HSBC Holdings plc

Pillar 3 Disclosures at 31 December 2019

HSBC

Contents

Unless the context requires otherwise, 'HSBC Holdings' means HSBC Holdings plc and 'HSBC', the 'Group', 'we', 'us' and 'our' refer to HSBC Holdings together with its subsidiaries. Within this document the Hong Kong Special Administrative Region of the People's Republic of China is referred to as 'Hong Kong'. When used in the terms 'shareholders' equity' and 'total shareholders' equity', 'shareholders' means holders of HSBC Holdings ordinary shares and those preference shares and capital securities issued by HSBC Holdings classified as equity. The abbreviations '$m' and '$bn' represent millions and billions (thousands of millions) of US dollars respectively.

Tables

The Group has adopted the EU's regulatory transitional arrangements for International Financial Reporting Standard ('IFRS') 9 Financial instruments. A number of tables in this document report under this arrangement as follows:

a. Some figures (indicated with ^) within the table have been prepared on an IFRS 9 transitional basis.

b. All figures within the table have been prepared on an IFRS 9 transitional basis.

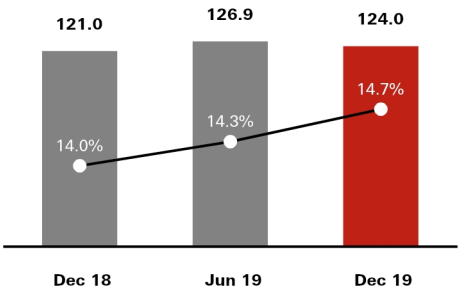
All other tables report numbers on the basis of full adoption of IFRS 9.

Introduction

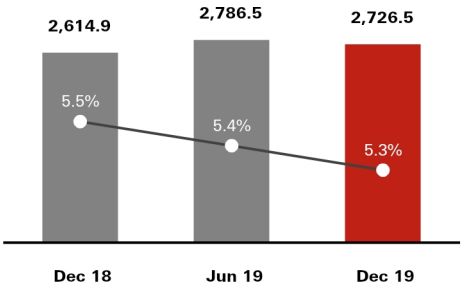
Highlights

Common equity tier 1 ('CET1') ratio further strengthened over 4Q19 to 14.7% driven by RWA reduction of $22bn

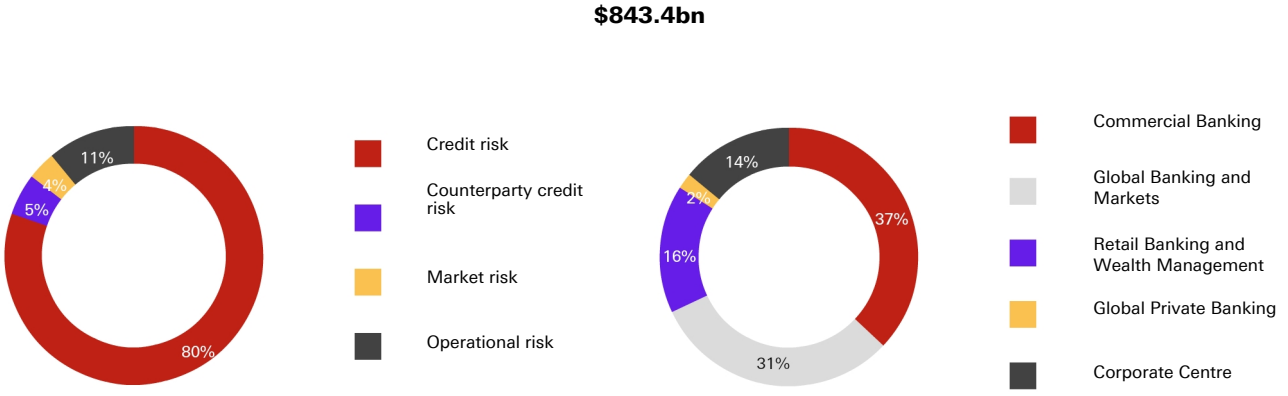
Common equity tier 1 ($bn and %)[1]



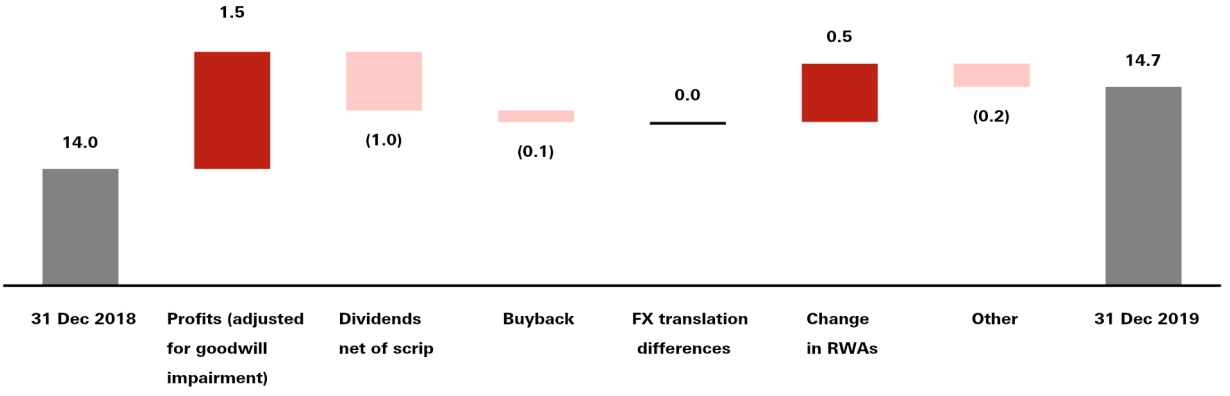
Leverage ratio and exposure ($bn and %)[3]



Risk-weighted assets by risk type and global business ($bn)



Common equity tier 1 ratio movement, %



For footnotes, see page 4.

Key metrics

Table 1: Key metrics (KM1/IFRS9-FL)

Ref*		Footnotes	At 31 Dec 2019	30 Sep 2019	30 Jun 2019	31 Mar 2019	31 Dec 2018
	Available capital ($bn)	1					
1	Common equity tier 1 ('CET1') capital	^	**124.0**	123.8	126.9	125.8	121.0
2	CET1 capital as if IFRS 9 transitional arrangements had not been applied		**123.1**	122.9	126.0	124.9	120.0
3	Tier 1 capital	^	**148.4**	149.7	152.8	151.8	147.1
4	Tier 1 capital as if IFRS 9 transitional arrangements had not been applied		**147.5**	148.8	151.9	150.9	146.1
5	Total regulatory capital	^	**172.2**	175.1	178.3	177.8	173.2
6	Total capital as if IFRS 9 transitional arrangements had not been applied		**171.3**	174.2	177.4	176.9	172.2
	Risk-weighted assets ('RWAs') ($bn)						
7	Total RWAs		**843.4**	865.2	886.0	879.5	865.3
8	Total RWAs as if IFRS 9 transitional arrangements had not been applied		**842.9**	864.7	885.5	878.9	864.7
	Capital ratios (%)	1					
9	CET1	^	**14.7**	14.3	14.3	14.3	14.0
10	CET1 as if IFRS 9 transitional arrangements had not been applied		**14.6**	14.2	14.2	14.2	13.9
11	Tier 1	^	**17.6**	17.3	17.2	17.3	17.0
12	Tier 1 as if IFRS 9 transitional arrangements had not been applied		**17.5**	17.2	17.2	17.2	16.9
13	Total capital	^	**20.4**	20.2	20.1	20.2	20.0
14	Total capital as if IFRS 9 transitional arrangements had not been applied		**20.3**	20.1	20.0	20.1	19.9
	Additional CET1 buffer requirements as a percentage of RWA (%)						
	Capital conservation buffer requirement		**2.50**	2.50	2.50	2.50	1.88
	Countercyclical buffer requirement		**0.61**	0.69	0.68	0.67	0.56
	Bank G-SIB and/or D-SIB additional requirements		**2.00**	2.00	2.00	2.00	1.50
	Total of bank CET1 specific buffer requirements		**5.11**	5.19	5.18	5.17	3.94
	Total capital requirement (%)	2					
	Total capital requirement		**11.0**	11.0	11.0	11.0	10.9
	CET1 available after meeting the bank's minimum capital requirements		**8.5**	8.1	8.1	8.1	7.9
	Leverage ratio	3					
15	Total leverage ratio exposure measure ($bn)		**2,726.5**	2,708.2	2,786.5	2,735.2	2,614.9
16	Leverage ratio (%)	^	**5.3**	5.4	5.4	5.4	5.5
17	Leverage ratio as if IFRS 9 transitional arrangements had not been applied (%)		**5.3**	5.4	5.3	5.4	5.5
	Liquidity Coverage Ratio ('LCR')	4					
	Total high-quality liquid assets ($bn)		**601.4**	513.2	532.8	535.4	567.2
	Total net cash outflow ($bn)		**400.5**	378.0	391.0	374.8	368.7
	LCR ratio (%)		**150.2**	135.8	136.3	142.9	153.8

* *The references in this and subsequent tables identify the lines prescribed in the EBA template where applicable and where there is a value.*

^ *Figures have been prepared on an IFRS 9 transitional basis.*

1 *Effective 30 June 2019, the capital figures and ratios are reported in accordance with the revised Capital Requirements Regulation and Directive, as implemented ('CRR II'). Prior period capital figures and ratios are reported on a Capital Requirements Regulation and Directive ('CRD IV') transitional basis.*

2 *Total capital requirement is defined as the sum of Pillar 1 and Pillar 2A capital requirements set by the Prudential Regulation Authority ('PRA'). Our Pillar 2A requirement at 31 December 2019, as per the PRA's Individual Capital Requirement based on a point in time assessment, was 3.0% of RWAs, of which 1.7% was met by CET1. The minimum requirements represent the total capital requirement to be met by CET1.*

3 *Effective 30 June 2019, the leverage ratio is calculated using the CRR II end point basis for capital. Prior period leverage ratios are calculated on the CRD IV end point basis for capital.*

4 *The EU's regulatory transitional arrangements for IFRS 9 'Financial instruments' in article 473a of the Capital Requirements Regulation do not apply to liquidity coverage measures. LCR is calculated as at the end of each period rather than using average values.*

We have adopted the regulatory transitional arrangements, including paragraph four within article 473a of the Capital Requirements Regulation, published by the EU on 27 December 2017 for IFRS 9 'Financial Instruments'. These permit banks to add back to their capital base a proportion of the impact that IFRS 9 has upon their loan loss allowances during the first five years of use. The proportion that banks may add back starts at 95% in 2018, and reduces to 25% by 2022. The impact of IFRS 9 on loan loss allowances is defined as:

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

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

In the current period, the add-back to the capital base amounted to $1.0bn under the STD approach with a tax impact of $0.2bn and a capital deduction threshold impact of $0.1bn. This resulted in a net add-back of $0.9bn.

Pillar 3 disclosures

Regulatory framework for disclosure

We are supervised on a consolidated basis in the United Kingdom ('UK') by the Prudential Regulation Authority ('PRA'), which receives information on the capital adequacy of, and sets capital requirements for, the Group as a whole. Individual banking subsidiaries are directly regulated by their local banking supervisors, who set and monitor their local capital adequacy requirements. In most jurisdictions, non-banking financial subsidiaries are also subject to the supervision and capital requirements of local regulatory authorities.

At the consolidated Group level, capital is calculated for prudential regulatory reporting purposes using the Basel III framework of the Basel Committee ('Basel') as implemented by the European Union ('EU') in CRR II, and in the PRA Rulebook for the UK banking industry. The regulators of Group banking entities outside the EU are at varying stages of implementation of Basel's framework, so local regulation in 2019 may have been on the basis of Basel I, II or III.

The Basel framework is structured around three 'pillars': the Pillar 1 minimum capital requirements and Pillar 2 supervisory review process are complemented by Pillar 3 market discipline. The aim of Pillar 3 is to produce disclosures that allow market participants to assess the scope of application by banks of the Basel framework and the rules in their jurisdiction, their capital condition, risk exposures and risk management processes, and hence their capital adequacy.

Our Pillar 3 Disclosures at 31 December 2019 comprises both quantitative and qualitative information required under Pillar 3. They are made in accordance with Part Eight of CRR II and the European Banking Authority's ('EBA') guidelines on disclosure requirements. These disclosures are supplemented by specific additional requirements of the PRA and discretionary disclosures on our part.

The Pillar 3 disclosures are governed by the Group's disclosure policy framework as approved by the Group Audit Committee ('GAC'). Information relating to the rationale for withholding certain disclosures is provided in Appendix IV.

Comparatives

To give insight into movements during the year, we provide comparative figures for the previous year or period, analytical review of variances and 'flow' tables for capital requirements. In all tables where the term 'capital requirements' is used, this represents the minimum total capital charge set at 8% of RWAs by article 92 of the Capital Requirements Regulation. Table name references and row numbering in tables identify those prescribed in the relevant EBA guidelines where applicable and where there is a value.

Where disclosures have been enhanced, or are new, we do not generally restate or provide prior year comparatives. Wherever specific rows and columns in the tables prescribed by the EBA or Basel are not applicable or immaterial to our activities, we omit them and follow the same approach for comparative disclosures.

Frequency and location

We publish comprehensive Pillar 3 disclosures annually and at interim on our website www.hsbc.com, concurrently with the release of our *Annual Report and Accounts* and *Interim Report*. Quarterly earnings releases also include regulatory information in line with the guidelines on the frequency of regulatory disclosures. Pillar 3 requirements may be met by inclusion in other disclosure media. Where we adopt this approach, references are provided to the relevant pages of the *Annual Report and Accounts 2019* or other locations. We continue to engage in the work of the UK authorities and industry associations to improve the transparency and comparability of UK banks' Pillar 3 disclosures.

Material risks

Pillar 3 requires all material risks to be disclosed to provide a comprehensive view of a bank's risk profile. In addition to the disclosure in this document, other information on material risks can be found on page 83 of the *Annual Report and Accounts 2019*. This includes:

- Credit risk (refer to page 84 of the *Annual Report and Accounts 2019)*
- Capital and liquidity risk (refer to page 130 of the *Annual Report and Accounts 2019)*
- Market risk (refer to page 135 of the *Annual Report and Accounts 2019)*
- Resilience risk (refer to page 143 of the *Annual Report and Accounts 2019)*
- Regulatory compliance risk (refer to page 144 of the *Annual Report and Accounts 2019)*
- Financial crime and fraud risk (refer to page 145 of the *Annual Report and Accounts 2019)*
- Model risk (refer to page 146 of the *Annual Report and Accounts 2019)*
- Insurance manufacturing operations risk (refer to page 146 of the *Annual Report and Accounts 2019)*

Information on climate change risk can be found on page 22 of the *Annual Report and Accounts 2019.*

Capital buffers

Our geographical breakdown and institution-specific countercyclical capital buffer ('CCyB') disclosure is provided in Appendix II. The G-SIB Indicators disclosure is published annually on our website, www.hsbc.com.

Remuneration

Our remuneration policy, including the remuneration committee membership and activities, remuneration strategy and remuneration details of HSBC's Identified Staff and Material Risk Takers, is set out in the Directors' Remuneration Report on page 184 of the *Annual Report and Accounts 2019.*

Regulatory developments

The UK's withdrawal from the EU

As a result of the decision of the referendum on 23 June 2016, the UK left the EU on 31 January 2020. In order to smooth the transition, the UK remains subject to EU law during an implementation period, which is currently expected to end on 31 December 2020. This implementation period may be extended by a further two years, subject to political agreement.

In preparation for the UK leaving without an agreement, a series of statutory instruments were made to transpose into UK law all of the EU laws and regulations that were directly applicable to UK firms on exit day. Although these statutory instruments were prepared for the UK leaving without a deal, it is anticipated that they will form the basis of the UK's regulation after the implementation period has ended; however, these may be subject to change to reflect the introduction of new EU law during the implementation period and the terms of any trade deal between the UK and the EU.

The Basel Committee

In December 2017, Basel published the Basel III Reforms. The package is broadly final, with Basel having completed a recalibration of the market risk RWA regime, the Fundamental Review of the Trading Book ('FRTB'), in January 2019. The remaining outstanding element is the revision of the calibration of the CVA framework, which Basel consulted on in November 2019.

The package aims for a 1 January 2022 implementation, with a five-year transitional provision for the output floor. This floor ensures that, at the end of the transitional period, banks' total

RWAs are no lower than 72.5% of those generated by the standardised approaches. The final standards will need to be transposed into the relevant local law before coming into effect.

We currently estimate our pre-mitigation RWAs could potentially rise in the range of 5% to 10% as at 1 January 2022 as a result of the regulatory changes. The primary drivers include changes in the market risk, operational risk and credit valuation adjustment methodologies, as well as the potential lack of equivalence for certain investments in funds. We plan to take action to substantially mitigate a significant proportion of the increase.

We estimate that there will be an additional RWA impact as a result of the output floor from 2026.

There remains a significant degree of uncertainty in the impact due to the number of national discretions within Basel's reforms, the need for further supporting technical standards to be developed and the lack of clarity regarding their implementation following the UK's withdrawal from the EU. Furthermore, the impact does not take into consideration the possibility of offsets against Pillar 2, which may arise as the shortcomings within Pillar 1 are addressed.

The Capital Requirements Regulation amendments

In June 2019, the EU enacted the final rules amending the Capital Requirements Regulation, known as the CRR II. This was the EU's implementation of the Financial Stability Board's ('FSB') requirements for Total Loss Absorbing Capacity ('TLAC'), known in Europe as the Minimum Requirement for Own Funds and Eligible Liabilities ('MREL'). Furthermore, it also included changes to the own funds regime.

The CRR II will also implement the first tranche of changes to the EU's legislation to reflect the Basel III Reforms, including the FRTB, revisions to the standardised approach for measuring counterparty risk, changes to the equity investments in funds rules and the new leverage ratio rules. The CRR II rules will follow a phased implementation with significant elements entering into force in 2021, in advance of Basel's timeline.

Since Basel's review of the calibration of the FRTB came too late to be included in the final CRR II text, the changes are being incorporated by way of a Delegated Act, which was published in near final format in December 2019. This introduces the FRTB in the EU as a reporting requirement only until a full impact assessment can be performed. Reporting on the standardised approach will begin 12 months after the enactment of the Delegated Act; whereas reporting on the modelled approaches will begin three years after enactment. A final date for the implementation of the FRTB in the EU has yet to be agreed.

The CRR II applies to HSBC's subsidiaries in the EU. In the UK, only the parts of the CRR II that are in force at the end of the Brexit implementation period will be transposed into UK law. As a result, any elements that are scheduled to enter into force after the end of the implementation period will need to be implemented separately by the UK.

The EU's implementation of the Basel III Reforms

The remaining elements of the Basel III Reforms will be implemented in the EU by a further set of amendments to the Capital Requirements Regulation ('CRR III'). In 2019, the European Commission ('EC') began consulting on the implementation of the CRR III, which will include reforms to credit risk, operational risk, and the output floor. The EC is expected to produce a draft CRR III text in the second quarter of 2020. The EU implementation will then be subject to an extensive negotiation process with the EU Council and Parliament. As a result, the final form of the rules remains unclear.

It is expected that the Brexit implementation period will have been completed before the CRR III enters into EU law. As a result, the UK will have to implement the remaining Basel III Reforms independently under UK law.

Other developments

In December 2019, the UK's Financial Policy Committee ('FPC') issued the latest Financial Stability Report. In the report, the FPC announced that it will increase the UK's countercyclical buffer from 1% to 2% on 16 December 2020, in order to give the UK more flexibility in times of future stress. It considers that the UK remains in a standard risk environment and as a result, the total loss absorbing capacity in the banking system should remain unchanged, notwithstanding the buffer increase. To this end, the PRA will consult in 2020 on proposals to reduce Pillar 2A requirements to reflect the additional resilience associated with a higher buffer.

The FPC also announced a review of IFRS9 and stress testing to ensure that there is a permanent solution to avoid unwarranted capital increases as a result of the interaction between the two. This may result in amendments to minimum capital requirements and TLAC.

In October 2019, the EBA published a consultation paper on draft guidelines concerning the carve-out of 'structural FX positions' from Pillar 1 market risk RWAs. The guidelines aim to ensure consistency in determining which positions qualify for the Pillar 1 carve out.

In July 2019, the Bank of England ('BoE') published its Resolvability Assessment Framework ('RAF'), which requires firms to develop capabilities to address eight identified barriers to resolvability. Banks are required to assess their resolvability in accordance with the BoE's criteria, submit this assessment by October 2020 and publish a summary by June 2021. Contemporaneously, the BoE will disclose its assessment of each firm's resolvability. The deadline for full compliance with the RAF framework is 1 January 2022.

In April 2019, the PRA issued statements setting out its expectations of how firms should manage the financial risks from climate change, focusing on governance, risk management, scenario analysis and disclosure areas. In particular, there is a requirement that the risk associated with climate change should be assessed and captured in firms' Pillar 2 assessments. The PRA also announced in December 2019 that the effects of climate change will be included in its 2021 stress test and are currently consulting on the form it might take.

Risk management

Our risk management framework

We use an enterprise-wide risk management framework across the organisation and across all risk types. It is underpinned by our risk culture.

The framework fosters continuous monitoring of the risk environment, and promotes risk awareness and sound operational and strategic decision making. It also ensures we have a consistent approach to monitoring, managing and mitigating the risks we accept and incur in our activities.

Further information on our risk management framework is set out on page 74 of the Annual Report and Accounts 2019. *The management and mitigation of principal risks facing the Group is described in our top and emerging risks on page 76 of the* Annual Report and Accounts 2019.

Commentary on hedging strategies and associated processes can be found in the Market risk and Securitisation sections of this document.

Culture

HSBC has long recognised the importance of a strong culture. Our culture is reinforced by our values. It is instrumental in aligning the behaviours of individuals with our attitude to assuming and managing risk, which helps to ensure that our risk profile remains in line with our risk appetite. The fostering of a strong culture is a key responsibility of our senior executives.

Our culture is also reinforced by our approach to remuneration. Individual awards, including those for senior executives, are based on compliance with our values and the achievement of financial and non-financial objectives, which are aligned to our risk appetite and global strategy.

Further information on risk and remuneration is set out on page 207 of the Annual Report and Accounts 2019.

Risk governance

The Board has ultimate responsibility for the effective management of risk and approves our risk appetite. It is advised on risk-related matters by the Group Risk Committee ('GRC') and the Financial System Vulnerabilities Committee ('FSVC'). The final meeting of the FSVC was held on 15 January 2020, with responsibility for oversight of financial crime risk transferred to the GRC, which will continue to advise the Board on risk-related matters.

The activities of the GRC and the FSVC are set out on pages 178 to 182 of the Annual Report and Accounts 2019.

Executive accountability for the ongoing monitoring, assessment and management of the risk environment, and the effectiveness of the risk management framework resides with the Group Chief Risk Officer ('CRO'). The CRO is supported by the Risk Management Meeting ('RMM') of the Group Management Board.

The management of financial crime risk resides with the Group Chief Compliance Officer ('COO'). The COO is supported by the Financial Crime Risk Management Meeting.

Further information is available on page 145 of the Annual Report and Accounts 2019.

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

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

Further information about the Group's three lines of defence model and executive risk governance structures is available on page 75 of the Annual Report and Accounts 2019.

Risk appetite

Risk appetite is a key component of our management of risk. It describes the type and quantum of risk that the Group is willing to accept in achieving its medium- and long-term strategic goals. At HSBC, risk appetite is managed through a global risk appetite framework and articulated in a risk appetite statement ('RAS'), which is approved biannually by the Board on the advice of the GRC.

Our risk appetite informs our strategic and financial planning process, defining the desired forward-looking risk profile of the Group. It is also integrated within other risk management tools, such as the top and emerging risks report and stress testing, to ensure consistency in risk management.

Information about our risk management tools is set out from page 73 of the Annual Report and Accounts 2019. *Details of the Group's overarching risk appetite are set out on page 73 of the* Annual Report and Accounts 2019.

Stress testing

HSBC operates a wide-ranging stress testing programme that supports our risk management and capital planning. It includes execution of stress tests mandated by our regulators. Our stress testing is supported by dedicated teams and infrastructure.

Our testing programme assesses our capital strength and enhances our resilience to external shocks. It also helps us understand and mitigate risks, and informs our decision about capital levels. As well as taking part in regulatory driven stress tests, we conduct our own internal stress tests.

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

Further information about stress testing and details of the Group's regulatory stress test results are set out on page 75 of the Annual Report and Accounts 2019.

Global Risk function

We have a dedicated Global Risk function, headed by the Group Chief Risk Officer, which is responsible for the Group's risk management framework. This includes establishing global policy, monitoring risk profiles, and forward-looking risk identification and management. Global Risk is made up of sub-functions covering all risks to our operations. It is independent from the global businesses in order to provide challenge, appropriate oversight and balance in risk/return decisions. The Global Risk function operates in line with the three lines of defence model.

For further information see page 75 of the Annual Report and Accounts 2019.

Risk management and internal control systems

The Directors are responsible for maintaining and reviewing the effectiveness of risk management and internal control systems, and for determining the aggregate level and risk types they are willing to accept in achieving the Group's business objectives. On behalf of the Board, the GAC has responsibility for oversight of risk management and internal controls over financial reporting, and the GRC has responsibility for oversight of risk management and internal controls other than for financial reporting.

The Directors, through the GRC and the GAC received regular updates and confirmation that management has taken, or was taking, the necessary actions to remediate any failings or weaknesses identified through the operation of our framework of controls.

HSBC's key risk management and internal control procedures are described on page 173 of the Annual Report and Accounts 2019, *where the Report of the Directors on the effectiveness of internal controls can also be found.*

Risk measurement and reporting systems

Our risk measurement and reporting systems are designed to help ensure that risks are comprehensively captured with all the attributes necessary to support well-founded decisions, that those attributes are accurately assessed, and that information is delivered in a timely manner for those risks to be successfully managed and mitigated.

Risk measurement and reporting systems are also subject to a governance framework designed to ensure that their build and implementation are fit for purpose and functioning appropriately. Risk information systems development is a key responsibility of the Global Risk function, while the development and operation of risk rating and management systems and processes are ultimately subject to the oversight of the Board.

We continue to invest significant resources in IT systems and processes in order to maintain and improve our risk management capabilities. Group standards govern the procurement and operation of systems used in our subsidiaries to process risk information within business lines and risk functions.

Risk measurement and reporting structures deployed at Group level are applied throughout global businesses and major operating subsidiaries through a common operating model for integrated risk management and control. This model sets out the respective responsibilities of Group, global business, region and country level risk functions in respect of risk governance and oversight, compliance risks, approval authorities and lending guidelines, global and local scorecards, management information and reporting, and relations with third parties such as regulators, rating agencies and auditors.

Risk analytics and model governance

The Global Risk function manages a number of analytics disciplines supporting the development and management of models, including those for risk rating, scoring, economic capital and stress testing; covering different risk types and business segments. The analytics functions formulate technical responses to industry developments and regulatory policy in the field of risk analytics, develops HSBC's global risk models, and oversees local model development and use around the Group toward our implementation targets for IRB approaches.

The Global Model Oversight Committee ('Global MOC') is the primary committee responsible for the oversight of Model Risk globally within HSBC. It serves an important role in providing strategic direction on the management of models and their associated risks to HSBC's businesses globally and is an essential element of the governance structure for model risk management. Global MOC is supported by Functional MOCs at the Global and Regional levels which are responsible for model risk management within their functional areas, including wholesale credit risk, market risk, retail risk, and finance.

The Global MOC meets regularly and reports to RMM. It is chaired by the Group CRO and membership includes the CEOs of the Global Businesses, and senior executives from Risk, Finance and global businesses. Through its oversight of the functional MOCs, it identifies emerging risks for all aspects of the risk rating system, ensuring that model risk is managed within our risk appetite statement, and formally advises RMM on any material model-related issues.

Models are also subject to an independent validation process and governance oversight by the Model Risk Management team within Global Risk. The team provides robust challenge to the modelling approaches used across the Group. It also ensures that the performance of those models is transparent and that their limitations are visible to key stakeholders. The development and use of data and models to meet local requirements are the responsibility of global businesses or functions, as well as regional and/or local entities under the governance of their own management, subject to overall Group policy and oversight.

Regulatory and other expectations continue to evolve with regards to our capability and practice of model risk management. We have benchmarked our capability against leading industry practice and are designing a new target operating model for Model Risk Management ('MRM') function, which sets model risk management policy, standards and model risk appetite.

Further information is available on page 146 of the Annual Report and Accounts 2019.

Linkage to the Annual Report and Accounts 2019

Structure of the regulatory group

Assets, liabilities and post-acquisition reserves of subsidiaries engaged in insurance activities are excluded from the regulatory consolidation. Our investments in these insurance subsidiaries are recorded at cost and deducted from CET1 capital, subject to thresholds.

The regulatory consolidation also excludes special purpose entities ('SPEs') where significant risk has been transferred to third parties. Exposures to these SPEs are risk-weighted as securitisation positions for regulatory purposes.

Participating interests in banking associates are proportionally consolidated for regulatory purposes by including our share of assets, liabilities, profit and loss, and risk-weighted assets in accordance with the PRA's application of EU legislation. Non-participating significant investments, along with non-financial associates, are deducted from capital, subject to thresholds.

Table 2: Reconciliation of balance sheets – financial accounting to regulatory scope of consolidation

	Ref †	Accounting balance sheet $m	Deconsolidation of insurance/ other entities $m	Consolidation of banking associates $m	Regulatory balance sheet $m
Assets					
Cash and balances at central banks		**154,099**	**(26)**	**299**	**154,372**
Items in the course of collection from other banks		**4,956**	**–**	**–**	**4,956**
Hong Kong Government certificates of indebtedness		**38,380**	**–**	**–**	**38,380**
Trading assets		**254,271**	**(822)**	**–**	**253,449**
Financial assets designated and otherwise mandatorily measured at fair value through profit or loss		**43,627**	**(33,839)**	**604**	**10,392**
– of which: debt securities eligible as tier 2 issued by Group Financial Sector Entities ('FSEs') that are outside the regulatory scope of consolidation	*r*	**–**	***602***	**–**	***602***
Derivatives		**242,995**	**(14)**	**93**	**243,074**
Loans and advances to banks		**69,203**	**(1,309)**	**1,316**	**69,210**
Loans and advances to customers		**1,036,743**	**(776)**	**12,004**	**1,047,971**
– of which: lending eligible as tier 2 to Group FSEs outside the regulatory scope of consolidation	*r*	**–**	***392***	**–**	***392***
expected credit losses on IRB portfolios	*h*	***(6,703)***	**–**	**–**	***(6,703)***
Reverse repurchase agreements – non-trading		**240,862**	**(42)**	**127**	**240,947**
Financial investments		**443,312**	**(66,551)**	**4,485**	**381,246**
– of which: lending eligible as tier 2 to Group FSEs outside the regulatory scope of consolidation	*r*	**–**	***367***	**–**	***367***
Capital invested in insurance and other entities		**–**	**2,304**	**–**	**2,304**
Prepayments, accrued income and other assets		**136,680**	**(6,636)**	**588**	**130,632**
– of which: retirement benefit assets	*j*	***8,280***	**–**	**–**	***8,280***
Current tax assets		**755**	**–**	**–**	**755**
Interests in associates and joint ventures		**24,474**	**(430)**	**(4,836)**	**19,208**
– of which: positive goodwill on acquisition	*e*	***486***	***(13)***	**–**	***473***
Goodwill and intangible assets	*e*	**20,163**	**(9,131)**	**1,222**	**12,254**
Deferred tax assets	*f*	**4,632**	**159**	**14**	**4,805**
Total assets at 31 Dec 2019		**2,715,152**	**(117,113)**	**15,916**	**2,613,955**
Liabilities and equity					
Hong Kong currency notes in circulation		**38,380**	**–**	**–**	**38,380**
Deposits by banks		**59,022**	**(12)**	**372**	**59,382**
Customer accounts		**1,439,115**	**2,596**	**14,277**	**1,455,988**
Repurchase agreements – non-trading		**140,344**	**–**	**–**	**140,344**
Items in course of transmission to other banks		**4,817**	**–**	**–**	**4,817**
Trading liabilities		**83,170**	**59**	**–**	**83,229**
Financial liabilities designated at fair value		**164,466**	**(4,225)**	**–**	**160,241**
– of which:					
included in tier 1	*n*	***419***	**–**	**–**	***419***
included in tier 2	*o, q, i*	***10,130***	**–**	**–**	***10,130***
Derivatives		**239,497**	**27**	**127**	**239,651**
– of which: debit valuation adjustment	*i*	***95***	**–**	**–**	***95***
Debt securities in issue		**104,555**	**(2,246)**	**–**	**102,309**
Accruals, deferred income and other liabilities		**118,156**	**(2,695)**	**819**	**116,280**
Current tax liabilities		**2,150**	**(45)**	**148**	**2,253**
Liabilities under insurance contracts		**97,439**	**(97,439)**	**–**	**–**
Provisions		**3,398**	**(11)**	**46**	**3,433**
– of which: credit-related contingent liabilities and contractual commitments on IRB portfolios	*h*	***357***	**–**	**–**	***357***
Deferred tax liabilities		**3,375**	**(1,337)**	**9**	**2,047**
Subordinated liabilities		**24,600**	**2**	**118**	**24,720**
– of which:					
included in tier 1	*l, n*	***1,825***	**–**	**–**	***1,825***
included in tier 2	*o, q*	***21,071***	**–**	**–**	***21,071***
Total liabilities at 31 Dec 2019		**2,522,484**	**(105,326)**	**15,916**	**2,433,074**
Equity					
Called up share capital	*a*	**10,319**	**–**	**–**	**10,319**
Share premium account	*a, l*	**13,959**	**–**	**–**	**13,959**
Other equity instruments	*k*	**20,871**	**–**	**–**	**20,871**
Other reserves	*c, g*	**2,127**	**1,913**	**–**	**4,040**
Retained earnings	*b, c*	**136,679**	**(12,595)**	**–**	**124,084**
Total shareholders' equity		**183,955**	**(10,682)**	**–**	**173,273**
Non-controlling interests	*d, m, n, p*	**8,713**	**(1,105)**	**–**	**7,608**
Total equity at 31 Dec 2019		**192,668**	**(11,787)**	**–**	**180,881**
Total liabilities and equity at 31 Dec 2019		**2,715,152**	**(117,113)**	**15,916**	**2,613,955**

† *The references (a)–(r) identify balance sheet components that are used in the calculation of regulatory capital in Table 6: Own funds disclosure on page 13.*

Table 3: Principal entities with a different regulatory and accounting scope of consolidation (LI3)

	Footnotes	Principal activities	Method of accounting consolidation	At 31 Dec 2019		
				Method of regulatory consolidation		
				Proportional consolidation	Neither consolidated nor deducted	Deducted from capital subject to thresholds
Principal associates						
The Saudi British Bank		Banking services	Equity	●		
Principal insurance entities excluded from the regulatory consolidation						
HSBC Life (International) Ltd		Life insurance	Fully consolidated			●
HSBC Assurances Vie (France)		Life insurance	Fully consolidated			●
Hang Seng Insurance Company Ltd		Life insurance	Fully consolidated			●
HSBC Insurance (Singapore) Pte Ltd		Life insurance	Fully consolidated			●
HSBC Life (UK) Ltd		Life insurance	Fully consolidated			●
HSBC Life Insurance Company Ltd		Life insurance	Fully consolidated			●
HSBC Life Assurance (Malta) Ltd		Life insurance	Fully consolidated			●
HSBC Seguros S.A. (Mexico)		Life insurance	Fully consolidated			●
Principal SPEs excluded from the regulatory consolidation	1					
Metrix Portfolio Distribution plc		Securitisation	Fully consolidated		●	
Neon Portfolio Distribution DAC		Securitisation	Fully consolidated		●	
Regency Assets Ltd		Securitisation	Fully consolidated		●	

1 *These SPEs issued no or* de minimis *share capital.*

Measurement of regulatory exposures

This section sets out the main reasons why the measurement of regulatory exposures is not directly comparable with the financial information presented in the *Annual Report and Accounts 2019.*

The *Pillar 3 Disclosures at 31 December 2019* are prepared in accordance with regulatory capital adequacy concepts and rules, while the *Annual Report and Accounts 2019* are prepared in accordance with IFRSs. The purpose of the regulatory balance sheet is to provide a point-in-time ('PIT') value of all on-balance sheet assets.

The regulatory exposure value includes an estimation of risk, and is expressed as the amount expected to be outstanding if and when the counterparty defaults.

Moreover, regulatory exposure classes are based on different criteria from accounting asset types and are therefore not comparable on a line by line basis.

The following tables show in two steps how the accounting values in the regulatory balance sheet link to regulatory exposure at default ('EAD').

Table 4 shows the difference between the accounting and regulatory scope of consolidation, and a breakdown of the accounting balances into the risk types that form the basis for regulatory capital requirements. Table 5 then shows the main differences between the accounting balances and regulatory exposures by regulatory risk type.

Table 4: Differences between accounting and regulatory scopes of consolidation and mapping of financial statement categories with regulatory risk categories (LI1)

			Carrying value of items				
	Carrying values as reported in published financial statements	Carrying values under scope of regulatory consolidation[1]	Subject to the credit risk framework	Subject to the counter-party credit risk framework[2]	Subject to the securitisation framework[3]	Subject to the market risk framework	Subject to deduction from capital or not subject to regulatory capital requirements
	$bn	$bn	$bn	$bn	$bn	$bn	$bn
Assets							
Cash and balances at central banks	154.1	154.4	154.4	–	–	–	–
Items in the course of collection from other banks	5.0	5.0	5.0	–	–	–	–
Hong Kong Government certificates of indebtedness	38.4	38.4	38.4	–	–	–	–
Trading assets	254.3	253.4	1.2	21.3	–	253.4	–
Financial assets designated and otherwise mandatorily measured at fair value	43.6	10.4	4.2	3.9	2.3	–	–
Derivatives	243.0	243.1	–	242.0	1.1	243.1	–
Loans and advances to banks	69.2	69.2	68.5	–	0.7	–	–
Loans and advances to customers	1,036.7	1,048.0	1,021.5	2.9	23.6	–	–
Reverse repurchase agreements – non-trading	240.9	240.9	–	240.9	–	–	–
Financial investments	443.3	381.2	381.2	–	–	–	–
Capital invested in insurance and other entities	–	2.3	1.5	–	–	–	0.8
Prepayments, accrued income and other assets	136.7	130.6	47.1	55.6	–	14.8	19.5
Current tax assets	0.8	0.8	0.8	–	–	–	–
Interests in associates and joint ventures	24.5	19.2	11.6	–	–	–	7.6
Goodwill and intangible assets	20.1	12.3	–	–	–	–	12.0
Deferred tax assets	4.6	4.8	6.6	–	–	–	(1.8)
Total assets at 31 Dec 2019	2,715.2	2,614.0	1,742.0	566.6	27.7	511.3	38.1
Liabilities							
Hong Kong currency notes in circulation	38.4	38.4	–	–	–	–	38.4
Deposits by banks	59.0	59.4	–	–	–	–	59.4
Customer accounts	1,439.1	1,456.0	–	–	–	–	1,456.0
Repurchase agreements – non-trading	140.3	140.3	–	140.3	–	–	–
Items in course of transmission to other banks	4.8	4.8	–	–	–	–	4.8
Trading liabilities	83.2	83.2	–	10.3	–	83.2	–
Financial liabilities designated at FV	164.5	160.2	–	–	–	62.1	98.1
Derivatives	239.5	239.7	–	239.7	–	239.7	–
Debt securities in issue	104.6	102.3	–	–	–	–	102.3
Accruals, deferred income, and other liabilities	118.2	116.3	–	56.6	–	–	59.7
Current tax liabilities	2.1	2.3	–	–	–	–	2.3
Liabilities under insurance contract	97.4	–	–	–	–	–	–
Provisions	3.4	3.4	0.6	–	–	–	2.8
Deferred tax liabilities	3.4	2.1	2.0	–	–	–	2.3
Subordinated liabilities	24.6	24.7	–	–	–	–	24.7
Total liabilities at 31 Dec 2019	2,522.5	2,433.1	2.6	446.9	–	385.0	1,850.8

1 The amounts shown in the column 'Carrying values under scope of regulatory consolidation' do not equal the sum of the amounts shown in the remaining columns of this table for line items 'Derivatives', 'Trading assets' and 'Prepayments, accrued income and other assets' as some of the assets in this column are subject to regulatory capital charges for both CCR and market risk.

