks, based on our current knowledge and assumptions, is set out below, with our subjective assessment of their impact, likelihood and velocity of change. This reflects the latest internal assessment of material risks that the Group faces as identified by senior management. This list is not designed to be exhaustive and there may be additional risks which could materialise or have an adverse effect on the Group.

Our mitigation approach for these risks may not be successful in completely eliminating them, but rather shows the Group's attempt to reduce or manage the risk. As certain risks develop and materialise over time, management will take appropriate incremental steps based on the materiality of the impact of the risk to the operations of the Group:

Geopolitical considerations (Risk ranked according to severity)

Emerging Risk	Risk trend since 2018	Context	How these are mitigated/next steps
US China trade tensions driven by geopolitics and trade imbalance Potential impact: **High** Likelihood: **High** Velocity of change: **Moderate**	↔	→ Trade tensions between the US and China continue driven by trade imbalance and geopolitical tensions → In 2018 the US imposed trade tariffs on $550 billion of imports from China; China retaliated with tariffs on $185 billion of US goods. In March 2019, talks began to end the trade war. The talks were fraught with complications and the relationship between the two countries initially deteriorated → The countries have however recently announced a 'phase one' deal → Whilst the prospect of an all-out trade war has receded slightly, the situation remains fragile, particularly given the backdrop of the 2020 Presidential election and China's protest over the US Senate's passing of the HK Human Rights and Democracy Act which threatens Hong Kong's special trade status → As opposed to merely slowing global growth, the risks are that the US-China dispute persists, expands to other regions such as Europe, and ultimately develops into a full-blown global trade war → The Group has a significant revenue stream from supporting cross-border trade	→ A sharp slowdown in US-China and, more broadly, world trade and global growth is a feature of the Group stress scenarios including the Internal Capital Adequacy Assessment Process (ICAAP) and the annual Bank of England (BoE) stress testing exercise. This included a sharp slowdown in China scenario which was assessed in September 2019. These stress tests provide visibility to key vulnerabilities so that management can implement timely interventions

Emerging Risk	Risk trend since 2018	Context	How these are mitigated/next steps
Hong Kong social unrest Potential impact: **High** Likelihood: **High** Velocity of change: **Fast**	↑	→ In February 2019, the Hong Kong government proposed the Fugitive Offenders and Mutual Legal Assistance in Criminal Matters Legislation (Amendment) Bill (the 'Extradition Bill'), triggering significant public reaction from June onwards → Continual large-scale social unrest initially demanded the withdrawal of the proposed Extradition Bill but later expanded to cover other issues including transparency, justice and democracy. There is evidence of de-escalation since December 2019 although the situation remains fluid → Key economic indicators suggest a notable slowdown in Hong Kong's economy → The unrest has not had a significant effect on operations and the portfolio to date → Hong Kong remains the largest profit contributor to the Group	→ The Group has formed a 'command centre' managed by Standard Chartered Bank Hong Kong, which assesses emerging risks and directs the Group's response → The Group's ongoing stress tests provide insight to develop strategies to mitigate these. Exposures that may result in material credit impairment and increased risk-weighted assets are closely monitored and actively managed → Detailed portfolio reviews are conducted on an ongoing basis, most recently in the fourth quarter of 2019
Middle East geopolitical tensions Potential impact: **High** Likelihood: **Medium** Velocity of change: **Moderate**	↑	→ The past 12 months have seen an increase in volatility across the Middle East. Conflicts continue in Syria, Yemen, Lebanon and Iraq → Following Major General Qasem Soleimani's death in a US drone strike, Iran took retaliatory action against US bases in Iraq and Ukrainian International Airlines flight PS752 was downed by an Iranian missile when departing Tehran → Following the decision by the US to withdraw its troops from Northern Syria, Turkey commenced a military operation to create a buffer zone on its border with Syria. In response, Syrian and Kurdish forces agreed to align against the Turkish army → There were attacks on Saudi oil installations claimed by Houthi rebels fighting against Saudi Arabian and UAE forces in Yemen. The attacks temporarily closed down 5 per cent of global oil production and led to new US sanctions on Iran. The US authorised the deployment of additional forces to the region. Iran further reduced its compliance with the Joint Comprehensive Plan of Action and is expanding its stock of low-enriched uranium → Attacks on oil tankers took place in the Strait of Hormuz off the coast of UAE and Oman. The US attributed the attacks to Iran; an accusation Iran denied → The boycott of Qatar by the Arab quartet (Saudi Arabia, UAE, Bahrain and Egypt) continues and has contributed to the downward pressures on economic growth in the region. There is little incentive for the parties to alter their positions in the absence of any strong external pressure to do so → Qatar's internal outlook is more positive given the country's response to the blockade, improved self-reliance and high foreign currency reserves → The Group has a material presence across the region	→ The Group has continued monitoring at regional and country level to detect horizon risks and analyse potential adverse developments → The direct impact on our Middle East portfolio to date has been limited, though the developments inevitably impact confidence and economic prospects for the region → Qatar's Risk Appetite and underwriting standards have been adjusted to reflect current conditions

↑ Risk heightened in 2019 ↓ Risk reduced in 2019 ↔ Risk remained consistent with 2018 levels