2 The amounts shown in the column 'Subject to the counterparty credit risk framework' include both non-trading book and trading book.

3 The amounts shown in the column 'Subject to the securitisation framework' are non-trading book positions. Trading book securitisation positions are included in the market risk column.

Table 5: Main sources of differences between regulatory exposure amounts and carrying values in financial statements (LI2)

	Footnotes	Total	Of which items subject to: Credit risk framework	CCR framework	Securitisation framework
		$bn	$bn	$bn	$bn
Carrying value of assets within scope of regulatory consolidation	1	2,575.9	1,742.0	566.6	27.7
Carrying value of liabilities within scope of regulatory consolidation	1	582.3	2.6	446.9	–
Net carrying value within scope of regulatory consolidation		1,993.6	1,739.4	119.7	27.7
Off-balance sheet amounts and potential future exposure for counterparty risk		865.5	275.6	52.9	11.2
Differences in netting rules		4.1	10.1	(6.0)	–
Differences due to financial collateral on standardised approach		(5.2)	(5.2)	–	–
Differences due to expected credit losses on IRB approach		6.5	6.5	–	–
Differences due to EAD modelling and other differences		5.3	7.7	–	(2.4)
Differences due to credit risk mitigation		(10.8)	–	(10.8)	–
Exposure values considered for regulatory purposes at 31 Dec 2019		2,859.0	2,034.1	155.8	36.5

1 Excludes amounts subject to deduction from capital or not subject to regulatory capital requirements.

Explanations of differences between accounting and regulatory exposure amounts

Off-balance sheet amounts and potential future exposure for counterparty risk

Off-balance sheet amounts subject to credit risk and securitisation regulatory frameworks include undrawn portions of committed facilities, various trade finance commitments and guarantees. We apply a credit conversion factor ('CCF') to these items and add potential future exposures ('PFE') for counterparty credit risk.

Differences in netting rules

The increase from carrying value due to differences in netting rules is the reversal of amounts deducted from gross loans and advances to customers in the published financial statements in accordance with the offsetting criteria of IAS 32 'Financial instruments: presentation'.

Differences due to financial collateral

Exposure value under the standardised approach is calculated after deducting credit risk mitigation whereas accounting value is before such deductions.

Differences due to expected credit losses

The carrying value of assets is net of credit risk adjustments. The regulatory exposure value under IRB approaches is before deducting credit risk adjustments.

Differences due to EAD modelling

The carrying value of assets is usually measured at amortised cost or fair value as at the balance sheet date. For certain IRB models, the exposure value used as EAD is the projected value over the next year.

Differences due to credit risk mitigation

In counterparty credit risk ('CCR'), differences arise between accounting carrying values and regulatory exposure as a result of the application of credit risk mitigation and the use of modelled exposures.

Explanation of differences between accounting fair value and regulatory prudent valuation

Fair value is defined as the best estimate of the price that would be received to sell an asset or be paid to transfer a liability in an orderly transaction between market participants at the measurement date.

Some fair value adjustments already reflect valuation uncertainty to some degree. These are market data uncertainty, model uncertainty and concentration adjustments.

However, it is recognised that a variety of valuation techniques using stressed assumptions and combined with the range of plausible market parameters at a given point in time may still generate unexpected uncertainty beyond fair value.

A series of additional valuation adjustments ('AVAs') are therefore required to reach a specified degree of confidence (the 'prudent value') set by regulators that differs both in terms of scope and measurement from HSBC's own quantification for disclosure purposes.

AVAs should consider at the minimum: market price uncertainty, bid-offer (close-out) uncertainty, model risk, concentration, administrative costs, unearned credit spreads and investing and funding costs.

AVAs are not limited to level 3 exposures, for which a 95% uncertainty range is already computed and disclosed, but must also be calculated for any exposure for which the exit price cannot be determined with a high degree of certainty. Table 64 presents further information on the prudent valuation adjustment.

Capital and RWAs

Capital management

Approach and policy

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

Our capital management process culminates in the annual Group capital plan, which is approved by the Board. HSBC Holdings is the primary provider of equity capital to its subsidiaries and also provides them with non-equity and loss-absorbing capital where necessary. These investments are substantially funded by HSBC Holdings' issuance of equity and non-equity capital and by profit retention. As part of its capital management process, HSBC Holdings seeks to maintain a balance between the composition of its capital and its investment in subsidiaries, including management of double leverage. Subject to the above, there is no current or foreseen impediment to HSBC Holdings' ability to provide such investments.

Each subsidiary manages its own capital to support its planned business growth and meet its local regulatory requirements within the context of the Group capital plan. Capital generated by subsidiaries in excess of planned requirements is returned to HSBC Holdings, normally by way of dividends, in accordance with the Group's capital plan.

During 2019, the Group's subsidiaries paid dividends consistent with their financial performance and local regulatory regimes, informed by the Group's capital plan. No significant restrictions are envisaged with respect to the payment of planned dividends or payments.

However, the ability of subsidiaries to pay dividends or advance monies to HSBC Holdings depends on, among other things, their respective local regulatory capital and banking requirements, exchange controls, statutory reserves, and financial and operating performance. None of our subsidiaries that are excluded from the regulatory consolidation have capital resources below their minimum regulatory requirement. HSBC Holdings has not entered into any Group Financial Support Agreements pursuant to the application of early intervention measures under the Bank Recovery and Resolution Directive.

All capital securities included in the capital base of HSBC have either been issued as fully compliant CRD IV securities (on an end point basis) or in accordance with the rules and guidance in the PRA's previous General Prudential Sourcebook, which are included in the capital base by virtue of the application of CRR II. The main features of capital securities issued by the Group, categorised as tier 1 ('T1') capital and tier 2 ('T2') capital, are set out on the HSBC website, www.hsbc.com.

The values disclosed are the IFRS balance sheet carrying amounts, not the amounts that these securities contribute to regulatory capital. For example, the IFRS accounting and the regulatory treatments differ in their approaches to issuance costs, regulatory amortisation and regulatory eligibility limits prescribed by the relevant regulatory legislation.

A list of the main features of our capital instruments in accordance with Annex III of Commission Implementing Regulation 1423/2013 is also published on our website with reference to our balance sheet on 31 December 2019. This is in addition to the full terms and conditions of our securities, also available on our website.

For further details of our approach to capital risk management, please see page 130 of the Annual Report and Accounts 2019.

Own funds

Table 6: Own funds disclosure

			At	
			31 Dec 2019	31 Dec 2018
Ref		*Ref †*	**$m**	$m
	Common equity tier 1 ('CET1') capital: instruments and reserves			
1	Capital instruments and the related share premium accounts		**22,873**	22,384
	– ordinary shares	*a*	**22,873**	22,384
2	Retained earnings	*b*	**127,188**	121,180
3	Accumulated other comprehensive income (and other reserves)	*c*	**1,735**	3,368
5	Minority interests (amount allowed in consolidated CET1)	*d*	**4,865**	4,854
5a	Independently reviewed interim net profits net of any foreseeable charge or dividend	*b*	**(3,381)**	3,697
6	**Common equity tier 1 capital before regulatory adjustments**		**153,280**	155,483
	Common equity tier 1 capital: regulatory adjustments			
7	Additional value adjustments[1]		**(1,327)**	(1,180)
8	Intangible assets (net of related deferred tax liability)	*e*	**(12,372)**	(17,323)
10	Deferred tax assets that rely on future profitability excluding those arising from temporary differences (net of related tax liability)	*f*	**(1,281)**	(1,042)
11	Fair value reserves related to gains or losses on cash flow hedges	*g*	**(41)**	135
12	Negative amounts resulting from the calculation of expected loss amounts	*h*	**(2,424)**	(1,750)
14	Gains or losses on liabilities valued at fair value resulting from changes in own credit standing	*i*	**2,450**	298
15	Defined benefit pension fund assets	*j*	**(6,351)**	(6,070)
16	Direct and indirect holdings of own CET1 instruments[2]		**(40)**	(40)
19	Direct, indirect and synthetic holdings by the institution of the CET1 instruments of financial sector entities where the institution has a significant investment in those entities (amount above 10% threshold and net of eligible short positions)[3]		**(7,928)**	(7,489)
28	**Total regulatory adjustments to common equity tier 1**		**(29,314)**	(34,461)
29	**Common equity tier 1 capital**		**123,966**	121,022
	Additional tier 1 ('AT1') capital: instruments			
30	Capital instruments and the related share premium accounts		**20,871**	22,367
31	– classified as equity under IFRSs	*k*	**20,871**	22,367
33	Amount of qualifying items and the related share premium accounts subject to phase out from AT1	*l*	**2,305**	2,297

Table 6: Own funds disclosure (continued)

Ref		Ref †	At 31 Dec 2019 $m	At 31 Dec 2018 $m
34	Qualifying tier 1 capital included in consolidated AT1 capital (including minority interests not included in CET1) issued by subsidiaries and held by third parties	*m, n*	**1,277**	1,516
35	– *of which: instruments issued by subsidiaries subject to phase out*	*n*	***1,218***	*1,298*
36	**Additional tier 1 capital before regulatory adjustments**		**24,453**	26,180
	Additional tier 1 capital: regulatory adjustments			
37	Direct and indirect holdings of own AT1 instruments[2]		**(60)**	(60)
43	**Total regulatory adjustments to additional tier 1 capital**		**(60)**	(60)
44	**Additional tier 1 capital**		**24,393**	26,120
45	**Tier 1 capital (T1 = CET1 + AT1)**		**148,359**	147,142
	Tier 2 capital: instruments and provisions			
46	Capital instruments and the related share premium accounts	*o*	**20,525**	20,249
	– *of which: instruments grandfathered under CRR II*		***7,067***	*N/A*
48	Qualifying own funds instruments included in consolidated T2 capital (including minority interests and AT1 instruments not included in CET1 or AT1) issued by subsidiaries and held by third parties[4]	*p, q*	**4,667**	6,480
49	– *of row 48: instruments issued by subsidiaries subject to phase out*	*q*	***2,251***	*1,585*
	– *of row 48: instruments issued by subsidiaries grandfathered under CRR II*		***1,452***	*N/A*
51	**Tier 2 capital before regulatory adjustments**		**25,192**	26,729
	Tier 2 capital: regulatory adjustments			
52	Direct and indirect holdings of own T2 instruments[2]		**(40)**	(40)
55	Direct and indirect holdings by the institution of the T2 instruments and subordinated loans of financial sector entities where the institution has a significant investment in those entities (net of eligible short positions)	*r*	**(1,361)**	(593)
57	**Total regulatory adjustments to tier 2 capital**		**(1,401)**	(633)
58	**Tier 2 capital**		**23,791**	26,096
59	**Total capital (TC = T1 + T2)**		**172,150**	173,238
60	**Total risk-weighted assets**		**843,395**	865,318
	Capital ratios and buffers			
61	Common equity tier 1		**14.7%**	14.0%
62	Tier 1		**17.6%**	17.0%
63	Total capital		**20.4%**	20.0%
64	Institution specific buffer requirement		**5.11%**	3.94%
65	– capital conservation buffer requirement		**2.50%**	1.88%
66	– counter-cyclical buffer requirement		**0.61%**	0.56%
67a	– Global Systemically Important Institution ('G-SII') buffer		**2.00%**	1.50%
68	Common equity tier 1 available to meet buffers		**8.5%**	7.9%
	Amounts below the threshold for deduction (before risk weighting)			
72	Direct and indirect holdings of the capital of financial sector entities where the institution does not have a significant investment in those entities (amount below 10% threshold and net of eligible short positions)		**2,938**	2,534
73	Direct and indirect holdings by the institution of the CET1 instruments of financial sector entities where the institution has a significant investment in those entities (amount below 10% threshold and net of eligible short positions)		**13,189**	12,851
75	Deferred tax assets arising from temporary differences (amount below 10% threshold, net of related tax liability)		**4,529**	4,956
	Applicable caps on the inclusion of provisions in tier 2			
77	Cap on inclusion of credit risk adjustments in T2 under standardised approach		**2,163**	2,200
79	Cap for inclusion of credit risk adjustments in T2 under internal ratings-based approach		**3,128**	3,221
	Capital instruments subject to phase-out arrangements (only applicable until 1 Jan 2022)			
82	Current cap on AT1 instruments subject to phase out arrangements		**5,191**	6,921
83	Amount excluded from AT1 due to cap (excess over cap after redemptions and maturities)		**122**	–
84	Current cap on T2 instruments subject to phase out arrangements		**2,737**	5,131

† *The references (a) – (r) identify balance sheet components in Table 2: Reconciliation of balance sheets – financial accounting to regulatory scope of consolidation on page 9 which are used in the calculation of regulatory capital.*

1 *Additional value adjustments are deducted from CET1. These are calculated on all assets measured at fair value.*

2 *The deduction for holdings of own CET1, T1 and T2 instruments is set by the PRA.*

3 *The threshold deduction for significant investments is drawn from numerous lines of the balance sheet and includes: investments in insurance subsidiaries and non-consolidated associates, other CET1 equity held in financial institutions, and connected funding of a capital nature.*

4 *Eligible instruments issued by subsidiaries previously reported in row 46 'Capital instruments and the related share premium accounts' are now reported here. For comparative purposes, 2018 data have been re-presented to reflect this change.*

At 31 December 2019, our CET1 ratio increased to 14.7% from 14.0% at 31 December 2018. CET1 capital increased during the year by $2.9bn, mainly as a result of:

- capital generation of $6.0bn through profits
- a fall in the deduction for intangible assets of $4.9bn. This was primarily due to $7.3bn of goodwill impairment, partly offset by an increase in internally generated software;
- a $1.5bn increase in FVOCI reserve; and
- favourable foreign currency translation differences of $1.0bn.

These increases were partly offset by:

- dividends and scrip of $9.0bn;
- share buy-back of $1.0bn; and
- an increase in the deduction for excess expected loss $0.7bn.

RWAs reduced by $21.9bn during the year. Excluding foreign currency translation differences, the remaining decrease of $26.9bn was primarily driven by methodology and policy changes and model updates which reduced RWAs by $39.9bn. These reductions were partly offset by increases of $12.7bn from movements in asset quality and size, including both RWA

increases due to overall lending growth and reductions as a result of active portfolio management.

Leverage

The risk of excessive leverage is managed as part of HSBC's global risk appetite framework and monitored using a leverage ratio metric within our RAS. The RAS articulates the aggregate level and types of risk that HSBC is willing to accept in its business activities in order to achieve its strategic business objectives. The RAS is monitored via the risk appetite profile report, which includes comparisons of actual performance against the risk appetite and tolerance thresholds assigned to each metric, to ensure that any excessive risk is highlighted, assessed and mitigated appropriately. The risk appetite profile report is presented monthly to the RMM and the GRC.

Our approach to risk appetite is described on page 73 of the Annual Report and Accounts 2019.

Table 7: Leverage ratio common disclosure (LRCom)

			At 31 Dec	
			2019^	2018
Re		*Footnotes*	**$bn**	$bn
	On-balance sheet exposures (excluding derivatives and SFT)			
1	On-balance sheet items (excluding derivatives, SFTs and fiduciary assets, but including collateral)		**2,119.1**	2,012.5
2	(Asset amounts deducted in determining tier 1 capital)		**(30.5)**	(33.8)
3	**Total on-balance sheet exposures (excluding derivatives, SFTs and fiduciary assets)**		**2,088.6**	1,978.7
	Derivative exposures			
4	Replacement cost associated with all derivatives transactions (i.e. net of eligible cash variation margin)		**53.5**	44.2
5	Add-on amounts for potential future exposure ('PFE') associated with all derivatives transactions (mark-to-market method)		**162.1**	154.1
6	Gross-up for derivatives collateral provided where deducted from the balance sheet assets pursuant to IFRSs		**8.3**	5.9
7	(Deductions of receivables assets for cash variation margin provided in derivatives transactions)		**(43.1)**	(21.5)
8	(Exempted central counterparty ('CCP') leg of client-cleared trade exposures)		**(53.2)**	(38.0)
9	Adjusted effective notional amount of written credit derivatives		**159.4**	160.9
10	(Adjusted effective notional offsets and add-on deductions for written credit derivatives)		**(150.4)**	(153.4)
11	**Total derivative exposures**		**136.6**	152.2
	Securities financing transaction exposures			
12	Gross SFT assets (with no recognition of netting), after adjusting for sales accounting transactions	*1*	**451.0**	429.8
13	(Netted amounts of cash payables and cash receivables of gross SFT assets)	*1*	**(196.1)**	(184.5)
14	Counterparty credit risk exposure for SFT assets		**10.7**	11.3
16	**Total securities financing transaction exposures**		**265.6**	256.6
	Other off-balance sheet exposures			
17	Off-balance sheet exposures at gross notional amount		**865.5**	829.8
18	(Adjustments for conversion to credit equivalent amounts)		**(629.8)**	(602.4)
19	**Total off-balance sheet exposures**		**235.7**	227.4
	Capital and total exposures			
20	**Tier 1 capital**		**144.8**	143.5
21	**Total leverage ratio exposure**		**2,726.5**	2,614.9
22	**Leverage ratio (%)**		**5.3**	5.5
EU	Choice of transitional arrangements for the definition of the capital measure		**Fully phased-in**	Fully phased-in

^ *Figures have been prepared on an IFRS 9 transitional basis.*

1 *At 31 December 2018, netting of $180.9bn relating to SFT assets was recognised. This had no impact on the total leverage ratio exposure. Comparatives have been restated.*

Our leverage ratio calculated in accordance with the Capital Requirements Regulation was 5.3% at 31 December 2019, down from 5.5% at 31 December 2018. The increase in exposure was primarily due to growth in customer lending and financial investments.

At 31 December 2019, the Group's leverage ratio measured under the PRA's UK leverage framework was 5.7%. This measure excludes qualifying central bank balances from the calculation of exposure.

At 31 December 2019, our UK minimum leverage ratio requirement of 3.25% under the PRA's UK leverage framework was supplemented by an additional leverage ratio buffer of 0.7% and a countercyclical leverage ratio buffer of 0.2%. These additional buffers translated into capital values of $17.7bn and $5.4bn respectively. We exceeded these leverage requirements.

For further details of the UK leverage ratio, please see page 155 of the Annual Report and Accounts 2019.

The following table provides a reconciliation of the total assets in our published balance sheet under IFRS and the total leverage exposure:

Table 8: Summary reconciliation of accounting assets and leverage ratio exposures (LRSum)

		At 31 Dec	
		2019	2018
Ref*		**$bn**	$bn
1	Total assets as per published financial statements	**2,715.2**	2,558.1
	Adjustments for:		
2	– entities which are consolidated for accounting purposes but are outside the scope of regulatory consolidation	**(101.2)**	(89.5)
4	– derivative financial instruments	**(106.4)**	(55.6)
5	– securities financing transactions ('SFT')	**2.8**	(5.1)
6	– off-balance sheet items (i.e. conversion to credit equivalent amounts of off-balance sheet exposures)	**235.7**	227.4
7	– other	**(19.6)**	(20.4)
8	**Total leverage ratio exposure**	**2,726.5**	2,614.9

The table below provides a breakdown of on-balance sheet exposures excluding derivatives, SFTs and exempted exposures, by asset class:

Table 9: Leverage ratio – Split of on-balance sheet exposures (excluding derivatives, SFTs and exempted exposures) (LRSpl)

		At 31 Dec	
		2019	2018
Ref*		**$bn**	$bn
EU-1	Total on-balance sheet exposures (excluding derivatives, SFTs and exempted exposures)	**2,076.0**	1,991.0
EU-2	– trading book exposures	**230.8**	218.5
EU-3	– banking book exposures	**1,845.2**	1,772.5
	'banking book exposures' comprises:		
EU-4	covered bonds	**2.6**	1.6
EU-5	exposures treated as sovereigns	**539.3**	507.3
EU-6	exposures to regional governments, multilateral development banks ('MDB'), international organisations and public sector entities not treated as sovereigns	**9.4**	9.3
EU-7	institutions	**59.3**	66.8
EU-8	secured by mortgage of immovable property	**330.4**	300.0
EU-9	retail exposures	**106.2**	82.8
EU-10	corporate	**603.2**	614.3
EU-11	exposures in default	**9.9**	9.1
EU-12	other exposures (e.g. equity, securitisations and other non-credit obligation assets)	**184.9**	181.3

Pillar 1 minimum capital requirements and RWA flow

Pillar 1 covers the minimum capital resource requirements for credit risk, counterparty credit risk, equity, securitisation, market risk and operational risk. These requirements are expressed in terms of RWAs. The table provides information on the scope of permissible approaches and our adopted approach by risk type.

Risk category	Scope of permissible approaches	Approach adopted by HSBC
Credit risk	The Basel framework applies three approaches of increasing sophistication to the calculation of Pillar 1 credit risk capital requirements. The most basic level, the standardised approach, requires banks to use external credit ratings to determine the risk weightings applied to rated counterparties. Other counterparties are grouped into broad categories and standardised risk weightings are applied to these categories. The next level, the foundation IRB ('FIRB') approach, allows banks to calculate their credit risk capital requirements on the basis of their internal assessment of a counterparty's probability of default ('PD'), but subjects their quantified estimates of EAD and loss given default ('LGD') to standard supervisory parameters. Finally, the advanced IRB ('AIRB') approach allows banks to use their own internal assessment in determining PD and in quantifying EAD and LGD.	For consolidated Group reporting, we have adopted the AIRB approach for the majority of our business. Some portfolios remain on the standardised or FIRB approaches: • pending the issuance of local regulations or model approval; • following supervisory prescription of a non-advanced approach; or • under exemptions from IRB treatment.
Counterparty credit risk	Four approaches to calculating CCR and determining exposure values are defined by Basel: mark-to-market, original exposure, standardised and internal model method ('IMM'). These exposure values are used to determine capital requirements under one of the three approaches to credit risk: standardised, FIRB or AIRB.	We use the mark-to-market and IMM approaches for CCR. Details of the IMM permission we have received from the PRA can be found in the Financial Services Register on the PRA website. Our aim is to increase the proportion of positions on IMM over time.
Equity	For the non-trading book, equity exposures can be assessed under standardised or IRB approaches.	For Group reporting purposes, all non-trading book equity exposures are treated under the standardised approach.
Securitisation	Basel specifies two approaches for calculating credit risk requirements for securitisation positions in non-trading books: the standardised approach and the IRB approach, which incorporates the ratings based method ('RBM'), the internal assessment approach ('IAA') and the supervisory formula method ('SFM'). Securitisation positions in the trading book are treated within the market risk framework, using the CRD IV standard rules. On 1 January 2019, the new securitisation framework came into force in the EU for new transactions. This framework prescribes the following approaches: • internal ratings-based approach ('SEC-IRBA'); • external ratings-based approach ('SEC-ERBA'); • internal assessment approach ('IAA'); and • standardised approach ('SEC-SA'). From 1 January 2020, all transactions will be subject to the new framework.	For the majority of the non-trading book securitisation positions, we use the IRB approach, and within this principally the RBM, with lesser amounts on the IAA and the SFM. We also use the standardised approach for an immaterial amount of non-trading book positions. We follow the CRD IV standard rules for the securitisation positions in the trading book. Our exposures subject to the new framework in 2019 include exposures under SEC-IRBA,SEC-ERBA, IAA and SEC-SA.
Market risk	Market risk capital requirements are calculated using a combination of standard rules and the internal models approach ('IMA'). The latter involves the use of internal value at risk ('VaR') models to measure market risks and determine the appropriate capital requirement. The internal model approach also includes stressed VaR ('SVaR') and incremental risk charge ('IRC'). HSBC does not use or need a Comprehensive Risk Model ('CRM').	The market risk capital requirement is measured using internal market risk models, where approved by the PRA, or under the standard rules. Our internal market risk models comprise VaR, stressed VaR and IRC. Non-proprietary details of the scope of our IMA permission are available in the Financial Services Register on the PRA website. We are in compliance with the requirements regarding i) rules and procedures for inclusion of positions within trading books and ii) application of prudent valuation adjustments to trading book positions.
Operational risk	Basel allows firms to calculate their operational risk capital requirement under the basic indicator approach, the standardised approach or the advanced measurement approach.	We currently use the standardised approach in determining our operational risk capital requirement. We have in place an operational risk model that is used for economic capital calculation purposes.

Table 10: Overview of RWAs (OV1)

		At		
		31 Dec 2019	30 Sep 2019	**31 Dec 2019**
		RWAs	RWAs	**Capital required**
		$bn	$bn	**$bn**
1	**Credit risk (excluding counterparty credit risk)**	**624.3**	636.6	**50.0**
2	– standardised approach	**126.1**	129.3	**10.1**
3	– foundation IRB approach	**32.3**	31.0	**2.6**
4	– advanced IRB approach	**465.9**	476.3	**37.3**
6	**Counterparty credit risk**	**43.9**	49.6	**3.5**
7	– mark-to-market	**20.6**	23.4	**1.7**
10	– internal model method	**18.7**	20.4	**1.5**
11	– risk exposure amount for contributions to the default fund of a central counterparty	**0.6**	0.5	**–**
12	– credit valuation adjustment	**4.0**	5.3	**0.3**
13	**Settlement risk**	**0.2**	0.2	**–**
14	**Securitisation exposures in the non-trading book**	**8.3**	6.9	**0.7**
15	– IRB ratings based method	**1.8**	2.2	**0.1**
17	– IRB internal assessment approach	**0.6**	1.0	**0.1**
18	– standardised approach	**1.3**	1.3	**0.1**
14a	– exposures subject to the new securitisation framework[1]	**4.6**	2.4	**0.4**
19	**Market risk**	**29.9**	36.9	**2.4**
20	– standardised approach	**7.8**	8.1	**0.6**
21	– internal models approach	**22.1**	28.8	**1.8**
23	**Operational risk**	**92.8**	91.1	**7.4**
25	– standardised approach	**92.8**	91.1	**7.4**
27	**Amounts below the thresholds for deduction (subject to 250% risk weight)**	**44.0**	43.9	**3.5**
29	**Total**	**843.4**	865.2	**67.5**

1 *On 1 January 2019, a new securitisation framework came into force in the EU for new transactions. Existing positions are subject to 'grandfathering' provisions and will transfer to the new framework on 1 January 2020. Our exposures subject to the approaches under the new framework at 31 December 2019 include $1.7bn under the external ratings-based approach, $5.2bn under the internal ratings-based approach, $7.1bn under the internal assessment approach, and $5.8bn under the standardised approach.*

Credit risk (including amounts below the thresholds for deduction)

RWAs decreased by $12.2bn in the fourth quarter of the year including an increase of $16.6bn due to foreign currency translation differences. Excluding foreign currency translation differences, the remaining decrease of $28.8bn was primarily driven by asset size decreases of $13.7bn, reflecting active portfolio management, and reductions of $7.3bn due to changes to methodology and policy. These included the effect of risk parameter refinements and securitisation transactions. A further reduction of $5.7bn was due to model updates, especially to global corporate and Private Banking models.

Counterparty credit risk

Counterparty credit risk (including settlement risk) RWAs decreased by $5.7bn primarily due to management initiatives totalling $3.5bn - including hedging, improved collateral recognition and parameter refinements. In addition, lower derivative exposures reduced RWAs by $1.7bn.

Securitisation

The $1.4bn RWA increase is primarily due to new securitisation transactions. During the period, exposures moved from the pre-existing securitisation framework to the new framework due to new deals on existing facilities.

Market risk

RWAs decreased by $7bn mainly due to reductions in sovereign and flow credit portfolio exposures.

Operational risk

RWAs increased by $1.7bn primarily due to increased contributions from Retail Banking and Wealth Management ('RBWM') and Commercial Banking ('CMB') reflecting income growth in those businesses between 2016 and 2019, partly offset by a $0.9bn fall in RWAs caused by an approved change to operational risk methodology.

Table 11: RWA flow statements of credit risk exposures under the IRB approach[1] (CR8)

		RWAs	**Capital required**
		$bn	**$bn**
1	**At 1 Oct 2019**	**507.3**	**40.6**
2	Asset size	**(11.8)**	**(0.9)**
3	Asset quality	**(2.2)**	**(0.2)**
4	Model updates	**(3.1)**	**(0.2)**
5	Methodology and policy	**(6.0)**	**(0.5)**
7	Foreign exchange movements	**14.0**	**1.1**
9	**At 31 Dec 2019**	**498.2**	**39.9**

1 *Securitisation positions are not included in this table.*

RWAs under the IRB approach decreased by $9.1bn in the fourth quarter of the year, including an increase of $14.0bn due to foreign currency translation differences. The remaining decrease of $23.1bn (excluding foreign currency translation differences) was principally due to:

- an $11.8bn asset size reduction in RWAs largely due to active portfolio management;
- a $6.0bn fall in RWAs due to methodology and policy changes - reflecting securitisation transactions, risk parameter refinements and improved collateral recognition; and
- a $3.1bn decrease in RWAs from model updates, mainly to our global corporate model.

Table 12: RWA flow statements of CCR exposures under IMM (CCR7)

		RWAs	Capital required
		$bn	$bn
1	**At 1 Oct 2019**	**25.0**	**2.0**
2	Asset size	**(2.7)**	**(0.3)**
3	Asset quality	**(0.1)**	**–**
4	Model updates	**(0.1)**	**–**
5	Methodology and policy	**(0.3)**	**–**
9	**At 31 Dec 2019**	**21.8**	**1.7**

RWAs under the IMM decreased by $3.2bn primarily due to management initiatives, including hedging and parameter refinements, and lower derivative exposure.

Table 13: RWA flow statements of market risk exposures under IMA (MR2-B)

		VaR	Stressed VaR	IRC	Other	Total RWAs	Total capital required
		$bn	$bn	$bn	$bn	$bn	$bn
1	**At 1 Oct 2019**	**6.0**	**8.6**	**10.6**	**3.6**	**28.8**	**2.3**
2	Movement in risk levels	**(0.6)**	**(0.5)**	**(4.0)**	**(0.7)**	**(5.8)**	**(0.4)**
4	Methodology and policy	**(0.1)**	**(0.1)**	**–**	**(0.7)**	**(0.9)**	**(0.1)**
8	**At 31 Dec 2019**	**5.3**	**8.0**	**6.6**	**2.2**	**22.1**	**1.8**

RWAs under the IMA decreased by $6.7bn mainly due to reductions in sovereign and flow credit portfolio exposures.

Minimum requirement for own funds and eligible liabilities

Overview and requirements

From 1 January 2019, a requirement for total loss-absorbing capacity ('TLAC') was introduced, as defined in the final standards adopted by the Financial Stability Board. In the EU, TLAC requirements were implemented via CRR II, which came into force in June 2019 and includes a new framework on minimum requirement for own funds and eligible liabilities ('MREL').

MREL includes own funds and liabilities that can be written down or converted into capital resources in order to absorb losses or recapitalise a bank in the event of its failure. The new framework is complemented with new disclosure requirements. As the specific EU format for disclosure is yet to be agreed, the disclosures are based on the formats provided in the Basel Standards for Pillar 3 disclosures requirements.

The preferred resolution strategy for the Group, as confirmed by the BoE, is a multiple point of entry ('MPE') strategy – allowing each individual resolution group to be resolved by its respective local resolution authority. Aligned with this strategy, the Group issues TLAC to the market from HSBC Holdings only, and then downstreams the proceeds to its subsidiaries as necessary and in accordance with requirements set by our regulators. This approach gives host authorities the option to recapitalise local subsidiaries through the write-down of internal TLAC resources, with the BoE applying bail-in powers at the HSBC Holdings level where necessary, and subsequently conducting any necessary restructuring and separation of the Group in coordination with host authorities.

In line with the existing structure and business model of the Group, we have three resolution groups – namely the European resolution group, the Asian resolution group and the US resolution group. There are some smaller entities that fall outside of the resolution groups, and can be separately resolved.

The table below lists the resolution groups, the related resolution entities and their material subsidiaries subject to TLAC requirements as currently agreed with the BoE.

Resolution structure

Resolution group	Resolution entity	Material entity/subgroup
European resolution group	HSBC Holdings plc	HSBC UK Holdings Limited
		HSBC Bank plc
		HSBC UK Bank plc
		HSBC France
Asian resolution group	HSBC Asia Holdings Limited	The Hongkong and Shanghai Banking Corporation Limited
		Hang Seng Bank Limited
US resolution group	HSBC North America Holdings Inc	N/A

The external MREL requirement for the Group as a whole is currently the highest of:

- 16% of the Group's consolidated RWAs;
- 6% of the Group's consolidated leverage exposure; and
- the sum of all loss-absorbing capacity requirements and other capital requirements relating to Group entities or sub-groups.

We expect the indicative, external MREL requirements applying to the Group from 2020 to 2021 to follow the same calibration. The indicative, external MREL requirement applicable in 2022 is expected to be the highest of:

- 18% of the Group's consolidated RWAs;
- 6.75% of the Group's consolidated leverage exposure; and
- the sum of all loss-absorbing capacity requirements and other capital requirements relating to other Group entities or sub-groups.

These indicative requirements remain subject to the BoE's confirmation and its review of the MREL framework in 2020.

Further details of our approach to capital management may be found in 'Capital management' on page 152 of the Annual Report and Accounts 2019.

Key metrics of the resolution groups

The table below provides a summary of key prudential metrics of the European, Asian and US resolution groups.

Table 14: Key metrics of the resolution groups (KM2)

		Resolution groups								
		European[1]			Asian[2]			US[3]		
		At 31 Dec 2019	At 30 Sep 2019	At 30 Jun 2019	**At 31 Dec 2019**	At 30 Sep 2019	At 30 Jun 2019	**At 31 Dec 2019**	At 30 Sep 2019	At 30 Jun 2019
1	Total loss absorbing capacity ('TLAC') available ($m)	**94,583**	95,474	97,256	**98,753**	97,244	97,040	**29,843**	30,184	31,739
1a	Fully loaded ECL accounting model TLAC available ($m)	**94,439**	95,282	97,055	**98,753**	97,244	97,040	**N/A**	N/A	N/A
2	Total RWA at the level of the resolution group ($m)	**297,431**	316,766	321,149	**366,076**	370,590	371,100	**128,705**	139,016	140,762
3	TLAC as a percentage of RWA (row1/row2) (%)	**31.8**	30.1	30.3	**27.0**	26.2	26.1	**23.2**	21.7	22.5
3a	Fully loaded ECL accounting model TLAC as a percentage of fully loaded ECL accounting model RWA (%)	**31.8**	30.1	30.2	**27.0**	26.2	26.1	**N/A**	N/A	N/A
4	Leverage exposure measure at the level of the resolution group ($m)	**1,166,576**	1,132,679	1,176,134	**1,036,243**	1,024,554	1,041,168	**331,869**	372,556	362,621
5	TLAC as a percentage of leverage exposure measure (row1/row4) (%)	**8.1**	8.4	8.3	**9.5**	9.5	9.3	**9.0**	8.1	8.8
5a	Fully loaded ECL accounting model TLAC as a percentage of fully loaded ECL accounting model Leverage exposure measure (%)	**8.1**	8.4	8.3	**9.5**	9.5	9.3	**N/A**	N/A	N/A
6a	Does the subordination exemption in the antepenultimate paragraph of Section 11 of the FSB TLAC Term Sheet apply?	**No**	No	No	**No**	No	No	**No**	No	No
6b	Does the subordination exemption in the penultimate paragraph of Section 11 of the FSB TLAC Term Sheet apply?	**No**	No	No	**No**	No	No	**No**	No	No
6c	If the capped subordination exemption applies, the amount of funding issued that ranks *pari passu* with excluded liabilities and that is recognised as external TLAC, divided by funding issued that ranks *pari passu* with excluded liabilities and that would be recognised as external TLAC if no cap was applied (%)	**N/A**	N/A	N/A	**N/A**	N/A	N/A	**N/A**	N/A	N/A

1 The European resolution group reports in accordance with CRR II. Unless otherwise stated, all figures are calculated using the EU's regulatory transitional arrangements for IFRS 9 in article 473a of the Capital Requirements Regulation.

2 Reporting for the Asian resolution group follows the Hong Kong Monetary Authority ('HKMA') regulatory rules. IFRS 9 has been implemented but no regulatory transitional arrangements apply.

3 Reporting for the US resolution group is prepared in accordance with local regulatory rules. The US accounting standard for current expected credit losses ('CECL') corresponding to IFRS 9 is not yet effective. Leverage exposure and ratio are calculated under the US supplementary leverage ratio rules.

Given the preferred MPE resolution strategy, and the fact that the BoE framework includes requirements set on the basis of HSBC group consolidated position, the following table presents data for both the consolidated Group and the resolution groups. The difference between Group CET1 and the aggregate of resolution groups' CET1 is driven by entities that fall outside of the resolution groups and by differences in regulatory frameworks.

Table 15: TLAC composition (TLAC1)

		At 31 Dec 2019				At 30 June 2019			
			Resolution group				Resolution group		
		Group[1]	European[1]	Asian[2]	US[3]	Group[1]	European[1]	Asian[2]	US[3]
	Regulatory capital elements of TLAC and adjustments ($m)								
	Common equity tier 1 capital before adjustments	**123,966**	**110,263**	**63,156**	**16,753**	126,949	116,222	61,561	18,649
	Deduction of CET1 exposures between MPE resolution groups and other group entities	**—**	**100,028**	**—**	**—**	—	102,699	—	—
1	Common equity tier 1 capital ('CET1')	**123,966**	**10,235**	**63,156**	**16,753**	126,949	13,523	61,561	18,649
2	Additional tier 1 capital ('AT1') before TLAC	**24,393**	**23,515**	**5,855**	**2,240**	25,878	25,089	5,837	2,240
4	Other adjustments	**—**	**6,673**	**—**	**—**	—	7,940	—	—
5	AT1 instruments eligible under the TLAC framework (row 2 minus row 3 minus row 4)	**24,393**	**16,842**	**5,855**	**2,240**	25,878	17,149	5,837	2,240
6	Tier 2 capital ('T2') before TLAC adjustments	**23,791**	**24,957**	**7,892**	**4,643**	25,432	25,167	8,074	5,503
7	Amortised portion of T2 instruments where remaining maturity > 1 year	**579**	**579**	**—**	**—**	1,257	302	—	—
8	T2 capital ineligible as TLAC as issued out of subsidiaries to third parties	**—**	**—**	**400**	**—**	—	—	400	—
9	Other adjustments	**164**	**8,087**	**—**	**1,793**	—	7,947	—	2,653
10	T2 instruments eligible under the TLAC framework (row 6 plus row 7 minus row 8 minus row 9)	**24,206**	**17,449**	**7,492**	**2,850**	26,689	17,522	7,674	2,850
11	TLAC arising from regulatory capital	**172,566**	**44,526**	**76,503**	**21,843**	179,516	48,194	75,072	23,739
	Non-regulatory capital elements of TLAC ($m)								
12	External TLAC instruments issued directly by the bank and subordinated to excluded liabilities	**81,192**	**50,057**	**22,257**	**8,000**	80,046	49,062	21,970	8,000
17	TLAC arising from non-regulatory capital instruments before adjustments	**81,192**	**50,057**	**22,257**	**8,000**	80,046	49,062	21,970	8,000
	Non-regulatory capital elements of TLAC: adjustments ($m)								
18	TLAC before deductions	**253,757**	**94,583**	**98,760**	**29,843**	259,562	97,256	97,042	31,739
19	Deductions of exposures between MPE resolution groups that correspond to items eligible for TLAC	**—**	**—**	**7**	**—**	—	—	2	—
20	Deduction of investments in own other TLAC liabilities	**80**	**—**	**—**	**—**	43	—	—	—
21	Other adjustments to TLAC	**—**	**—**	**—**	**—**	—	—	—	—
22	TLAC after deductions (row 18 minus row 19 minus row 20 minus row 21)	**253,677**	**94,583**	**98,753**	**29,843**	259,519	97,256	97,040	31,739
	Risk-weighted assets and leverage exposure measure for TLAC purposes ($m)								
23	Total risk-weighted assets	**843,395**	**297,431**	**366,076**	**128,705**	885,971	321,149	371,100	140,762
24	Leverage exposure measure	**2,726,542**	**1,166,576**	**1,036,243**	**331,869**	2,786,468	1,176,134	1,041,168	362,621
	TLAC ratios and buffers (%)								
25	TLAC (as a percentage of risk-weighted assets)	**30.1%**	**31.8%**	**27.0%**	**23.2%**	29.3%	30.3%	26.1%	22.5%
26	TLAC (as a percentage of leverage exposure)	**9.3%**	**8.1%**	**9.5%**	**9.0%**	9.3%	8.3%	9.3%	8.8%
27	CET1 (as a percentage of risk-weighted assets) available after meeting the resolution group's minimum capital and TLAC requirements[4]	**8.5%**	**N/A**	**N/A**	**5.2%**	8.1%	N/A	N/A	4.5%
28	Institution-specific buffer requirement expressed as a percentage of risk-weighted assets	**5.1%**	**N/A**	**N/A**	**2.5%**	5.2%	N/A	N/A	2.5%
29	*– of which: capital conservation buffer requirement*	***2.5%***	***N/A***	***N/A***	***2.5%***	*2.5%*	*N/A*	*N/A*	*2.5%*
30	*– of which: bank specific countercyclical buffer requirement*	***0.6%***	***N/A***	***N/A***	***N/A***	*0.7%*	*N/A*	*N/A*	*N/A*
31	*– of which: higher loss absorbency (G-SIB) requirement*	***2.0%***	***N/A***	***N/A***	***N/A***	*2.0%*	*N/A*	*N/A*	*N/A*

1 The Group and European resolution group reports in accordance with CRR II. Unless otherwise stated all figures are calculated using the EU's regulatory transitional arrangements for IFRS 9 in article 473a. Investments by the European resolution group in the regulatory capital or TLAC of other group companies are deducted from the corresponding form of capital in rows 1, 4 & 9. Buffer requirements are reported as 'Not applicable' as none have yet been set for the European resolution group.