Potential impact Refers to the extent to which a risk event might affect the Group	**Likelihood** Refers to the possibility that a given event will occur	**Velocity of change** Refers to when the risk event might materialise
High *(significant financial or non-financial risk)*	High *(almost certain)*	Fast *(risk of sudden developments with limited time to respond)*
Medium *(some financial or non-financial risk)*	Medium *(likely or possible)*	Moderate *(moderate pace of developments for which we expect there will be time to respond)*
Low *(marginal financial or non-financial risk)*	Low *(unlikely or rare)*	Steady *(gradual or orderly developments)*

Emerging Risk	Risk trend since 2018	Context	How these are mitigated/next steps
Brexit implications Potential impact: **Low** Likelihood: **High** Velocity of change: **Steady**	↓	→ The UK general election result has reduced the immediate risk surrounding the exit of the UK from the European Union (Brexit) and transition is currently due to continue until December 2020 → Brexit could have implications on the economic outlook for the Eurozone and the UK, which might in turn have global implications because of changes in policy direction. The uncertainties linked to Brexit negotiations could delay corporate investment decisions until there is more clarity	→ We continue to assess and manage Brexit risk and the practical implications through the Brexit Executive Committee, which is chaired by a member of the Management Team. We have also evaluated the potential implications from a transition and will continue monitoring the progress of the political negotiations → The Brexit Programme has been extended into 2020 to ensure continued focus on Brexit deliverables → The Group has set up a new EU subsidiary and optimised our EU structure to mitigate any potential impact to our clients, staff or the Group because of Brexit, including loss of EU passporting rights
Japan-Korea diplomatic dispute Potential impact: **Medium** Likelihood: **High** Velocity of change: **Steady**	↑	→ As the Japan-Korea dispute over wartime labour compensation escalated, Japan imposed export restrictions on South Korea along with other key Asian countries such as China and Singapore, regarding important raw materials for semiconductors and organic light emitting diode (OLED) displays, with effect from 4 July 2019 → South Korean chip manufacturers rely on these imports → This supply shortage is expected to have minimal immediate impact because the use of these raw materials is limited to high-end products. However, adoption of these advanced technologies is critical for retaining technological leadership and is expected to accelerate in the medium term → These are important markets for the Group	→ We anticipate very limited impact on the Group and no portfolio-level actions have been taken. The Group performed a portfolio review and will continue to monitor exposure → There is continuous monitoring at a country, regional and Group level to identify emerging risks and evaluate their management

Macroeconomic considerations

Emerging Risk	Risk trend since 2018	Context	How these are mitigated/next steps
Novel coronavirus outbreak, China slowdown and impact on regional economies with close ties to China Potential impact: **High** Likelihood: **High** Velocity of change: **Fast**	↑	→ Asia remains the main driver of global growth supported by internal drivers, led by China → Chinese authorities have confirmed a new coronavirus 'Covid-19', which is a family of viruses that cause respiratory infections such as severe acute respiratory syndrome (SARS) and middle east respiratory syndrome (MERS) → By 31 January 2020, the World Health Organisation declared a global health emergency as the outbreak spread well beyond China with the majority of cases in mainland China → Governments around the world have taken measures to contain the spread of the virus including travel restrictions. Some companies have scaled back their operations in China → The rapid spread of the novel coronavirus outbreak presents risks to regional economic growth → The outbreak has raised comparisons with SARS in 2003, which infected over 8,000 people and led to approximately 700 deaths. SARS caused widespread economic disruption as fear of infection resulted in a reduction in retail activity as well as a downturn in hospitality and tourism. There are risks the effect will be greater due to China's increased global economic importance → The economic impact of the novel coronavirus outbreak will depend on how the virus spreads and the response of the authorities. Prior to the outbreak, China GDP growth slowed to 6.0 per cent in Q3 and 6.1 per cent in Q4 2019, the weakest pace in almost 30 years → Highly trade-oriented economies such as Hong Kong and Singapore with close ties to China would weaken in the event of an economic slowdown. Regional supply chain economies such as Korea, Taiwan and Malaysia would also be impacted from a fall in economic activity → Greater China, North Asia and South East Asian economies remain key strategic regions for the Group and Hong Kong remains the largest profit contributor	→ In response to the novel coronavirus outbreak the Group's priority is to ensure the health and safety of our clients and employees and continue normal operations by leveraging our robust Business Continuity Plans → As part of our stress tests, a severe stress in the global economy associated with a sharp slowdown in China was assessed in September 2019 in addition to the ICAAP and BoE 2019 stress tests → Exposures that result in material credit impairment charges and risk-weighted assets inflation under stress tests are regularly reviewed and actively managed → A global downturn with shocks concentrated on China and countries with close trade links with China is one of the regularly run market and Traded Risk stress tests → We continue to monitor data from Greater China, North Asia and South East Asia regions

Environmental and social considerations

Emerging Risk	Risk trend since 2018	Context	How these are mitigated/next steps
Climate-related transition and physical risks[1] Potential impact: **High** Likelihood: **High** Velocity of change: **Moderate**	↑	→ National governments have, through the United Nations Framework Convention on Climate Change process and Paris Agreement, made commitments to enact policies which support the transition to a lower-carbon economy, limiting global warming to "well below 2°C" and therefore mitigating the most severe physical effects of climate change → The PRA published its formal Supervisory Statement SS 3/19 with regards to climate-related risks in April 2019. The Supervisory Statement requires significant measures to be taken by banks in identification, assessment, management, reporting, governance and disclosure of the financial and non-financial risks arising from climate change. The expectation is that regulatory guidance and expectation will increase → Such policies may have significant impacts, for example on energy infrastructure developed in our markets, and thus present 'transition' risks for our clients. The Group, for example, could be impacted by climate change from a credit or reputational perspective due to the impact on our clients' operations or their underlying business model → Conversely, if governments fail to enact policies which limit global warming, the Group's markets are particularly susceptible to 'physical' risks of climate change such as droughts, floods, sea level change and average temperature change	→ The Group recognises the distinction and linkages between managing its contribution to climate change (through direct and financed emissions) and managing the financial and non-financial risks arising from climate change. The Group is committed to respond responsibly and with urgency on both → The 2019 Taskforce for Climate-related Financial Disclosures (TCFD)-aligned disclosures provide details on the Group's progress. The TCFD report includes current emissions intensities for the Group's automotive and cement manufacturing portfolios, as measured through the pilot methodology developed by 2 Degrees Investing Initiative → The Group announced that it will only support clients who actively transition their business to generate less than 10 per cent of earnings from thermal coal by 2030. The Group recognises, however, that transitioning to clean technology will require significant changes across our markets, and because of that has chosen to implement this decision on a phased basis, using set milestones, beginning 1 January 2021. The Group's environmental and social requirements are documented in our Position Statements and our Prohibited Activities include aspects of oil and gas and mining and metals sectors → The Group has a public target to fund and facilitate $35 billion towards renewable energy from 2020 to the end of 2024 → A Climate Risk Management Forum has been established internally to provide oversight on the development and implementation of the Climate Risk framework → The Group is a member of the Risk Management Working Group under the BoE's Climate Financial Risk Forum and led the Framework and Governance section of the handbook → The Group is actively collaborating with clients, regulators, investors, peer banks, external experts and coalition platforms (such as United Nations Environment Programme Finance Initiative (UNEP-FI) to solve the collective challenges in the approach to managing climate-related risks

1 Physical risk refers to the risk of increased extreme weather events while transition risk refers to the risk of changes to market dynamics due to governments' responses to climate change

Legal considerations (Risk ranked according to severity)

Emerging Risk	Risk trend since 2018	Context	How these are mitigated/next steps
Interbank Offered Rate ('IBOR') discontinuation and transition Potential impact: **High** Likelihood: **High** Velocity of change: **Moderate**	↑	→ With the significant decrease in liquidity and volume of transactions upon which the London Interbank Offered Rate (LIBOR) benchmark submissions are made, regulators have expressed concern over the robustness and sustainability of the IBOR benchmarks. In 2014, the Financial Stability Board published a report on reforming major interest rate benchmarks, seeking alternative risk free rates (RFRs) for the IBOR currencies (US dollar, pound sterling, euro, Swiss franc and Japanese yen) → In 2017, the UK Financial Conduct Authority (FCA) announced that it had reached an agreement with LIBOR panel banks to contribute to LIBOR until the end of 2021. It is likely that several panel banks will cease contributing to LIBOR by the end of 2021, leading to LIBOR's cessation. Given this, the FCA called for the industry to start preparing for LIBOR cessation, by transitioning from IBORs to RFRs → Transition from LIBOR to RFRs presents several risks: (i) there are fundamental differences between LIBOR and RFRs and value transfer may arise in transitioning contracts from one to the other; (ii) the market may transition at different paces in different regions and across different products, presenting various sources of basis risk and posing major challenges on hedging strategies; (iii) clients may not be treated fairly through-out the transition or may not be aware of the options available to them and the implications of decisions taken, which may result in unfair financial detriment, (iv) changes in processes, systems and vendor arrangements associated with the transition may not be within appropriate tolerance levels, (v) Legal risk in relation to the fall-back risks associated with the transition and (vi) Accounting and Financial Reporting risk in that the changes in underlying rates, such as on cashflows and valuations, may not be incorporated correctly → The lack of liquidity in some of the RFR markets may present challenges to the transition until resolved, as will the likely different transition timelines for the five LIBOR currencies. The efficiency of our contract digitisation and remediation work is heavily reliant on the release of standardised fall-back language, including the outcomes of the Tough Legacy Task Force, established under the Sterling Risk-Free Reference Rates Working Group. Complexity in managing the IBOR transition is also increasing as a result of growing interest from a number of our local regulators, given our footprint, and the work required where there are local IBORs requiring transition as well → As LIBOR is the most widely used benchmark, its cessation and transition to RFRs will have profound impact on all participants in the financial markets → Whilst the Group does not submit to LIBOR, LIBOR is heavily relied upon by the Group as a reference rate for many financial instruments	→ The Group has set up a global IBOR Transition Programme to consider all aspects of the transition and how risks from the transition can be mitigated. A Management. Team member is the Senior Manager for the IBOR Transition Programme → Efforts to raise awareness of the transition, both internally and with clients, have started, with internal training sessions and client seminars held in Thailand, Hong Kong and Singapore as of December 2019 → From an industry and regulatory perspective, the Group is actively participating in and contributing to different RFR Working Groups, industry associations and business forums focusing on different aspects of the LIBOR (or IBOR, as applicable) to RFR transition → The Group monitors the developments at these IBOR-related forums and reflects and aligns significant industry decisions into the Group's transition plans, as required