2 Reporting for the Asian resolution group follows HKMA regulatory rules. IFRS 9 has been implemented but no regulatory transitional arrangements apply.

3 Reporting for the US resolution group is prepared in accordance with local regulatory rules. The US accounting standard for current expected credit losses ('CECL') corresponding to IFRS 9 is not yet effective. Leverage exposure and ratio are calculated under the US supplementary leverage ratio rules. Other adjustments for the US resolution group relate to allowances for loan and lease losses that are not TLAC eligible and Tier 2 instruments that currently do not qualify as TLAC. Under the US Final TLAC rules, in addition to the risk-weighted assets component of the TLAC requirement, the US resolution group is subject to an external 2.5% TLAC buffer that is similar to the capital conservation buffer.

4 For the Group, minimum capital requirement is defined as the sum of Pillar 1 and Pillar 2A capital requirements set by the PRA. The minimum requirements represent the total capital requirement to be met by CET1.

Creditor ranking at legal entity level

The following tables present information regarding the ranking of creditors in the liability structure of legal entities at 31 December 2019. The tables present the ranking of creditors of HSBC Holdings plc, its resolution entities, and their material sub-group entities. Nominal values are disclosed.

The main features of capital instruments disclosure for the Group, Asia and US resolution groups is published on our website, https://www.hsbc.com/investors/fixed-income-investors/regulatory-capital-securities.

European resolution group

The European resolution group comprises HSBC Holdings plc, the designated resolution entity, together with its material operating entities – namely HSBC Bank plc and its subsidiaries, and HSBC

UK Bank plc and its subsidiaries. The following tables present information regarding the ranking of creditors of HSBC Holdings plc, HSBC Bank plc and HSBC UK Bank plc.

Table 16: HSBC Holdings plc creditor ranking (TLAC3)

			Creditor ranking ($m)				
			1	2	3	4	
			(most junior)			(most senior)	Sum of 1 to 4
1	Description of creditor ranking	Footnotes	Ordinary shares[1]	Preference shares and AT1 instruments	Subordinated notes	Senior notes and other *pari passu* liabilities	
2	Total capital and liabilities net of credit risk mitigation		10,319	23,633	20,816	82,234	137,002
3	– *of row 2 that are excluded liabilities*	2	–	–	–	412	412
4	Total capital and liabilities less excluded liabilities (row 2 minus row 3)		10,319	23,633	20,816	81,822	136,590
5	– *of row 4 that are potentially eligible as TLAC*		*10,319*	*23,633*	*20,816*	*80,031*	*134,799*
6	– *of row 5 with 1 year ≤ residual maturity < 2 years*		–	–	–	*15,658*	*15,658*
7	– *of row 5 with 2 years ≤ residual maturity < 5 years*		–	–	*2,000*	*30,341*	*32,341*
8	– *of row 5 with 5 years ≤ residual maturity < 10 years*		–	–	*7,525*	*27,290*	*34,815*
9	– *of row 5 with residual maturity ≥ 10 years, but excluding perpetual securities*		–	–	*10,391*	*6,742*	*17,133*
10	– *of row 5 that are perpetual securities*		*10,319*	*23,633*	*900*	–	*34,852*

1 Excludes the value of share premium and reserves attributable to ordinary shareholders.
2 Excluded liabilities are defined in CRR II Article 72a (2). The balance mainly relates to accruals for service company recharges.

Table 17: HSBC UK Bank plc creditor ranking (TLAC2)

			Creditor ranking ($m)				
			1	2	3	4	
		Footnotes	(most junior)			(most senior)	Sum of 1 to 4
1	Is the resolution entity the creditor/investor?	1	No	No	No	No	
2	Description of creditor ranking		Ordinary shares[2]	AT1 instruments	Subordinated loans	Senior subordinated loans	
3	Total capital and liabilities net of credit risk mitigation		–	2,903	3,881	8,619	15,403
4	– *of row 3 that are excluded liabilities*		–	–	–	–	–
5	Total capital and liabilities less excluded liabilities (row 3 minus row 4)		–	2,903	3,881	8,619	15,403
6	– *of row 5 that are eligible as TLAC*		–	*2,903*	*3,881*	*8,619*	*15,403*
7	– *of row 6 with 1 year ≤ residual maturity < 2 years*		–	–	–	–	–
8	– *of row 6 with 2 years ≤ residual maturity < 5 years*		–	–	–	–	–
9	– *of row 6 with 5 years ≤ residual maturity < 10 years*		–	–	*1,700*	*4,627*	*6,327*
10	– *of row 6 with residual maturity ≥ 10 years, but excluding perpetual securities*		–	–	*2,181*	*3,992*	*6,173*
11	– *of row 6 that are perpetual securities*		–	*2,903*	–	–	*2,903*

1 The entity's capital and TLAC are owned by HSBC UK Holdings Limited.
2 The nominal value of ordinary shares is £50,002. This excludes the value of share premium and reserves attributable to ordinary shareholders.

Table 18: HSBC Bank plc creditor ranking (TLAC2)

			Creditor ranking ($m)				
			1	2	3	4	
		Footnotes	(most junior)			(most senior)	Sum of 1 to 4
1	Is the resolution entity the creditor/investor?	1	No	No	No	No	
2	Description of creditor ranking		Ordinary shares[2]	Third Dollar preference shares and AT1 instruments	Undated primary capital notes	Subordinated notes and subordinated loans	
3	Total capital and liabilities net of credit risk mitigation		1,054	5,203	1,550	18,381	26,188
4	– *of row 3 that are excluded liabilities*		–	–	–	–	–
5	Total capital and liabilities less excluded liabilities (row 3 minus row 4)		1,054	5,203	1,550	18,381	26,188
6	– *of row 5 that are eligible as TLAC*		*1,054*	*5,203*	*1,550*	*18,381*	*26,188*
7	– *of row 6 with 1 year ≤ residual maturity < 2 years*		–	–	–	*450*	*450*
8	– *of row 6 with 2 years ≤ residual maturity < 5 years*		–	–	–	*11,003*	*11,003*
9	– *of row 6 with 5 years ≤ residual maturity < 10 years*		–	–	–	*3,391*	*3,391*
10	– *of row 6 with residual maturity ≥ 10 years, but excluding perpetual securities*		–	–	–	*2,215*	*2,215*
11	– *of row 6 that are perpetual securities*		*1,054*	*5,203*	*1,550*	*1,322*	*9,129*

1 The entity's ordinary shares are owned by HSBC UK Holdings Limited. Other instruments are either owned by HSBC UK Holdings Limited or by third parties.
2 Excludes the value of share premium and reserves attributable to ordinary shareholders.

Asian resolution group

The Asian resolution group comprises HSBC Asia Holdings Ltd, The Hongkong & Shanghai Banking Corporation Limited, Hang Seng Bank Limited and their subsidiaries. HSBC Asia Holdings Ltd is the designated resolution entity. The following table presents information regarding the ranking of creditors of HSBC Asia Holdings Limited.

Table 19: HSBC Asia Holdings Ltd creditor ranking[1] (TLAC3)

		Creditor ranking ($m)				
		1	2	3	4	
		(most junior)			(most senior)	Sum of 1 to 4
1	Description of creditor ranking	Ordinary shares[2]	AT1 instruments	Tier 2 instruments	LAC loans	
2	Total capital and liabilities net of credit risk mitigation	56,587	5,700	1,780	21,177	85,244
3	– *of row 2 that are excluded liabilities*	–	–	–	–	–
4	Total capital and liabilities less excluded liabilities (row 2 minus row 3)	56,587	5,700	1,780	21,177	85,244
5	– *of row 4 that are potentially eligible as TLAC*	*56,587*	*5,700*	*1,780*	*21,177*	*85,244*
6	– *of row 5 with 1 year ≤ residual maturity < 2 years*	–	–	–	–	–
7	– *of row 5 with 2 years ≤ residual maturity < 5 years*	–	–	–	*9,828*	*9,828*
8	– *of row 5 with 5 years ≤ residual maturity < 10 years*	–	–	–	*9,349*	*9,349*
9	– *of row 5 with residual maturity ≥ 10 years, but excluding perpetual securities*	–	–	*1,780*	*2,000*	*3,780*
10	– *of row 5 that are perpetual securities*	*56,587*	*5,700*	–	–	*62,287*

1 The entity's capital and TLAC are held by HSBC Holdings plc.
2 Excludes the value of share premium and reserves attributable to ordinary shareholders.

Table 20: The Hongkong and Shanghai Banking Corporation Ltd creditor ranking (TLAC2)

		Creditor ranking ($m)					
		1	2	3	4	5	Sum of 1 to 5
		(most junior)				(most senior)	
1	Is the resolution entity the creditor/investor?	Yes	Yes	No[1]	Yes	Yes	
2	Description of creditor ranking	Ordinary shares[2]	AT1 instruments	Primary capital notes	Tier 2 instruments	LAC loans	
3	Total capital and liabilities net of credit risk mitigation	22,125	5,700	400	1,780	21,177	51,182
4	– *of row 3 that are excluded liabilities*	–	–	–	–	–	–
5	Total capital and liabilities less excluded liabilities (row 3 minus row 4)	22,125	5,700	400	1,780	21,177	51,182
6	– *of row 5 that are eligible as TLAC*	*22,125*	*5,700*	–	*1,780*	*21,177*	*50,782*
7	– *of row 6 with 1 year ≤ residual maturity < 2 years*	–	–	–	–	–	–
8	– *of row 6 with 2 years ≤ residual maturity < 5 years*	–	–	–	–	*9,828*	*9,828*
9	– *of row 6 with 5 years ≤ residual maturity < 10 years*	–	–	–	–	*9,349*	*9,349*
10	– *of row 6 with residual maturity ≥ 10 years, but excluding perpetual securities*	–	–	–	*1,780*	*2,000*	*3,780*
11	– *of row 6 that are perpetual securities*	*22,125*	*5,700*	–	–	–	*27,825*

1 The company's primary capital notes are held by third parties.
2 Excludes the value of share premium and reserves attributable to ordinary shareholders.

Table 21: Hang Seng Bank Ltd creditor ranking (TLAC2)

			Creditor ranking ($m)			
			1	2	3	Sum of 1 to 3
		Footnotes	(most junior)		(most senior)	
1	Is the resolution entity the creditor/investor?	1	No	No	No	
2	Description of creditor ranking		Ordinary shares[2]	AT1 instruments	LAC loans	
3	Total capital and liabilities net of credit risk mitigation		1,240	1,500	2,503	5,243
4	– *of row 3 that are excluded liabilities*		—	—	—	—
5	Total capital and liabilities less excluded liabilities (row 3 minus row 4)		1,240	1,500	2,503	5,243
6	– *of row 5 that are eligible as TLAC*		***1,240***	***1,500***	***2,503***	***5,243***
7	– *of row 6 with 1 year ≤ residual maturity < 2 years*		—	—	—	—
8	– *of row 6 with 2 years ≤ residual maturity < 5 years*		—	—	—	—
9	– *of row 6 with 5 years ≤ residual maturity < 10 years*		—	—	***2,103***	***2,103***
10	– *of row 6 with residual maturity ≥ 10 years, but excluding perpetual securities*		—	—	***400***	***400***
11	– *of row 6 that are perpetual securities*		***1,240***	***1,500***	—	***2,740***

1 62.14% of Hang Seng Bank Limited's ordinary share capital is owned by The Hongkong and Shanghai Banking Corporation Limited. Hang Seng Bank Limited's other TLAC eligible securities are directly held by The Hongkong and Shanghai Banking Corporation Limited.
2 Excludes the value of reserves attributable to ordinary shareholders.

US resolution group

The US resolution group comprises HSBC North America Holdings Inc. and its subsidiaries. HSBC North America Holdings Inc. is the designated resolution entity.

The following table presents information regarding the ranking of creditors of HSBC North America Holdings Inc.

Table 22: HSBC North America Holdings Inc. creditor ranking[1] (TLAC3)

			Creditor ranking ($m)				
			1	2	3	4	Sum of 1 to 4
			(most junior)			(most senior)	
1	Description of creditor ranking	Footnotes	Common stock[2]	Preferred stock	Subordinated loans	Senior unsecured loans and other *pari passu* liabilities	
2	Total capital and liabilities net of credit risk mitigation		—	2,240	2,850	8,333	13,423
3	– *of row 2 that are excluded liabilities*	3	—	—	—	183	183
4	Total capital and liabilities less excluded liabilities (row 2 minus row 3)		—	2,240	2,850	8,150	13,240
5	– *of row 4 that are potentially eligible as TLAC*		—	***2,240***	***2,850***	***8,000***	***13,090***
6	– *of row 5 with 1 year ≤ residual maturity < 2 years*		—	—	—	—	—
7	– *of row 5 with 2 years ≤ residual maturity < 5 years*		—	—	—	***3,500***	***3,500***
8	– *of row 5 with 5 years ≤ residual maturity < 10 years*		—	—	***2,850***	***4,500***	***7,350***
9	– *of row 5 with residual maturity ≥ 10 years, but excluding perpetual securities*		—	—	—	—	—
10	– *of row 5 that are perpetual securities*		—	***2,240***	—	—	***2,240***

1 The entity's capital and TLAC are held by HSBC Overseas Holdings (UK) Limited.
2 The nominal value of common stock is $2. This excludes the value of share premium and reserves attributable to ordinary shareholders.
3 Excluded liabilities consists of 'unrelated liabilities' as defined in the Final US TLAC rules. This mainly represents accrued employee benefit obligations.

Pillar 2 and ICAAP

Pillar 2

We conduct an Internal Capital Adequacy Assessment Process ('ICAAP') to determine a forward-looking assessment of our capital requirements given our business strategy, risk profile, risk appetite and capital plan. This process incorporates the Group's risk management processes and governance framework. Our base capital plan undergoes stress testing. This, coupled with our economic capital framework and other risk management practices, is used to assess our internal capital adequacy requirements and inform our view of our internal capital planning buffer. The ICAAP is formally approved by the Board, which has the ultimate responsibility for the effective management of risk and approval of HSBC's risk appetite.

The ICAAP is reviewed by the PRA and by a college of supervisors, as part of the joint risk assessment and decision process, during the Supervisory Review and Evaluation Process. This process occurs periodically to enable the regulator to define the individual capital requirement ('ICR') (previously known as the individual capital guidance ('ICG')) or minimum capital requirements for HSBC and to define the PRA buffer, where required. Under the revised Pillar 2 PRA regime, which came into effect from 1 January 2017, the capital planning buffer has been replaced with a 'PRA buffer'. This is not intended to duplicate the CRD IV buffers and, where necessary, will be set according to vulnerability in a stress scenario, as identified and assessed through the annual PRA stress testing exercise.

The processes of internal capital adequacy assessment and supervisory review lead to a final determination by the PRA of the ICR and any PRA buffer that may be required.

Pillar 2 comprises Pillar 2A and Pillar 2B. Pillar 2A considers, in addition to the minimum capital requirements for Pillar 1 risks described above, any supplementary requirements for those risks and any requirements for risk categories not captured by Pillar 1. The risk categories covered under Pillar 2A depend on the specific circumstances of a firm and the nature and scale of its business.

Pillar 2B consists of guidance from the PRA on the capital buffer a firm would require in order to remain above its ICR in adverse circumstances that may be largely outside the firm's normal and direct control; for example, during a period of severe but plausible downturn stress, when asset values and the firm's capital surplus may become strained. This is quantified via any PRA buffer requirement the PRA may consider necessary. The assessment of this is informed by stress tests and a rounded judgement of a firm's business model, also taking into account the PRA's view of a firm's options and capacity to protect its capital position under stress; for instance, through capital generation. Where the PRA assesses that a firm's risk management and governance are significantly weak, it may also increase the PRA buffer to cover the risks posed by those weaknesses until they are addressed. The PRA buffer is intended to be drawn upon in times of stress, and its use is not of itself a breach of capital requirements that would trigger automatic restrictions on distributions. In specific circumstances, the PRA should agree a plan with a firm for its restoration over an agreed timescale.

Internal capital adequacy assessment

The Board manages the Group ICAAP and, together with RMM and GRC, it examines the Group's risk profile from both a regulatory and economic capital viewpoint. They aim to ensure that capital resources:

- remain sufficient to support our risk profile and outstanding commitments;
- meet current regulatory requirements, and that HSBC is well placed to meet those expected in the future;
- allow the group to remain adequately capitalised in the event of a severe economic downturn stress scenario; and
- remain consistent with our strategic and operational goals, and our shareholder and investor expectations.

The minimum regulatory capital that we are required to hold is determined by the rules and guidance established by the PRA for the consolidated Group and by local regulators for individual Group companies. These capital requirements are a primary factor in influencing and shaping the business planning process, in which RWA targets are established for our global businesses in accordance with the Group's strategic direction and risk appetite.

Economic capital is the internally calculated capital requirement that we deem necessary to support the risks to which we are exposed. The economic capital assessment is a more risk-sensitive measure than the regulatory minimum, and takes account of the substantial diversification of risk accruing from our operations. Both the regulatory and the economic capital assessments rely upon the use of models that are integrated into our risk management processes. Our economic capital models are calibrated to quantify the level of capital that is sufficient to absorb potential losses over a one-year time horizon to a 99.95% level of confidence for our banking and trading activities, to a 99.5% level of confidence for our insurance activities and pension risks, and to a 99.9% level of confidence for our operational risks.

The ICAAP and its constituent economic capital calculations are examined by the PRA as part of its Supervisory Review and Evaluation Process. This examination informs the regulator's view of our Pillar 2 capital requirements.

Preserving our strong capital position remains a priority, and the level of integration of our risk and capital management helps to optimise our response to business demand for regulatory and economic capital. Risks that are explicitly assessed through economic capital are credit risk (including CCR), market risk, operational risk, interest rate risk in the banking book ('IRRBB'), insurance risk, pension risk and structural foreign exchange risk.

Credit risk

Overview and responsibilities

Credit risk represents our largest regulatory capital requirement.

The principal objectives of our credit risk management function are:

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

The credit risk functions within Wholesale Credit and Market Risk and RBWM are the constituent parts of Global Risk that support the Group CRO in overseeing credit risks. Their major duties comprise undertaking independent reviews of large and high-risk credit proposals, overseeing large exposure policy and reporting on our wholesale and retail credit risk management disciplines. They also own our credit policy and credit systems programmes, oversee portfolio management and report on risk matters to senior executive management and regulators.

These credit risk functions work closely with other parts of Global Risk; for example, with Operational Risk on the internal control framework and with Risk Strategy on the risk appetite process. In addition, they work jointly with Risk Strategy and Global Finance on stress testing.

The credit responsibilities of Global Risk are described on page 75 of the Annual Report and Accounts 2019.

Group-wide, the credit risk functions comprise a network of credit risk management offices reporting within regional risk functions. They fulfil an essential role as independent risk control units distinct from business line management in providing objective scrutiny of risk rating assessments, credit proposals for approval and other risk matters.

Our credit risk procedures operate through a hierarchy of personal credit limit approval authorities. Operating company chief executives, acting under authorities delegated by their boards and Group standards, are accountable for credit risk and other risks in their business. In turn, chief executives delegate authority to operating company chief risk officers and management teams on an individual basis. Each operating company is responsible for the quality and performance of its credit portfolios in accordance with Group standards. Above these thresholds of delegated personal credit limited approval authorities, approval must be sought from the regional and, as appropriate, the global credit risk function.

Credit risk management

Our exposure to credit risk arises from a wide range of customer and products, and the risk rating systems in place to measure and monitor these risks are correspondingly diverse. Senior management receives a variety of reports on our credit risk exposures, including expected credit losses, total exposures and RWAs, as well as updates on specific portfolios that are considered to have heightened credit risk.

Credit risk exposures are generally measured and managed in portfolios of either customer types or product categories. Risk rating systems are designed to assess the default propensity of, and loss severity associated with, distinct customers who are typically managed as individual relationships or, in the case of retail business exposures, on a product portfolio basis.

Risk rating systems for retail exposures are generally quantitative in nature, applying techniques such as behavioural analysis across product portfolios comprising large numbers of homogeneous transactions. Rating systems for individually managed relationships typically use customer financial statements and market data analysis, but also qualitative elements and a final subjective overlay to better reflect any idiosyncratic elements of the customer's risk profile.

See 'Application of the IRB Approach' on page 44 for more information.

A fundamental principle of our policy and approach is that analytical risk rating systems and scorecards are all valuable tools at the disposal of management.

The credit process provides for at least an annual review of facility limits granted. Review may be more frequent, as required by circumstances such as the emergence of adverse risk factors.

We constantly seek to improve the quality of our risk management. Group IT systems that process credit risk data continue to be enhanced in order to deliver both comprehensive management information in support of business strategy and solutions to evolving regulatory reporting requirements.

Group standards govern the process through which risk rating systems are initially developed, judged fit for purpose, approved and implemented. They also govern the conditions under which analytical risk model outcomes can be overridden by decision takers and the process of model performance monitoring and reporting. The emphasis is on an effective dialogue between business line and risk management, suitable independence of decision takers, and a good understanding and robust challenge on the part of senior management.

Like other facets of risk management, analytical risk rating systems are not static. They are subject to review and modification in light of the changing environment, the greater availability and quality of data, and any deficiencies identified through internal and external regulatory review. Structured processes and metrics are in place to capture relevant data and feed this into continuous model improvement.

See 'Model performance' on page 51 for more information.

Credit risk models governance

All new or materially changed IRB capital models require the PRA's approval, as set out in more detail on page 44. Throughout HSBC, such models fall directly under the remit of the global functional MOCs, operating in line with HSBC's model risk policy, and under the oversight of the Global MOC.

Both the Wholesale and RBWM MOCs require all credit risk models for which they are responsible to be approved by delegated senior managers with notification to the committees that retain the responsibility for oversight.

Global Risk sets internal standards for the development, validation, independent review, approval, implementation and performance monitoring of credit risk rating models. Independent reviews of our models are performed by our Independent Model Review function which is separate from our Risk Analytics functions that are responsible for the development of models.

We are designing a new target operating model for the MRM function, which sets model risk management policy, standards and model risk appetite.

Further information is available on page 146 of the Annual Report and Accounts 2019.

Compliance with Group standards is subject to examination by Risk oversight and review from within the Risk function itself, and by Internal Audit.

Dilution risk

Dilution risk is the risk that an amount receivable is reduced through cash or non-cash credit to the obligor, and arises mainly from factoring and invoice discounting transactions.

Where there is recourse to the seller, we treat these transactions as loans secured by the collateral of the debts purchased and do not report dilution risk for them. For our non-recourse portfolio we obtain an indemnity from the seller that indemnifies us against this risk. Moreover, factoring transactions involve lending at a discount to the face-value of the receivables, which provides protection against dilution risk.

The table below provides a summary of credit risk exposure by exposure class and approach. Further information on credit risk exposure by industry and geography can be found in the Concentration risk section on page 35.

Table 23: Credit risk exposure – summary (CRB-B)

		At 31 Dec 2019					At 31 Dec 2018				
	Footnotes	Net carrying values	Average net carrying values[3]	RWAs^	Capital required	RWA density	Net carrying values	Average net carrying values[3]	RWAs^	Capital required	RWA density
		$bn	$bn	$bn	$bn	%	$bn	$bn	$bn	$bn	%
IRB advanced approach		**1,935.3**	**1,892.4**	**452.6**	**36.2**	**29**	1,844.5	1,812.1	468.2	37.4	32
– central governments and central banks		**346.3**	**343.9**	**36.3**	**2.9**	**11**	331.7	315.4	36.9	3.0	11
– institutions		**74.7**	**82.4**	**10.8**	**0.9**	**16**	80.6	88.0	14.2	1.1	19
– corporates	1	**959.9**	**958.1**	**327.7**	**26.2**	**50**	948.9	932.0	345.1	27.5	52
– total retail		**554.4**	**508.0**	**77.8**	**6.2**	**16**	483.3	476.7	72.0	5.8	17
Secured by mortgages on immovable property SME		***3.6***	***3.6***	***1.5***	***0.1***	**45**	*3.5*	*3.2*	*1.8*	*0.1*	*54*
Secured by mortgages on immovable property non-SME		***314.5***	***298.9***	***40.4***	***3.2***	**13**	*285.9*	*280.9*	*37.2*	*3.0*	*13*
Qualifying revolving retail		***140.3***	***135.1***	***18.8***	***1.5***	**23**	*132.1*	*129.1*	*17.3*	*1.4*	*23*
Other SME		***7.9***	***7.8***	***4.7***	***0.4***	**76**	*7.5*	*8.7*	*4.8*	*0.4*	*76*
Other non-SME		***88.1***	***62.6***	***12.4***	***1.0***	**18**	*54.3*	*54.8*	*10.9*	*0.9*	*24*
IRB securitisation positions		**20.2**	**25.0**	**3.7**	**0.3**	**19**	29.7	31.0	6.3	0.5	21
IRB non-credit obligation assets		**62.4**	**60.1**	**13.3**	**1.1**	**21**	56.9	59.2	10.8	0.9	19
IRB foundation approach		**88.3**	**82.1**	**32.3**	**2.6**	**59**	78.4	76.5	30.5	2.4	61
– central governments and central banks		**–**	**–**	**–**	**–**	**20**	–	–	–	–	25
– institutions		**0.7**	**0.6**	**0.2**	**–**	**26**	0.5	0.3	0.2	–	35
– corporates		**87.6**	**81.5**	**32.1**	**2.6**	**59**	77.9	76.2	30.3	2.4	61
Standardised approach		**525.3**	**518.3**	**174.7**	**14.0**	**45**	501.8	501.9	175.3	14.1	48
– central governments and central banks		**176.9**	**164.5**	**11.2**	**0.9**	**6**	163.9	182.5	12.5	1.0	7
– regional governments or local authorities		**8.9**	**7.9**	**1.6**	**0.1**	**18**	7.3	5.7	1.3	0.1	19
– public sector entities		**16.6**	**14.1**	**–**	**–**	**–**	12.2	7.6	–	–	–
– multilateral development banks		**0.1**	**0.1**	**–**	**–**	**–**	0.2	0.2	–	–	2
– international organisations		**1.6**	**1.5**	**–**	**–**	**–**	1.6	2.0	–	–	–
– institutions		**2.4**	**2.8**	**0.9**	**0.1**	**58**	3.4	3.0	1.2	0.1	52
– corporates		**159.8**	**181.4**	**72.5**	**5.8**	**94**	179.4	168.4	79.2	6.3	94
– retail		**70.7**	**67.0**	**14.4**	**1.2**	**74**	63.8	66.2	14.8	1.2	74
– secured by mortgages on immovable property		**33.4**	**32.1**	**12.0**	**1.0**	**37**	32.0	30.3	11.3	0.9	37
– exposures in default		**3.4**	**3.1**	**4.1**	**0.3**	**114**	3.0	3.0	3.8	0.3	117
– items associated with particularly high risk		**5.5**	**5.3**	**7.9**	**0.6**	**150**	4.8	4.2	6.9	0.6	150
– securitisation positions		**16.3**	**8.1**	**4.6**	**0.4**	**28**	2.7	2.5	2.1	0.2	82
– collective investment undertakings ('CIU')		**0.4**	**0.5**	**0.4**	**–**	**100**	0.6	0.6	0.6	0.1	100
– equity exposures	2	**16.4**	**16.2**	**36.3**	**2.9**	**220**	15.6	13.2	35.0	2.8	223
– other items		**12.9**	**13.7**	**8.8**	**0.7**	**68**	11.3	12.5	6.6	0.5	58
Total		**2,631.5**	**2,577.9**	**676.6**	**54.2**	**33**	2,511.3	2,480.7	691.1	55.3	35

^ *Figures have been prepared on an IFRS 9 transitional basis.*
1 Corporates includes specialised lending exposures which are reported in more detail in Table 75: Specialised lending on slotting approach (CR10).
2 Equity exposures include investments that are risk weighted at 250%.
3 Average net carrying values are calculated by aggregating net carrying values of the last five quarters and dividing by five.

Credit quality

We are a universal bank with a conservative approach to credit risk. This is reflected in our credit risk profile being diversified across a number of asset classes and geographies with a credit quality profile mainly concentrated in the higher quality bands.

The following tables present information on the credit quality of exposures by exposure class, industry and geography. For further detail on the credit quality of STD exposures, refer to Table 41 and 74. Information on the credit quality of IRB exposures can be found in Table 76.

Table 24: Credit quality of exposures by exposure classes and instruments[1] (CR1-A)

		Gross carrying values of					
		Defaulted exposures	Non-defaulted exposures	Specific credit risk adjustments	Write-offs in the year[2]	Credit risk adjustment charges of the period[2]	Net carrying values
		$bn	$bn	$bn	$bn	$bn	$bn
1	Central governments and central banks	–	346.4	0.1	–	–	346.3
2	Institutions	–	75.4	–	–	–	75.4
3	Corporates	6.9	1,044.9	4.3	0.9	1.0	1,047.5
4	– *of which: specialised lending*	*1.1*	*50.8*	*0.5*	–	–	*51.4*
6	Retail	3.4	553.0	2.0	0.8	1.1	554.4
7	– Secured by real estate property	2.4	316.0	0.3	–	–	318.1
8	*SMEs*	*0.1*	*3.6*	*0.1*	–	–	*3.6*
9	*Non-SMEs*	*2.3*	*312.4*	*0.2*	–	–	*314.5*
10	– Qualifying revolving retail	0.3	141.0	1.0	0.4	0.6	140.3
11	– Other retail	0.7	96.0	0.7	0.4	0.5	96.0
12	*SMEs*	*0.4*	*7.8*	*0.3*	*0.2*	*0.2*	*7.9*
13	*Non-SMEs*	*0.3*	*88.2*	*0.4*	*0.2*	*0.3*	*88.1*
15	**Total IRB approach**	10.3	2,019.7	6.4	1.7	2.1	2,023.6
16	Central governments and central banks	–	176.9	–	–	–	176.9
17	Regional governments or local authorities	–	8.9	–	–	–	8.9
18	Public sector entities	–	16.6	–	–	–	16.6
19	Multilateral development banks	–	0.1	–	–	–	0.1
20	International organisations	–	1.6	–	–	–	1.6
21	Institutions	–	2.4	–	–	–	2.4
22	Corporates	3.7	160.3	2.0	0.5	0.2	162.0
24	Retail	1.0	71.7	1.4	0.7	0.8	71.3
25	– *of which: SMEs*	–	*1.3*	*0.1*	–	–	*1.2*
26	Secured by mortgages on immovable property	0.7	33.5	0.2	–	–	34.0
27	– *of which: SMEs*	–	*0.1*	–	–	–	*0.1*
28	Exposures in default	5.4	–	2.0	1.2	1.0	3.4
29	Items associated with particularly high risk	0.1	5.4	–	–	–	5.5
32	Collective investment undertakings ('CIU')	–	0.4	–	–	–	0.4
33	Equity exposures	–	16.4	–	–	–	16.4
34	Other exposures	–	12.9	–	–	–	12.9
35	**Total standardised approach**	5.5	507.1	3.6	1.2	1.0	509.0
36	**Total at 31 Dec 2019**	15.8	2,526.8	10.0	2.9	3.1	2,532.6
	– *of which: loans*	*14.6*	*1,274.0*	*9.4*	*2.9*	*3.1*	*1,279.2*
	– *of which: debt securities*	–	*377.4*	*0.1*	–	–	*377.3*
	– *of which: off-balance sheet exposures*	*1.2*	*837.5*	*0.5*	–	–	*838.2*

Table 24: Credit quality of exposures by exposure classes and instruments[1] (CR1-A) (continued)

		Gross carrying values of					
		Defaulted exposures	Non-defaulted exposures	Specific credit risk adjustments	Write-offs in the year[2]	Credit risk adjustment charges of the period[2]	Net carrying values
		$bn	$bn	$bn	$bn	$bn	$bn
1	Central governments and central banks	—	331.8	0.1	—	—	331.7
2	Institutions	—	81.1	—	—	—	81.1
3	Corporates	6.9	1,024.0	4.1	0.8	0.5	1,026.8
4	*– of which: specialised lending*	*0.8*	*49.3*	*0.4*	—	*0.1*	*49.7*
6	Retail	3.3	481.8	1.8	0.7	0.9	483.3
7	– Secured by real estate property	2.5	287.3	0.4	—	0.1	289.4
8	*SMEs*	*0.1*	*3.5*	*0.1*	—	*0.1*	*3.5*
9	*Non-SMEs*	*2.4*	*283.8*	*0.3*	—	—	*285.9*
10	– Qualifying revolving retail	0.1	132.7	0.7	0.3	0.4	132.1
11	– Other retail	0.7	61.8	0.7	0.4	0.4	61.8
12	*SMEs*	*0.3*	*7.5*	*0.3*	*0.2*	*0.2*	*7.5*
13	*Non-SMEs*	*0.4*	*54.3*	*0.4*	*0.2*	*0.2*	*54.3*
15	Total IRB approach	10.2	1,918.7	6.0	1.5	1.4	1,922.9
16	Central governments and central banks	—	163.9	—	—	—	163.9
17	Regional governments or local authorities	—	7.3	—	—	—	7.3
18	Public sector entities	—	12.2	—	—	—	12.2
19	Multilateral development banks	—	0.2	—	—	—	0.2
20	International organisations	—	1.6	—	—	—	1.6
21	Institutions	—	3.4	—	—	—	3.4
22	Corporates	3.3	180.0	2.1	0.3	0.4	181.2
24	Retail	1.1	64.9	1.5	0.7	0.5	64.5
25	*– of which: SMEs*	—	*1.2*	—	—	—	*1.2*
26	Secured by mortgages on immovable property	0.6	32.1	*0.2*	—	—	32.5
27	*– of which: SMEs*	—	*0.1*	—	—	—	*0.1*
28	Exposures in default	5.1	—	2.1	1.0	0.8	3.0
29	Items associated with particularly high risk	0.1	4.7	—	—	—	4.8
32	Collective investment undertakings ('CIU')	—	0.6	—	—	—	0.6
33	Equity exposures	—	15.6	—	—	—	15.6
34	Other exposures	—	11.3	—	—	—	11.3
35	Total standardised approach	5.1	497.8	3.8	1.0	0.9	499.1
36	Total at 31 Dec 2018	15.3	2,416.5	9.8	2.5	2.3	2,422.0
	– of which: loans	*13.7*	*1,233.4*	*9.1*	*2.5*	*2.3*	*1,238.0*
	– of which: debt securities	—	*348.5*	—	—	—	*348.5*
	– of which: off-balance sheet exposures	*1.6*	*798.7*	*0.6*	—	—	*799.7*

1 Securitisation positions and non-credit obligation assets are not included in this table.
2 Presented on a year-to-date basis.

Table 25: Credit quality of exposures by industry or counterparty types[1], [2] (CR1-B)

		Gross carrying values of					
		Defaulted exposures	Non-defaulted exposures	Specific credit risk adjustments	Write-offs in the year[3]	Credit risk adjustment charges of the period[3]	Net carrying values
		$bn	$bn	$bn	$bn	$bn	$bn
1	Agriculture	**0.3**	**9.7**	**0.2**	**–**	**–**	**9.8**
2	Mining & oil extraction	**0.4**	**41.1**	**0.3**	**–**	**–**	**41.2**
3	Manufacturing	**1.8**	**261.3**	**1.4**	**0.6**	**0.8**	**261.7**
4	Utilities	**0.2**	**32.2**	**0.1**	**0.1**	**–**	**32.3**
5	Water supply	**–**	**3.4**	**–**	**–**	**–**	**3.4**
6	Construction	**1.2**	**46.1**	**0.6**	**0.2**	**0.1**	**46.7**
7	Wholesale & retail trade	**2.1**	**204.3**	**1.3**	**0.3**	**0.3**	**205.1**
8	Transportation & storage	**0.4**	**44.6**	**0.2**	**–**	**–**	**44.8**
9	Accommodation & food services	**0.3**	**29.0**	**0.1**	**0.1**	**0.1**	**29.2**
10	Information & communication	**–**	**16.8**	**0.1**	**–**	**–**	**16.7**
11	Financial & insurance	**0.4**	**535.0**	**0.3**	**–**	**0.1**	**535.1**
12	Real estate	**1.2**	**196.0**	**0.7**	**–**	**0.1**	**196.5**
13	Professional activities	**0.1**	**28.0**	**0.1**	**–**	**–**	**28.0**
14	Administrative service	**2.0**	**154.9**	**0.9**	**–**	**0.1**	**156.0**
15	Public admin & defence	**0.2**	**214.1**	**0.2**	**–**	**(0.2)**	**214.1**
16	Education	**–**	**3.6**	**–**	**–**	**–**	**3.6**
17	Human health & social work	**0.2**	**7.1**	**0.1**	**–**	**–**	**7.2**
18	Arts & entertainment	**–**	**7.0**	**–**	**0.1**	**–**	**7.0**
19	Other services	**0.2**	**17.6**	**0.1**	**–**	**0.1**	**17.7**
20	Personal	**4.8**	**631.6**	**3.3**	**1.5**	**1.6**	**633.1**
21	Extra-territorial bodies	**–**	**43.4**	**–**	**–**	**–**	**43.4**
22	**Total at 31 Dec 2019**	**15.8**	**2,526.8**	**10.0**	**2.9**	**3.1**	**2,532.6**
1	Agriculture	0.3	8.6	0.1	–	–	8.8
2	Mining & oil extraction	0.5	40.9	0.3	0.1	(0.1)	41.1
3	Manufacturing	2.0	255.6	1.4	0.4	0.3	256.2
4	Utilities	0.1	31.5	0.2	–	–	31.4
5	Water supply	–	3.6	–	–	–	3.6
6	Construction	1.4	39.8	0.6	–	0.2	40.6
7	Wholesale & retail trade	2.2	203.4	1.3	0.3	0.4	204.3
8	Transportation & storage	0.4	45.0	0.2	–	0.1	45.2
9	Accommodation & food services	0.4	27.2	0.2	–	–	27.4
10	Information & communication	–	18.8	0.1	–	0.1	18.7
11	Financial & insurance	0.3	531.4	0.2	0.1	(0.1)	531.5
12	Real estate	1.0	189.3	0.6	–	0.2	189.7
13	Professional activities	0.2	28.5	0.1	–	0.1	28.6
14	Administrative service	1.1	146.3	0.9	0.1	0.1	146.5
15	Public admin & defence	0.4	192.0	0.4	–	–	192.0
16	Education	–	3.5	–	–	–	3.5
17	Human health & social work	0.2	6.9	0.1	–	–	7.0
18	Arts & entertainment	–	8.5	–	–	–	8.5
19	Other services	0.2	13.0	0.1	–	–	13.1
20	Personal	4.6	572.8	3.0	1.5	1.0	574.4
21	Extra-territorial bodies	–	49.9	–	–	–	49.9
22	Total at 31 Dec 2018	15.3	2,416.5	9.8	2.5	2.3	2,422.0

1 Securitisation positions and non-credit obligation assets are not included in this table.
2 The industry classifications of this disclosure have been revised. 31 December 2018 data has been restated to be on a consistent basis with the current year.
3 Presented on a year-to-date basis.