Emerging Risk	Risk trend since 2018	Context	How these are mitigated/next steps
Regulatory changes Potential impact: **Medium** Likelihood: **High** Velocity of change: **Steady**	↔	→ Rules have been defined in many key areas of regulation that could impact our business model and how we manage our capital and liquidity positions → **Prudential treatment of software:** The Capital Requirements Regulation (CRR) II introduces a new prudential treatment for software intangibles: it excludes "prudently valued" software assets from the scope of those assets which must be deducted from Common Equity Tier 1. According to CRR II, the value of "prudently valued" software assets is not materially affected by resolution, insolvency or liquidation → **Crypto assets:** There is currently considerable uncertainty around the regulatory treatment of crypto assets. In May 2019, the Financial Stability Board published a report that referred to the ongoing work by the Basel Committee. While the current Basel framework does not set out an explicit treatment of banks' exposures to crypto assets, it does set out minimum requirements for the capital and liquidity treatment of "other assets". The BCBS is now considering whether to formally clarify the prudential treatment of crypto-assets across the set of risk categories (credit risk, counterparty credit risk, market risk, liquidity risk, etc.) → **Other:** These include the upcoming Basel III changes to capital calculation methodology for credit and operational risk, revised framework for Credit Valuation Adjustment risk, Fundamental Review of the Trading Book and implementation of Margin Reforms → Ongoing regulatory scrutiny and emphasis on local responsibilities for remotely booked business. The degree of reliance on global controls is reducing, and the focus is on local controls and governance	→ We actively monitor regulatory initiatives across our footprint to identify any potential impact and change to our business model → With respect to the finalisation of Basel III: – The Group has mobilised a Risk & Finance sponsored Programme to undertake a comprehensive assessment of the Capital and Operational impacts of the Basel III Finalisation regulations. Capital optimisation efforts and business strategies are being reviewed considering these requirements – We continuously review a menu of prospective capital accretive actions, along with their impact on the Group strategy and financial performance → Relevant product areas have implemented project management or programme oversight to review and improve the end-to-end process, including oversight and accountability, policies and standards, transparency and management information, permission and controls, legal-entity level limits and training
Regulatory reviews and investigations, legal proceedings Potential impact: **High** Likelihood: **Medium** Velocity of change: **Moderate**	↔	→ The Group has been, and will continue to be, subject to regulatory actions, reviews, requests for information (including subpoenas and requests for documents) and investigations across our markets, the outcomes of which are generally difficult to predict and could be material to the Group → In recent years, authorities have exercised their discretion to impose severe penalties on financial institutions in connection with violations of laws and regulations, and there can be no assurance that future penalties will not be of similar or increased severity → The Group is also party to legal proceedings from time to time, which may give rise to financial losses or adversely impact our reputation in the eyes of our customers, investors and other stakeholders	→ We continue to invest in enhancing systems and controls, and implementing remediation programmes where relevant → The Group cooperates with regulatory reviews, requests for information and investigations and actively manages legal proceedings → We continue to train and educate our people on relevant issues including conduct, conflicts of interest, information security and financial crime compliance in order to reduce our exposure to legal and regulatory proceedings

Technological considerations (Risk ranked according to severity)