Table 26: Credit quality of exposures by geography[1] (CR1-C)

		Gross carrying values of					
		Defaulted exposures	Non-defaulted exposures	Specific credit risk adjustments	Write-offs in the year[2]	Credit risk adjustment charges of the period[2]	Net carrying values
		$bn	$bn	$bn	$bn	$bn	$bn
1	**Europe**	**7.1**	**811.5**	**3.8**	**1.1**	**1.2**	**814.8**
2	– United Kingdom	**4.6**	**505.5**	**2.7**	**0.8**	**1.0**	**507.4**
3	– France	**1.2**	**136.5**	**0.6**	**0.1**	**0.2**	**137.1**
4	– Other countries	**1.3**	**169.5**	**0.5**	**0.2**	**–**	**170.3**
5	**Asia**	**2.5**	**1,056.3**	**2.3**	**0.6**	**0.8**	**1,056.5**
6	– Hong Kong	**0.7**	**531.7**	**0.9**	**0.2**	**0.4**	**531.5**
7	– China	**0.3**	**163.3**	**0.4**	**0.1**	**0.2**	**163.2**
8	– Singapore	**0.2**	**76.5**	**0.2**	**–**	**0.1**	**76.5**
9	– Australia	**0.2**	**59.4**	**0.1**	**–**	**–**	**59.5**
10	– Other countries	**1.1**	**225.4**	**0.7**	**0.3**	**0.1**	**225.8**
11	**MENA**	**3.5**	**145.2**	**2.1**	**0.4**	**0.1**	**146.6**
12	**North America**	**1.9**	**439.8**	**0.7**	**0.2**	**0.3**	**441.0**
13	– United States of America	**1.2**	**311.0**	**0.4**	**0.2**	**0.2**	**311.8**
14	– Canada	**0.3**	**112.5**	**0.2**	**–**	**0.1**	**112.6**
15	– Other countries	**0.4**	**16.3**	**0.1**	**–**	**–**	**16.6**
16	**Latin America**	**0.8**	**60.3**	**1.1**	**0.6**	**0.7**	**60.0**
17	**Other geographical areas**	**–**	**13.7**	**–**	**–**	**–**	**13.7**
18	**Total at 31 Dec 2019**	**15.8**	**2,526.8**	**10.0**	**2.9**	**3.1**	**2,532.6**
1	Europe	6.7	780.1	3.8	0.9	1.0	783.0
2	– United Kingdom	4.1	474.2	2.4	0.8	0.9	475.9
3	– France	1.0	127.2	0.6	0.1	–	127.6
4	– Other countries	1.6	178.7	0.8	–	0.1	179.5
5	Asia	2.8	1,001.7	2.1	0.6	0.8	1,002.4
6	– Hong Kong	0.9	497.5	0.7	0.3	0.1	497.7
7	– China	0.3	157.3	0.3	0.1	0.2	157.3
8	– Singapore	0.2	71.9	0.2	–	0.1	71.9
9	– Australia	0.2	52.5	0.2	–	–	52.5
10	– Other countries	1.2	222.5	0.7	0.2	0.4	223.0
11	MENA	2.9	137.3	2.3	0.3	0.3	137.9
12	North America	2.0	419.4	0.6	0.2	(0.1)	420.8
13	– United States of America	1.3	295.1	0.3	0.1	–	296.1
14	– Canada	0.2	107.5	0.2	0.1	–	107.5
15	– Other countries	0.5	16.8	0.1	–	(0.1)	17.2
16	Latin America	0.9	62.9	1.0	0.5	0.3	62.8
17	Other geographical areas	–	15.1	–	–	–	15.1
18	Total at 31 Dec 2018	15.3	2,416.5	9.8	2.5	2.3	2,422.0

1 Amounts shown by geographical region and country/territory in this table are based on the country/territory of residence of the counterparty. Securitisation positions and non-credit obligation assets are not included in this table.
2 Presented on a year-to-date basis.

Table 27: Changes in stock of general and specific credit risk adjustments (CR2-A)

			Twelve months to 31 Dec			
			2019		2018	
			Accumulated specific credit risk adjustments	Accumulated general credit risk adjustments	Accumulated specific credit risk adjustments	Accumulated general credit risk adjustments
		Footnotes	$bn	$bn	$bn	$bn
1	**Opening balance at the beginning of the period**		**9.8**	**–**	10.4	–
2	Increases due to amounts set aside for estimated loan losses during the period	1	**3.1**	**–**	2.3	–
4	Decreases due to amounts taken against accumulated credit risk adjustments		**(2.9)**	**–**	(2.5)	–
6	Impact of exchange rate differences		**–**	**–**	(0.4)	–
9	**Closing balance at the end of the period**		**10.0**	**–**	9.8	–
10	Recoveries on credit risk adjustments recorded directly to the statement of profit or loss		**0.4**	**–**	0.4	–

1 Following adoption of IFRS 9 'Financial Instruments', the movement due to amounts set aside for estimated loan losses during the period has been reported on a net basis.

Table 28: Changes in stock of defaulted loans and debt securities (CR2-B)

			Twelve months to 31 Dec	
			2019	2018
			Gross carrying value	Gross carrying value
		Footnotes	**$bn**	$bn
1	**Defaulted loans and debt securities at the beginning of the period**		**13.7**	15.1
2	Loans and debt securities that have defaulted since the last reporting period		**6.5**	5.7
3	Returned to non-defaulted status		**(1.0)**	(1.3)
4	Amounts written off		**(2.9)**	(2.5)
5	Other changes	*1*	**(0.1)**	(0.8)
7	Repayments		**(1.6)**	(2.5)
6	**Defaulted loans and debt securities at the end of the period**		**14.6**	13.7

1 Other changes include foreign exchange movements and changes in assets held for sale in default.

Non-performing and forborne exposures

Tables 29 to 32 are presented in accordance with the EBA's 'Guidelines on disclosure of non-performing and forborne exposures'.

The EBA defines non-performing exposures as exposures with material amounts that are more than 90 days past due or exposures where the debtor is assessed as unlikely to pay its credit obligations in full without the realisation of collateral, regardless of the existence of any past due amounts or number days past due. Any debtors that are in default for regulatory purposes or impaired under the applicable accounting framework are always considered as non-performing exposures. The *Annual Report and Accounts 2019* does not define non-performing exposures, however, the definition of credit-impaired (stage 3) is aligned to the EBA's definition of non-performing exposures.

Forborne exposures are defined by the EBA as exposures where the bank has made concessions toward a debtor that is experiencing or about to experience financial difficulties in meeting its financial commitments. In the *Annual Report and Accounts 2019*, forborne exposures are reported as 'renegotiated loans'. This term is aligned to the EBA definition of forborne exposure, except in its treatment of 'cures'.

Under the EBA definition, exposures cease to be reported as forborne if they pass three tests:

- the forborne exposure must have been considered to be performing for a 'probation period' of at least two years;
- regular payments of more than an insignificant aggregate amount of principal or interest have been made during at least half of the probation period; and
- no exposure to the debtor is more than 30 days past due at the end of the probation period.

In the *Annual Report and Accounts 2019*, renegotiated loans retain this classification until maturity or de-recognition.

Table 29: Credit quality of forborne exposures

		Gross carrying amount/nominal amount				**Accumulated impairment, accumulated negative changes in fair value due to credit risk and provisions**		**Collateral received and financial guarantees received on forborne exposures**	
			Non-performing forborne						
		Performing forborne	**Total**	***Of which defaulted***	***Of which impaired***	**On performing forborne exposures**	**On non-performing forborne exposures**	**Total**	***Of which forborne non-performing exposures***
		$bn	**$bn**	**$bn**	**$bn**	**$bn**	**$bn**	**$bn**	**$bn**
	At 31 Dec 2019								
1	**Loans and advances**	**1.7**	**5.7**	***5.7***	***5.7***	**–**	**(1.8)**	**3.2**	***2.4***
2	Central banks	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**
3	General governments	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**
4	Credit institutions	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**
5	Other financial corporations	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**
6	Non-financial corporations	**1.7**	**3.5**	***3.5***	***3.5***	**–**	**(1.4)**	**1.8**	***1.0***
7	Households	**–**	**2.2**	***2.2***	***2.2***	**–**	**(0.4)**	**1.4**	***1.4***
8	**Debt securities**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**
9	**Loan commitments given**	**–**	**0.1**	***0.1***	***0.1***	**–**	**–**	**0.1**	***0.1***
10	**Total**	**1.7**	**5.8**	***5.8***	***5.8***	**–**	**(1.8)**	**3.3**	***2.5***

Table 30 presents an analysis of performing and non-performing exposures by days past due. The gross non-performing loan ('NPL') ratio at 31 Dec 2019 was 0.94% calculated in line with the EBA guidelines.

Table 30: Credit quality of performing and non-performing exposures by past due days

		Gross carrying amount/nominal amount[1]											
		Performing exposures			Non-performing exposures								
		Total	Not past due or past due ≤ 30 days	Past due > 30 days ≤ 90 days	Total	Unlikely to pay but not past due or past due ≤ 90 days	Past due > 90 days ≤ 180 days	Past due > 180 days ≤ 1 year	Past due > 1 year ≤ 2 years	Past due > 2 years ≤ 5 years	Past due > 5 years ≤ 7 years	Past due > 7 years	*of which: defaulted*
		$bn	$bn	$bn	$bn	$bn	$bn	$bn	$bn	$bn	$bn	$bn	$bn
	At 31 Dec 2019												
1	**Loans and advances**	**1,535.0**	**1,533.2**	**1.8**	**14.6**	**7.4**	**2.8**	**0.8**	**1.1**	**1.7**	**0.3**	**0.5**	***14.6***
2	Central banks	**191.7**	**191.7**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**
3	General governments	**9.9**	**9.9**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**
4	Credit institutions	**126.0**	**126.0**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**
5	Other financial corporations	**238.5**	**238.4**	**0.1**	**0.3**	**0.3**	**–**	**–**	**–**	**–**	**–**	**–**	***0.3***
6	Non-financial corporations	**537.6**	**537.2**	**0.4**	**9.5**	**4.8**	**1.9**	**0.3**	**0.8**	**1.1**	**0.2**	**0.4**	***9.5***
8	Households	**431.3**	**430.0**	**1.3**	**4.8**	**2.3**	**0.9**	**0.5**	**0.3**	**0.6**	**0.1**	**0.1**	***4.8***
9	**Debt securities**	**381.2**	**381.2**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**
10	Central banks	**66.9**	**66.9**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**
11	General governments	**229.9**	**229.9**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**
12	Credit institutions	**36.8**	**36.8**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**
13	Other financial corporations	**41.0**	**41.0**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**
14	Non-financial corporations	**6.6**	**6.6**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**
15	**Off-balance-sheet exposures**	**709.5**	**N/A**	**N/A**	**1.2**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	***1.2***
16	Central banks	**0.1**	**N/A**	**N/A**	**–**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**–**
17	General governments	**2.7**	**N/A**	**N/A**	**–**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**–**
18	Credit institutions	**56.3**	**N/A**	**N/A**	**–**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**–**
19	Other financial corporations	**54.9**	**N/A**	**N/A**	**–**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**–**
20	Non-financial corporations	**373.1**	**N/A**	**N/A**	**1.0**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	***1.0***
21	Households	**222.4**	**N/A**	**N/A**	**0.2**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	***0.2***
22	**Total**	**2,625.7**	**1,914.4**	**1.8**	**15.8**	**7.4**	**2.8**	**0.8**	**1.1**	**1.7**	**0.3**	**0.5**	***15.8***

1 Includes reverse repos and settlement accounts.

The table below provides information on the instruments that were cancelled in exchange for collateral obtained by taking possession and on the value of the collateral obtained by taking possession. The value at initial recognition represents the gross carrying amount of the collateral obtained by taking possession at initial recognition on the balance sheet, whilst the accumulated negative changes is the accumulated impairment or negative change on the initial recognition value of the collateral obtained by taking possession including amortisation in the case of PP&E and investment properties.

Table 31: Collateral obtained by taking possession and execution processes

		At 31 Dec 2019	
		Collateral obtained by taking possession	
		Value at initial recognition	Accumulated negative changes
		$bn	$bn
1	Property, plant and equipment (PP&E)	**–**	**–**
2	Other than PP&E	**0.1**	**–**
3	Residential immovable property	**0.1**	**–**
8	**Total**	**0.1**	**–**

The following table provides information on the gross carrying amount of exposures and related impairment with further detail on the IFRS 9 stage, accumulated partial write off and collateral. The IFRS 9 stages have the following characteristics:

- stage 1: These financial assets are unimpaired and without a significant increase in credit risk. A 12-month allowance for ECL is recognised;
- stage 2: A significant increase in credit risk has been experienced on these financial assets since initial recognition. A lifetime ECL is recognised;
- stage 3: There is objective evidence of impairment and the financial assets are therefore considered to be in default or otherwise credit impaired. A lifetime ECL is recognised.
- Purchased or originated credit-impaired ('POCI'): Financial assets purchased or originated at a deep discount are seen to reflect incurred credit losses. A lifetime ECL is recognised. These exposures are included in stage 3 in table 32 below.

Refer to the section 'EL and credit risk adjustments' on page 44 for further information on IFRS 9.

Credit-impaired (stage 3) exposures are disclosed on page 105 and 120 of the Annual Report and Accounts 2019.

Table 32: Performing and non-performing exposures and related provisions

		Gross carrying amount/nominal amount[1]						Accumulated impairment, accumulated negative changes in fair value due to credit risk and provisions							Collaterals and financial guarantees received	
		Performing exposures			Non-performing exposures			Performing exposures			Non-performing exposures			Accumulated partial write-off	On performing exposures	On non-performing exposures
			of which stage 1	*of which stage 2*		*of which stage 2*	*of which stage 3*		*of which stage 1*	*of which stage 2*		*of which stage 2*	*of which stage 3*			
		$bn	*$bn*	*$bn*	$bn	*$bn*	*$bn*	$bn	*$bn*	*$bn*	$bn	*$bn*	*$bn*	$bn	$bn	$bn
	At 31 Dec 2019															
1	**Loans and advances**	**1,535.0**	***1,448.0***	***82.0***	**14.6**	**–**	***14.6***	**(3.8)**	***(1.4)***	***(2.5)***	**(5.5)**	**–**	***(5.5)***	**(0.5)**	**931.4**	**5.6**
2	Central banks	**191.7**	***190.4***	***1.3***	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**8.3**	**–**
3	General governments	**9.9**	***9.3***	***0.6***	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**2.1**	**–**
4	Credit institutions	**126.0**	***125.8***	***0.1***	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**83.9**	**–**
5	Other financial corporations	**238.5**	***229.4***	***5.2***	**0.3**	**–**	***0.3***	**(0.1)**	***(0.1)***	***(0.1)***	**(0.2)**	**–**	***(0.2)***	**–**	**169.3**	**–**
6	Non-financial corporations	**537.6**	***477.7***	***59.2***	**9.5**	**–**	***9.5***	**(1.7)**	***(0.7)***	***(1.0)***	**(4.1)**	**–**	***(4.1)***	**(0.2)**	**295.0**	**2.7**
8	Households	**431.3**	***415.4***	***15.6***	**4.8**	**–**	***4.8***	**(2.0)**	***(0.6)***	***(1.4)***	**(1.2)**	**–**	***(1.2)***	**(0.3)**	**372.8**	**2.9**
9	**Debt securities**	**381.2**	***379.6***	***0.4***	**–**	**–**	**–**	**(0.1)**	**–**	***(0.1)***	**–**	**–**	**–**	**–**	**19.3**	**–**
10	Central banks	**66.9**	***66.8***	***0.1***	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**
11	General governments	**229.9**	***229.0***	***0.2***	**–**	**–**	**–**	**(0.1)**	**–**	***(0.1)***	**–**	**–**	**–**	**–**	**6.3**	**–**
12	Credit institutions	**36.8**	***36.8***	***0.1***	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**
13	Other financial corporations	**41.0**	***40.6***	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**13.0**	**–**
14	Non-financial corporations	**6.6**	***6.4***	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**
15	**Off-balance-sheet exposures**	**709.5**	***614.6***	***24.0***	**1.2**	**–**	***1.2***	**(0.4)**	***(0.1)***	***(0.2)***	**(0.2)**	**–**	***(0.1)***		**117.5**	**0.1**
16	Central banks	**0.1**	***0.1***	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**		**–**	**–**
17	General governments	**2.7**	***1.7***	***0.1***	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**		**0.3**	**–**
18	Credit institutions	**56.3**	***52.6***	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**		**0.4**	**–**
19	Other financial corporations	**54.9**	***51.2***	***1.4***	**–**	**–**	**–**	**(0.1)**	**–**	**–**	**–**	**–**	**–**		**6.9**	**–**
20	Non-financial corporations	**373.1**	***288.2***	***20.9***	**1.0**	**–**	***1.0***	**(0.3)**	***(0.1)***	***(0.2)***	**(0.2)**	**–**	***(0.1)***		**60.6**	**0.1**
21	Households	**222.4**	***220.8***	***1.6***	**0.2**	**–**	***0.2***	**–**	**–**	**–**	**–**	**–**	**–**		**49.3**	**–**
22	**Total**	**2,625.7**	***2,442.2***	***106.4***	**15.8**	**–**	***15.8***	**(4.3)**	***(1.5)***	***(2.8)***	**(5.7)**	**–**	***(5.6)***	**(0.5)**	**1,068.2**	**5.7**

1 Includes reverse repos and settlement accounts.

Table 33 analyses past due unimpaired and credit-impaired exposures on a regulatory consolidation basis using accounting values. There are no material differences between the regulatory and accounting scope of consolidation.

All amounts past due more than 90 days are considered credit impaired even where regulatory rules deem default as 180 days past due.

Table 33: Amount of past due unimpaired and credit-impaired exposures by geographical region

At 31 Dec 2019	**Europe** $bn	**Asia** $bn	**MENA** $bn	**North America** $bn	**Latin America** $bn	**Total** $bn
Past due	**4.2**	**5.0**	**3.2**	**2.1**	**1.2**	**15.7**
– personal	**2.1**	**2.7**	**0.7**	**1.5**	**0.6**	**7.6**
– corporate and commercial	**2.1**	**1.7**	**2.5**	**0.5**	**0.5**	**7.3**
– financial	**–**	**0.6**	**–**	**0.1**	**0.1**	**0.8**
At 31 Dec 2018						
Past due	5.0	5.2	3.3	2.3	1.3	17.1
– personal	2.1	2.6	0.8	1.5	0.6	7.6
– corporate and commercial	2.9	2.4	2.3	0.8	0.7	9.1
– financial	–	0.2	0.2	–	–	0.4

Concentration risk

Concentrations of credit risk arise when a number of counterparties or exposures have comparable economic characteristics, are engaged in similar activities or operate in the same geographical areas or industry sectors so that their collective ability to meet contractual obligations is uniformly affected by changes in economic, political or other conditions.

We have a number of global businesses with a broad range of products. We operate in a number of geographical markets with the majority of our exposures in Asia and Europe. We use a number of controls and measures to minimise undue concentration of exposure in our portfolios across industries, countries and global businesses. These include portfolio and counterparty limits, approval and review controls, and stress testing. The following tables present information on the concentration of exposures by geography and industry.

Table 34: Geographical breakdown of exposures (CRB-C)

		Net carrying values[1,2]									
			Of which:				Of which:				
		Europe	United Kingdom	France	Other countries	Asia	Hong Kong	China	Singapore	Australia	Other countries
		$bn	$bn	$bn	$bn	$bn	$bn	$bn	$bn	$bn	$bn
	IRB approach exposure classes										
1	Central governments and central banks	3.7	0.1	–	3.6	172.0	54.1	28.7	15.8	8.9	64.5
2	Institutions	23.4	12.5	1.6	9.3	34.7	4.1	12.2	2.5	4.1	11.8
3	Corporates	308.1	169.0	47.4	91.7	461.0	216.3	85.6	32.8	24.6	101.7
4	Retail	243.3	214.1	26.6	2.6	251.6	202.2	5.9	12.3	17.3	13.9
6	**Total IRB approach**	578.5	395.7	75.6	107.2	919.3	476.7	132.4	63.4	54.9	191.9
	Standardised approach exposure									–	
7	Central governments and central banks	172.1	99.4	50.5	22.2	0.9	0.4	–	–	0.1	0.4
8	Regional governments or local authorities	2.8	–	–	2.8	–	–	–	–	–	–
9	Public sector entities	16.6	–	2.9	13.7	–	–	–	–	–	–
10	Multilateral development banks	–	–	–	–	–	–	–	–	–	–
11	International organisations	–	–	–	–	–	–	–	–	–	–
12	Institutions	1.0	0.1	0.8	0.1	0.1	–	0.1	–	–	–
13	Corporates	23.0	2.8	3.6	16.6	53.7	32.3	5.7	4.9	2.6	8.2
14	Retail	3.1	1.3	0.3	1.5	45.0	11.7	4.8	7.5	1.8	19.2
15	Secured by mortgages on immovable	7.6	2.4	1.0	4.2	16.7	3.6	8.0	0.6	0.1	4.4
16	Exposures in default	0.6	0.1	0.1	0.4	0.4	0.1	–	–	–	0.3
17	Items associated with particularly high risk	3.4	1.1	0.9	1.4	–	–	–	–	–	–
20	Collective investment undertakings ('CIU')	0.4	0.4	–	–	–	–	–	–	–	–
21	Equity exposures	1.7	1.1	0.5	0.1	13.4	1.8	11.4	0.1	–	0.1
22	Other exposures	4.0	3.0	0.9	0.1	7.0	4.9	0.8	–	–	1.3
23	**Total standardised approach**	236.3	111.7	61.5	63.1	137.2	54.8	30.8	13.1	4.6	33.9
24	**Total at 31 Dec 2019**	814.8	507.4	137.1	170.3	1,056.5	531.5	163.2	76.5	59.5	225.8

Table 34: Geographical breakdown of exposures (CRB-C)

		Net carrying values[1,2]							
				Of which:					
		MENA	North America	United States of America	Canada	Other countries	Latin America	Other	Total
		$bn	$bn	$bn	$bn	$bn	$bn	$bn	$bn
	IRB approach exposure classes								
1	Central governments and central banks	20.4	129.3	108.4	20.8	0.1	8.9	12.0	346.3
2	Institutions	6.2	10.3	2.1	8.2	–	0.8	–	75.4
3	Corporates	48.5	223.1	159.3	55.6	8.2	6.8	–	1,047.5
4	Retail	3.5	55.8	27.4	25.1	3.3	0.2	–	554.4
6	**Total IRB approach**	78.6	418.5	297.2	109.7	11.6	16.7	12.0	2,023.6
	Standardised approach exposure classes								
7	Central governments and central banks	1.7	1.7	1.6	0.1	–	0.5	–	176.9
8	Regional governments or local authorities	5.0	–	–	–	–	1.1	–	8.9
9	Public sector entities	–	–	–	–	–	–	–	16.6
10	Multilateral development banks	–	–	–	–	–	–	0.1	0.1
11	International organisations	–	–	–	–	–	–	1.6	1.6
12	Institutions	1.3	–	–	–	–	–	–	2.4
13	Corporates	44.8	10.6	7.6	0.7	2.3	27.7	–	159.8
14	Retail	8.7	4.6	2.3	1.9	0.4	9.3	–	70.7
15	Secured by mortgages on immovable property	3.9	1.8	0.6	0.1	1.1	3.4	–	33.4
16	Exposures in default	1.6	0.3	–	–	0.3	0.5	–	3.4
17	Items associated with particularly high risk	0.2	1.8	0.9	–	0.9	0.1	–	5.5
20	Collective investment undertakings ('CIU')	–	–	–	–	–	–	–	0.4
21	Equity exposures	0.2	1.0	1.0	–	–	0.1	–	16.4
22	Other exposures	0.6	0.7	0.6	0.1	–	0.6	–	12.9
23	**Total standardised approach**	68.0	22.5	14.6	2.9	5.0	43.3	1.7	509.0
24	**Total at 31 Dec 2019**	146.6	441.0	311.8	112.6	16.6	60.0	13.7	2,532.6

Table 34: Geographical breakdown of exposures (CRB-C) (continued)

		Net carrying values[1,2]									
			Of which:				*Of which:*				
		Europe	*United Kingdom*	*France*	*Other countries*	Asia	*Hong Kong*	*China*	*Singapore*	*Australia*	*Other countries*
		$bn	*$bn*	*$bn*	*$bn*	$bn	*$bn*	*$bn*	*$bn*	*$bn*	*$bn*
	IRB approach exposure classes										
1	Central governments and central banks	4.3	*0.4*	*0.1*	*3.8*	172.4	*52.9*	*29.7*	*15.4*	*7.2*	*67.2*
2	Institutions	23.1	*8.7*	*1.8*	*12.6*	40.8	*7.0*	*13.9*	*2.6*	*4.4*	*12.9*
3	Corporates	307.9	*171.7*	*47.2*	*89.0*	440.9	*207.9*	*79.8*	*32.2*	*22.9*	*98.1*
4	Retail	228.1	*201.0*	*25.1*	*2.0*	199.9	*161.5*	*5.4*	*6.8*	*13.8*	*12.4*
6	Total IRB approach	563.4	*381.8*	*74.2*	*107.4*	854.0	*429.3*	*128.8*	*57.0*	*48.3*	*190.6*
	Standardised approach exposure classes										
7	Central governments and central banks	158.6	*82.7*	*45.3*	*30.6*	0.8	*0.5*	—	—	*0.1*	*0.2*
8	Regional governments or local authorities	2.7	—	—	*2.7*	—	—	—	—	—	—
9	Public sector entities	12.1	—	*0.2*	*11.9*	—	—	—	—	—	—
10	Multilateral development banks	—	—	—	—	—	—	—	—	—	—
11	International organisations	—	—	—	—	—	—	—	—	—	—
12	Institutions	1.0	—	*0.9*	*0.1*	0.2	*0.1*	—	—	—	*0.1*
13	Corporates	27.3	*2.9*	*4.2*	*20.2*	69.3	*45.3*	*5.5*	*7.8*	*2.0*	*8.7*
14	Retail	3.0	*1.2*	*0.4*	*1.4*	40.2	*10.5*	*3.8*	*6.6*	*1.9*	*17.4*
15	Secured by mortgages on immovable	5.5	*1.4*	*0.8*	*3.3*	18.8	*6.2*	*7.5*	*0.4*	*0.2*	*4.5*
16	Exposures in default	0.6	*0.1*	—	*0.5*	0.4	*0.1*	—	—	—	*0.3*
17	Items associated with particularly high risk	2.9	*1.3*	*0.5*	*1.1*	—	—	—	—	—	—
20	Collective investment undertakings ('CIU')	0.6	*0.6*	—	—	—	—	—	—	—	—
21	Equity exposures	1.5	*0.9*	*0.5*	*0.1*	12.5	*1.5*	*10.8*	*0.1*	—	*0.1*
22	Other exposures	3.8	*3.0*	*0.6*	*0.2*	6.2	*4.2*	*0.9*	—	—	*1.1*
23	Total standardised approach	219.6	*94.1*	*53.4*	*72.1*	148.4	*68.4*	*28.5*	*14.9*	*4.2*	*32.4*
24	Total at 31 Dec 2018	783.0	*475.9*	*127.6*	*179.5*	1,002.4	*497.7*	*157.3*	*71.9*	*52.5*	*223.0*

Table 34: Geographical breakdown of exposures (CRB-C) (continued)

		Net carrying values[1,2]							
				Of which:					
		MENA	North America	*United States of America*	*Canada*	*Other countries*	Latin America	Other	Total
		$bn	$bn	*$bn*	*$bn*	*$bn*	$bn	$bn	$bn
	IRB approach exposure classes								
1	Central governments and central banks	17.1	111.9	*89.2*	*22.7*	—	12.8	13.2	331.7
2	Institutions	6.3	10.2	*1.9*	*8.0*	*0.3*	0.6	0.1	81.1
3	Corporates	45.8	223.2	*162.8*	*51.8*	*8.6*	9.0	—	1,026.8
4	Retail	2.4	52.6	*27.8*	*22.3*	*2.5*	0.3	—	483.3
6	Total IRB approach	71.6	397.9	*281.7*	*104.8*	*11.4*	22.7	13.3	1,922.9
	Standardised approach exposure classes								
7	Central governments and central banks	1.7	2.2	*2.1*	*0.1*	—	0.6	—	163.9
8	Regional governments or local authorities	3.7	—	—	—	—	0.9	—	7.3
9	Public sector entities	—	—	—	—	—	0.1	—	12.2
10	Multilateral development banks	—	—	—	—	—	—	0.2	0.2
11	International organisations	—	—	—	—	—	—	1.6	1.6
12	Institutions	2.1	—	—	—	—	0.1	—	3.4
13	Corporates	44.7	12.3	*8.4*	*0.8*	*3.1*	25.8	—	179.4
14	Retail	8.7	2.9	*0.7*	*1.7*	*0.5*	9.0	—	63.8
15	Secured by mortgages on immovable property	3.4	1.7	*0.6*	*0.1*	*1.0*	2.6	—	32.0
16	Exposures in default	1.1	0.4	*0.1*	—	*0.3*	0.5	—	3.0
17	Items associated with particularly high risk	0.2	1.6	*0.8*	—	*0.8*	0.1	—	4.8
20	Collective investment undertakings ('CIU')	—	—	—	—	—	—	—	0.6
21	Equity exposures	0.2	1.2	*1.1*	—	*0.1*	0.2	—	15.6
22	Other exposures	0.5	0.6	*0.6*	—	—	0.2	—	11.3
23	Total standardised approach	66.3	22.9	*14.4*	*2.7*	*5.8*	40.1	1.8	499.1
24	Total at 31 Dec 2018	137.9	420.8	*296.1*	*107.5*	*17.2*	62.8	15.1	2,422.0

1 Amounts shown by geographical region and country/territory in this table are based on the country/territory of residence of the counterparty.
2 Securitisation positions and non-credit obligation assets are not included in this table.

Table 35: Concentration of exposures by industry or counterparty types[1] (CRB-D)

	Net carrying values[1]	Agriculture $bn	Mining/oil extraction $bn	Manufac-turing $bn	Utilities $bn	Water supply $bn	Construction $bn	Whole-sale & retail trade $bn	Trans-portation & storage $bn	Accom-modation & food services $bn	Infor-mation & commun-ication $bn	Financial & insurance $bn
1	Central governments and central banks	–	–	0.1	0.5	–	–	0.1	0.1	–	–	150.2
2	Institutions	–	0.5	0.3	0.4	–	0.1	0.1	0.2	–	0.1	69.9
3	Corporates	7.7	35.3	234.6	27.7	3.1	38.0	181.8	41.1	25.5	14.3	111.9
4	Retail	1.0	–	0.8	–	–	0.3	1.4	0.2	0.4	0.1	4.8
6	**Total IRB approach**	8.7	35.8	235.8	28.6	3.1	38.4	183.4	41.6	25.9	14.5	336.8
7	Central governments and central banks	–	–	–	–	–	–	–	–	–	0.1	132.0
8	Regional governments or local authorities	–	–	–	–	–	–	–	–	–	–	0.3
9	Public sector entities	–	–	0.1	–	–	–	–	–	–	–	13.6
10	Multilateral development banks	–	–	–	–	–	–	–	–	–	–	0.1
11	International organisations	–	–	–	–	–	–	–	–	–	–	–
12	Institutions	–	–	–	–	–	–	–	–	–	–	2.4
13	Corporates	1.0	5.4	25.0	3.7	0.3	7.8	21.3	3.0	3.1	2.1	15.6
14	Retail	0.1	–	0.4	–	–	–	0.2	0.2	–	–	–
15	Secured by mortgages on immovable property	–	–	–	–	–	0.3	–	–	0.1	–	0.1
16	Exposures in default	–	–	0.4	–	–	0.2	0.2	–	0.1	–	0.1
17	Items associated with particularly high risk	–	–	–	–	–	–	–	–	–	–	4.8
20	Collective investment undertakings ('CIU')	–	–	–	–	–	–	–	–	–	–	0.4
21	Equity exposures	–	–	–	–	–	–	–	–	–	–	16.2
22	Other exposures	–	–	–	–	–	–	–	–	–	–	12.7
23	**Total STD approach**	1.1	5.4	25.9	3.7	0.3	8.3	21.7	3.2	3.3	2.2	198.3
24	**Total at 31 Dec 2019**	9.8	41.2	261.7	32.3	3.4	46.7	205.1	44.8	29.2	16.7	535.1

Table 35: Concentration of exposures by industry or counterparty types (CRB-D)

	Net carrying values[1]	Real estate $bn	Professional activities $bn	Adminis-trative services $bn	Public admin & defence $bn	Education $bn	Human health & social work $bn	Arts & enter-tainment $bn	Other services $bn	Personal $bn	Extra-territorial bodies $bn	Total $bn
1	Central governments and central banks	–	–	–	164.8	–	0.2	–	0.3	–	30.0	346.3
2	Institutions	0.2	–	–	1.9	0.1	0.2	–	–	–	1.4	75.4
3	Corporates	180.7	26.4	87.3	2.6	3.1	5.7	6.3	14.0	0.4	–	1,047.5
4	Retail	0.8	–	15.9	–	0.3	0.2	0.1	0.2	527.9	–	554.4
6	**Total IRB approach**	181.7	26.4	103.2	169.3	3.5	6.3	6.4	14.5	528.3	31.4	2,023.6
7	Central governments and central banks[3]	–	–	–	33.5	–	–	–	1.5	–	9.8	176.9
8	Regional governments or local authorities	–	–	–	8.6	–	–	–	–	–	–	8.9
9	Public sector entities	–	–	–	2.2	–	–	–	0.1	–	0.6	16.6
10	Multilateral development banks	–	–	–	–	–	–	–	–	–	–	0.1
11	International organisations	–	–	–	–	–	–	–	–	–	1.6	1.6
12	Institutions	–	–	–	–	–	–	–	–	–	–	2.4
13	Corporates	13.0	1.5	51.0	0.5	0.1	0.8	0.6	1.6	2.4	–	159.8
14	Retail	–	–	0.2	–	–	–	–	–	69.6	–	70.7
15	Secured by mortgages on immovable property	1.1	–	0.2	–	–	–	–	–	31.6	–	33.4
16	Exposures in default	0.1	0.1	1.0	–	–	–	–	–	1.2	–	3.4
17	Items associated with particularly high risk	0.6	–	0.1	–	–	–	–	–	–	–	5.5
20	Collective investment undertakings	–	–	–	–	–	–	–	–	–	–	0.4
21	Equity exposures	–	–	0.1	–	–	0.1	–	–	–	–	16.4
22	Other exposures	–	–	0.2	–	–	–	–	–	–	–	12.9
23	**Total STD approach**	14.8	1.6	52.8	44.8	0.1	0.9	0.6	3.2	104.8	12.0	509.0
24	**Total at 31 Dec 2019**	196.5	28.0	156.0	214.1	3.6	7.2	7.0	17.7	633.1	43.4	2,532.6

Table 35: Concentration of exposures by industry or counterparty types[1] (CRB-D) (continued)

	Net carrying values[1]	Agriculture $bn	Mining/oil extraction $bn	Manufac-turing $bn	Utilities $bn	Water supply $bn	Construction $bn	Wholesale & retail trade $bn	Trans-portation & storage $bn	Accom-modation & food services $bn	Infor-mation & commun-ication $bn	Financial & insurance $bn
1	Central governments and central banks	—	—	—	0.4	—	—	—	—	—	—	140.2
2	Institutions	—	0.2	—	0.4	—	—	—	—	—	—	80.1
3	Corporates	6.8	35.4	228.6	26.5	3.6	32.5	181.0	40.6	23.7	16.6	120.2
4	Retail	1.0	—	0.8	—	—	0.2	1.4	0.3	0.4	—	0.2
6	Total IRB approach	7.8	35.6	229.4	27.3	3.6	32.7	182.4	40.9	24.1	16.6	340.7
7	Central governments and central banks	—	—	—	—	—	—	—	—	—	—	126.3
8	Regional governments or local authorities	—	—	—	—	—	—	—	—	—	—	0.3
9	Public sector entities	—	—	—	—	—	—	—	—	—	—	10.4
10	Multilateral	—	—	—	—	—	—	—	—	—	—	0.2
11	International	—	—	—	—	—	—	—	—	—	—	—
12	Institutions	—	—	—	—	—	—	—	—	—	—	3.4
13	Corporates	0.9	5.5	26.1	4.1	—	7.5	21.4	4.1	3.2	2.1	18.0
14	Retail	0.1	—	0.2	—	—	—	0.2	0.1	—	—	0.6
15	Secured by mortgages on immovable property	—	—	—	—	—	0.1	—	—	—	—	0.1
16	Exposures in default	—	—	0.5	—	—	0.2	0.3	0.1	0.1	—	0.1
17	Items associated with particularly high risk	—	—	—	—	—	0.1	—	—	—	—	4.2
20	Collective investment undertakings	—	—	—	—	—	—	—	—	—	—	0.6
21	Equity exposures	—	—	—	—	—	—	—	—	—	—	15.6
22	Other exposures	—	—	—	—	—	—	—	—	—	—	11.0
23	Total STD approach	1.0	5.5	26.8	4.1	—	7.9	21.9	4.3	3.3	2.1	190.8
24	Total at 31 Dec 2018	8.8	41.1	256.2	31.4	3.6	40.6	204.3	45.2	27.4	18.7	531.5

	Net carrying values[1]	Real estate $bn	Professional activities $bn	Adminis-trative services $bn	Public admin & defence $bn	Education $bn	Human health & social work $bn	Arts & entertainment $bn	Other services $bn	Personal $bn	Extra-territorial bodies $bn	Total $bn
1	Central governments and central banks	—	—	—	154.5	—	0.3	—	0.2	—	36.1	331.7
2	Institutions	—	—	—	0.2	0.1	—	—	—	—	0.1	81.1
3	Corporates	173.4	26.5	80.7	2.6	2.9	5.5	7.6	11.5	0.6	—	1,026.8
4	Retail	1.0	—	0.4	—	0.1	0.2	0.2	0.1	477.0	—	483.3
6	Total IRB approach	174.4	26.5	81.1	157.3	3.1	6.0	7.8	11.8	477.6	36.2	1,922.9
7	Central governments and central banks	—	—	—	26.2	—	—	—	—	—	11.4	163.9
8	Regional governments or local authorities	—	—	—	7.0	—	—	—	—	—	—	7.3
9	Public sector entities	—	—	—	1.0	0.1	—	—	—	—	0.7	12.2
10	Multilateral development banks	—	—	—	—	—	—	—	—	—	—	0.2
11	International	—	—	—	—	—	—	—	—	—	1.6	1.6
12	Institutions	—	—	—	—	—	—	—	—	—	—	3.4
13	Corporates	14.3	2.1	64.4	0.5	0.3	1.0	0.7	1.1	2.1	—	179.4
14	Retail	0.1	—	0.2	—	—	—	—	0.1	62.2	—	63.8
15	Secured by mortgages on immovable property	0.5	—	—	—	—	—	—	—	31.3	—	32.0
16	Exposures in default	0.1	—	0.3	—	—	—	—	0.1	1.2	—	3.0
17	Items associated with particularly high risk	0.3	—	0.2	—	—	—	—	—	—	—	4.8
20	Collective investment undertakings	—	—	—	—	—	—	—	—	—	—	0.6
21	Equity exposures	—	—	—	—	—	—	—	—	—	—	15.6
22	Other exposures	—	—	0.3	—	—	—	—	—	—	—	11.3
23	Total STD approach	15.3	2.1	65.4	34.7	0.4	1.0	0.7	1.3	96.8	13.7	499.1
24	Total at 31 Dec 2018	189.7	28.6	146.5	192.0	3.5	7.0	8.5	13.1	574.4	49.9	2,422.0

1 The industry classifications of this disclosure have been revised. 31 December 2018 data have been restated to be on a consistent basis with the current year.