Emerging Risk	Risk trend since 2018	Context	How these are mitigated/next steps
New technologies and digitisation (including business disruption risk, responsible use of Artificial Intelligence and Obsolescence Risk) Potential impact: **High** Likelihood: **High** Velocity of change: **Fast**	↔	→ Innovation in the financial services industry is happening at a relentless pace. Artificial intelligence (AI) and blockchain technology have continued to gather speed with a growing number of use cases that address evolving customer expectations to which the Group must adapt its operating model or risk competitive disadvantage → In Retail Banking, the Group continues to observe significant shifts in customer value propositions as markets deepen. Fintechs are delivering digital-only banking offerings with a differentiated user experience, value propositions and product pricing. There is growing usage of AI and machine learning (ML) to deliver highly personalised services, e.g. virtual chatbots to provide digital financial advice and predictive analytics to cross-sell products. The Group may be unable to compete effectively if it fails to appropriately invest in innovation and disruptive technologies → In the Corporate Banking sector, we continue to observe an increasing focus on process digitisation to streamline processes and provide scalable and personalised solutions for corporate clients. There are growing use cases for blockchain technologies, e.g. streamline cross-border payments and automate key documentation. AI and ML have also been increasingly used in predictive risk modelling, e.g. loan default forecasting. Failure to expediently adapt and harness such technologies would place the Group at a competitive disadvantage → There is an increasing usage of partnerships and alliances by banks to respond to a rapidly changing banking landscape and disruption from existing players and new entrants. This is making partnerships and alliances an integral part of banks' emerging business model and value proposition to the clients → As these new technologies grow in sophistication and become further embedded across the banking and financial services industry, banks may become more susceptible to technology-related risks. For example, the growing usage of big data and cloud computing solutions has heightened cyber security risks in banks. Banks may also face increased risks of business model disruption as new products and technologies continue to emerge → Regulators are increasing emphasis on the importance of resilient technology infrastructure in terms of elimination of cyber risk and improving reliability. The challenge is in renewing our technology and infrastructure to reduce the risks presented by obsolescence when the demands of delivering ongoing technology investment into this estate and its required performance levels continue to rise significantly	→ The Group continues to undertake a rigorous approach in monitoring emerging trends and new developments, opportunities and risks in the technology space which may have implications on the banking sector. The Group manages the risks at two levels: firstly, staying relevant to clients and markets and; secondly understanding and managing new types of risk → In 2017, the Group set up the SC Ventures unit to spearhead Group-wide digital advancement. The unit is gaining momentum to promote innovation, invest in disruptive technologies and deliver client digital solutions. SC Ventures recently launched its eXellerator innovation lab in China, adding to the Group's other eXellerator labs in Singapore, Hong Kong, London, San Francisco and Kenya. The labs are designed to drive innovation, invest in promising fintech and implement new business models in banking → The Group has continued to make headway in harnessing new technologies to develop innovative solutions. This has included deploying blockchain technology solutions to digitise cross-border trade documents and optimise supply chain financing. The Group is also co-creating new solutions and establishing new partnerships to improve the client experience. For example, the Group recently announced a strategic partnership with SAP Ariba to make SCB's financial supply chain solutions accessible to businesses in the Asia Pacific region through Ariba Network. This is the world's largest digital business network → The Group has an integrated strategy to leverage technology to manage cyber risk and combat cyber-enabled financial crime. Rapid adoption of new technologies requires that we also determine how the Group's security standards, capabilities and processes need to be applied. In some cases, this includes adapting new security aspects considering new technology. The Group is also implementing a framework to ensure Fairness, Ethics, Accountability and Transparency in the Group's usage of data analytics and AI → The Group maintains its vigilant watch on legal and regulatory trends in relation to the usage of new technologies and related data risks. The Group is also developing a crypto asset risk framework to better manage these risks → The Group is actively targeting the reduction of obsolescent/end of support technology following a Technology & Innovation led programme under the oversight of the Risk function and the Group's senior executives. The target is to address the Group's obsolescence risk by evergreening and use of new technologies such as the Cloud. We also continue to focus on clients by delivering on outage reductions, enhanced protection by raising cyber defences and efficiency by improvements to technology deployment

Emerging Risk	Risk trend since 2018	Context	How these are mitigated/next steps
Increased data privacy and security risks from strategic and wider use of data Potential impact: **High** Likelihood: **High** Velocity of change: **Moderate**	⇔	→ As digital technologies grow in sophistication and become further embedded across the banking and financial services industry, the potential impact profile with regards to data risk is changing. Banks may become more susceptible to technology-related data security risks as well as customer privacy issues. The growing use of big data for analysis purposes and cloud computing solutions are examples of this → In addition, these risks represent an emerging and topical theme both from a regulatory and compliance perspective (i.e. the EU General Data Protection Regulation (GDPR) raises the profile of data protection compliance) → As the Group moves towards cloud computing solutions and an increasing use of big data for analysis purposes, this leads to increased susceptibility to data security and customer privacy risks	→ We have existing governance and control frameworks for the deployment of new technologies and services and are developing a Data Management risk sub-type → To manage the risks posed by rapidly evolving security threats and technology adoption, we have designed a Transformation and Remediation Portfolio (TRP). This is a multi-year initiative with a focus on security improvements and providing assurance to regulators that we are building a sustainable Information and Cyber Security programme that will secure its information and technology assets for the long-term. The programme is progressing with capability being built out in multiple areas including governance, investment prioritisation and execution risk management → We maintain a vigilant watch on legal and regulatory developments in relation to data protection and customer privacy to identify any potential impact to the business and to implement appropriate mechanisms to control this risk → For the Group, GDPR principally impacts Group locations and client segments in the EU, functions such as Human Resources and downstream suppliers such as hubs and external vendors that process personal data caught by the GDPR ('EU personal data'). A GDPR programme has been established to review and remediate vendor contracts and intra-group agreements that involve the processing of EU personal data

Capital review

The Capital review provides an analysis of the Group's capital and leverage position and requirements.

Capital summary (unaudited)

The Group's capital and leverage position is managed within the Board-approved risk appetite. The Group is well capitalised with low leverage and high levels of loss-absorbing capacity.

Capital, leverage and risk-weighted assets (RWA)	2019	2018
CET1 capital	**13.8 %**	14.2 %
Tier 1 capital	**16.5 %**	16.8 %
Total capital	**21.2 %**	21.6 %
UK leverage	**5.2 %**	5.6 %
Risk-weighted assets (RWA) $million	**264,090**	258,297

The Group's Common Equity Tier 1 (CET1) capital and Tier 1 leverage position are well above current minimum requirements. For further detail see the Capital section in the Standard Chartered PLC Pillar 3 Disclosures for FY 2019.

The Group's Pillar 2A requirement increased to 3.4 per cent of RWA, from 2.9 per cent, of which at least 1.9 per cent must be held in CET1. This requirement can vary over time. The Hong Kong Monetary Authority (HKMA) reduced the Hong Kong countercyclical buffer to 2.0 per cent from 2.5 per cent. The combined impact of changes to the Pillar 2A requirements and Hong Kong countercyclical buffer rates increased the Group's CET1 minimum requirement from 10.0 per cent to 10.2 per cent at 31 December 2019. The Financial Policy Committee announced it would increase the UK countercyclical buffer from 1.0 per cent to 2.0 per cent to take effect from 16 December 2020 and this change (based on the period end balance sheet) is expected to increase the Group's minimum CET1 requirements by 6 basis points to 10.3 per cent by the end of 2020.

The Group's fully phased minimum requirement for own funds and eligible liabilities (MREL) is 22.8 per cent of RWA from 1 January 2022. The Group's combined buffer (the capital conservation, global systemically important institution (G-SII) and countercyclical buffers) is additive to the minimum requirement, resulting in a total MREL requirement of 26.7[1] per cent of RWA from 1 January 2022. The Group's MREL position at 31 December 2019 was 28.6 per cent of RWA and 9.4 per cent of leverage exposure.

The Group has continued its programme of MREL issuance from its holding company in 2019, issuing around $7.7 billion of MREL eligible securities during the period, including the Group's inaugural issuance of Australian dollar senior notes. The Group also priced an inaugural SGD750 million Additional Tier 1 (AT1) and its first emerging-markets focused sustainability bond of EUR500 million in the period.

In the period, the Group completed a buy-back of $1.0 billion of its ordinary share capital. The impact of the $1.0 billion buy-back on the Group's CET1 ratio was a reduction of around 39 basis points.

The Group is a G-SII, with a 1.0 per cent G-SII CET1 buffer. The Standard Chartered PLC 2018 G-SII disclosure is published at: sc.com/fullyearresults

1 Fully phased minimum 2022 MREL requirement includes the estimated impact of the proposed UK countercyclical buffer increase from 1.0 per cent to 2.0 per cent with effect from 16 December 2020

Capital ratios (unaudited)

	2019	2018
CET1	**13.8%**	14.2%
Tier 1 capital	**16.5%**	16.8%
Total capital	**21.2%**	21.6%

CRD IV Capital base[1]

	2019 $million	2018 $million
CET1 instruments and reserves		
Capital instruments and the related share premium accounts	**5,584**	5,617
Of which: share premium accounts	**3,989**	3,965
Retained earnings	**24,044**	25,377
Accumulated other comprehensive income (and other reserves)	**11,685**	11,878
Non-controlling interests (amount allowed in consolidated CET1)	**723**	686
Independently reviewed interim and year-end profits	**2,301**	1,072
Foreseeable dividends net of scrip	**(871)**	(527)
CET1 capital before regulatory adjustments	**43,466**	44,103
CET1 regulatory adjustments		
Additional value adjustments (prudential valuation adjustments)	**(615)**	(564)
Intangible assets (net of related tax liability)	**(5,318)**	(5,146)
Deferred tax assets that rely on future profitability (excludes those arising from temporary differences)	**(129)**	(115)
Fair value reserves related to net losses on cash-flow hedges	**59**	10
Deduction of amounts resulting from the calculation of excess expected loss	**(822)**	(875)
Net gains on liabilities at fair value resulting from changes in own Credit Risk	**(2)**	(412)
Defined-benefit pension fund assets	**(26)**	(34)
Fair value gains arising from the institution's own Credit Risk related to derivative liabilities	**(38)**	(127)
Exposure amounts which could qualify for risk weighting of 1250%	**(62)**	(123)
Total regulatory adjustments to CET1	**(6,953)**	(7,386)
CET1 capital	**36,513**	36,717
AT1 capital instruments	**7,184**	6,704
AT1 regulatory adjustments	**(20)**	(20)
Tier 1 capital	**43,677**	43,401
Tier 2 capital instruments	**12,318**	12,325
Tier 2 regulatory adjustments	**(30)**	(30)
Tier 2 capital	**12,288**	12,295
Total capital	**55,965**	55,696
Total risk-weighted assets (unaudited)	**264,090**	258,297

1 CRD IV capital is prepared on the regulatory scope of consolidation

Movement in total capital

	2019 $million	2018 $million
CET1 at 1 January	**36,717**	38,162
Ordinary shares issued in the period and share premium	**25**	14
Share buy-back[1]	**(1,006)**	–
Profit for the period	**2,301**	1,072
Foreseeable dividends net of scrip deducted from CET1	**(871)**	(527)
Difference between dividends paid and foreseeable dividends	**(641)**	(575)
Movement in goodwill and other intangible assets	**(172)**	(34)
Foreign currency translation differences	**(180)**	(1,161)
Non-controlling interests	**37**	(164)
Movement in eligible other comprehensive income	**284**	60
Deferred tax assets that rely on future profitability	**(14)**	10
Decrease/(increase) in excess expected loss	**53**	267
Additional value adjustments (prudential valuation adjustment)	**(51)**	10
IFRS 9 day one transitional impact on regulatory reserves	**(43)**	(441)
Exposure amounts which could qualify for risk weighting	**61**	18
Other	**13**	6
CET1 at 31 December	**36,513**	36,717
AT1 at 1 January	**6,684**	6,699
Issuances net of redemptions	**552**	–
Foreign currency translation difference	**9**	(15)
Excess on AT1 grandfathered limit (ineligible)	**(81)**	–
AT1 at 31 December	**7,164**	6,684
Tier 2 capital at 1 January	**12,295**	13,897
Regulatory amortisation	**(1,111)**	166
Issuances net of redemptions	**1,000**	(1,713)
Foreign currency translation difference	**(12)**	(215)
Tier 2 ineligible minority interest	**31**	144
Recognition of ineligible AT1	**81**	–
Other	**4**	16
Tier 2 capital at 31 December	**12,288**	12,295
Total capital at 31 December	**55,965**	55,696