2 Securitisation positions and non-credit obligation assets are not included in this table.

Table 36: Maturity of on-balance sheet exposures (CRB-E)

		Net carrying values[1]					
		On demand	Less than 1 year	Between 1 and 5 years	More than 5 years	Undated	Total
		$bn	$bn	$bn	$bn	$bn	$bn
	IRB approach exposure classes						
1	Central governments and central banks	**39.3**	**136.2**	**105.5**	**61.8**	**–**	**342.8**
2	Institutions	**11.8**	**27.9**	**22.2**	**1.3**	**–**	**63.2**
3	Corporates	**51.7**	**191.2**	**232.7**	**56.1**	**–**	**531.7**
4	Retail	**23.6**	**32.8**	**33.4**	**297.4**	**–**	**387.2**
6	**Total IRB approach**	**126.4**	**388.1**	**393.8**	**416.6**	**–**	**1,324.9**
	Standardised approach exposure classes						
7	Central governments and central banks	**90.9**	**46.0**	**15.9**	**18.6**	**4.6**	**176.0**
8	Regional governments or local authorities	**0.8**	**0.9**	**5.3**	**1.5**	**–**	**8.5**
9	Public sector entities	**–**	**2.5**	**9.7**	**4.3**	**–**	**16.5**
10	Multilateral development banks	**–**	**–**	**0.1**	**–**	**–**	**0.1**
11	International organisations	**–**	**–**	**0.7**	**0.9**	**–**	**1.6**
12	Institutions	**0.3**	**1.4**	**0.5**	**–**	**–**	**2.2**
13	Corporates	**4.3**	**30.7**	**32.1**	**7.8**	**–**	**74.9**
14	Retail	**7.3**	**1.2**	**7.0**	**4.1**	**–**	**19.6**
15	Secured by mortgages on immovable property	**–**	**2.1**	**5.9**	**24.3**	**–**	**32.3**
16	Exposures in default	**0.3**	**0.7**	**1.4**	**0.8**	**–**	**3.2**
17	Items associated with particularly high risk	**–**	**0.2**	**0.6**	**0.1**	**2.2**	**3.1**
20	Collective investment undertakings ('CIU')	**–**	**–**	**–**	**–**	**0.4**	**0.4**
21	Equity exposures	**–**	**–**	**–**	**–**	**16.4**	**16.4**
22	Other exposures	**–**	**2.7**	**–**	**0.4**	**9.1**	**12.2**
23	**Total standardised approach**	**103.9**	**88.4**	**79.2**	**62.8**	**32.7**	**367.0**
24	**Total at 31 Dec 2019**	**230.3**	**476.5**	**473.0**	**479.4**	**32.7**	**1,691.9**
	IRB approach exposure classes						
1	Central governments and central banks	38.0	149.5	93.8	47.3	–	328.6
2	Institutions	10.1	35.1	23.4	0.9	–	69.5
3	Corporates	59.1	183.7	221.0	62.5	–	526.3
4	Retail	21.5	7.3	38.0	267.3	–	334.1
6	Total IRB approach	128.7	375.6	376.2	378.0	–	1,258.5
	Standardised approach exposure classes						
7	Central governments and central banks	75.5	50.5	22.9	8.8	5.2	162.9
8	Regional governments or local authorities	0.8	0.9	3.9	1.4	–	7.0
9	Public sector entities	–	2.6	7.3	2.2	–	12.1
10	Multilateral development banks	–	–	0.2	–	–	0.2
11	International organisations	–	0.8	0.3	0.5	–	1.6
12	Institutions	0.1	0.3	2.9	–	–	3.3
13	Corporates	3.9	44.0	36.5	6.6	–	91.0
14	Retail	6.8	2.0	7.0	4.5	–	20.3
15	Secured by mortgages on immovable property	–	1.9	5.0	23.7	–	30.6
16	Exposures in default	0.3	0.9	1.1	0.5	–	2.8
17	Items associated with particularly high risk	–	0.1	0.7	0.1	1.6	2.5
20	Collective investment undertakings ('CIU')	–	–	–	–	0.6	0.6
21	Equity exposures	–	–	–	–	15.6	15.6
22	Other exposures	–	2.7	–	0.2	7.6	10.5
23	Total standardised approach	87.4	106.7	87.8	48.5	30.6	361.0
24	Total at 31 Dec 2018	216.1	482.3	464.0	426.5	30.6	1,619.5

1 Securitisation positions and non-credit obligation assets are not included in this table.

Risk mitigation

Our approach when granting credit facilities is to do so on the basis of capacity to repay, rather than placing primary reliance on credit risk mitigants. Depending on a customer's standing and the type of product, facilities may be provided unsecured.

Mitigation of credit risk is a key aspect of effective risk management and takes many forms. Our general policy is to promote the use of credit risk mitigation, justified by commercial prudence and capital efficiency. Detailed policies cover the acceptability, structuring and terms with regard to the availability of credit risk mitigation such as in the form of collateral security. These policies, together with the setting of suitable valuation parameters, are subject to regular review to ensure that they are supported by empirical evidence and continue to fulfil their intended purpose.

Collateral

The most common method of mitigating credit risk is to take collateral. In our retail residential and commercial real estate ('CRE') businesses, a mortgage over the property is usually taken to help secure claims. Physical collateral is also taken in various forms of specialised lending and leasing transactions where income from the physical assets that are financed is also the principal source of facility repayment. In the commercial and industrial sectors, charges are created over business assets such as premises, stock and debtors. Loans to private banking clients may be made against a pledge of eligible marketable securities, cash or real estate. Facilities to small- and medium-sized enterprises ('SMEs') are commonly granted against guarantees given by their owners and/or directors.

For credit risk mitigants in the form of immovable property, the key determinant of concentration at Group level is geographic. Use of immovable property mitigants for risk management purposes is predominantly in Asia and Europe.

Further information regarding collateral held over CRE and residential property is provided on pages 112 and 123, respectively, of the Annual Report and Accounts 2019.

Financial collateral

In the institutional sector, trading facilities are supported by charges over financial instruments, such as cash, debt securities and equities. Financial collateral in the form of marketable securities is used in much of the Group's derivatives activities and in securities financing transactions, such as repos, reverse repos, securities lending and borrowing. Netting is used extensively and is a prominent feature of market standard documentation.

Further information regarding collateral held for trading exposures is on page 118 of the Annual Report and Accounts 2019.

In the non-trading book, we provide customers with working capital management products. In some cases, these products combine loans and advances to customers with customer accounts over which we have right of offset which comply with the regulatory requirements for on-balance sheet netting. Where this applies, the customer accounts are treated as cash collateral and are reflected in our LGD estimates.

Under on-balance sheet netting, the customer accounts are treated as cash collateral and the effects of this collateral are incorporated in our LGD estimates. For risk management purposes, the net amounts of such exposures are subject to limits and the relevant customer agreements are subject to review to ensure the legal right of offset remains appropriate.

At 31 December 2019, $31bn of customer accounts were treated as cash collateral, mainly in the UK.

Other forms of credit risk mitigation

Our Global Banking and Markets ('GB&M') business utilises credit risk mitigation to manage the credit risk of its portfolios, with the goal of reducing concentrations in individual names, sectors or portfolios. The techniques in use include credit default swap ('CDS') purchases, structured credit notes and securitisation structures. Buying credit protection creates credit exposure against the protection provider, which is monitored as part of the overall credit exposure to them. Where applicable, the transaction is entered into directly with a central clearing house counterparty; otherwise our exposure to CDS protection providers is diversified among mainly banking counterparties with strong credit ratings. In our corporate lending, we also take guarantees from corporates and export credit agencies ('ECA'). Corporates would normally provide guarantees as part of a parent/subsidiary or common parent relationship and would span a number of credit grades. The ECAs will normally be investment grade.

Policy and procedures

Policies and procedures govern the protection of our position from the outset of a customer relationship; for instance, in requiring standard terms and conditions or specifically agreed documentation permitting the offset of credit balances against debt obligations, and through controls over the integrity, current valuation and, if necessary, realisation of collateral security.

Valuing collateral

Valuation strategies are established to monitor collateral mitigants to ensure that they will continue to provide the anticipated secure secondary repayment source. The frequency of valuation increases with the volatility of the collateral. For market trading activities such as collateralised over-the-counter ('OTC') derivatives and securities financing transactions ('SFTs'), we typically carry out daily valuations. In the residential mortgage business, Group policy prescribes revaluation at intervals of up to three years, or more frequently as the need arises; for example, where market conditions are subject to significant change. Residential property collateral values are determined through a combination of professional appraisals, house price indices or statistical analysis.

Local market conditions determine the frequency of valuation for CRE. Revaluations are sought where, for example, material concerns arise in relation to the performance of the collateral. CRE revaluation also occurs commonly in circumstances where an obligor's credit quality has declined sufficiently to cause concern that the principal payment source may not fully meet the obligation.

Recognition of risk mitigation under the IRB approach

Within an IRB approach, risk mitigants are considered in two broad categories:

- those which reduce the intrinsic PD of an obligor and therefore operate as determinants of PD; and
- those which affect the estimated recoverability of obligations and require adjustment of LGD or, in certain limited circumstances, EAD.

The first category typically includes full parental guarantees where one obligor within a group guarantees another. In these circumstances, the parent guarantor materially influences the PD of the guaranteed obligor. PD estimates are also subject to a 'sovereign ceiling', constraining the risk ratings assigned to obligors in countries of higher risk, and where only partial parental support exists. In certain jurisdictions, certain types of third-party guarantee are recognised by substituting the obligor's PD with that of the guarantor.

In the second category, LGD estimates are affected by a wider range of collateral, including cash, charges over real estate property, fixed assets, trade goods, receivables and floating charges such as mortgage debentures. Unfunded mitigants, such as third-party guarantees, are also considered in LGD estimates where there is evidence that they reduce loss expectation.

The main types of provider of guarantees are banks, other financial institutions and corporates. The creditworthiness of providers of unfunded credit risk mitigation is taken into consideration as part of the guarantor's risk profile. Internal limits for such contingent exposure are approved in the same way as direct exposures.

EAD and LGD values, in the case of individually assessed exposures, are determined by reference to regionally approved internal risk parameters based on the nature of the exposure. For retail portfolios, credit risk mitigation data is incorporated into the internal risk parameters for exposures and feeds into the calculation of the expected loss ('EL') band value summarising both customer delinquency and product or facility risk. Credit and credit risk mitigation data form inputs submitted by all Group offices to centralised databases. A range of collateral recognition approaches are applied to IRB capital treatments:

- Unfunded protection, which includes credit derivatives and guarantees, is reflected through adjustment or determination of PD or LGD. Under the IRB advanced approach, recognition may be through PD or LGD.
- Eligible financial collateral under the IRB advanced approach is recognised in LGD models. Under the IRB foundation approach, regulatory LGD values are adjusted. The adjustment to LGD is based on the degree to which the exposure value would be adjusted notionally if the financial collateral comprehensive method were applied.
- For all other types of collateral, including real estate, the LGD for exposures under the IRB advanced approach is calculated by models. For IRB foundation, base regulatory LGDs are adjusted depending on the value and type of the asset taken as collateral relative to the exposure. The types of eligible mitigant recognised under the IRB foundation approach are more limited.

Table 39 sets out, for IRB exposures, the exposure value and the effective value of credit risk mitigation expressed as the exposure value covered by the credit risk mitigant. IRB credit risk mitigation reductions of EAD were immaterial at 31 December 2019.

Recognition of risk mitigation under the standardised approach

Where credit risk mitigation is available in the form of an eligible guarantee, non-financial collateral or a credit derivative, the exposure is divided into covered and uncovered portions. The covered portion is determined after applying an appropriate 'haircut' for currency and maturity mismatches (and for omission of restructuring clauses in credit derivatives, where appropriate) to the amount of the protection provided and attracts the risk weight of the protection provider. The uncovered portion attracts the risk weight of the obligor.

The value of exposure fully or partially covered by eligible financial collateral is adjusted under the financial collateral comprehensive method using supervisory volatility adjustments (including those for currency mismatch) which are determined by the specific type of collateral (and its credit quality, in the case of eligible debt securities) and its liquidation period. The adjusted exposure value is subject to the risk weight of the obligor.

Table 37: Credit risk mitigation techniques – overview (CR3)

		Exposures unsecured: carrying amount	Exposures secured: carrying amount	Exposures secured by collateral	Exposures secured by financial guarantees	Exposures secured by credit derivatives
		$bn	$bn	$bn	$bn	$bn
1	Loans	**626.0**	**653.2**	**546.1**	**106.6**	**0.5**
2	Debt securities	**335.8**	**41.5**	**35.6**	**5.9**	**–**
3	**Total at 31 Dec 2019**	**961.8**	**694.7**	**581.7**	**112.5**	**0.5**
4	*of which: defaulted*	***5.3***	***4.2***	***3.7***	***0.5***	**–**
1	Loans	641.2	596.8	494.0	102.1	0.7
2	Debt securities	316.1	32.4	27.2	5.2	–
3	Total at 31 Dec 2018	957.3	629.2	521.2	107.3	0.7
4	*of which: defaulted*	*6.3*	*4.6*	*4.1*	*0.4*	–

Table 38: Standardised approach – credit conversion factor ('CCF') and credit risk mitigation ('CRM') effects (CR4)

		Exposures before CCF and CRM		Exposures post-CCF and CRM		RWAs and RWA density	
		On-balance sheet amount	Off-balance sheet amount	On-balance sheet amount	Off-balance sheet amount	RWAs	RWA density
		$bn	$bn	$bn	$bn	$bn	%
	Asset classes[1]						
1	Central governments or central banks	**175.8**	**0.9**	**183.9**	**1.6**	**11.2**	**6**
2	Regional governments or local authorities	**8.5**	**0.4**	**8.8**	**0.1**	**1.6**	**18**
3	Public sector entities	**16.5**	**0.1**	**16.4**	**–**	**–**	**–**
4	Multilateral development banks	**0.1**	**–**	**0.1**	**–**	**–**	**–**
5	International organisations	**1.6**	**–**	**1.6**	**–**	**–**	**–**
6	Institutions	**2.2**	**0.2**	**1.5**	**0.1**	**0.9**	**58**
7	Corporates	**75.0**	**84.9**	**66.3**	**10.5**	**72.5**	**94**
8	Retail	**19.8**	**51.1**	**19.1**	**0.4**	**14.4**	**74**
9	Secured by mortgage on immovable property	**32.3**	**1.1**	**32.2**	**0.3**	**12.0**	**37**
10	Exposures in default	**3.6**	**0.2**	**3.6**	**–**	**4.1**	**114**
11	Higher-risk categories	**3.1**	**2.4**	**3.1**	**2.2**	**7.9**	**150**
14	Collective investment undertakings	**0.4**	**–**	**0.4**	**–**	**0.4**	**100**
15	Equity	**16.5**	**–**	**16.5**	**–**	**36.3**	**220**
16	Other items	**12.2**	**0.7**	**12.2**	**0.7**	**8.8**	**68**
17	**Total at 31 Dec 2019**	**367.6**	**142.0**	**365.7**	**15.9**	**170.1**	**45**
1	Central governments or central banks	162.7	1.0	170.8	1.1	12.5	7
2	Regional governments or local authorities	7.0	0.3	7.0	0.1	1.3	19
3	Public sector entities	12.1	0.1	12.0	–	–	–
4	Multilateral development banks	0.2	–	0.2	–	–	2
5	International organisations	1.6	–	1.6	–	–	–
6	Institutions	3.3	0.1	2.3	–	1.2	52
7	Corporates	91.2	88.3	72.0	12.2	79.2	94
8	Retail	20.5	43.5	19.7	0.2	14.8	74
9	Secured by mortgage on immovable property	30.6	1.4	30.6	0.3	11.3	37
10	Exposures in default	3.3	0.2	3.3	–	3.8	117
11	Higher-risk categories	2.5	2.3	2.4	2.2	6.9	150
14	Collective investment undertakings	0.6	–	0.6	–	0.6	100
15	Equity	15.7	–	15.7	–	35.0	223
16	Other items	10.5	0.8	10.5	0.8	6.6	58
17	Total at 31 Dec 2018	361.8	138.0	348.7	16.9	173.2	47

1 Securitisation positions are not included in this table.

Table 39: Credit risk mitigation techniques – IRB and Standardised

	Footnotes	At 31 Dec 2019 Exposures unsecured: carrying amount $bn	Exposures secured: carrying amount $bn	Secured by: collateral $bn	financial guarantees $bn	credit derivatives $bn	At 31 Dec 2018 Exposures unsecured: carrying amount $bn	Exposures secured: carrying amount $bn	Secured by: collateral $bn	financial guarantees $bn	credit derivatives $bn
Exposures under the IRB approach	1										
Central governments and central banks		**309.4**	**36.9**	**35.2**	**1.7**	**–**	303.4	28.3	26.8	1.5	–
Institutions		**69.9**	**5.5**	**4.7**	**0.8**	**–**	75.0	6.1	4.4	1.7	–
Corporates		**612.6**	**434.9**	**305.3**	**116.5**	**13.1**	618.0	408.8	287.6	110.3	10.9
Retail		**205.6**	**348.8**	**322.0**	**26.8**	**–**	192.0	291.3	267.9	23.4	–
Securitisation		**20.2**	**–**	**–**	**–**	**–**	29.7	–	–	–	–
Total		**1,217.7**	**826.1**	**667.2**	**145.8**	**13.1**	1,218.1	734.5	586.7	136.9	10.9
Exposures under the STD approach	1										
Central governments and central banks	2	**171.7**	**0.6**	**0.1**	**0.5**	**–**	157.9	0.8	–	0.8	–
Institutions		**1.6**	**0.8**	**–**	**0.8**	**–**	2.3	1.1	–	1.1	–
Corporates		**117.5**	**42.3**	**32.0**	**10.3**	**–**	125.6	53.8	43.0	10.8	–
Retail		**69.5**	**1.2**	**1.0**	**0.2**	**–**	62.3	1.5	1.3	0.2	–
Secured by mortgages on immovable property		**11.8**	**21.6**	**21.5**	**0.1**	**–**	9.8	22.2	22.1	0.1	–
Exposures in default		**2.7**	**0.7**	**0.6**	**0.1**	**–**	2.4	0.6	0.5	0.1	–
Items associated with particularly high risk	3	**2.0**	**0.1**	**–**	**0.1**	**–**	1.7	0.1	–	0.1	–
Regional governments or local authorities		**8.9**	**–**	**–**	**–**	**–**	7.1	0.2	0.2	–	–
Public sector entities		**11.7**	**4.9**	**0.1**	**4.8**	**–**	8.2	4.0	–	4.0	–
Securitisation		**15.8**	**0.5**	**–**	**–**	**0.5**	2.7	–	–	–	–
Total		**413.2**	**72.7**	**55.3**	**16.9**	**0.5**	380.0	84.3	67.1	17.2	–

1 This table includes both on- and off-balance sheet exposures.
2 Deferred tax assets are excluded from the exposure.
3 Equities are excluded from the exposure.

Table 40: IRB – Effect on RWA of credit derivatives used as CRM techniques (CR7)

		At 31 Dec 2019 Pre-credit derivatives RWAs $bn	2019 Actual RWAs $bn	2018 Pre-credit derivatives RWAs $bn	2018 Actual RWAs $bn
1	**Exposures under FIRB**	**32.3**	**32.3**	30.5	30.5
3	Institutions	**0.2**	**0.2**	0.2	0.2
6	Corporates – other	**32.1**	**32.1**	30.3	30.3
7	**Exposures under AIRB**	**467.1**	**465.9**	480.0	479.0
8	Central governments and central banks	**36.3**	**36.3**	36.9	36.9
9	Institutions	**10.8**	**10.8**	14.2	14.2
11	Corporates – specialised lending	**26.8**	**26.8**	27.0	27.0
12	Corporates – other	**302.1**	**300.9**	319.1	318.1
13	Retail – Secured by real estate SMEs	**1.5**	**1.5**	1.8	1.8
14	Retail – Secured by real estate non-SMEs	**40.4**	**40.4**	37.2	37.2
15	Retail – Qualifying revolving	**18.8**	**18.8**	17.3	17.3
16	Retail – Other SMEs	**4.7**	**4.7**	4.8	4.8
17	Retail – Other non-SMEs	**12.4**	**12.4**	10.9	10.9
19	Other non-credit obligation assets	**13.3**	**13.3**	10.8	10.8
20	**Total**	**499.4**	**498.2**	510.5	509.5

Global risk

Qualitative disclosures on banks' use of external credit ratings under the standardised approach for credit risk

The standardised approach is applied where exposures do not qualify for use of an IRB approach and/or where an exemption from IRB has been granted. The standardised approach requires banks to use risk assessments prepared by external credit assessment institutions ('ECAIs') or ECAs to determine the risk weightings applied to rated counterparties.

ECAI risk assessments are used within the Group as part of the determination of risk weightings for the following classes of exposure:

- central governments and central banks;
- regional governments and local authorities;
- institutions;
- corporates;
- securitisation positions; and
- short-term claims on institutions and corporates.

We have nominated three ECAIs for this purpose – Moody's Investor Service ('Moody's'), Standard and Poor's rating agency ('S&P') and Fitch Ratings ('Fitch'). In addition to this, we use DBRS ratings specifically for securitisation positions. We have not nominated any ECAs.

Data files of external ratings from the nominated ECAIs are matched with customer records in our centralised credit database.

When calculating the risk-weighted value of an exposure using ECAI risk assessments, risk systems identify the customer in question and look up the available ratings in the central database according to the rating selection rules. The systems then apply the prescribed credit quality step mapping to derive from the rating the relevant risk weight.

All other exposure classes are assigned risk weightings as prescribed in the PRA's Rulebook.

Credit quality step	Moody's assessment	S&P's assessment	Fitch's assessment	DBRS assessment
1	Aaa to Aa3	AAA to AA–	AAA to AA–	AAA to AAL
2	A1 to A3	A+ to A–	A+ to A–	AH to AL
3	Baa1 to Baa3	BBB+ to BBB–	BBB+ to BBB–	BBBH to BBBL
4	Ba1 to Ba3	BB+ to BB–	BB+ to BB–	BBH to BBL
5	B1 to B3	B+ to B–	B+ to B–	BH to BL
6	Caa1 and below	CCC+ and below	CCC+ and below	CCCH and below

Exposures to, or guaranteed by, central governments and central banks of the European Economic Area ('EEA') states are risk-weighted at 0% provided that they are denominated and funded in local currency or qualify for that weight by virtue of their external rating.

The following table provides further detail on the risk weighting of our standardised non-counterparty credit exposures. For further detail on the risk weighting of our standardised counterparty credit risk exposures, refer to Table 50.

Table 41: Standardised approach – exposures by asset class and risk weight (CR5)

	Risk weight ('RW%')	0%	2%	20%	35%	50%	70%	75%	100%	150%	250%	Deducted	Exposure amount (post-CCF and CRM)	*Of which unrated*
		$bn	$bn	$bn	$bn	$bn	$bn	$bn	$bn	$bn	$bn	$bn	$bn	$bn
	Asset classes[1]													
1	Central governments or central banks	**180.9**	**–**	**0.1**	**–**	**–**	**–**	**–**	**0.1**	**–**	**4.4**	**–**	**185.5**	***4.4***
2	Regional governments or local authorities	**3.8**	**–**	**3.9**	**–**	**0.9**	**–**	**–**	**0.3**	**–**	**–**	**–**	**8.9**	***0.3***
3	Public sector entities	**16.4**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**16.4**	**–**
4	Multilateral development banks	**0.1**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**0.1**	**–**
5	International organisations	**1.6**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**1.6**	**–**
6	Institutions	**–**	**–**	**0.3**	**–**	**0.8**	**–**	**–**	**0.5**	**–**	**–**	**–**	**1.6**	***0.3***
7	Corporates	**–**	**–**	**3.9**	**0.3**	**2.5**	**0.5**	**–**	**68.0**	**1.6**	**–**	**–**	**76.8**	***65.9***
8	Retail	**–**	**–**	**–**	**–**	**–**	**–**	**19.5**	**–**	**–**	**–**	**–**	**19.5**	***19.5***
9	Secured by mortgage on immovable property	**–**	**–**	**–**	**30.7**	**1.0**	**–**	**–**	**0.8**	**–**	**–**	**–**	**32.5**	***32.5***
10	Exposures in default	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**2.6**	**1.0**	**–**	**–**	**3.6**	***3.6***
11	Higher-risk categories	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**5.3**	**–**	**–**	**5.3**	***5.3***
14	Collective investment undertakings	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**0.4**	**–**	**–**	**–**	**0.4**	***0.4***
15	Equity	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**3.3**	**–**	**13.2**	**–**	**16.5**	***16.5***
16	Other items	**0.1**	**–**	**5.0**	**–**	**–**	**–**	**–**	**7.8**	**–**	**–**	**–**	**12.9**	***12.9***
17	**Total at 31 Dec 2019**	**202.9**	**–**	**13.2**	**31.0**	**5.2**	**0.5**	**19.5**	**83.8**	**7.9**	**17.6**	**–**	**381.6**	***161.6***
1	Central governments or central banks	166.5	–	0.2	–	0.1	–	–	0.1	–	5.0	–	171.9	*5.0*
2	Regional governments or local authorities	2.8	–	3.5	–	0.5	–	–	0.3	–	–	–	7.1	*0.5*
3	Public sector entities	12.0	–	–	–	–	–	–	–	–	–	–	12.0	–
4	Multilateral development banks	0.2	–	–	–	–	–	–	–	–	–	–	0.2	–
5	International organisations	1.6	–	–	–	–	–	–	–	–	–	–	1.6	–
6	Institutions	–	0.1	0.4	–	1.4	–	–	0.4	–	–	–	2.3	*0.2*
7	Corporates	–	–	3.6	0.3	3.4	0.5	–	75.6	0.8	–	–	84.2	*59.1*
8	Retail	–	–	–	–	–	–	19.9	–	–	–	–	19.9	*19.9*
9	Secured by mortgage on immovable property	–	–	–	30.2	–	–	–	0.7	–	–	–	30.9	*30.9*
10	Exposures in default	–	–	–	–	–	–	–	2.2	1.1	–	–	3.3	*3.3*
11	Higher-risk categories	–	–	–	–	–	–	–	–	4.6	–	–	4.6	*4.6*
14	Collective investment undertakings	–	–	–	–	–	–	–	0.6	–	–	–	0.6	*0.6*
15	Equity	–	–	–	–	–	–	–	2.8	–	12.9	–	15.7	*15.7*
16	Other items	–	–	5.9	–	–	–	–	5.4	–	–	–	11.3	*11.3*
17	Total at 31 Dec 2018	183.1	0.1	13.6	30.5	5.4	0.5	19.9	88.1	6.5	17.9	–	365.6	*151.1*

1 Securitisation positions are not included in this table.

Application of the IRB approach

Our Group IRB credit risk rating framework incorporates obligor propensity to default expressed in PD, and loss severity in the event of default expressed in EAD and LGD. These measures are used to calculate regulatory EL and capital requirements. They are also used with other inputs to inform rating assessments for the purposes of credit approval and many other purposes, for example:

- credit approval and monitoring: IRB models are used in the assessment of customer and portfolio risk in lending decisions;
- risk appetite: IRB measures are an important element in identifying risk exposure at customer, sector and portfolio level;
- pricing: IRB parameters are used in pricing tools for new transactions and reviews; and
- economic capital and portfolio management: IRB parameters are used in the economic capital model that has been implemented across HSBC.

Refer to Tables 69 and 71 in Appendix I for further information on our wholesale and retail IRB models.

Roll-out of the IRB approach

With the PRA's permission, we have adopted the advanced IRB approach for the majority of our business. At the end of 2019, portfolios in much of Europe, Asia and North America were on advanced IRB approaches. Others remain on the standardised or foundation approaches pending the development of models for the PRA's approval in line with our IRB roll-out plans where the primary focus is on corporate and retail exposures.

At 31 December 2019, 77% of the Group's exposures were treated under AIRB, 3% under FIRB and 20% under the standardised approach.

Refer to Table 70 in Appendix I for further detail on our IRB models including PD, LGD, RWA and exposure by country/territory.

EL and credit risk adjustments

We analyse credit loss experience in order to assess the performance of our risk measurement and control processes, and to inform our understanding of the implications for risk and capital management of dynamic changes occurring in the risk profile of our exposures.

When comparing regulatory EL with measures of ECL under IFRS 9, differences in the definition and scope of each should be considered. These can give rise to material differences in the way economic, business and methodological drivers are reflected quantitatively in the accounting and regulatory measures of loss.

In general, HSBC calculates ECL using three main components namely probability of default, loss given default, and exposure at default.

ECLs include impairment allowances (or provisions, against commitments and guarantees) calculated for a 12-month period ('12-month ECL'), for the remaining life of an exposure ('lifetime ECL'), and on financial assets that are considered to be in default or otherwise credit impaired. ECLs resulting from default events that are possible:

- within the next 12 months are recognised for financial instruments in stage 1; and
- beyond 12 months are recognised for financial instruments in stages 2 and 3.

An assessment of whether credit risk has increased significantly since initial recognition is performed at each reporting period by considering the change in the risk of default occurring over the remaining life of the financial instrument.

Unless identified at an earlier stage, all financial assets are deemed to have suffered a significant increase in credit risk when 30 days past due.

Change in ECL and other credit impairment charges represents the movement in the ECL during the year including write-offs, recoveries and foreign exchange. EL represents the one-year regulatory expected loss accumulated in the book at the balance sheet date.

Credit risk adjustments ('CRAs') encompass the impairment allowances or provisions balances, and changes in ECL and other credit impairment charges.

Table 72 in Appendix I sets out for IRB credit exposures the EL, CRA balances and actual loss experience reflected in the charges for CRAs.

HSBC leverages the Basel IRB framework where possible, with recalibration to meet the differing IFRS 9 requirements as follows:

Model	Regulatory capital	IFRS 9
PD	• Through the cycle (represents long-run average PD throughout a full economic cycle) • The definition of default includes a backstop of 90+ days past due, although this has been modified to 180+ days past due for some portfolios, particularly UK and US mortgages	• Point in time (based on current conditions, adjusted to take into account estimates of future conditions that will impact PD) • Default backstop of 90+ days past due for all portfolios
EAD	• Cannot be lower than current balance	• Amortisation captured for term products
LGD	• Downturn LGD (consistent with losses we would expect to suffer during a severe but plausible economic downturn) • Regulatory floors may apply to mitigate risk of underestimating downturn LGD due to lack of historical data • Discounted using cost of capital • All collection costs included	• Expected LGD (based on estimate of loss given default including the expected impact of future economic conditions such as changes in value of collateral) • No floors • Discounted using the original effective interest rate of the loan • Only costs associated with obtaining/selling collateral included
Other		• Discounted back from point of default to balance sheet date

Wholesale risk

The wholesale risk rating system

This section describes how we operate our credit risk analytical models and use IRB metrics in the wholesale customer business.

PDs for wholesale customer segments (that is central governments and central banks, financial institutions and corporate customers) and for certain individually assessed personal customers are derived from a customer risk rating ('CRR') master scale of 23 grades. Of these, 21 are non-default grades representing varying degrees of strength of financial condition, and two are default grades. Each CRR has a PD range associated with it as well as a mid-point PD.

The score generated by a credit risk rating model for the obligor is mapped to a corresponding PD and master-scale CRR. The CRR is then reviewed by a credit approver who, taking into account information such as the most recent events and market data, makes the final decision on the rating. The rating assigned reflects the approver's overall view of the obligor's credit standing.

The mid-point PD associated with the finally assigned CRR is then used in the regulatory capital calculation.

Relationship managers may propose a different CRR from that indicated through an override process which must be approved by the Credit function. Overrides for each model are recorded and monitored as part of the model management process.

The CRR is assigned at an obligor level, which means that separate exposures to the same obligor are generally subject to a single, consistent rating. Unfunded credit risk mitigants, such as guarantees, may also influence the final assignment of a CRR to an obligor. The effect of unfunded risk mitigants is considered for IRB and standardised approaches in Table 39.

If an obligor is in default on any material credit obligation to the Group, all of the obligor's facilities from the Group are considered to be in default.

Under the IRB approach, obligors are grouped into grades that have similar PD or anticipated default frequency. The anticipated default frequency may be estimated using all relevant information at the relevant date (PIT rating system) or be free of the effects of the credit cycle (TTC rating system).

We generally utilise a hybrid approach of PIT and through the cycle ('TTC'). That is, while models are calibrated to long-run default rates, obligor ratings are reviewed annually, or more frequently if necessary, to reflect changes in their circumstances and/or their economic operating environment.

Our policy requires approvers to downgrade ratings on expectations, but to upgrade them only on performance. This leads to expected defaults typically exceeding actual defaults.

For EAD and LGD estimation, operating entities are permitted, subject to overview by Group Risk, to use their own modelling approaches to suit conditions in their jurisdictions. Group Risk provides co-ordination, benchmarks, and promotion of best practice on EAD and LGD estimation.

EAD is estimated to a 12-month forward time horizon and represents the current exposure, plus an estimate for future increases in exposure and the realisation of contingent exposures post-default.

LGD is based on the effects of facility and collateral structure on outcomes post-default. This includes such factors as the type of client, the facility seniority, the type and value of collateral, past recovery experience and priority under law. It is expressed as a percentage of EAD.

Wholesale models

To determine credit ratings for the different types of wholesale obligor, multiple models and scorecards are used for PD, LGD, and EAD. These models may be differentiated by region, customer segment and/or customer size. For example, we have separate PD models for all of our key customer segments, including sovereigns, financial institutions, and large-, medium- and small-sized corporates.

Global PD models have been developed for asset classes, or clearly identifiable segments of asset classes, where the customer relationship is managed globally; for example, sovereigns, financial institutions and the largest corporate clients that typically operate internationally.

Local PD models, specific to a particular country, region, or sector, are developed for other obligors. These include corporate clients when they show distinct characteristics in common in a particular geography.

The two major drivers of model methodology are the nature of the portfolio and the availability of internal or external data on historical defaults and risk factors. For some historically low-default portfolios, e.g. sovereign and financial institutions, a model will rely more heavily on external data and/or the input of an expert panel. Where sufficient data is available, models are built on a statistical basis, although the input of expert judgement may still form an important part of the overall model development methodology.

Most LGD and EAD models are developed according to local circumstances, considering legal and procedural differences in the recovery and workout processes. Our approach to EAD and LGD also encompasses global models for central governments and central banks, and for institutions, as exposures to these customer types are managed centrally by Global Risk. The PRA requires all firms to apply an LGD floor of 45% for senior unsecured exposure to sovereign entities. This floor was applied to reflect the relatively few loss observations across all firms in relation to these obligors. This floor is applied for the purposes of regulatory capital reporting.

The PRA has published guidance on the appropriateness of LGD models for low default portfolios. It states there should be at least 20 defaults per country per collateral type for LGD models to be approved. Where there are insufficient defaults, an LGD floor will be applied. As a result, in 2019, we continued to apply LGD floors for our banks portfolio and some Asian corporate portfolios where there were insufficient loss observations.

The PRA has also indicated that it considers income-producing real estate to be an asset class that would be difficult to model. As a result, RWAs for our UK CRE portfolio and US income-producing CRE portfolio are calculated using the supervisory slotting approach. Under the supervisory slotting approach the bank allocates exposures to one of five categories. Each category then receives a fixed pre-determined RWA and EL percentage.

Local models for the corporate exposure class are developed using various data inputs, including collateral information and geography (for LGD) and product type (for EAD). The most material corporate models are the UK and Asian models, all of which are developed using more than 10 years' data. The LGD models are calibrated to a period of credit stress or downturn in economic conditions.

None of our EAD models is calibrated for a downturn, as analysis shows that utilisation decreases during a downturn because credit stress is accompanied by more intensive limit monitoring and facility reduction.

Table 42 sets out the key characteristics of the significant wholesale credit risk models that drive the capital calculation split by regulatory wholesale asset class, with their associated RWAs, including the number of models for each component, the model method or approach and the number of years of loss data used.

Table 42: Wholesale IRB credit risk models

Portfolio	IRB exposure class	RWA $bn	Component model	Number of material component models	Model description and methodology	Number of years loss data	Regulatory Floors
Sovereign	Central government and central banks, Institutions, Corporates – Others	36.3	PD	1	A shadow rating approach that includes macroeconomic and political factors, constrained with expert judgement.	>10	No
			LGD	1	An unsecured model built on assessment of structural factors that influence the country's long-term economic performance. For unsecured LGD, a floor of 45% is applied.	8	Floored at Foundation IRB
			EAD	1	A cross-classification model that uses both internal data and expert judgement, as well as information on similar exposure types from other asset classes.	8	EAD must be at least equal to the current utilisation of the balance at account level
Banking institutions	Institutions	11.0	PD	1	A statistical model that combines quantitative analysis on financial information with expert inputs and macroeconomic factors.	10	PD >0.03%
			LGD	1	A quantitative model that produces both downturn and expected LGD. Several securities types are included in the model to recognise collateral in the LGD calculation. For unsecured LGD, a floor of 45% is applied.	10	Floored at Foundation IRB
			EAD	1	A quantitative model that assigns credit conversion factors ('CCF') taking into account product types and committed/uncommitted indicator to calculate EAD using current utilisation and available headroom.	10	EAD must be at least equal to the current utilisation of the balance at account level
Corporates[1]	Corporates – Other, institutions	337.2					
Large corporates			PD	1	A statistical model built on 15 years of data. The model uses financial information, macroeconomic information and market-driven data, and is complemented by a qualitative assessment.	15	PD >0.03%
Regional corporates			PD	10	Corporates that fall below the global large corporate threshold are rated through regional/local PD models, which reflect regional/local circumstances. These models use financial information, behavioural data and qualitative information to derive a statistically built PD.	>10	
Non-banks financial institutions			PD	10	Predominantly statistical models that combine quantitative analysis on financial information with expert inputs.	10	PD >0.03%
All corporates			LGD	7	Regional/local statistical models covering all corporates, including global large corporates, developed using historical loss/recovery data and various data inputs, including collateral information, customer type and geography.	>7	UK Floored at Foundation IRB
			EAD	5	Regional/local statistical models covering all corporates, including global large corporates, developed using historical utilisation information and various data inputs, including product type and geography.	>7	EAD must be at least equal to the current utilisation of the balance at account level

1 *Excludes specialised lending exposures subject to supervisory slotting approach (see table 75).*

Table 43: IRB models – estimated and actual values (wholesale)[1]

		PD[2]		LGD[3]		EAD[4]	
		Estimated	Actuals	Estimated[5]	Actuals[5]	Estimated	Actuals
	Footnotes	%	%	%	%	%	%
2019							
– Sovereigns model	6	**2.01**	**–**	**–**	**–**	**–**	**–**
– Banks model		**1.09**	**–**	**–**	**–**	**–**	**–**
– Corporates models	7	**1.53**	**1.05**	**33.23**	**25.37**	**0.42**	**0.31**
2018							
– Sovereigns model	6	2.37	–	–	–	–	–
– Banks model		1.31	–	–	–	–	–
– Corporates models	7	1.61	0.87	30.47	16.60	0.38	0.33
2017							
– Sovereigns model	6	2.24	–	–	–	–	–
– Banks model		1.72	–	–	–	–	–
– Corporates models	7	1.72	0.96	27.75	17.50	0.39	0.36

1 Data represents an annual view, analysed at 30 September.
2 Estimated PD for all models in each asset class, calculated on the total number of obligors covered by the models. Actual numbers are the observed default rate in each asset class for the specified period.
3 Estimated and actual LGD represent defaulted populations. Average LGD values are EAD-weighted.
4 Expressed as a percentage of total EAD, which includes all defaulted and non-defaulted exposures for the relevant population.
5 Estimated LGD represents the EAD weighted average downturn LGD. In the current year, we have changed the methodology of computing actual LGD. Actual LGD represents the actual loss for defaults resolved in period divided by EAD of defaults resolved in the period. Prior period actual LGD has been restated.
6 The estimated PD excludes inactive sovereign obligors.
7 Covers the combined populations of the global large corporates model, all regional IRB models for large, medium and small corporates, and non-bank financial institutions. The estimated and observed PDs were calculated only for unique obligors.

Retail risk

Retail risk rating systems

Due to the different country-level portfolio performance characteristics and loss history, there are no global models for our retail portfolios. Across the Group, over 100 models are used with the PRA's approval under our IRB permission.

Table 44 sets out the key characteristics of significant retail credit risk models that drive the capital calculation, consistent with those shown in the previous year. The table presents regulatory retail asset class, the associated RWAs, the number of models for each component, the model method or approach and the number of years of loss data used. The RWAs of $47.7bn represent 61% of the total retail IRB RWA.

PD models are developed using statistical estimation based on a minimum of five years of historical data. The modelling approach is typically inherently TTC. Where models are developed based on a PIT approach (as in the UK), the model outputs become effectively TTC through the application of buffer or model adjustments as agreed with the PRA.

EAD models are also developed using at least five years of historical observations and typically adopt one of two approaches:

- For closed-end products without the facility for additional drawdowns, EAD is estimated as the outstanding balance of accounts at the time of observation.
- For products with the facility for additional drawdowns, EAD is estimated as the outstanding balance of accounts at the time of observation plus a credit conversion factor applied to the undrawn portion of the facility.

LGD estimates have more variation, particularly in respect of the time period that is used to quantify economic downturn assumptions.

Table 44: Retail IRB risk rating systems

Portfolio	Exposure class	RWA $bn	Component model	Number of material component models	Model description and methodology	Number of years loss data[1]	Applicable Pillar 1 regulatory thresholds and overlays
UK HSBC residential mortgages	Retail – secured by mortgages on immovable property non-SME	5.36	PD	1	Statistical model built on internal behavioural data and bureau information. Underlying PIT model is calibrated to the latest observed PD. An adjustment is then applied to generate the long-run PD based on a combination of historical misalignment of the underlying model and expert judgement.	7–10	PD floor of 0.03%
			LGD	1	Component based model incorporating, 'possession given default', 'predicted shortfall' and 'time to possession'. A downturn adjustment is applied to each component including a 30% reduction from peak house valuation and a 10% adjustment to forced sale haircut.	>10	LGD floor of 10% at portfolio level
			EAD	1	Logical model that uses the sum of balance at observation plus further unpaid interest that could accrue before default.	7–10	EAD must at least be equal to current balance
UK First Direct residential mortgages	Retail – secured by mortgages on immovable property non-SME	0.80	PD	1	Underlying PIT PD model is a segmented scorecard. An adjustment is then applied based on observed misalignment in the underlying model (with some additional conservatism applied).	7–10	PD floor of 0.03%
			LGD	1	Component based model incorporating, 'possession given default', 'predicted shortfall' and 'time to possession'. A downturn adjustment is applied to each component including a 30% reduction from peak house valuation and a 10% adjustment to forced sale haircut.	>10	LGD floor of 10% at portfolio level
			EAD	2	There are two separate EAD models – one for standard capital repayment mortgages and one for offset mortgages which offer a revolving loan facility.	7–10	EAD must at least be equal to current balance
UK HSBC credit cards	Retail – qualifying revolving	3.02	PD	1	Statistical model built on internal behavioural data and bureau information. Underlying PIT model is calibrated to the latest observed PD. An adjustment is then applied to generate the long-run PD based on historical observed misalignment of the underlying model.	7–10	PD floor of 0.03%
			LGD	1	Statistical model based on forecasting the amount of expected future recoveries, segmented by default status.	7–10	
			EAD	1	Statistical model that directly estimates EAD for different segments of the portfolio using either balance or limit as the key input.	7–10	EAD must at least be equal to current balance
UK HSBC personal loans	Retail – other non-SME	4.75	PD	1	Statistical model built on internal behavioural data and bureau information. Underlying PIT model is calibrated to the latest observed PD. An adjustment is then applied to generate the long-run PD based on historical observed misalignment of the underlying model.	7–10	PD floor of 0.03%
			LGD	1	Statistical model based on forecasting the amount of expected future recoveries, segmented by default status.	7–10	
			EAD	1	EAD is equal to current balance as this provides a conservative estimate.	7–10	EAD must at least be equal to current balance

Table 44: Retail IRB risk rating systems (continued)

Portfolio	Exposure class	RWA $bn	Component model	Number of material component models	Model description and methodology	Number of years loss data[1]	Applicable Pillar 1 regulatory thresholds and overlays
UK business banking	Retail – other SME	3.28	PD	1	Statistical model built on internal behavioural data and bureau information. Underlying PIT model is calibrated to the latest observed PD. An adjustment is then applied to generate the long run PD based on historical observed misalignment of the underlying model.	7–10	PD floor of 0.03%
			LGD	2	Two sets of models – one for secured exposures and another for unsecured exposures. The secured model uses the value to loan as a key component for estimation and the unsecured model estimates the amount of future recoveries and undrawn portion.	7–10	
			EAD	1	Statistical model using segmentation according to limit and utilisation and estimation of the undrawn exposure.	7–10	EAD must at least be equal to current balance
Hong Kong HSBC personal residential mortgages[2]	Retail – secured by mortgages on immovable property non-SME	12.34	PD	2	Statistical model built on internal behavioural data and bureau information, and calibrated to a long-run default rate.	>10	PD floor of 0.03%
			LGD	2	Statistical model based on estimate of loss incurred over a recovery period derived from historical data with downturn LGD based on the worst observed default rate.	>10	LGD floor of 10% at portfolio level
			EAD	2	Rule-based calculation based on current balance, which provides a conservative estimate of EAD.	>10	EAD must at least be equal to current balance
Hong Kong Hang Seng personal residential mortgages	Retail – secured by mortgages on immovable property non-SME	7.52	PD	2	Statistical model built on internal behavioural data, and calibrated to a long-run default rate.	>10	PD floor of 0.03%
			LGD	2	Two statistical models and one historical average model based on estimates of loss incurred over a recovery period derived from historical data with a downturn adjustment.	>10	LGD floor of 10% at portfolio level
			EAD	2	Rule-based calculation based on current balance, which provides a conservative estimate of EAD.	>10	EAD must at least be equal to current balance
Hong Kong HSBC credit cards	Retail – qualifying revolving	4.08	PD	1	Statistical model built on internal behavioural data and bureau information, and calibrated to a long-run default rate.	>10	PD floor of 0.03%
			LGD	1	Statistical model based on forecasting the amount of expected losses. Downturn LGD derived using data from the period with the highest default rate.	>10	
			EAD	1	Statistical model that derives a credit utilisation which is used to estimate EAD.	>10	EAD must at least be equal to current balance
Hong Kong HSBC personal instalment loans	Retail – other non-SME	1.50	PD	1	Statistical model built on internal behavioural data and bureau information, and calibrated to a long-run default rate.	>10	PD floor of 0.03%
			LGD	1	Statistical model based on forecasting the amount of expected future losses. Downturn LGD derived using data from the period with the highest default rate.	>10	
			EAD	1	Statistical model that derives a credit conversion factor to determine the proportion of undrawn limit to be added to the balance at observation.	>10	EAD must at least be equal to current balance
US HSBC personal first lien residential mortgages[3]	Retail – secured by mortgages on immovable property non-SME	5.04	PD	1	Statistical model built on internal behavioural data and bureau information, and calibrated to a long-run default rate.	>10	PD floor of 0.03%
			LGD	1	Statistical model based on identifying the main risk drivers of loss and recovery and grouping them into homogeneous pools. Downturn LGD is derived based on the peak default rate observed. Additional assumptions and estimations are made on incomplete workouts.	>10	LGD floor of 10% at portfolio level
			EAD	1	Rule-based calculation based on current balance which provides a conservative estimate of EAD.	>10	EAD must at least be equal to current balance

1 *Defined as the number of years of historical data used in model development and estimation.*
2 *The Hong Kong Monetary Authority ('HKMA') applies a risk weight floor of 25% to all residential mortgages booked after 19 May 2017 (previously 15%).*
3 *In US mortgage business, first lien is a primary claim on a property that takes precedence over all subsequent claims and will be paid first from the proceeds in case of the property's foreclosure sale.*

Retail credit models

Given the large number of retail IRB models globally, we disclose information on our significant local models. The actual and estimated values are derived from local model monitoring and calibration processes. Within the discipline of our global modelling policies, our analytics teams adopt back-testing criteria specific to local conditions in order to assess the accuracy of their models.

Table 45 presents estimated and actual values from the back-testing of significant IRB models covering portfolios in the UK, Hong Kong, and the residential mortgage portfolio in the US. The most recent three years have been included for comparative purposes.

In the table below:

- PD presented is expressed on an obligor count basis consisting of non-defaulted obligors at the time of observation and
- LGD and EAD refer to observations for the defaulted population.

The LGD values represent the amount of loss as a percentage of EAD, and are calculated based on defaulted accounts that were fully resolved or have completed the modelled recovery outcome period at the reporting date. The EAD values of the defaulted exposures are presented as a percentage of the total EAD, which includes all defaulted and non-defaulted exposures for the relevant population. The regulatory PD and LGD floors (0.03% and 10% respectively) are only applied during final capital calculation and are not reflected in the estimates below.

For our UK residential mortgage portfolios, the estimates include required regulatory downturn adjustments. In conducting the back-testing, our UK residential mortgage LGD models consider repossession rates over a 36-month period starting at the date of default. For both our HSBC and First Direct branded residential mortgages, estimates and actual values for LGD remained low and stable in 2019.

The Hong Kong estimated LGD values in Table 45 include required stressed factors to reflect downturn conditions. The LGD models for our Hong Kong HSBC and Hang Seng residential mortgage portfolios use a recovery outcome period of 24 months starting at the date of default. For both portfolios, LGD estimates remain higher than the calculated actual values but below the 10% regulatory floor.

The US estimates in Table 45 include downturn adjustments and model overlays agreed with the PRA. The LGD models use a recovery outcome period of 36 months, reflecting the recovery process due to foreclosure moratoria. LGD estimates and actual values remained stable in 2019.

Table 45: IRB models – estimated and actual values (retail)[1]

	PD		LGD		EAD	
	Estimated %	Actuals %	Estimated %	Actuals %	Estimated %	Actuals %
2019						
UK						
– HSBC residential mortgage	**0.33**	**0.29**	**9.17**	**0.32**	**0.29**	**0.28**
– FD residential mortgages	**0.42**	**0.34**	**7.42**	**1.85**	**0.93**	**0.74**
– HSBC credit card	**1.06**	**1.05**	**91.29**	**88.58**	**1.51**	**1.48**
– HSBC personal loans	**2.54**	**2.19**	**83.61**	**61.79**	**2.26**	**2.10**
– Business Banking (Retail SME)	**2.95**	**2.92**	**78.23**	**55.48**	**2.54**	**2.31**
Hong Kong						
– HSBC personal residential mortgage	**0.60**	**0.03**	**1.58**	**1.21**	**0.02**	**0.02**
– Hang Seng personal residential mortgage	**0.37**	**0.10**	**4.52**	**1.03**	**0.07**	**0.07**
– HSBC credit card	**0.53**	**0.20**	**89.06**	**78.37**	**0.38**	**0.40**
– HSBC personal instalment loans	**2.13**	**1.31**	**88.92**	**84.70**	**1.06**	**0.92**
US – HSBC personal first lien residential mortgage	**1.54**	**0.54**	**51.01**	**18.24**	**0.30**	**0.29**
2018						
UK						
– HSBC residential mortgage	0.40	0.27	9.60	0.38	0.27	0.25
– FD residential mortgages	0.45	0.38	8.19	2.07	1.05	0.86
– HSBC credit card	1.01	0.97	88.75	85.15	1.42	1.40
– HSBC personal loans	2.13	1.88	84.84	87.97	1.83	1.75
– Business Banking (Retail SME)	2.83	2.86	78.56	71.56	2.30	2.09
Hong Kong						
– HSBC personal residential mortgage	0.70	0.02	2.87	1.70	0.02	0.02
– Hang Seng personal residential mortgage	0.39	0.09	5.99	0.84	0.08	0.08
– HSBC credit card	0.57	0.24	87.92	75.98	0.40	0.42
– HSBC personal instalment loans	2.27	1.47	89.01	83.73	1.24	1.10
US – HSBC personal first lien residential mortgage	1.71	0.69	52.06	21.69	0.43	0.42
2017						
UK						
– HSBC residential mortgage	0.44	0.28	9.74	0.88	0.26	0.24
– FD residential mortgages	0.48	0.41	2.11	0.45	1.09	0.91
– HSBC credit card	0.92	0.77	90.86	85.68	1.10	1.07
– HSBC personal loans	1.94	1.62	87.77	79.90	1.58	1.50
– Business Banking (Retail SME)	2.57	2.64	73.87	70.25	1.90	1.51
Hong Kong						
– HSBC personal residential mortgage	0.72	0.04	1.43	0.14	0.05	0.05
– Hang Seng personal residential mortgage	0.42	0.14	5.18	0.59	0.14	0.14
– HSBC credit card	0.65	0.28	89.33	76.11	0.47	0.50
– HSBC personal instalment loans	2.34	1.51	89.07	80.05	1.25	1.14
US – HSBC personal first lien residential mortgage	1.91	0.80	53.27	22.22	0.37	0.36

1 Data represents an annual view, analysed at 30 September.

Model performance

Model validation is subject to global internal standards designed to support a comprehensive quantitative and qualitative process within a cycle of model monitoring and validation that includes:

- investigation of model stability;
- measuring model performance by comparing the model's outputs against actual outcomes; and
- reviewing model use within the business, e.g. user input data quality, override activity and the assessment of results from key controls around the usage of the rating system as a whole within the overall credit process.

Models are monitored against a series of metrics and triggers approved by the appropriate governance committee. Model performance metrics, and any material remedial actions in the event of a trigger breach, are reported at the Wholesale and RBWM MOCs. We also disclose model performance reports for our IRB models to our lead regulator, the PRA, quarterly. We are designing a new target operating model for the MRM function, which sets model risk management policy, standards and model risk appetite.

Further information is available on page 146 of the Annual Report and Accounts 2019.

A large number of models are used within the Group, and data at individual model level is, in most cases, immaterial in the context of the overall Group. We therefore disclose data covering most wholesale models, including corporate models on an aggregated basis, and on the significant retail models.

Tables 46 and 47 below validate the reliability of PD calculations by comparing the PD used in IRB calculations with actual default experience. In Table 47, a customer's PD is observed at a PIT and their default or non-default status in the following one-year period is recorded against that PD grade.

Table 46: Wholesale IRB exposure – back-testing of probability of default (PD) per portfolio[1] (CR9)

PD range	External rating equivalent (S&P)	External rating equivalent (Moody's)	External rating equivalent (Fitch)	Weighted average PD %	Arithmetic average PD by obligors %	Number of obligors: End of previous year[3]	Number of obligors: End of the year	Defaulted obligors in the year	*of which: new defaulted obligors in the year*	Average historical annual default rate %
2019										
Sovereigns[2]										
0.00 to <0.15	AAA to A-	Aaa to	AAA to BBB+	0.02	0.04	53	54	–	–	–
0.15 to <0.25	BBB+	Baa2	BBB	0.22	0.22	6	7	–	–	–
0.25 to <0.50	BBB	Baa3	BBB-	0.37	0.37	8	8	–	–	–
0.50 to <0.75	BBB-	Baa3	BBB-	0.63	0.63	7	6	–	–	–
0.75 to <2.50	BB+ to BB-	Ba1 to B1	BB+ to B+	2.05	1.38	21	16	–	–	–
2.5 to <10.00	B+ to B-	B2 to Caa1	B to CCC+	5.65	4.81	21	22	–	–	–
10.00 to <100.00	CCC+ to C	Caa1 to C	CCC to C	36.00	17.33	6	7	–	–	1.79
Banks										
0.00 to <0.15	AAA to A-	Aaa to	AAA to BBB+	0.05	0.08	268	287	–	–	–
0.15 to <0.25	BBB+	Baa2	BBB	0.22	0.22	62	71	–	–	–
0.25 to <0.50	BBB	Baa3	BBB-	0.37	0.37	61	49	–	–	–
0.50 to <0.75	BBB-	Baa3	BBB-	0.63	0.63	47	50	–	–	–
0.75 to <2.50	BB+ to BB-	Ba1 to B1	BB+ to B+	1.11	1.31	102	91	–	–	–
2.5 to <10.00	B+ to B-	B2 to Caa1	B to CCC+	4.17	4.59	54	42	–	–	0.09
10.00 to <100.00	CCC+ to C	Caa1 to C	CCC to C	12.67	11.77	17	24	–	–	1.40
Corporates										
0.00 to <0.15	AAA to A-	Aaa to	AAA to BBB+	0.08	0.11	12,916	13,575	12	–	0.03
0.15 to <0.25	BBB+	Baa2	BBB	0.22	0.22	12,147	12,808	19	–	0.11
0.25 to <0.50	BBB	Baa3	BBB-	0.37	0.37	11,998	12,911	24	–	0.23
0.50 to <0.75	BBB-	Baa3	BBB-	0.63	0.63	10,844	11,926	29	*3*	0.41
0.75 to <2.50	BB+ to BB-	Ba1 to B1	BB+ to B+	1.38	1.42	33,473	32,750	262	*36*	0.86
2.5 to <10.00	B+ to B-	B2 to Caa1	B to CCC+	4.15	4.25	12,978	12,999	556	*77*	3.05
10.00 to <100.00	CCC+ to C	Caa1 to C	CCC to C	21.94	18.42	1,571	1,723	234	*16*	13.29

Table 46: Wholesale IRB exposure – back-testing of probability of default (PD) per portfolio[1] (CR9) (continued)

PD range	External rating equivalent (S&P)	External rating equivalent (Moody's)	External rating equivalent (Fitch)	Weighted average PD %	Arithmetic average PD by obligors %	Number of obligors: End of previous year[3]	Number of obligors: End of the year	Defaulted obligors in the year	*of which: new defaulted obligors in the year*	Average historical annual default rate %
2018										
Sovereigns[2]										
0.00 to <0.15	AAA to BBB	Aaa to Baa2	AAA to BBB	0.02	0.04	53	53	—	—	—
0.15 to <0.25	BBB-	Baa3	BBB-	0.22	0.22	7	6	—	—	—
0.25 to <0.50	BBB-	Baa3	BBB-	0.37	0.37	5	8	—	—	—
0.50 to <0.75	BB+ to BB	Ba1 to Ba2	BB+ to BB	0.63	0.63	7	7	—	—	—
0.75 to <2.50	BB- to B-	Ba3 to B2	BB- to B-	1.44	1.32	23	21	—	—	—
2.5 to <10.00	B to B-	B2 to Caa1	CCC+ to CCC	3.65	4.92	21	21	—	—	—
10.00 to <100.00	B- to C	Caa1 to C	CCC to C	10.00	18.75	8	6	—	—	1.79
Banks										
0.00 to <0.15	AAA to A-	Aaa to Baa1	AAA to BBB+	0.05	0.08	258	268	—	—	—
0.15 to <0.25	BBB+	Baa2	BBB	0.22	0.22	62	62	—	—	—
0.25 to <0.50	BBB	Baa3	BBB-	0.37	0.37	48	61	—	—	—
0.50 to <0.75	BBB-	Baa3	BBB-	0.63	0.63	58	47	—	—	—
0.75 to <2.50	BB+ to BB-	Ba1 to B1	BB+ to B+	1.15	1.36	119	102	—	—	—
2.5 to <10.00	B+ to B-	B2 to Caa1	B to CCC+	4.10	4.54	75	54	—	—	0.17
10.00 to <100.00	CCC+ to C	Caa1 to C	CCC to C	15.62	13.61	18	17	—	—	1.55
Corporates										
0.00 to <0.15	AAA to A-	Aaa to Baa1	AAA to BBB+	0.09	0.10	12,935	13,750	6	—	0.02
0.15 to <0.25	BBB+	Baa2	BBB	0.22	0.22	12,344	12,741	4	—	0.11
0.25 to <0.50	BBB	Baa3	BBB-	0.37	0.37	12,779	12,794	9	—	0.22
0.50 to <0.75	BBB-	Baa3	BBB-	0.63	0.63	11,153	11,616	27	*1*	0.40
0.75 to <2.50	BB+ to BB-	Ba1 to B1	BB+ to B+	1.35	1.44	36,542	35,581	275	*27*	0.88
2.5 to <10.00	B+ to B-	B2 to Caa1	B to CCC+	4.23	4.32	13,712	14,023	379	*42*	2.93
10.00 to <100.00	CCC+ to C	Caa1 to C	CCC to C	18.81	19.65	1,814	1,762	269	*21*	12.93

1 Data represents an annual view, analysed at 30 September.
2 The CRR to external ratings mapping has been updated for Sovereign portfolios to reflect the current CRR master scale.
3 Back-testing is conducted on the basis of the opening count of obligors not in default in each year. Obligors who default during the year are excluded from the opening count for the following year.

Table 47: Retail IRB exposure – back-testing of probability of default (PD) per portfolio[1] (CR9)

PD range	Weighted average PD	Arithmetic average PD by obligors	Number of obligors: End of previous year[2]	Number of obligors: End of the year	Defaulted obligors in the year	*of which: new defaulted obligors in the year*	Average historical annual default rate
2019							
Retail – Secured by real estate non-SME							
0.00 to <0.15	**0.06**	**0.06**	**727,744**	**762,489**	**269**	***2***	**0.04**
0.15 to <0.25	**0.19**	**0.19**	**65,933**	**71,284**	**63**	***2***	**0.09**
0.25 to <0.50	**0.35**	**0.35**	**65,548**	**70,656**	**99**	***2***	**0.13**
0.50 to <0.75	**0.59**	**0.59**	**26,743**	**27,154**	**65**	***–***	**0.21**
0.75 to <2.50	**1.31**	**1.38**	**54,654**	**61,885**	**245**	***2***	**0.38**
2.50 to <10.00	**4.19**	**4.25**	**16,580**	**15,967**	**358**	***–***	**1.80**
10.00 to <100.00	**26.39**	**21.52**	**6,301**	**3,852**	**1,196**	***16***	**17.19**
Retail – qualifying revolving							
0.00 to <0.15	**0.06**	**0.06**	**3,219,726**	**3,328,050**	**1,483**	***67***	**0.05**
0.15 to <0.25	**0.19**	**0.19**	**776,922**	**811,125**	**796**	***31***	**0.10**
0.25 to <0.50	**0.36**	**0.36**	**692,096**	**737,010**	**1,365**	***46***	**0.20**
0.50 to <0.75	**0.61**	**0.62**	**330,981**	**349,945**	**1,174**	***44***	**0.35**
0.75 to <2.50	**1.35**	**1.33**	**717,012**	**755,881**	**6,253**	***196***	**0.81**
2.50 to <10.00	**4.58**	**4.35**	**216,958**	**228,896**	**7,665**	***279***	**3.25**
10.00 to <100.00	**29.90**	**29.24**	**60,952**	**47,671**	**17,756**	***33***	**22.75**
Retail – other non-SME							
0.00 to <0.15	**0.13**	**0.13**	**34,493**	**46,360**	**57**	***14***	**0.15**
0.15 to <0.25	**0.18**	**0.17**	**119,005**	**108,191**	**220**	***25***	**0.14**
0.25 to <0.50	**0.39**	**0.39**	**70,521**	**130,566**	**303**	***127***	**0.27**
0.50 to <0.75	**0.58**	**0.58**	**35,026**	**57,295**	**301**	***93***	**0.52**
0.75 to <2.50	**1.33**	**1.34**	**199,214**	**185,914**	**2,631**	***444***	**1.18**
2.50 to <10.00	**4.23**	**4.54**	**77,263**	**61,559**	**3,563**	***265***	**3.70**
10.00 to <100.00	**37.52**	**37.19**	**18,396**	**8,894**	**5,864**	***22***	**34.92**
Retail – other SME							
0.00 to <0.15	**0.10**	**0.10**	**59,060**	**57,074**	**29**	***–***	**0.05**
0.15 to <0.25	**0.21**	**0.20**	**49,952**	**49,148**	**52**	***2***	**0.16**
0.25 to <0.50	**0.39**	**0.38**	**120,086**	**118,700**	**414**	***7***	**0.34**
0.50 to <0.75	**0.61**	**0.61**	**97,307**	**99,368**	**578**	***6***	**0.63**
0.75 to <2.50	**1.51**	**1.34**	**269,122**	**273,060**	**3,736**	***96***	**1.43**
2.50 to <10.00	**4.79**	**4.68**	**159,675**	**155,791**	**7,440**	***212***	**4.06**
10.00 to <100.00	**20.75**	**22.90**	**50,282**	**42,171**	**11,718**	***94***	**17.16**

Table 47: Retail IRB exposure – back-testing of probability of default (PD) per portfolio[1] (CR9) (continued)

PD range	Weighted average PD	Arithmetic average PD by obligors	Number of obligors: End of previous year[2]	Number of obligors: End of the year	Defaulted obligors in the year	*of which: new defaulted obligors in the year*	Average historical annual default rate
2018							
Retail – Secured by real estate non-SME							
0.00 to <0.15	0.06	0.06	696,972	738,577	259	*3*	0.03
0.15 to <0.25	0.19	0.19	60,467	60,748	59	–	0.08
0.25 to <0.50	0.35	0.34	65,972	64,896	98	*2*	0.13
0.50 to <0.75	0.60	0.60	26,090	24,446	59	–	0.20
0.75 to <2.50	1.33	1.35	58,184	53,707	237	*1*	0.41
2.50 to <10.00	4.33	4.32	18,547	15,669	332	*1*	1.97
10.00 to <100.00	26.08	23.26	7,612	4,883	1,254	*9*	18.79
Retail – qualifying revolving							
0.00 to <0.15	0.06	0.06	3,142,314	3,246,838	1,492	*72*	0.05
0.15 to <0.25	0.19	0.19	727,005	756,129	747	*18*	0.10
0.25 to <0.50	0.36	0.36	660,076	690,157	1,277	*38*	0.20
0.50 to <0.75	0.61	0.62	310,930	334,756	1,120	*23*	0.35
0.75 to <2.50	1.35	1.32	661,414	723,761	5,871	*97*	0.81
2.50 to <10.00	4.60	4.41	205,789	224,910	7,319	*78*	3.11
10.00 to <100.00	29.12	28.71	68,365	48,267	16,375	*11*	21.00
Retail – other non-SME							
0.00 to <0.15	0.09	0.08	124,924	146,849	267	*7*	0.15
0.15 to <0.25	0.19	0.19	79,492	89,056	145	*5*	0.14
0.25 to <0.50	0.36	0.36	114,634	127,085	395	*23*	0.27
0.50 to <0.75	0.61	0.62	39,397	40,862	213	*13*	0.52
0.75 to <2.50	1.35	1.40	97,623	96,793	1,345	*45*	1.23
2.50 to <10.00	4.52	4.82	53,464	47,449	2,108	*48*	3.51
10.00 to <100.00	41.84	40.92	15,141	7,090	5,535	*6*	35.84
Retail – other SME							
0.00 to <0.15	0.10	0.10	61,271	59,701	18	–	0.06
0.15 to <0.25	0.20	0.19	51,337	50,498	78	*1*	0.18
0.25 to <0.50	0.38	0.36	114,069	113,307	382	*3*	0.38
0.50 to <0.75	0.61	0.61	120,311	121,038	687	*4*	0.69
0.75 to <2.50	1.54	1.37	292,313	289,602	4,083	*86*	1.55
2.50 to <10.00	4.86	4.80	155,113	145,309	7,558	*117*	4.21
10.00 to <100.00	19.62	22.47	49,944	42,946	11,563	*29*	17.07

1 Data represents an annual view, analysed at 30 September.

2 Back-testing is conducted on the basis of the opening count of obligors not in default in each year. Obligors who default during the year are excluded from the opening count for the following year.

Counterparty credit risk

Counterparty credit risk management

Counterparty credit risk ('CCR') arises for derivatives and SFTs. It is calculated in both the trading and non-trading books, and is the risk that a counterparty may default before settlement of the transaction. CCR is generated primarily in our wholesale global businesses.

Four approaches may be used under CRD IV to calculate exposure values for CCR: mark-to-market, original exposure, standardised and IMM. Exposure values calculated under these approaches are used to determine RWAs. Across the Group, we use the mark-to-market and IMM approaches.

Under the mark-to-market approach, the EAD is calculated as current exposure plus regulatory add-ons. We use this approach for all products not covered by our IMM permission. Under the IMM approach, EAD is calculated by multiplying the effective expected positive exposure with a multiplier called 'alpha'.

Alpha (set to a default value of 1.4) accounts for several portfolio features that increase EL above that indicated by effective expected positive exposure in the event of default, such as:

- co-variance of exposures;
- correlation between exposures and default;
- level of volatility/correlation that might coincide with a downturn;
- concentration risk; and
- model risk.

The effective expected positive exposure is derived from simulation, pricing and aggregation internal models approved by regulators. The IMM model is subject to ongoing model validation including monthly model performance monitoring.

From a risk management perspective, products not covered by IMM are subject to conservative asset class add-ons, in addition to daily monitoring of credit limit utilisation.

The potential future exposure ('PFE') measures used for CCR management are calibrated to the 95th percentile. The measures consider volatility, trade maturity and the counterparty legal documentation covering netting and collateral.

Limits for CCR exposures are assigned within the overall credit process. The credit risk function assigns a limit against each counterparty to cover exposure which may arise as a result of a counterparty default. The magnitude of this limit will depend on the overall risk appetite and type of derivatives and SFT trading undertaken with the counterparty.

The models and methodologies used in the calculation of CCR are overseen and monitored by the Traded Risk Model Oversight Committee. Models are subject to ongoing monitoring and validation. Additionally, they are subject to independent review at inception and annually thereafter.

Table 48: Analysis of counterparty credit risk exposure by approach (excluding centrally cleared exposures)[1] (CCR1)

		Replacement cost	Potential future exposure	Effective expected positive exposure	Multiplier	EAD post-CRM	RWAs
		$bn	$bn	$bn	$bn	$bn	$bn
1	Mark-to-market	**7.6**	**22.5**	**–**	**–**	**30.1**	**12.4**
4	Internal Model Method	**–**	**–**	**34.8**	**1.4**	**48.7**	**18.7**
6	– *of which: derivatives and long settlement transactions*[2]	***–***	***–***	***34.8***	***1.4***	***48.7***	***18.7***
9	Financial collateral comprehensive method (for SFTs)	**–**	**–**	**–**	**–**	**50.4**	**7.9**
11	**Total at 31 Dec 2019**	**7.6**	**22.5**	**34.8**	**1.4**	**129.2**	**39.0**
1	Mark to market	12.6	21.5	–	–	34.1	13.9
4	Internal Model Method	–	–	29.9	1.4	41.8	16.2
6	– *of which: derivatives and long settlement transactions*[2]	–	–	*29.9*	*1.4*	*41.8*	*16.2*
9	Financial collateral comprehensive method (for SFTs)	–	–	–	–	49.3	10.2
11	Total at 31 Dec 2018	12.6	21.5	29.9	1.4	125.2	40.3

1 As the Group does not use the original exposure method, notional values are not reported.
2 Prior to the implementation of SA-CCR, exposures reported in this row will be those under the mark-to-market method.

Credit valuation adjustment

Credit valuation adjustments ('CVA') represent the risk of loss as a result of adverse changes to the credit quality of counterparties in derivative transactions. Where we have both specific risk VaR approval and IMM approval for a product, the CVA VaR approach has been used to calculate the CVA capital charge.

Where we do not hold both approvals, the standardised approach has been applied. Certain counterparty exposures are exempt from CVA, such as non-financial counterparties and sovereigns.

Table 49: Credit valuation adjustment (CVA) capital charge (CCR2)

		At 31 Dec 2019		At 31 Dec 2018	
		EAD post-CRM	RWAs	EAD post-CRM	RWAs
		$bn	$bn	$bn	$bn
1	Total portfolios subject to the Advanced CVA capital charge	**22.2**	**3.1**	21.4	4.9
2	– VaR component (including the 3 × multiplier)		**0.5**		0.9
3	– stressed VaR component (including the 3 × multiplier)		**2.6**		4.0
4	All portfolios subject to the Standardised CVA capital charge	**13.6**	**0.9**	13.6	1.0
5	**Total subject to the CVA capital charge**	**35.8**	**4.0**	35.0	5.9

The following table presents information on the risk-weighting of CCR exposures under the standardised approach by regulatory portfolio. Further detail on the standardised approach is provided on page 43. Information on exposures under the IRB approach can be found in Table 78 of Appendix I.

Table 50: Standardised approach – CCR exposures by regulatory portfolio and risk weights (CCR3)

	Risk weight	0%	10%	20%	50%	75%	100%	150%	Others	Total credit exposure	*of which: unrated*
		$bn	$bn	$bn	$bn	$bn	$bn	$bn	$bn	$bn	*$bn*
1	Central governments and central banks	**8.8**	**–**	**–**	**–**		**–**	**–**	**–**	**8.8**	**–**
2	Regional government or local authorities	**2.5**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**2.5**	**–**
6	Institutions	**–**		**–**	**0.1**		**0.1**	**–**	**–**	**0.2**	
7	Corporates	**–**	**–**	**–**	**–**	**–**	**2.1**	**–**	**–**	**2.1**	***1.9***
	Total at 31 Dec 2019	**11.3**	**–**	**–**	**0.1**	**–**	**2.2**	**–**	**–**	**13.6**	***1.9***
1	Central governments and central banks	7.4	–	0.1	–	–	–	–	–	7.5	–
2	Regional government or local authorities	1.0	–	–	–	–	–	–	–	1.0	*0.1*
6	Institutions	–	–	–	–	–	0.1	–	–	0.1	–
7	Corporates	–	–	–	–	–	1.9	–	–	1.9	*1.6*
	Total at 31 Dec 2018	8.4	–	0.1	–	–	2.0	–	–	10.5	*1.7*

Collateral arrangements

Our policy is to revalue all traded transactions and associated collateral positions on a daily basis. An independent collateral management function manages the collateral process, including pledging and receiving collateral and investigating disputes and non-receipts.

Eligible collateral types are controlled under a policy to ensure price transparency, price stability, liquidity, enforceability, independence, reusability and eligibility for regulatory purposes.

A valuation 'haircut' policy reflects the fact that collateral may fall in value between the date the collateral was called and the date of liquidation or enforcement. Approximately 99% of collateral held as variation margin under CSAs is either cash or liquid government securities.

Further information on gross fair value exposure and the offset due to legally enforceable netting and collateral is set out on page 304 of the Annual Report and Accounts 2019.

Table 51: Impact of netting and collateral held on exposure values (CCR5-A)

		Gross positive fair value or net carrying amount	Netting benefits	Netted current credit exposure	Collateral held	Net credit exposure
		$bn	$bn	$bn	$bn	$bn
1	Derivatives	**595.4**	**442.8**	**152.6**	**51.9**	**100.7**
2	SFTs	**865.1**	**–**	**865.1**	**814.6**	**50.5**
4	**Total at 31 Dec 2019**	**1,460.5**	**442.8**	**1,017.7**	**866.5**	**151.2**
1	Derivatives	579.7	431.8	147.9	42.4	105.5
2	SFTs	983.8	–	983.8	933.1	50.7
4	Total at 31 Dec 2018	1,563.5	431.8	1,131.7	975.5	156.2

Table 52: Composition of collateral for CCR exposure (CCR5-B)

		Collateral used in derivative transactions				Collateral used in SFTs	
		Fair value of collateral received		Fair value of posted collateral		Fair value of collateral received	Fair value of posted collateral
		Segregated	Unsegregated	Segregated	Unsegregated		
		$bn	$bn	$bn	$bn	$bn	$bn
1	Cash – domestic currency	**–**	**6.8**	**–**	**7.8**	**57.4**	**98.6**
2	Cash – other currencies	**–**	**48.1**	**–**	**45.3**	**287.4**	**374.1**
3	Domestic sovereign debt	**–**	**7.3**	**0.5**	**6.4**	**90.4**	**64.7**
4	Other sovereign debt	**–**	**5.1**	**2.8**	**11.3**	**327.0**	**275.4**
5	Government agency debt	**–**	**0.2**	**–**	**0.1**	**6.5**	**1.0**
6	Corporate bonds	**–**	**1.0**	**0.7**	**0.3**	**47.2**	**10.5**
7	Equity securities	**–**	**0.2**	**0.2**	**–**	**39.1**	**40.6**
8	Other collateral	**–**	**0.2**	**2.8**	**1.6**	**1.7**	**0.2**
9	**Total at 31 Dec 2019**	**–**	**68.9**	**7.0**	**72.8**	**856.7**	**865.1**
1	Cash – domestic currency	–	5.6	1.6	4.9	75.9	118.9
2	Cash – other currencies	–	37.6	5.5	32.6	344.1	402.0
3	Domestic sovereign debt	–	5.5	–	5.2	107.7	84.6
4	Other sovereign debt	–	5.8	–	9.5	352.4	323.8
5	Government agency debt	–	0.1	–	0.2	13.4	4.4
6	Corporate bonds	–	0.7	–	0.3	36.4	16.5
7	Equity securities	–	–	–	–	36.8	32.3
8	Other collateral	–	0.3	–	1.2	1.4	0.5
9	Total at 31 Dec 2018	–	55.6	7.1	53.9	968.1	983.0

Table 53 shows the credit derivative exposures that HSBC holds, split between those amounts due to client intermediation and those amounts booked as part of HSBC's own credit portfolio.

Where the credit derivative is used to hedge our own portfolio, no counterparty credit risk capital requirement arises.

For a discussion on hedging risk and monitoring the continuing effectiveness of hedges, refer to Note 1.2(h) of the Annual Report and Accounts 2019.