1 $1,006 million includes share buy-back expenses of $6 million

The main movements in capital in the period were:

- The CET1 ratio decreased from 14.2 per cent to 13.8 per cent predominantly because of higher RWAs, the impact of the $1.0 billion share buy-back and other distributions to shareholders, including preference dividends, partly offset by profit for the period
- CET1 capital decreased by $0.2 billion, mainly due to the share buy-back of $1.0 billion and other distributions during the period of $1.5 billion, partly offset by profit after tax of $2.3 billion
- AT1 increased slightly to $7.2 billion, mainly due to the new issuance of SGD 750 million of AT1 securities
- Tier 2 capital was unchanged at $12.3 billion mainly due to $1.0 billion of new subordinated debt issuance, offset by amortisation of $1.1 billion during the year

Risk-weighted assets by business (unaudited)

	2019			
	Credit Risk $million	Operational Risk $million	Market Risk $million	Total risk $million
Corporate & Institutional Banking	**98,227**	**13,261**	**20,562**	**132,050**
Retail Banking	**37,138**	**7,314**	**–**	**44,452**
Commercial Banking	**25,440**	**2,626**	**–**	**28,066**
Private Banking	**5,681**	**728**	**–**	**6,409**
Central & other items	**49,178**	**3,691**	**244**	**53,113**
Total risk-weighted assets	**215,664**	**27,620**	**20,806**	**264,090**

	2018			
	Credit Risk $million	Operational Risk $million	Market Risk $million	Total risk $million
Corporate & Institutional Banking	96,954	13,029	19,008	128,991
Retail Banking	35,545	7,358	–	42,903
Commercial Banking	27,711	2,770	–	30,481
Private Banking	5,103	758	–	5,861
Central & other items	45,825	4,135	101	50,061
Total risk-weighted assets	211,138	28,050	19,109	258,297

Risk-weighted assets by geographic region (unaudited)

	2019 $million	2018 $million
Greater China & North Asia	**85,695**	81,023
ASEAN & South Asia	**88,942**	87,935
Africa & Middle East	**49,244**	53,072
Europe & Americas	**43,945**	40,789
Central & other items	**(3,736)**	(4,522)
Total risk-weighted assets	**264,090**	258,297

Movement in risk-weighted assets (unaudited)

	Credit Risk								
	Corporate & Institutional Banking $million	Retail Banking $million	Commercial Banking $million	Private Banking $million	Central & other items $million	Total $million	Operational Risk $million	Market Risk $million	Total risk $million
As at 1 January 2018	109,368	36,345	29,712	5,134	45,671	226,230	30,478	23,040	279,748
Assets (decline)/growth	(1,527)	1,466	(1,347)	56	2,896	1,544	–	–	1,544
Net credit migration	(2,120)	25	237	–	494	(1,364)	–	–	(1,364)
Risk-weighted assets efficiencies	(3,540)	(597)	–	–	(748)	(4,885)	–	–	(4,885)
Model, methodology and policy changes	(3,338)	(671)	66	–	77	(3,866)	–	(1,948)	(5,814)
Disposals	–	–	–	–	(626)	(626)	–	–	(626)
Foreign currency translation	(1,889)	(1,023)	(957)	(87)	(1,939)	(5,895)	–	–	(5,895)
Other non-credit risk movements	–	–	–	–	–	–	(2,428)	(1,983)	(4,411)
Aa at 31 December 2018	96,954	35,545	27,711	5,103	45,825	211,138	28,050	19,109	258,297
Assets (decline)/growth	**1,303**	**1,020**	**(557)**	**528**	**4,093**	**6,387**	**–**	**–**	**6,387**
Net credit migration	**2,565**	**832**	**(642)**	**8**	**607**	**3,370**	**–**	**–**	**3,370**
Risk-weighted assets efficiencies	**(1,112)**	**(33)**	**(403)**	**–**	**(2,404)**	**(3,952)**	**–**	**–**	**(3,952)**
Model, methodology and policy changes	**(904)**	**(7)**	**–**	**–**	**1,400**	**489**	**–**	**500**	**989**
Disposals	**(397)**	**–**	**(441)**	**–**	**–**	**(838)**	**–**	**–**	**(838)**
Foreign currency translation	**(182)**	**(219)**	**(228)**	**42**	**(343)**	**(930)**	**–**	**–**	**(930)**
Other non-Credit Risk movements	**–**	**–**	**–**	**–**	**–**	**–**	**(430)**	**1,197**	**767**
As at 31 December 2019	**98,227**	**37,138**	**25,440**	**5,681**	**49,178**	**215,664**	**27,620**	**20,806**	**264,090**

Movements in risk-weighted assets

RWA increased by $5.8 billion, or 2.2 per cent from 31 December 2018 to $264.1 billion. This was mainly due to increases in Credit Risk RWA of $4.5 billion, Market Risk RWA $1.7 billion, partly offset by a decrease of $0.4 billion in Operational Risk RWA.