Table 53: Credit derivatives exposures (CCR6)

	Footnotes	At 31 Dec 2019 Protection bought $bn	At 31 Dec 2019 Protection sold $bn	At 31 Dec 2018 Protection bought $bn	At 31 Dec 2018 Protection sold $bn
Notionals					
Credit derivative products used for own credit portfolio					
– Index credit default swaps		**9.4**	**7.7**	2.3	–
Total notionals used for own credit portfolio		**9.4**	**7.7**	2.3	–
Credit derivative products used for intermediation	1				
– Index credit default swaps		**160.7**	**142.0**	168.6	154.0
– Total return swaps		**15.4**	**9.7**	14.6	6.9
Total notionals used for intermediation		**176.1**	**151.7**	183.2	160.9
Total credit derivative notionals		**185.5**	**159.4**	185.5	160.9
Fair values					
– Positive fair value (asset)		**2.4**	**2.3**	2.6	1.2
– Negative fair value (liability)		**(2.8)**	**(2.8)**	(1.4)	(2.4)

1 *This is where we act as an intermediary for our clients, enabling them to take a position in the underlying securities. This does not increase risk for HSBC.*

Central counterparties

While exchange traded derivatives have been cleared through central counterparties ('CCPs') for many years, recent regulatory initiatives designed to reduce systemic risk in the banking system are directing increasing volumes of OTC derivatives to be cleared through CCPs.

To manage the significant concentration of risk in CCPs that results from this, we have developed a risk appetite framework to manage risk accordingly, at the level of individual CCPs and globally. A dedicated CCP risk team has been established to manage the interface with CCPs and undertake in-depth due diligence of the unique risks associated with these organisations.

Table 54: Exposures to central counterparties (CCR8)

		At 31 Dec 2019 EAD post-CRM $bn	At 31 Dec 2019 RWAs $bn	At 31 Dec 2018 EAD post-CRM $bn	At 31 Dec 2018 RWAs $bn
1	Exposures to QCCPs (total)	**33.4**	**1.1**	42.3	1.1
2	Exposures for trades at QCCPs (excluding initial margin and default fund contributions)	**15.2**	**0.3**	24.8	0.5
3	– OTC derivatives	**5.1**	**0.1**	9.8	0.2
4	– exchange-traded derivatives	**5.4**	**0.1**	9.2	0.2
5	– securities financing transactions	**4.7**	**0.1**	5.8	0.1
7	Segregated initial margin	**6.9**	**–**	7.1	–
8	Non-segregated initial margin	**11.3**	**0.2**	10.4	0.2
9	Pre-funded default fund contributions	**–**	**0.6**	–	0.4

Wrong-way risk

Wrong-way risk occurs when a counterparty's exposures are adversely correlated with its credit quality.

There are two types of wrong-way risk:

- General wrong-way risk occurs when the probability of counterparty default is positively correlated with general risk factors, for example, where a counterparty is resident and/or incorporated in a higher-risk country and seeks to sell a non-domestic currency in exchange for its home currency.
- Specific wrong-way risk occurs in self-referencing transactions. These are transactions in which exposure is driven by capital or financing instruments issued by the counterparty and occurs where exposure from HSBC's perspective materially increases as the value of the counterparty's capital or financing instruments referenced in the contract decreases. It is HSBC policy that specific wrong-way transactions are approved on a case-by-case basis.

We use a range of tools to monitor and control wrong-way risk, including requiring the business to obtain prior approval before undertaking wrong-way risk transactions outside pre-agreed guidelines.

The regional Traded Risk functions are responsible for the control and monitoring process within an overarching Group framework and limit framework.

Credit rating downgrade

A credit rating downgrade clause in a Master Agreement or a credit rating downgrade threshold clause in a credit support annex ('CSA') is designed to trigger an action if the credit rating of the affected party falls below a specified level. These actions may include the requirement to pay or increase collateral, the termination of transactions by the non-affected party or the assignment of transactions by the affected party.

At 31 December 2019, the value of the additional collateral pertaining to International Swaps and Derivatives Association CSA downgrade thresholds that we would potentially need to post with counterparties in the event of a one-notch downgrade of our rating was $0.2bn (2018: $0.2bn) and for a two-notch downgrade was $0.4bn (2018: $0.4bn).

Securitisation

Securitisation strategy

HSBC acts as originator, sponsor, liquidity provider and derivative counterparty to our own originated and sponsored securitisations, as well as those of third parties. Our strategy is to use securitisation to meet our needs for aggregate funding or capital management, to the extent that market, regulatory treatments and other conditions are suitable, and for customer facilitation. We do not provide support to any of our originated or sponsored securitisations, and it is not our policy to do so.

We have senior and junior exposures to Mazarin Funding Limited, which is a securities investment conduit ('SIC'). We also hold all of the commercial paper issued by Solitaire Funding Limited. These are considered legacy businesses, and exposures are being repaid as the securities they hold amortise or are sold.

Securitisation activity

Our roles in the securitisation process are as follows:

- originator: where we originate the assets being securitised, either directly or indirectly;
- sponsor: where we establish and manage a securitisation programme that purchases exposures from third parties; and
- investor: where we invest in a securitisation transaction directly or provide derivatives or liquidity facilities to a securitisation.

HSBC as originator

We use SPEs to securitise customer loans and advances and other debt that we have originated in order to diversify our sources of funding for asset origination and for capital efficiency purposes. In such cases, we transfer the loans and advances to the SPEs for cash, and the SPEs issue debt securities to investors to fund the cash purchases.

In addition, we use SPEs to mitigate the capital absorbed by some of the customer loans and advances we have originated. Credit derivatives are used to transfer the credit risk associated with such customer loans and advances to an SPE, using an approach commonly known as synthetic securitisation by which the SPE writes CDS protection for HSBC.

HSBC as sponsor

We are sponsor to a number of types of securitisation entities, details of which can be found in the table below.

The Group's exposure to Barion Funding Limited and Malachite Funding Limited at 31 December 2019 is not significant and limited to balances associated with the winding-up of these entities.

Further details are available in Note 20 of the Financial Statements in the Annual Report and Accounts 2019.

Securitisation entity	Description and nature of exposure	Accounting consolidation	Regulatory consolidation	Regulatory treatment
Solitaire	Asset-backed commercial paper ('ABCP') conduit to which a first-loss letter of credit and transaction-specific liquidity facilities are provided	✓	✓	Look through to risk weights of underlying assets
Regency	Multi-seller conduit to which senior liquidity facilities and programme-wide credit enhancement are provided	✓	×	Exposures (including derivatives and liquidity facilities) are risk-weighted

HSBC as investor

We have exposure to third-party securitisations across a wide range of sectors in the form of investments, liquidity facilities and as a derivative counterparty. These are primarily legacy exposures.

Monitoring of securitisation positions

Securitisation positions are managed by a dedicated team that uses a combination of market standard systems and third-party data providers to monitor performance data and manage market and credit risks.

In the case of re-securitisation positions, similar processes are conducted in respect of the underlying securitisations.

Liquidity risk of securitised assets is consistently managed as part of the Group's liquidity and funding risk management framework.

Valuation of securitisation positions

The process of valuing our investments in securitisation exposures primarily focuses on quotations from third parties, observed trade levels and calibrated valuations from market standard models.

Our hedging and credit risk mitigation strategy, with regards to retained securitisation and re-securitisation exposures, is to continually review our positions.

Securitisation accounting treatment

For accounting purposes, we consolidate structured entities (including SPEs) when the substance of the relationship indicates that we control them; that is, we are exposed, or have rights, to variable returns from our involvement with the structured entity and have the ability to affect those returns through our power over the entity.

Full details of these assessments and our accounting policy on structured entities may be found in Note 1.2(a) and Note 20 on the Financial Statements respectively of the Annual Report and Accounts 2019.

We reassess the need to consolidate whenever there is a change in the substance of the relationship between HSBC and a structured entity.

HSBC enters into transactions in the normal course of business by which it transfers financial assets to structured entities. Depending on the circumstances, these transfers may either result in these financial assets being fully or partly derecognised, or continuing to be recognised in their entirety.

Full derecognition occurs when we transfer our contractual right to receive cash flows from the financial assets, or assume an obligation to pass on the cash flows from the assets, and transfer substantially all the risks and rewards of ownership. Only in the event that derecognition is achieved are sales and any resultant gains recognised in the financial statements.

Partial derecognition occurs when we sell or otherwise transfer financial assets in such a way that some but not substantially all of the risks and rewards of ownership are transferred and control is retained. These financial assets are recognised on the balance sheet to the extent of our continuing involvement and an associated liability is also recognised. The net carrying amount of the financial asset and associated liability will be based on either the amortised cost or the fair value of the rights and obligations retained by the entity, depending upon the measurement basis of the financial asset.

Further disclosure of such transfers may be found in Note 17 on the Financial Statements of the Annual Report and Accounts 2019.

Securitisation regulatory treatment

For regulatory purposes, any reduction in RWAs that would be achieved by our own originated securitisations must receive the PRA's permission and be justified by a commensurate transfer of credit risk to third parties. If achieved, the associated SPEs and underlying assets are not consolidated but exposures to them, including derivatives or liquidity facilities, are risk-weighted as securitisation positions.

For the majority of the non-trading book securitisation positions we use the IRB approach and, within this, Ratings Based Method ('RBM') and Internal Assessment Approach ('IAA') with lesser amounts on the Supervisory Formula Method ('SFM'). We also use the standardised approach on the non-trading book positions. Securitisation positions in the trading book are overseen within Market Risk under the standardised approach.

Use of the IAA is limited to exposures arising from Regency Assets Limited related to liquidity facilities. Eligible ECAI rating methodology, which includes stress factors, is applied to each asset class in order to derive the equivalent rating level for each transaction. This methodology is verified by the internal credit function as part of the approval process for each new transaction. The performance of each underlying asset portfolio, including residential and commercial mortgages and re-securitisations, is monitored to confirm that the applicable equivalent rating level still applies and is independently verified. Our IAA approach is audited periodically by Internal Audit and reviewed by the PRA.

Further details of our securitisation regulatory treatment may be found on page 17 of this document.

Analysis of securitisation exposures

Our involvement in securitisation activities reflects the following:

- securitisation positions are not backed by revolving exposures other than trade receivables in Regency Assets Limited, which is unchanged from 2018;
- facilities are not subject to early amortisation provisions;
- $7.2bn positions held as synthetic transactions (2018: $3.2bn);
- no assets awaiting securitisation and no material realised losses on securitisation asset disposals during the year;
- unrealised losses on asset-backed securities ('ABS') in the year amounted to $0.2bn (2018: $0.2bn), which relates to assets within SPEs that are consolidated for regulatory purposes; and
- total exposures include off-balance sheet exposure of $11.1bn (2018: $10.9bn), mainly relating to contingent liquidity lines provided to securitisation vehicles where we act as sponsor, with a small amount from derivative exposures where we are an investor. The off-balance sheet exposures are held in the non-trading book and the exposure types are residential mortgages, commercial mortgages, trade receivables and re-securitisations.

Further details of our securitisation exposures may be found on page 287 of the Annual Report and Accounts 2019.

Table 55: Securitisation exposure – movement in the year

	Total at 1 Jan	Movement in year			Total at 31 Dec
		As originator	As sponsor	As investor	
	$bn	$bn	$bn	$bn	$bn
Aggregate amount of securitisation exposures					
Residential mortgages	**9.2**	**–**	**(0.6)**	**1.1**	**9.7**
Commercial mortgages	**2.3**	**–**	**–**	**0.6**	**2.9**
Credit Cards	**1.4**	**–**	**(0.7)**	**0.9**	**1.6**
Leasing	**6.0**	**–**	**(1.3)**	**1.2**	**5.9**
Loans to corporates or SMEs	**3.3**	**4.0**	**–**	**–**	**7.3**
Consumer loans	**6.8**	**–**	**(0.5)**	**0.8**	**7.1**
Trade receivables	**5.4**	**(0.4)**	**(0.8)**	**0.7**	**4.9**
Other assets	**0.5**	**–**	**–**	**0.3**	**0.8**
Re-securitisations	**0.4**	**–**	**(0.4)**	**–**	**–**
2019	**35.3**	**3.6**	**(4.3)**	**5.6**	**40.2**

Table 56: Securitisation – asset values and impairments

	Footnotes	2019 Underlying assets[1] Total[3] $bn	2019 Underlying assets[1] Impaired and past due $bn	2019 Securitisation exposures impairment $bn	2018 Underlying assets[1] Total[3] $bn	2018 Underlying assets[1] Impaired and past due $bn	2018 Securitisation exposures impairment $bn
As originator		**10.7**	**–**	**–**	5.4	–	–
– loans to corporates and SMEs		**10.7**	**–**	**–**	5.0	–	–
– trade receivables		**–**	**–**	**–**	0.4	–	–
– re-securitisations	2	**–**	**–**	**–**	–	–	–
As sponsor		**15.6**	**0.2**	**–**	19.9	–	–
– residential mortgages		**3.7**	**–**	**–**	4.3	–	–
– commercial mortgages		**0.1**	**–**	**–**	0.1	–	–
– credit cards		**–**	**–**	**–**	0.7	–	–
– leasing		**4.3**	**–**	**–**	5.6	–	–
– loans to corporates and SMEs		**–**	**–**	**–**	–	–	–
– consumer loans		**3.1**	**0.2**	**–**	3.6	–	–
– trade receivables		**4.2**	**–**	**–**	5.0	–	–
– re-securitisations	2	**–**	**–**	**–**	0.4	–	–
– other assets		**0.2**	**–**	**–**	0.2	–	–
At 31 Dec		**26.3**	**0.2**	**–**	25.3	–	–

1 Securitisation exposures may exceed the underlying asset values when HSBC provides liquidity facilities while also acting as derivative counterparty and a note holder in the SPE.
2 The amount of underlying assets reported for re-securitisations denotes the value of collateral within the re-securitisation vehicles.
3 As originator and sponsor, all associated underlying assets are held in the non-trading book. These assets are all underlying to traditional securitisations with the exception of 'loans to corporates and SMEs', which is underlying to a synthetic securitisation.

Table 57: Securitisation exposures in the non-trading book (SEC1)

		Bank acts as originator Traditional $bn	Bank acts as originator Synthetic $bn	Bank acts as originator Sub-total $bn	Bank acts as sponsor Traditional $bn	Bank acts as sponsor Synthetic $bn	Bank acts as sponsor Sub-total $bn	Bank acts as investor Traditional $bn	Bank acts as investor Synthetic $bn	Bank acts as investor Sub-total $bn
1	**Retail (total)**	**–**	**–**	**–**	**11.0**	**–**	**11.0**	**10.0**	**–**	**10.0**
2	– residential mortgage	**–**	**–**	**–**	**3.7**	**–**	**3.7**	**4.5**	**–**	**4.5**
3	– credit card	**–**	**–**	**–**	**–**	**–**	**–**	**1.5**	**–**	**1.5**
4	– other retail exposures	**–**	**–**	**–**	**7.3**	**–**	**7.3**	**4.0**	**–**	**4.0**
5	– re-securitisation	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**
6	**Wholesale (total)**	**–**	**7.2**	**7.2**	**4.6**	**–**	**4.6**	**3.7**	**–**	**3.7**
7	– loans to corporates	**–**	**7.2**	**7.2**	**–**	**–**	**–**	**0.1**	**–**	**0.1**
8	– commercial mortgage	**–**	**–**	**–**	**0.1**	**–**	**0.1**	**1.9**	**–**	**1.9**
9	– lease and receivables	**–**	**–**	**–**	**4.3**	**–**	**4.3**	**1.6**	**–**	**1.6**
10	– other wholesale	**–**	**–**	**–**	**0.2**	**–**	**0.2**	**0.1**	**–**	**0.1**
11	– re-securitisation	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**
	Total at 31 Dec 2019	**–**	**7.2**	**7.2**	**15.6**	**–**	**15.6**	**13.7**	**–**	**13.7**
	– *of which:*									
	securitisations under the new framework	**–**	***5.2***	***5.2***	***7.2***	**–**	***7.2***	***7.3***	**–**	***7.3***
	securitisations under the pre-existing framework	**–**	***2.0***	***2.0***	***8.4***	**–**	***8.4***	***6.4***	**–**	***6.4***
1	Retail (total)	0.4	–	0.4	13.6	–	13.6	6.8	–	6.8
2	– residential mortgage	–	–	–	4.3	–	4.3	3.8	–	3.8
3	– credit card	–	–	–	0.7	–	0.7	0.5	–	0.5
4	– other retail exposures	0.4	–	0.4	8.6	–	8.6	2.5	–	2.5
5	– re-securitisation	–	–	–	–	–	–	–	–	–
6	Wholesale (total)	–	3.2	3.2	6.3	–	6.3	2.1	–	2.1
7	– loans to corporates	–	3.2	3.2	–	–	–	0.1	–	0.1
8	– commercial mortgage	–	–	–	0.1	–	0.1	1.5	–	1.5
9	– lease and receivables	–	–	–	5.6	–	5.6	0.4	–	0.4
10	– other wholesale	–	–	–	0.2	–	0.2	0.1	–	0.1
11	– re-securitisation	–	–	–	0.4	–	0.4	–	–	–
	Total at 31 Dec 2018	0.4	3.2	3.6	19.9	–	19.9	8.9	–	8.9

Table 58: Securitisation exposures in the trading book (SEC2)

		At					
		31 Dec 2019			31 Dec 2018		
		Bank acts as investor[1]			Bank acts as investor[1]		
		Traditional	Synthetic	Sub-total	Traditional	Synthetic	Sub-total
		$bn	$bn	$bn	$bn	$bn	$bn
1	**Retail (total)**	**2.3**	**–**	**2.3**	2.0	–	2.0
2	– residential mortgage	**1.5**	**–**	**1.5**	1.1	–	1.1
3	– credit card	**0.1**	**–**	**0.1**	0.2	–	0.2
4	– other retail exposures	**0.7**	**–**	**0.7**	0.7	–	0.7
6	**Wholesale (total)**	**1.4**	**–**	**1.4**	0.9	–	0.9
7	– loans to corporates	**–**	**–**	**–**	–	–	–
8	– commercial mortgage	**0.9**	**–**	**0.9**	0.7	–	0.7
9	– lease and receivables	**–**	**–**	**–**	–	–	–
10	– other wholesale	**0.5**	**–**	**0.5**	0.2	–	0.2
	Total (all portfolios)	**3.7**	**–**	**3.7**	2.9	–	2.9
	– *of which:*						
	securitisations under the new framework	***3.0***	**–**	***3.0***	*N/A*	*N/A*	*N/A*
	securitisations under the pre-existing framework	***0.7***	**–**	***0.7***	*2.9*	–	*2.9*

1 HSBC does not act as originator or sponsor for securitisation exposures in the trading book.

The following tables present the Group's exposure in the non-trading book and associated regulatory capital requirements where the Group acts as originator or as sponsor. Table 59.i presents the Group's exposures under the pre-existing securitisation framework, whereas Table 59.ii presents the exposures the Group has taken on since 1 January 2019 under the new securitisation framework.

Table 59.i: Securitisation exposures in the non-trading book and associated capital requirements – bank acting as originator or sponsor (under the pre-existing framework) (SEC3)

		Exposure values (by risk weight bands)					Exposure values (by regulatory approach)			
		≤20% RW	>20% to 50% RW	>50% to 100% RW	>100% to 1,250% RW	1,250% RW	IRB RBM (including IAA)	IRB SFA	SA	1,250%
		$bn	$bn	$bn	$bn	$bn	$bn	$bn	$bn	$bn
2	**Traditional securitisation**	**7.4**	**0.5**	**0.5**	**–**	**–**	**7.6**	**–**	**0.8**	**–**
3	Securitisation	**7.4**	**0.5**	**0.5**	**–**	**–**	**7.6**	**–**	**0.8**	**–**
4	– retail underlying	**5.4**	**0.5**	**0.4**	**–**	**–**	**5.5**	**–**	**0.8**	**–**
5	– wholesale	**2.0**	**–**	**0.1**	**–**	**–**	**2.1**	**–**	**–**	**–**
6	Re-securitisation	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**
7	– senior	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**
8	– non-senior	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**
9	**Synthetic securitisation**	**1.7**	**–**	**0.3**	**–**	**–**	**2.0**	**–**	**–**	**–**
10	Securitisation	**1.7**	**–**	**0.3**	**–**	**–**	**2.0**	**–**	**–**	**–**
11	– retail underlying	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**
12	– wholesale	**1.7**	**–**	**0.3**	**–**	**–**	**2.0**	**–**	**–**	**–**
1	**Total at 31 Dec 2019**	**9.1**	**0.5**	**0.8**	**–**	**–**	**9.6**	**–**	**0.8**	**–**
2	Traditional securitisation	19.0	0.2	0.8	0.2	0.1	19.5	–	0.7	0.1
3	Securitisation	19.0	–	0.8	0.1	–	19.2	–	0.7	–
4	– retail underlying	13.2	–	0.7	0.1	–	13.3	–	0.7	–
5	– wholesale	5.8	–	0.1	–	–	5.9	–	–	–
6	Re-securitisation	–	0.2	–	0.1	0.1	0.3	–	–	0.1
7	– senior	–	–	–	–	–	–	–	–	–
8	– non-senior	–	0.2	–	0.1	0.1	0.3	–	–	0.1
9	Synthetic securitisation	2.9	–	–	0.3	–	3.2	–	–	–
10	Securitisation	2.9	–	–	0.3	–	3.2	–	–	–
11	– retail underlying	–	–	–	–	–	–	–	–	–
12	– wholesale	2.9	–	–	0.3	–	3.2	–	–	–
1	Total at 31 Dec 2018	21.9	0.2	0.8	0.5	0.1	22.7	–	0.7	0.1

Table 59.i: Securitisation exposures in the non-trading book and associated capital requirements – bank acting as originator or sponsor (under the pre-existing framework) (SEC3) (continued)

		RWAs (by regulatory approach)				Capital charge after cap			
		IRB RBM (including IAA)	IRB SFA	SA	1,250%	IRB RBM (including IAA)	IRB SFA	SA	1,250%
		$bn	$bn	$bn	$bn	$bn	$bn	$bn	$bn
2	**Traditional securitisation**	**1.0**	**–**	**0.6**	**–**	**0.1**	**–**	**–**	**–**
3	Securitisation	**1.0**	**–**	**0.6**	**–**	**0.1**	**–**	**–**	**–**
4	– retail underlying	**0.6**	**–**	**0.6**	**–**	**0.1**	**–**	**–**	**–**
5	– wholesale	**0.4**	**–**	**–**	**–**	**–**	**–**	**–**	**–**
6	Re-securitisation	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**
7	– senior	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**
8	– non-senior	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**
9	**Synthetic securitisation**	**0.4**	**–**	**–**	**0.1**	**–**	**–**	**–**	**–**
10	Securitisation	**0.4**	**–**	**–**	**0.1**	**–**	**–**	**–**	**–**
11	– retail underlying	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**
12	– wholesale	**0.4**	**–**	**–**	**0.1**	**–**	**–**	**–**	**–**
1	**Total at 31 Dec 2019**	**1.4**	**–**	**0.6**	**0.1**	**0.1**	**–**	**–**	**–**
2	Traditional securitisation	2.5	–	0.7	1.4	0.2	–	0.1	0.1
3	Securitisation	2.0	–	0.7	0.6	0.2	–	0.1	–
4	– retail underlying	1.5	–	0.7	0.5	0.2	–	0.1	–
5	– wholesale	0.5	–	–	0.1	–	–	–	–
6	Re-securitisation	0.5	–	–	0.8	–	–	–	0.1
7	– senior	–	–	–	–	–	–	–	–
8	– non-senior	0.5	–	–	0.8	–	–	–	0.1
9	Synthetic securitisation	0.8	–	–	0.2	0.1	–	–	–
10	Securitisation	0.8	–	–	0.2	0.1	–	–	–
11	– retail underlying	–	–	–	–	–	–	–	–
12	– wholesale	0.8	–	–	0.2	0.1	–	–	–
1	Total at 31 Dec 2018	3.3	–	0.7	1.6	0.3	–	0.1	0.1

The reduction in RWA is mainly due to the disposal of non-senior, resecuritisation exposure in the legacy book and renewal of pre-existing positions moving to the new securitisation framework.

Table 59.ii: Securitisation exposures in the non-trading book and associated capital requirements – bank acting as originator or sponsor (under the new framework) (SEC3)

		Exposure values (by risk weight bands)					Exposure values (by regulatory approach)				
		≤20% RW	>20% to 50% RW	>50% to 100% RW	>100% to 1,250% RW	1,250% RW	SEC-IRBA	SEC-ERBA	SEC IAA	SEC-SA	1,250%
		$bn	$bn	$bn	$bn	$bn	$bn	$bn	$bn	$bn	$bn
2	**Traditional securitisation**	**4.0**	**2.9**	**0.2**	**0.1**	**–**	**–**	**–**	**7.1**	**0.1**	**–**
3	Securitisation	**4.0**	**2.9**	**0.2**	**0.1**	**–**	**–**	**–**	**7.1**	**0.1**	**–**
4	– retail underlying	**1.8**	**2.6**	**0.2**	**0.1**	**–**	**–**	**–**	**4.6**	**0.1**	**–**
5	– wholesale	**2.2**	**0.3**	**–**	**–**	**–**	**–**	**–**	**2.5**	**–**	**–**
9	**Synthetic securitisation**	**5.2**	**–**	**–**	**–**	**–**	**5.2**	**–**	**–**	**–**	**–**
10	Securitisation	**5.2**	**–**	**–**	**–**	**–**	**5.2**	**–**	**–**	**–**	**–**
11	– retail underlying	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**
12	– wholesale	**5.2**	**–**	**–**	**–**	**–**	**5.2**	**–**	**–**	**–**	**–**
1	**Total at 31 Dec 2019**	**9.2**	**2.9**	**0.2**	**0.1**	**–**	**5.2**	**–**	**7.1**	**0.1**	**–**

		RWAs (by regulatory approach)					Capital charge after cap				
		SEC-IRBA	SEC-ERBA	SEC IAA	SEC-SA	1,250%	SEC-IRBA	SEC-ERBA	SEC IAA	SEC-SA	1,250%
		$bn	$bn	$bn	$bn	$bn	$bn	$bn	$bn	$bn	$bn
2	**Traditional securitisation**	**–**	**–**	**1.7**	**–**	**–**	**–**	**–**	**0.1**	**–**	**–**
3	Securitisation	**–**	**–**	**1.7**	**–**	**–**	**–**	**–**	**0.1**	**–**	**–**
4	– retail underlying	**–**	**–**	**1.2**	**–**	**–**	**–**	**–**	**0.1**	**–**	**–**
5	– wholesale	**–**	**–**	**0.5**	**–**	**–**	**–**	**–**	**–**	**–**	**–**
9	**Synthetic securitisation**	**0.9**	**–**	**–**	**–**	**0.4**	**0.1**	**–**	**–**	**–**	**–**
10	Securitisation	**0.9**	**–**	**–**	**–**	**0.4**	**0.1**	**–**	**–**	**–**	**–**
11	– retail underlying	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**
12	– wholesale	**0.9**	**–**	**–**	**–**	**0.4**	**0.1**	**–**	**–**	**–**	**–**
1	**Total at 31 Dec 2019**	**0.9**	**–**	**1.7**	**–**	**0.4**	**0.1**	**–**	**0.1**	**–**	**–**

The following tables present the Group's exposure in the non-trading book and associated regulatory capital requirements where the Group acts as an investor. Table 60.i presents the Group's exposures under the pre-existing securitisation framework, whereas table 60.ii presents the exposures the Group has taken on since 1 January 2019 under the new securitisation framework.

Table 60.i: Securitisation exposures in the non-trading book and associated capital requirements – bank acting as investor (under the pre-existing framework) (SEC4)

		Exposure values (by risk weight bands)					Exposure values (by regulatory approach)			
		≤20% RW	>20% to 50% RW	>50% to 100% RW	>100% to 1,250% RW	1,250% RW	IRB RBM (including IAA)	IRB SFA	SA	1,250%
		$bn	$bn	$bn	$bn	$bn	$bn	$bn	$bn	$bn
2	**Traditional securitisation**	**5.2**	**0.6**	**0.6**	**–**	**–**	**5.4**	**–**	**1.0**	**–**
3	Securitisation	**5.2**	**0.6**	**0.6**	**–**	**–**	**5.4**	**–**	**1.0**	**–**
4	– retail underlying	**3.1**	**0.6**	**0.6**	**–**	**–**	**3.3**	**–**	**1.0**	**–**
5	– wholesale	**2.1**	**–**	**–**	**–**	**–**	**2.1**	**–**	**–**	**–**
1	**Total at 31 Dec 2019**	**5.2**	**0.6**	**0.6**	**–**	**–**	**5.4**	**–**	**1.0**	**–**
2	Traditional securitisation	7.0	0.6	1.3	–	–	6.9	–	2.0	–
3	Securitisation	7.0	0.6	1.3	–	–	6.9	–	2.0	–
4	– retail underlying	5.0	0.6	1.2	–	–	4.8	–	2.0	–
5	– wholesale	2.0	–	0.1	–	–	2.1	–	–	–
1	Total at 31 Dec 2018	7.0	0.6	1.3	–	–	6.9	–	2.0	–

		RWAs (by regulatory approach)				Capital charge after cap			
		IRB RBM (including IAA)	IRB SFA	SA	1,250%	IRB RBM (including IAA)	IRB SFA	SA	1,250%
		$bn	$bn	$bn	$bn	$bn	$bn	$bn	$bn
2	**Traditional securitisation**	**0.7**	**–**	**0.7**	**0.2**	**0.1**	**–**	**0.1**	**–**
3	Securitisation	**0.7**	**–**	**0.7**	**0.2**	**0.1**	**–**	**0.1**	**–**
4	– retail underlying	**0.3**	**–**	**0.7**	**0.2**	**–**	**–**	**0.1**	**–**
5	– wholesale	**0.4**	**–**	**–**	**–**	**0.1**	**–**	**–**	**–**
1	**Total at 31 Dec 2019**	**0.7**	**–**	**0.7**	**0.2**	**0.1**	**–**	**0.1**	**–**
2	Traditional securitisation	0.9	–	1.5	0.4	0.1	–	0.1	–
3	Securitisation	0.9	–	1.5	0.4	0.1	–	0.1	–
4	– retail underlying	0.5	–	1.5	0.3	–	–	0.1	–
5	– wholesale	0.4	–	–	0.1	0.1	–	–	–
1	Total at 31 Dec 2018	0.9	–	1.5	0.4	0.1	–	0.1	–

Table 60.ii: Securitisation exposures in the non-trading book and associated capital requirements – bank acting as investor (under the new framework) (SEC4)

		Exposure values (by risk weight bands)					Exposure values (by regulatory approach)				
		≤20% RW	>20% to 50% RW	>50% to 100% RW	>100% to 1,250% RW	1,250% RW	SEC-IRBA	SEC-ERBA	SEC IAA	SEC-SA	1,250%
		$bn	$bn	$bn	$bn	$bn	$bn	$bn	$bn	$bn	$bn
2	**Traditional securitisation**	**6.1**	**0.7**	**0.4**	**0.1**	**–**	**–**	**1.7**	**–**	**5.6**	**–**
3	Securitisation	**6.1**	**0.7**	**0.4**	**0.1**	**–**	**–**	**1.7**	**–**	**5.6**	**–**
4	– retail underlying	**4.6**	**0.7**	**0.2**	**0.1**	**–**	**–**	**1.4**	**–**	**4.2**	**–**
5	– wholesale	**1.5**	**–**	**0.2**	**–**	**–**	**–**	**0.3**	**–**	**1.4**	**–**
1	**Total at 31 Dec 2019**	**6.1**	**0.7**	**0.4**	**0.1**	**–**	**–**	**1.7**	**–**	**5.6**	**–**

		RWAs (by regulatory approach)					Capital charge after cap				
		SEC-IRBA	SEC-ERBA	SEC IAA	SEC-SA	1,250%	SEC-IRBA	SEC-ERBA	SEC IAA	SEC-SA	1,250%
		$bn	$bn	$bn	$bn	$bn	$bn	$bn	$bn	$bn	$bn
2	**Traditional securitisation**	**–**	**0.5**	**–**	**1.1**	**–**	**–**	**–**	**–**	**0.1**	**–**
3	Securitisation	**–**	**0.5**	**–**	**1.1**	**–**	**–**	**–**	**–**	**0.1**	**–**
4	– retail underlying	**–**	**0.4**	**–**	**0.9**	**–**	**–**	**–**	**–**	**0.1**	**–**
5	– wholesale	**–**	**0.1**	**–**	**0.2**	**–**	**–**	**–**	**–**	**–**	**–**
1	**Total at 31 Dec 2019**	**–**	**0.5**	**–**	**1.1**	**–**	**–**	**–**	**–**	**0.1**	**–**

Market risk

Overview of market risk in global businesses

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

Exposure to market risk

Exposure to market risk is separated into two portfolio types:

- Trading portfolios: these comprise positions held for client servicing and market-making, with the intention of short-term resale and/or to hedge risks resulting from such positions.
- Non-trading portfolios: these comprise positions that primarily arise from the interest rate management of our retail and commercial banking assets and liabilities, financial investments measured at fair value through other comprehensive income, debt instruments measured at amortised cost, and exposures arising from our insurance operations.

Where appropriate, we apply similar risk management policies and measurement techniques to both trading and non-trading portfolios. Our objective is to manage and control market risk exposures to optimise return on risk while maintaining a market risk profile consistent with our established risk appetite.

For a discussion on hedging risk and monitoring the continuing effectiveness of hedges, refer to page 135 of the Annual Report and Accounts 2019.

The tables below reflect the components of capital requirement under the standardised approach, Table 61 and the internal model approach, Table 62 for market risk.

Table 61: Market risk under standardised approach (MR1)

		At 31 Dec		
		2019	2018	**2019**
		RWAs	RWAs	**Capital requirements**
		$bn	$bn	**$bn**
	Outright products			
1	Interest rate risk (general and specific)	**2.6**	2.5	**0.2**
2	Equity risk (general and specific)	**0.1**	0.1	**–**
3	Foreign exchange risk	**3.7**	1.4	**0.3**
4	Commodity risk	**0.1**	–	**–**
	Options			
6	Delta-plus method	**0.1**	0.1	**–**
7	Scenario approach	**–**	–	**–**
8	**Securitisation**	**1.2**	1.6	**0.1**
9	**Total**	**7.8**	5.7	**0.6**

Table 62: Market risk under IMA (MR2-A)

		2019		2018	
		RWAs	**Capital required**	RWAs	Capital required
		$bn	**$bn**	$bn	$bn
1	**VaR (higher of values a and b)**	**5.3**	**0.4**	7.1	0.6
(a)	Previous day's VaR		**0.1**		0.1
(b)	Average daily VaR[1]		**0.4**		0.6
2	**Stressed VaR (higher of values a and b)**	**8.0**	**0.7**	12.1	1.0
(a)	Latest SVaR		**0.1**		0.2
(b)	Average SVaR[1]		**0.7**		1.0
3	**Incremental risk charge (higher of values a and b)**	**6.6**	**0.5**	6.4	0.5
(a)	Most recent IRC value		**0.5**		0.4
(b)	Average IRC value[1]		**0.5**		0.5
5	**Other**	**2.2**	**0.2**	4.5	0.3
6	**Total at 31 Dec**	**22.1**	**1.8**	30.1	2.4

1 VaR average values are calculated on a 60 business days basis. SVaR and IRC average values are calculated on a 12-week basis.

Under the IMA approach, the decrease in VaR and SVaR is largely due to the increased diversification benefits following regulatory approval to expand the regulatory scope of consolidation and reduced exposure.

Market risk governance

The majority of the total VaR, stressed VaR ('SVaR') and incremental risk charge ('IRC') of HSBC and almost all trading VaR resides in GB&M. GB&M manages the Group's market risk, using risk limits approved by the GB&M CRO.

For a discussion on market risk governance refer to page 135 of the Annual Report and Accounts 2019.

Market risk measures

Monitoring and limiting market risk exposures

Our objective is to manage and control market risk exposures while maintaining a market risk profile consistent with our risk appetite. We use a range of tools to monitor and limit market risk exposures including sensitivity analysis, VaR and stress testing.

Sensitivity analysis

We use sensitivity measures to monitor the market risk positions within each risk type. Granular sensitivity limits are set primarily

for trading desks with consideration of market liquidity, customer demand and capital constraints, amongst other factors.

Value at risk

Value at risk ('VaR') is a technique that estimates the potential losses on risk positions in the trading portfolio as a result of movements in market rates and prices over a specified time horizon and to a given level of confidence. The use of VaR is integrated into market risk management and is calculated for all trading positions regardless of how we capitalise those exposures.

In addition, we use VaR for non-trading portfolios. Our models are predominantly based on historical simulation. VaR is calculated at a 99% confidence level for a one-day holding period, although a long period is additionally used for non-trading positions.

Our VaR models use historical series of market rates and prices, implicitly taking into account inter-relationships between different markets and rates such as interest rates and foreign exchange rates.

The primary categories of risk factors driving market risk are summarised below:

Risk factor	Description
Foreign exchange	Risk arising from changes in foreign exchange rates and volatilities.
Interest rate	Risk arising from changes in the level of interest rates that may impact prices of interest rate sensitive assets such as interest rate swaps.
Equity	Risk arising from changes in equity prices, volatilities and dividend yields.
Commodity	Risk arising from changes in commodity prices.

Our models use a mixed approach when applying changes in market rates and prices:

- For equity, credit and foreign exchange risk factors, VaR scenarios are calculated on a relative return basis.
- For interest rates, a mixed approach is used. The scenarios applied to volatilities are on a relative return basis, whereas the scenarios applied to interest rate curves are calculated using a hybrid of absolute and relative returns. This approach enables the VaR to smoothly adapt to either low or high interest rate environments.

We use the past two years as the historical data set in our VaR models and the scenarios are updated on a fortnightly basis. These scenarios are then applied to the market baselines and positions on a daily basis. The models incorporate the effect of option features on the underlying exposures.The valuation approach used in our models varies:

- non-linear instruments use a full revaluation approach; and
- linear instruments, such as bonds and swaps, use a sensitivity-based approach.

The nature of the VaR models means that an increase in observed market volatility will lead to an increase in VaR even without any changes in the underlying positions.

VaR model limitations

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

- The use of historical data as a proxy for estimating future events may not encompass all potential events, particularly those which are extreme in nature.
- The use of a 1-day holding period for risk management purposes of trading and non-trading books assumes that this short period is sufficient to hedge or liquidate all positions.
- The use of a 99% confidence level by definition does not take into account losses that might occur beyond this level of confidence.
- VaR is calculated on the basis of exposures outstanding at close of business and therefore does not necessarily reflect intra-day exposures.

Risk not in VaR framework

The risks not in VaR ('RNIV') framework captures risks from exposures in the HSBC trading book that are not captured well by the VaR model. Our VaR model is designed to capture significant basis risk such as CDS versus bond, asset swap spreads and cross-currency basis. Other basis risks that are not completely covered in VaR, such as CCP swap basis risks, are complemented by our RNIV calculations and are integrated into our capital framework.

Risk factors are reviewed on a regular basis and are either incorporated directly in the VaR models, where possible, or quantified through the VaR-based RNIV approach or a stress test approach within the RNIV framework. While VaR-based RNIVs are calculated by using historical scenarios, stress-type RNIVs are estimated on the basis of stress scenarios whose severity is calibrated to be in line with the capital adequacy requirements. The outcome of the VaR-based RNIV approach is included in the overall VaR calculation but excluded from the VaR measures used for regulatory back-testing. In addition, stressed VaR also captures risk factors considered in the VaR-based RNIV approach through a corresponding stressed VaR RNIV.

Stress-type RNIVs include a gap risk exposure measure to capture risk on non-recourse margin loans and a de-peg risk measure to capture risk to pegged and heavily managed currencies.

Back-testing

We validate daily the accuracy of our VaR models by back-testing them against both actual and hypothetical profit and loss. Hypothetical profit and loss excludes non-modelled items such as fees, commissions and revenues of intra-day transactions.

The actual number of profits or losses in excess of VaR over this period can therefore be used to gauge how well the models are performing. We consider enhanced internal monitoring of a VaR model if more than five profit exceptions or more than five loss exceptions occur in a 250-day period.