Corporate & Institutional Banking

Credit risk RWA increased by $1.3 billion to $98.2 billion mainly due to:

- $2.6 billion increase due to net credit migration principally in Greater China & North Asia and Europe & Americas
- $1.3 billion increase due to asset balance growth in Financial Markets and Corporate Finance, primarily in Greater China & North Asia, partly offset by asset decline in Africa & Middle East
- $1.1 billion decrease due to RWA efficiencies, relating to a number of initiatives across the segment
- $0.9 billion decrease due to the implementation of the internal model method (IMM) for Counterparty Credit Risk
- $0.4 billion decrease due to the disposal of Principal Finance assets
- $0.2 billion decrease from foreign currency translation due to depreciation of currencies in Europe and India against the US dollar.

Retail Banking

Credit Risk RWA increased by $1.6 billion to $37.1 billion mainly due to:

- $1.0 billion asset balance growth in Greater China & North Asia
- $0.8 billion increase from net credit migration primarily in Greater China & North Asia and in Africa & Middle East
- $0.2 billion decrease from foreign currency translation mainly due to depreciation of currencies in Korea against the US dollar

Commercial Banking

Credit Risk RWA decreased by $2.3 billion to $25.4 billion mainly due to:

- $0.6 billion RWA decrease due to decline in asset balances in Greater China & North Asia
- $0.6 billion decrease due to net credit migration primarily in Greater China & North Asia and in Africa & Middle East
- $0.4 billion decrease in RWA efficiencies primarily relating to SME clients
- $0.4 billion decrease due to the disposal of Principal Finance assets
- $0.2 billion decrease from foreign currency translation due to depreciation of currencies in India, Korea and Pakistan against the US dollar.

Private Banking

Credit Risk RWA increased by $0.6 billion to $5.7 billion principally due to asset balance growth in wealth management products primarily in Greater China & North Asia

Central & other items

Central & other items RWA mainly relates to the Treasury Markets liquidity portfolio, the Group's principal joint venture investment, PT Bank Permata Tbk, equity investments and deferred/current tax assets.

Credit Risk RWA increased by $3.4 billion to $49.2 billion mainly due to:

- $4.1 billion RWA increase from asset balance growth, primarily in Europe & Americas and ASEAN & South Asia regions
- $0.6 billion increase in net credit migration primarily in Greater China & North Asia and in Africa & Middle East
- $1.4 billion increase from the implementation of the IFRS 16 standard relating to leases on property
- $2.4 billion of benefit from RWA efficiency initiatives on Treasury exposures (Interbank Loans & Treasury bills)
- $0.3 billion decrease from foreign currency translation due to depreciation of currencies in Pakistan, Ghana and Korea against the US dollar.

Market Risk

Total Market Risk RWA increased by $1.7 billion, or 8.9 per cent from 31 December 2018 to $20.8 billion. This change was due mainly to increased RWA under standardised rules, and a net increase in internal models approach (IMA) RWA following an increase in regulatory backtesting exceptions, as explained on page 192, partly offset by reduced IMA positions.

Operational Risk

Operational Risk RWA reduced by $0.4 billion to $27.6 billion, comprising a decrease in the average income over a rolling three-year time horizon, as lower 2018 income replaced higher 2015 income, and a reduced average beta factor, due to a shift towards lower beta businesses. This represents a 1.5 per cent year-on-year reduction in Operational Risk RWA.

UK leverage ratio

The Group's UK leverage ratio, which excludes qualifying claims on central banks in accordance with a PRA waiver, was 5.2 per cent, which is above the current minimum requirement of 3.7 per cent. The lower UK leverage ratio in the period was mainly due to: an increased exposure measure reflecting asset growth (on and off balance sheet), lower derivative and regulatory consolidation adjustments partly offset by a small increase in Tier 1 capital following the new issuance of SGD750 million of AT1 securities in the period.

UK leverage ratio (unaudited)

	2019 $million	2018 $million
Tier 1 capital (transitional)	43,677	43,401
Additional Tier 1 capital subject to phase-out	(1,671)	(1,743)
Tier 1 capital (end point)	42,006	41,658
Derivative financial instruments	47,212	45,621
Derivative cash collateral	9,169	10,323
Securities financing transactions (SFTs)	60,414	61,735
Loans and advances and other assets	603,603	571,083
Total on-balance sheet assets	720,398	688,762
Regulatory consolidation adjustments[1]	(31,485)	(45,521)
Derivatives adjustments		
Derivatives netting	(32,852)	(34,300)
Adjustments to cash collateral	(11,853)	(14,827)
Net written credit protection	1,650	1,221
Potential future exposure on derivatives	32,961	28,498
Total derivatives adjustments	(10,094)	(19,408)
Counterparty Risk leverage exposure measure for SFTs	7,005	8,281
Off-balance sheet items	122,341	115,335
Regulatory deductions from Tier 1 capital	(6,913)	(6,847)
UK leverage exposure (end point)	801,252	740,602
UK leverage ratio (end point)	5.2%	5.6%
UK leverage exposure quarterly average	816,244	734,976
UK leverage ratio quarterly average	5.1%	5.8%
Countercyclical leverage ratio buffer	0.1%	0.1%
G-SII additional leverage ratio buffer	0.4%	0.3%

1 Includes adjustment for qualifying central bank claims