We back-test our VaR at various levels of our Group entity hierarchy. Back-testing using the regulatory hierarchy includes entities which have approval to use VaR in the calculation of market risk regulatory capital requirement.

HSBC submits separate back-testing results to regulators, including the PRA and the European Central Bank, based on applicable frequencies ranging from two business days after an exception occurs, to quarterly submissions.

In terms of the CRD IV rules, VaR back-testing loss, and not profit, exceptions count towards the multiplier determined by the PRA for the purposes of the capital requirement calculation for market risk. The multiplier is increased if there are five or more loss exceptions in a 250-day period.

The following graphs show a one-year history for VaR back-testing exceptions against both actual and hypothetical profit and loss.

In 2019, the Group experienced six profit back-testing exceptions and one loss back-testing exception against actual profit and loss. Some of these exceptions were driven by profits spread across a large number of desks or arose from new trades, which are outside trading VaR scope. The above exceptions comprised:

- a profit exception in early January, driven by gains across most asset classes, as interest rates rose and equity markets rebounded;
- a profit exception in late January, due mainly to gains from new transactions in the Rates business and lower equity volatilities;
- a profit exception in March, driven by increased volatility in some emerging markets currencies and interest rates;
- a loss exception in March, attributable to month-end valuation adjustments driven by portfolio and spread changes;
- two profit exceptions in early May, arising from new transactions and a number of relatively small gains spread across all asset classes; and

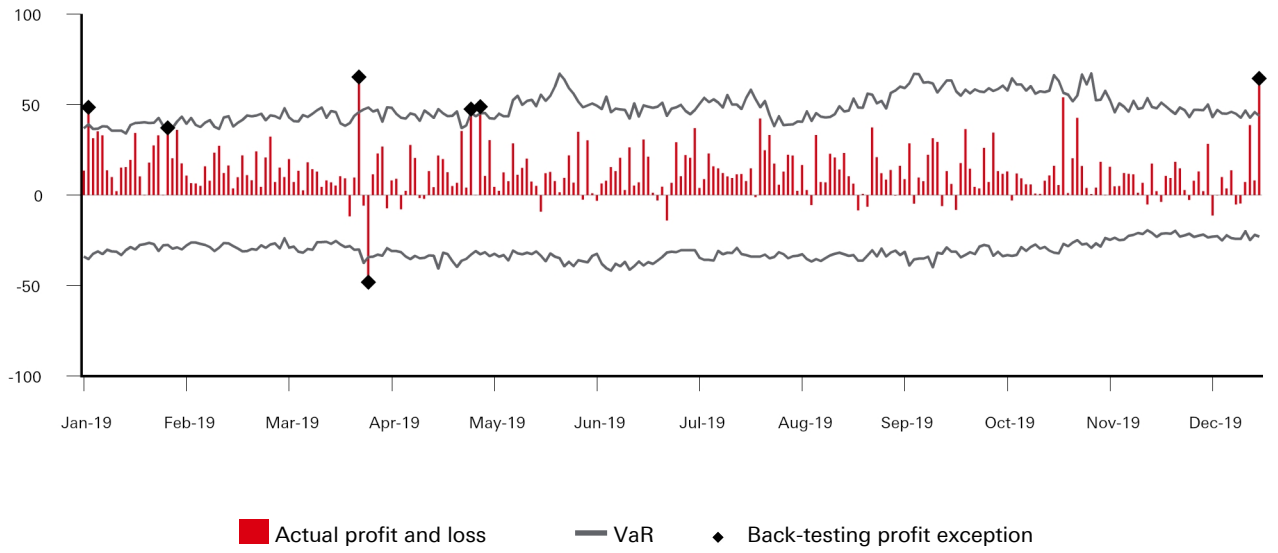
- a profit exception in December, due to gains from multiple desks and spread across all asset classes.

The Group also experienced one profit back-testing exception and one loss back-testing exception against hypothetical profit and loss;

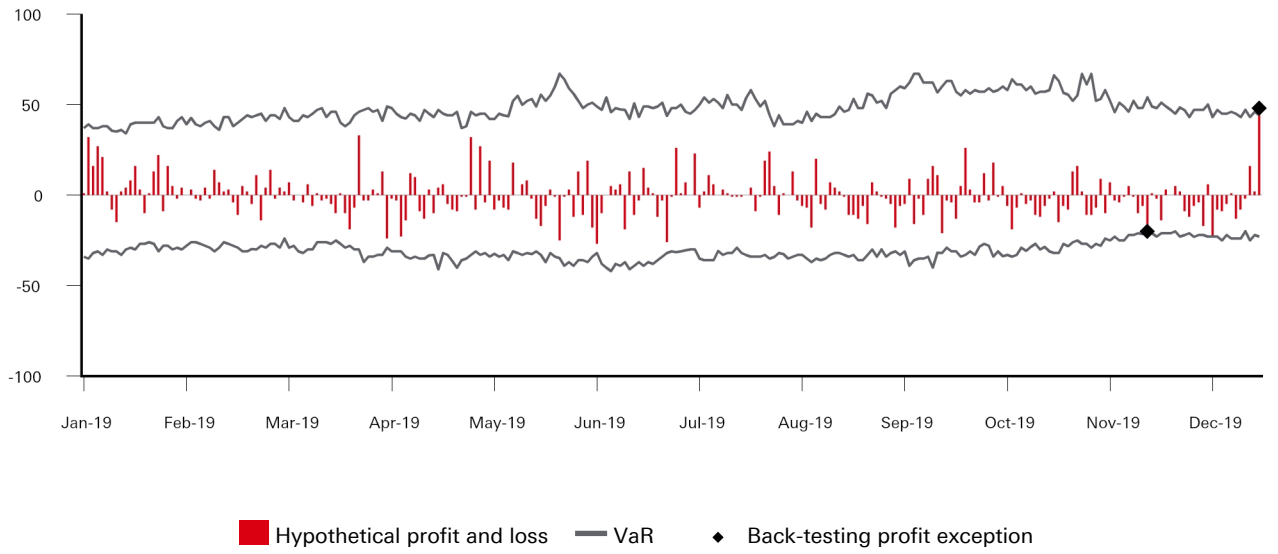
- a loss exception in November 2019 driven primarily by the impact of the widening of the credit spread on a high-yield bond holding; and
- a profit exception in December, due to gains from multiple desks and spread across all asset classes.

Comparison of VaR estimates with gains/losses

VaR back-testing exceptions against actual profit and loss ($m)



VaR back-testing exceptions against hypothetical profit and loss ($m)



Stress testing

Stress testing is an integral part of our market risk management framework to evaluate the potential impact on portfolio values of more extreme, although plausible, events or movements in a set of financial variables. In such scenarios, losses can be greater than those predicted by VaR modelling.

Stress testing is implemented at legal entity, regional and overall Group levels. A set of scenarios is used consistently across all regions within the Group. The risk appetite around potential stress losses for the Group is set and monitored against referral limits.

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

Stressed VaR and stress testing, together with reverse stress testing and the management of gap risk, provide senior

management with insights regarding the 'tail risk' beyond VaR, for which HSBC's appetite is limited.

The market risk stress testing incorporates the historical and hypothetical events.

During 2019, we ran stress scenarios for specific geopolitical and economic events including several Brexit scenarios, Global Trade war, and the UK elections in Q2 and Q4. We are also actively monitoring our portfolio in Hong Kong and we have performed internal stress tests and scenario analysis. These new scenarios were run in addition to existing scenarios that capture potential events of concern.

Market risk capital models

HSBC has permission to use a number of market risk capital models to calculate regulatory capital as listed in the table below. For regulatory purposes, the trading book comprises all positions in financial instruments and commodities held with trading intent and positions where it can be demonstrated that they hedge positions in the trading book. Trading book positions must either be free of any restrictive covenants on their tradability or be capable of being hedged.

A financial instrument is defined as any contract that gives rise to both a financial asset to one party and a financial liability or equity instrument to another party.

HSBC maintains a trading book policy, which defines the minimum requirements for trading book positions and the process for classifying positions as trading or non-trading book. Positions in the trading book are subject to market risk-based rules, i.e. market risk capital, calculated using regulatory approved models. Where we do not have permission to use internal models, market risk capital is calculated using the standardised approach.

If any of the policy criteria are not met, then the position is categorised as a non-trading book exposure.

Model component	Confidence level	Liquidity horizon	Model description and methodology
VaR	99%	10 day	Uses most recent two years' history of daily returns to determine a loss distribution. The result is scaled, using the square root of 10, to provide an equivalent 10-day loss.
Stressed VaR	99%	10 day	Stressed VaR is calibrated to a one-year period of stress observed in history.
IRC	99.9%	1 year	Uses a multi-factor Gaussian Monte-Carlo simulation, which includes product basis, concentration, hedge mismatch, recovery rate and liquidity as part of the simulation process. A minimum liquidity horizon of three months is applied and is based on a combination of factors, including issuer type, currency and size of exposure.

Non-proprietary details of these models are available in the Financial Services Register on the PRA website.

Table 63: IMA values for trading portfolios[1] (MR3)

		At 31 Dec	
		2019	2018
		$m	$m
VaR (10 day 99%)			
1	Maximum value	**185.2**	210.0
2	Average value	**149.3**	182.9
3	Minimum value	**116.8**	160.3
4	Period end	**128.0**	193.2
Stressed VaR (10 day 99%)			
5	Maximum value	**222.8**	408.5
6	Average value	**172.3**	256.8
7	Minimum value	**133.1**	194.9
8	Period end	**222.8**	408.5
Incremental risk charge (99.9%)			
9	Maximum value	**1,076.9**	743.7
10	Average value	**706.2**	603.9
11	Minimum value	**448.9**	424.9
12	Period end	**465.8**	492.7

1 *Comparatives as at 31 December 2018 for averages, maximums and minimums were restated in compliance with EBA guidance. Maximum, average and minimum values are calculated on a six-month basis.*

VaR

VaR used for regulatory purposes differs from VaR used for management purposes with key differences listed below.

VaR	Regulatory	Management
Scope	Regulatory approval (PRA)	Broader population of trading and non-trading book positions
Confidence interval	99%	99%
Liquidity horizon	10 day	1 day
Data set	Past 2 years	Past 2 years

The trading books that received approval from the regulator to be covered via an internal model are used to calculate VaR for regulatory purposes. Overall regulatory VaR also includes VaR-based RNIVs. Regulatory VaR levels contribute to the calculation of market risk RWAs.

The regulatory VaR table is calculated on consolidated positions according to the regulatory permissions received, plus aggregated sites. This differs from the daily VaR reported in the *Annual Report and Accounts 2019*, which shows a fully diversified view used for internal risk management.

Trading VaR used for regulatory capital purposes decreased in 2019 primarily due to lower contributions from:

- exposures to credit spread and interest rate risks;
- equity correlation and interest rate volatility risks captured in the RNIV framework.

Stressed VaR

Stressed VaR is primarily used for regulatory capital purposes and is integrated into the risk management process to ensure prudent capital management. Stressed VaR complements other risk measures by providing the potential losses under stressed market conditions.

Stressed VaR modelling follows the same approach as our VaR risk measure except that:

- potential market movements employed for stressed VaR calculations are based on a continuous one-year period of stress for the trading portfolio;
- the choice of period is based on the assessment at the Group level of the most volatile period in recent history. This is assessed quarterly and changed during 2019 as follows:
  - to (March 2010 to February 2011) in March 2019;
  - to (December 2010 to November 2011) in June 2019;
  - to (July 2007 to July 2008) in September 2019; and
  - to (April 2016 to March 2017) in December 2019;
- it is calculated to a 99% confidence using a 10-day holding period; and
- it is based on an actual 10-day holding period, whereas regulatory VaR is based on a one-day holding period scaled to 10 days.

The decrease in stressed VaR during 2019 was spread across all asset classes, including lower contributions from the foreign exchange options trading, flow fixed income activity and the equity prime finance business.

Incremental risk charge

The incremental risk charge ('IRC') measures the default and migration risk of issuers of traded instruments.

IRC risk factors include credit migration, default, product basis, concentration, hedge mismatch, recovery rate and liquidity. The PDs are floored to reflect the lack of historical data on defaults and a period of stress is used to calibrate the spread changes for the relevant ratings. The IRC model is validated quarterly by stressing key model parameters and reviewing the response of the model.

The IRC is a stand-alone charge generating no diversification benefit with other charges. IRC relies on a range of liquidity horizons from three months, corresponding to the regulatory floor, to one year. A wide range of criteria can indicate the liquidity of a position. The liquidity horizon for the IRC measure depends on a set of factors such as issuer features, including rating, sector, geography and size of positions, including product, maturity and concentration.

The IRC transition matrices are calibrated using transition and default data published by three rating agencies (S&P, Moody's and Fitch) as the starting point, in combination with internal rules for flooring. The average of the three matrices is computed for each sector. The PDs are then floored: sovereign PDs are consistent with IRB, while a 3 basis point floor is applied to corporates' and banks' PDs.

The IRC correlation matrix is derived from historical CDS spreads data, covering the latest two-year VaR period. The returns estimation window is set equal to either three or 12 months, depending on the liquidity horizon of each obligor. First, each obligor is mapped to six sector/rating categories; then the correlation matrix is obtained by computing the arithmetic mean of correlations for each category.

IRC increased during the first half of the year, driven mainly by exposures to the U.S., Japan and Brazil sovereigns. After peaking in Q3, IRC decreased mainly as a result of the Rates business actively reducing our exposures arising from U.S. government debt asset swaps.

Structural foreign exchange exposures

Structural foreign exchange exposures represent net investments in subsidiaries, branches and associates whose functional currency is not the US dollar. An entity's functional currency is normally that of the primary economic environment in which it operates.

Exchange differences on structural exposures are recognised in 'Other comprehensive income'. We use the US dollar as our presentation currency in our consolidated financial statements because the US dollar and currencies linked to it form the major currency bloc in which we transact and fund our business.

Our consolidated balance sheet is, therefore, affected by exchange differences between the US dollar and all the non-US dollar functional currencies of underlying subsidiaries.

Our structural foreign exchange exposures are managed with the primary objective of ensuring, where practical, that our consolidated capital ratios and the capital ratios of individual banking subsidiaries are largely protected from the effect of changes in exchange rates. We hedge structural foreign exchange exposures only in limited circumstances.

Details of our structural foreign exchange exposures are provided in the Market risk section, on page 136 of the Annual Report and Accounts 2019.

Interest rate risk in the banking book

Interest rate risk in the banking book ('IRRBB') is the potential adverse impact of changes in interest rates on earnings and capital. The component of IRRBB that can be economically neutralised in the market is transferred to BSM to manage, in accordance with internal transfer pricing rules. In its management of IRRBB, the Group aims to balance mitigating the effect of future interest rate movements, which could reduce net interest income against the cost of hedging. The monitoring of the projected net interest income and economic value of equity sensitivity under varying interest rate scenarios is a key part of this.

More details on our IRRBB and the net interest income sensitivity may be found on page 136 and page 140 of the Annual Report and Accounts 2019.

Prudent valuation adjustment

HSBC has documented policies and maintains systems and controls for the calculation of the prudent valuation adjustment ('PVA'). Prudent value represents a conservative estimate with a 90% degree of certainty of a price that would be received to sell an asset or paid to transfer a liability in orderly transactions occurring between market participants at the balance sheet date. HSBC's methodology addresses fair value uncertainties arising from a number of sources: market price uncertainty, bid-offer uncertainty, model risk, concentration, administrative costs, unearned credit spreads and investing and funding costs.

Table 64: Prudential valuation adjustments (PV1)

	Equity	Interest rates	FX	Credit	Commodities	Total	*Of which: in the trading book*	*Of which: in the banking book*
	$m	$m	$m	$m	$m	$m	*$m*	*$m*
Closeout uncertainty	**260**	**361**	**47**	**137**	**5**	**810**	**606**	**204**
– *of which:*								
Mid-market value	***198***	***135***	***19***	***57***	***4***	***413***	***312***	***101***
Closeout cost	***20***	***91***	***9***	***8***	***1***	***129***	***115***	***14***
Concentration	***42***	***135***	***19***	***72***	**—**	***268***	***179***	***89***
Early termination	**—**	**—**	**—**	**4**	**—**	**4**	**4**	**—**
Model risk	**25**	**85**	**6**	**9**	**—**	**125**	**122**	**3**
Operational risk	**22**	**28**	**3**	**9**	**—**	**62**	**50**	**12**
Investing and funding costs	**—**	**56**	**—**	**2**	**—**	**58**	**58**	**—**
Unearned credit spreads	**—**	**90**	**4**	**8**	**—**	**102**	**102**	**—**
Future administrative costs	**—**	**1**	**—**	**7**	**—**	**8**	**8**	**—**
Other	**—**	**—**	**—**	**—**	**—**	**—**	**—**	**—**
Total adjustment at 31 Dec 2019	**307**	**621**	**60**	**176**	**5**	**1,169**	**950**	**219**
Closeout uncertainty, of which:	196	360	29	149	2	736	470	266
– *of which:*								
Mid-market value	*127*	*98*	*4*	*54*	*—*	*283*	*127*	*156*
Closeout cost	*21*	*94*	*10*	*9*	*2*	*136*	*123*	*13*
Concentration	*48*	*168*	*15*	*86*	*—*	*317*	*220*	*97*
Early termination	—	—	—	5	—	5	5	—
Model risk	21	116	4	5	—	146	146	—
Operational risk	15	29	2	11	—	57	39	18
Investing and funding costs	—	95	1	2	—	98	98	—
Unearned credit spreads	1	90	7	19	3	120	120	—
Future administrative costs	—	5	—	4	—	9	9	—
Other	—	—	—	—	—	—	—	—
Total adjustment at 31 Dec 2018	233	695	43	195	5	1,171	887	284

The net PVA charge was broadly unchanged due to some offsetting movements, notably:

- a $130m increase in mid-market value notably driven by deferral of day one profits which are no longer eligible to offset any additional valuation adjustment following an EBA statement;
- offset by a $110m reduction in other additional valuation adjustments, driven by a reduction in underlying exposures and reduced spreads.

The types of financial instruments for which the highest PVA is observed include (i) multi callable interest rate derivatives, (ii) asset backed securities and valuation adjustments related to non-collateralised derivatives.

Non-financial risk

Non-financial risk is the risk to achieving our strategy or objectives as a result of inadequate or failed internal processes, people and systems, or from external events. Sound non-financial risk management is central to achieving good outcomes for our customers. Non-financial risk is relevant to every aspect of our business and is managed through the operational risk management framework ('ORMF'). It covers a wide spectrum of issues, such as resilience risk, financial crime and fraud, regulatory compliance, reporting and tax risk, legal risk, model risk, people risk and failure in other principle risk processing. Losses arising from breaches of regulation and law, unauthorised activities, error, omission, inefficiency, fraud, systems failure or external events all fall within the definition of non-financial risk.

Operational risk capital requirements

Operational risk is part of non-financial risk. Table 65 reports our operational risk capital requirements by region and global business.

Table 65: Operational risk RWAs

	31 Dec 2019		31 Dec 2018	
	RWAs	**Capital required**	RWAs	Capital required
	$bn	**$bn**	$bn	$bn
By global business	**92.8**	**7.4**	91.1	7.3
Retail Banking and Wealth Management	**30.2**	**2.4**	27.3	2.2
Commercial Banking	**25.9**	**2.1**	24.3	1.9
Global Banking and Markets	**30.8**	**2.5**	31.5	2.5
Global Private Banking	**2.8**	**0.2**	2.8	0.2
Corporate Centre	**3.1**	**0.2**	5.2	0.5
By geographical region	**92.8**	**7.4**	91.1	7.3
Europe	**24.5**	**2.0**	27.3	2.2
Asia	**45.2**	**3.6**	39.5	3.2
Middle East and North Africa	**6.2**	**0.5**	6.8	0.5
North America	**11.9**	**0.9**	11.7	0.9
Latin America	**5.0**	**0.4**	5.8	0.5

Organisation and responsibilities

Responsibility for managing non-financial risk lies with our people. During 2019, we continued to strengthen our approach to managing non-financial risk as set out in the ORMF. The framework sets out our approach to governance and risk appetite. It provides a single view of non-financial risks that matter the most and associated controls. The enhancement and embedding of the risk appetite framework for non-financial risk, and the improvement of the consistency of the adoption of the end-to-end risk and control assessment processes were a particular focus in 2019. While there remains more to do, we made progress in strengthening the control environment and the management of non-financial risk.

Activity to strengthen the three lines of defence model continued to be a key focus in 2019. The first line of defence owns the risk and is accountable for identifying, assessing, managing key existing and emerging risks. The second line of defence sets the policy and control standards to manage risks, and provides advice and guidance to support these policies. It also challenges the first line to ensure it is managing risk effectively. The third line of defence is Internal Audit, which provides independent assurance to the Board and management that our risk management approach and processes are designed and operating effectively.

The Non-Financial Risk Management Board ('NFRMB') is a formal governance committee established to provide strategic direction and oversight of the management of non-financial risk and is a sub-committee of the Group Risk Management Meeting ('GRMM').

Operational risk is organised as a specific risk discipline within Global Risk and is headed by the Group Head of Operational Risk. The Group Head of Operational Risk is responsible for establishing and maintaining the ORMF, as well as monitoring the level of operational losses and the effectiveness of the internal control environment supported by their second line of defence functions. The Group Head of Operational Risk is accountable to the Group Chief Risk Officer in respect of this element of the overall enterprise-wide risk management framework.

Measurement and monitoring

We have codified our ORMF in a high-level standard, supplemented by detailed policies. These policies explain our approach to identifying, assessing, monitoring and controlling non-financial risk, and give guidance on mitigating actions to be taken when weaknesses are identified.

Monitoring non-financial risk exposure against risk appetite on a regular basis, and setting out our risk acceptance process, drives risk awareness in a more forward-looking manner. This assists management in determining whether further action is required.

Risk scenario analysis across material legal entities provides a top down, forward-looking assessment of risks to help determine whether they are being effectively managed within our risk appetite or whether further management action is required. In each of our subsidiaries, business managers are responsible for maintaining an appropriate level of internal control, commensurate with the scale and nature of operations. They are responsible for identifying and assessing risks, designing controls and monitoring the effectiveness of these controls. The ORMF helps managers to fulfil these responsibilities by defining a standard risk assessment methodology and providing a tool for the systematic reporting of operational loss data.

Risk and control assessment approach

Non-financial risk and control assessments are performed by individual business units and functions. The risk and control assessment process is designed to provide business areas and functions with a forward-looking view of non-financial risks, an assessment of the effectiveness of controls, and a tracking mechanism for action plans so that they can proactively manage non-financial risks within acceptable levels. Appropriate means of mitigation and controls are considered. These include:

- making specific changes to strengthen the internal control environment; and
- investigating whether cost-effective insurance cover is available to mitigate the risk.

Recording

We use a Group-wide risk management system to record the results of our non-financial risk management process. Non-financial risk and control assessments, as described above, are input and maintained by business units. Business management monitors and follows up the progress of documented action plans. Operational risk losses are entered into the Group-wide risk management system and reported to governance on a monthly basis. Loss capture thresholds are in line with industry standards.

Liquidity

Strategies and processes

HSBC has an internal liquidity and funding risk management framework ('LFRF'), which aims to allow it to withstand very severe liquidity stresses. It is designed to be adaptable to changing business models, markets and regulations. The management of liquidity and funding is primarily undertaken locally (by country) in our operating entities in compliance with the Group's LFRF, and with practices and limits set by the GMB through the RMM and approved by the Board. Our general policy is that each defined operating entity should be self-sufficient in funding its own activities.

The key aspects of the internal LFRF which is used to ensure that HSBC maintains an appropriate overall liquidity risk profile are:

- each entity must manage liquidity and funding risk on a stand-alone basis without reliance on other members of the group or central banks, unless pre-approved;
- minimum liquidity coverage ratio ('LCR') requirement; and
- minimum net stable funding ratio ('NSFR') requirement or other appropriate metric.

The internal LFRF and the risk tolerance limits were approved by the Group Risk Committee and the Board on the basis of recommendations made by the RMM.

Structure and organisation

Asset, Liability and Capital Management ('ALCM') teams are responsible for the application of the LFRF at a local operating entity level. The elements of the LFRF are underpinned by a robust governance framework, the two major elements of which are:

- Group, regional and entity level asset and liability management committees ('ALCOs'); and
- an internal liquidity adequacy assessment process ('ILAAP') used to validate risk tolerance and set risk appetite.

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

Management of liquidity and funding risk

Liquidity coverage ratio

The LCR aims to ensure that a bank has sufficient unencumbered high-quality liquid assets ('HQLA') to meet its liquidity needs in a 30 calendar day liquidity stress scenario. For the calculation of the LCR, HSBC follows the EU Regulation LCR Delegated Act 2015/61.

Net stable funding ratio

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

Currency mismatch in the LCR

The Group's internal liquidity and funding risk management framework requires all operating entities to monitor the LCR for material currencies. Limits are set to ensure that outflows can be met, given assumptions on stressed capacity in the FX swap markets.

Governance

ALCM teams apply the LFRF at both an individual entity and Group level. Regional and local ALCM teams are responsible for the implementation of Group-wide and local regulatory policy at a legal entity level. Balance Sheet Management ('BSM') has responsibility for cash and liquidity management.

Liquidity Risk Management carry out independent review, challenge and assurance of the appropriateness of the risk management activities undertaken by ALCM and BSM. Their work includes setting control standards, advice on policy implementation, and review and challenge of reporting.

Internal Audit provide independent assurance that risk is managed effectively.

More details on the concentration of funding and liquidity sources may be found on page 133 of the Annual Report and Accounts 2019.

Table 66: Level and components of HSBC Group consolidated liquidity coverage ratio (LIQ1)

	Quarter ended 31 Dec 2019		Quarter ended 30 Sep 2019		Quarter ended 30 Jun 2019		Quarter ended 31 Mar 2019	
	Total unweighted value	Total weighted value	Total unweighted value	Total weighted value	Total unweighted value	Total weighted value	Total unweighted value	Total weighted value
	$m	$m	$m	$m	$m	$m	$m	$m
Number of data points used in the calculation of averages		12		12		12		12
High quality liquid assets								
Total high quality liquid assets ('HQLA')		542,436		543,249		548,045		540,986
Cash outflows								
Retail deposits and small business funding	747,510	77,146	741,029	76,814	740,337	76,875	739,011	76,577
– *of which:*								
stable deposits	*304,474*	*15,224*	*293,281*	*14,651*	*286,926*	*14,293*	*286,380*	*14,225*
less stable deposits	*441,819*	*61,548*	*446,634*	*61,820*	*452,473*	*62,297*	*451,828*	*62,116*
Unsecured wholesale funding	643,185	303,439	635,166	298,301	622,518	291,807	612,755	286,357
– operational deposits (all counterparties) and deposits in networks of cooperative banks	200,638	48,996	200,875	48,992	198,169	48,206	195,587	47,487
– non-operational deposits (all counterparties)	427,855	239,751	420,574	235,592	411,775	231,027	406,102	227,804
– unsecured debt	14,692	14,692	13,717	13,717	12,574	12,574	11,066	11,066
Secured wholesale funding		11,532		12,737		13,249		13,181
Additional requirements	310,100	89,589	306,075	88,533	305,290	88,350	308,002	90,119
– outflows related to derivative exposures and other collateral requirements	39,394	39,011	38,254	37,849	38,540	37,906	40,395	39,588
– outflows related to loss of funding on debt products	–	–	–	–	–	–	–	–
– credit and liquidity facilities	270,706	50,578	267,821	50,684	266,750	50,444	267,607	50,531
Other contractual funding obligations	88,055	37,881	92,249	38,326	96,962	37,942	97,645	36,037
Other contingent funding obligations	464,319	12,375	425,446	12,222	390,535	12,471	359,989	12,510
Total cash outflows		531,962		526,933		520,694		514,781
Cash inflows								
Secured lending transactions (including reverse repos)	307,567	32,831	310,390	34,147	303,143	36,126	295,235	38,746
Inflows from fully performing exposures	102,549	70,653	105,650	73,971	110,404	79,002	112,583	81,523
Other cash inflows	114,166	48,542	111,556	48,084	101,067	46,246	93,069	45,893
(Difference between total weighted inflows and total weighted outflows arising from transactions in third countries where there are transfer restrictions or which are denominated in non-convertible currencies)		–		–		–		–
(Excess inflows from a related specialised credit institution)		–		–		–		–
Total cash inflows	524,282	152,026	527,596	156,202	514,614	161,374	500,887	166,162
Fully exempt inflows	–	–	–	–	–	–	–	–
Inflows Subject to 90% Cap	–	–	–	–	–	–	–	–
Inflows Subject to 75% Cap	493,752	152,026	497,429	156,202	484,373	161,374	467,328	166,162
Liquidity coverage ratio (Adjusted value)								
Liquidity Buffer		542,436		543,249		548,045		540,986
Total net cash outflows		379,936		370,731		359,320		348,619
Liquidity coverage ratio (%)		142.8%		146.5%		152.5%		155.2%

Analysis of on-balance sheet encumbered and unencumbered assets and off-balance sheet collateral

On-balance sheet encumbered and unencumbered assets

The table on the following page summarises the total on-balance sheet assets capable of supporting future funding and collateral needs, and shows the extent to which they are currently pledged for this purpose. This disclosure aims to facilitate an understanding of available and unrestricted assets that could be used to support potential future funding and collateral needs.

Off-balance sheet collateral

The fair value of assets accepted as collateral that we are permitted to sell or repledge in the absence of default was $468bn at 31 December 2019 (2018: $483bn). The fair value of any such collateral actually sold or repledged was $295bn (2018: $329bn). We are obliged to return equivalent securities. These transactions are conducted under terms that are usual and customary to standard reverse repo, stock borrowing and derivative transactions.

The fair value of collateral received and re-pledged in relation to reverse repos, stock borrowing and derivatives is reported on a gross basis. The related balance sheet receivables and payables are reported on a net basis where required under IFRS offset criteria. As a consequence of reverse repo, stock borrowing and derivative transactions where the collateral received could be sold or re-pledged but had not been, we held $173bn (2018: $154bn) of unencumbered collateral available to support potential future funding and collateral needs at 31 December 2019.

Under the terms of our current collateral obligations under derivative contracts (which are ISDA compliant CSA contracts and contracts entered into for pension obligations), and based on an estimate of the positions at 31 December 2019, we calculate that we could be required to post additional collateral of up to $0.2bn (2018: $0.2bn) in the event of a one-notch downgrade in third-party agencies' credit rating of HSBC's debt. This would increase to $0.4bn (2018: $0.4bn) in the event of a two-notch downgrade.

For further details on liquidity and funding risk management, see page 131 onwards of the Annual Report and Accounts 2019.

Table 67: Analysis of on-balance sheet encumbered and unencumbered assets

	Assets encumbered as a result of transactions with counterparties other than central banks			Assets positioned at central banks (i.e. pre-positioned plus encumbered)	Unencumbered assets not positioned at central banks				
	As a result of covered bonds	As a result of securitisations	Other		Assets readily available for encumbrance	Other assets capable of being encumbered	Reverse repos/stock borrowing receivables and derivative assets	Assets that cannot be encumbered	Total
	$m	$m	$m	$m	$m	$m	$m	$m	$m
Cash and balances at central banks	–	–	–	244	151,247	39	–	2,569	154,099
Items in the course of collection from other banks	–	–	–	–	–	–	–	4,956	4,956
Hong Kong Government certificates of indebtedness	–	–	–	–	–	–	–	38,380	38,380
Trading assets	–	–	58,310	3,440	159,552	10,019	21,349	1,601	254,271
– treasury and other eligible bills	–	–	1,650	2,354	17,215	531	–	39	21,789
– debt securities	–	–	32,034	1,086	90,783	2,088	–	52	126,043
– equity securities	–	–	24,626	–	51,534	2,648	–	19	78,827
– loans and advances to banks	–	–	–	–	20	1,797	5,538	1,047	8,402
– loans and advances to customers	–	–	–	–	–	2,955	15,811	444	19,210
Financial assets designated and otherwise mandatorily measured at fair value through profit or loss	–	–	1,145	–	2,507	4,896	642	34,437	43,627
– treasury and other eligible bills	–	–	629	–	–	–	–	32	661
– debt securities	–	–	–	–	266	179	–	6,107	6,552
– equity securities	–	–	1	–	2,182	1,086	–	27,670	30,939
– loans and advances to banks	–	–	–	–	59	3,227	642	628	4,556
– other assets	–	–	515	–	–	404	–	–	919
Derivatives	–	–	–	–	–	–	242,995	–	242,995
Loans and advances to banks	–	–	85	2,920	1,337	44,318	–	20,543	69,203
Loans and advances to customers	7,471	7,812	3,328	53,343	15,815	909,677	53	39,244	1,036,743
Reverse repurchase agreements – non-trading	–	–	–	–	–	–	240,862	–	240,862
Financial investments	–	405	25,517	19,503	321,651	4,957	–	71,279	443,312
– treasury and other eligible bills	–	405	564	9,000	93,486	1,228	–	836	105,519
– debt securities	–	–	24,953	10,503	227,665	3,013	–	69,661	335,795
– equity securities	–	–	–	–	500	716	–	697	1,913
– other instruments	–	–	–	–	–	–	–	85	85
Prepayments, accrued income and other assets	–	17	49,580	398	4,444	27,736	–	54,505	136,680
Current tax assets	–	–	–	–	–	–	–	755	755
Interest in associates and joint ventures	–	–	–	–	14	24,029	–	431	24,474
Goodwill and intangible assets	–	–	–	–	–	–	–	20,163	20,163
Deferred tax	–	–	–	–	–	–	–	4,632	4,632
At 31 Dec 2019	7,471	8,234	137,965	79,848	656,567	1,025,671	505,901	293,495	2,715,152

Table 67: Analysis of on-balance sheet encumbered and unencumbered assets (continued)

	Assets encumbered as a result of transactions with counterparties other than central banks			Assets positioned at central banks (i.e. pre-positioned plus encumbered)	Unencumbered assets not positioned at central banks				
	As a result of covered bonds	As a result of securitisations	Other		Assets readily available for encumbrance	Other assets capable of being encumbered	Reverse repos/stock borrowing receivables and derivative assets	Assets that cannot be encumbered	Total
	$m	$m	$m	$m	$m	$m	$m	$m	$m
Cash and balances at central banks	–	–	–	493	155,813	24	–	6,513	162,843
Items in the course of collection from other banks	–	–	–	–	–	–	–	5,787	5,787
Hong Kong Government certificates of indebtedness	–	–	–	–	–	–	–	35,859	35,859
Trading assets	–	–	68,877	3,221	137,589	8,493	18,279	1,671	238,130
– treasury and other eligible bills	–	–	2,367	2,357	17,707	209	–	34	22,674
– debt securities	–	–	44,000	864	83,640	1,803	–	232	130,539
– equity securities	–	–	22,510	–	36,242	2,070	–	74	60,896
– loans and advances to banks	–	–	–	–	–	2,768	6,753	904	10,425
– loans and advances to customers	–	–	–	–	–	1,643	11,526	427	13,596
Financial assets designated and otherwise mandatorily measured at fair value through profit or loss	–	–	1,177	–	2,135	7,601	605	29,593	41,111
– treasury and other eligible bills	–	–	627	–	–	–	–	43	670
– debt securities	–	–	–	–	297	4	–	6,246	6,547
– equity securities	–	–	–	–	1,676	1,035	–	22,638	25,349
– loans and advances to banks and customers	–	–	–	–	162	6,331	605	619	7,717
– other assets	–	–	550	–	–	231	–	47	828
Derivatives	–	–	–	–	–	–	207,825	–	207,825
Loans and advances to banks	–	–	170	2,367	1,947	45,992	–	21,691	72,167
Loans and advances to customers	6,621	7,653	4,036	58,737	15,867	847,301	28	41,453	981,696
Reverse repurchase agreements – non-trading	–	–	–	–	–	–	242,804	–	242,804
Financial investments	–	670	28,723	21,310	285,374	5,157	–	66,199	407,433
– treasury and other eligible bills	–	276	1,079	5,377	88,556	1,235	–	798	97,321
– debt securities	–	394	27,644	15,933	196,436	3,466	–	64,485	308,358
– equity securities	–	–	–	–	382	456	–	819	1,657
– other investments	–	–	–	–	–	–	–	97	97
Prepayments, accrued income and other assets	–	3	35,407	88	3,609	33,060	–	38,404	110,571
Current tax assets	–	–	–	–	–	–	–	684	684
Interest in associates and joint ventures	–	–	–	–	15	21,994	–	398	22,407
Goodwill and intangible assets	–	–	–	–	–	–	–	24,357	24,357
Deferred tax	–	–	–	–	–	–	–	4,450	4,450
At 31 Dec 2018	6,621	8,326	138,390	86,216	602,349	969,622	469,541	277,059	2,558,124

Other risks

Non-trading book exposures in equities

At 31 December 2019, we had equity investments in the non-trading book of $5.9bn (2018: $5.0bn). These consist of investments held for the purposes shown in Table 68.

We make investments in private equity primarily through managed funds that are subject to limits on the amount of investment. We risk-assess these commitments to ensure that industry and geographical concentrations remain within acceptable levels for the portfolio as a whole, and perform regular reviews to substantiate the valuation of the investments within the portfolio.

Exchange traded investments amounted to $0.5bn (2018: $0.7bn), with the remainder being unlisted. These investments are held at fair value in line with market prices.

On a regulatory consolidation basis, the net realised gain from disposal of equity securities amounted to $0.1bn (2018: $0.1bn). Unrealised gains on FVOCI equities of $0.6bn at 31 December 2019 were fully recognised in CET1.

Details of our accounting policy for equity investments measured at FVOCI and the valuation of financial instruments may be found on page 244 of the Annual Report and Accounts 2019. *A detailed description of the valuation techniques applied to private equity may be found on page 269 of the* Annual Report and Accounts 2019.

Table 68: Non-trading book equity investments

	Fair value through other comprehensive income (FVOCI)	Mandatorily measured at fair value through profit and loss	Total
	$bn	$bn	$bn
Private equity holdings	**—**	**2.4**	**2.4**
Investment to facilitate ongoing business[1]	**2.0**	**1.3**	**3.3**
Other strategic investments	**—**	**0.2**	**0.2**
At 31 Dec 2019	**2.0**	**3.9**	**5.9**
Private equity holdings	—	1.9	1.9
Investment to facilitate ongoing business	1.7	1.1	2.8
Other strategic investments	—	0.3	0.3
At 31 Dec 2018	1.7	3.3	5.0

1 *Includes holdings in government-sponsored enterprises and local stock exchanges.*

Risk management of insurance operations

We operate an integrated bancassurance model that provides insurance products principally for customers with whom we have a banking relationship.

The insurance contracts we sell relate to the underlying needs of our banking customers, which we can identify from our point-of-sale contacts and customer knowledge. The majority of sales are of savings and investment products and term and credit life contracts.

By focusing largely on personal and small- and medium-sized enterprises ('SMEs') lines of business, we are able to optimise volumes and diversify individual insurance risks.

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

We have life insurance manufacturing subsidiaries in Argentina, mainland China, France, Hong Kong, Malaysia, Malta, Mexico, Singapore and the UK. We also have a life insurance manufacturing associate in India.

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

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

The risk profile of our insurance manufacturing businesses is measured using an economic capital approach. Assets and liabilities are measured on a market value basis, and a capital requirement is defined to ensure that there is a less than one-in-200 chance of insolvency over a one-year time horizon, given the risks to which the businesses are exposed. The methodology for the economic capital calculation is largely aligned to the pan-European Solvency II insurance capital regulations.

Subsidiaries engaged in insurance activities are excluded from the regulatory consolidation by excluding assets, liabilities and post-acquisition reserves, leaving the investment of these insurance subsidiaries to be recorded at cost and deducted from CET1 subject to thresholds (amounts below the thresholds are risk-weighted).

Further details of the management of financial risks and insurance risk arising from the insurance operations are provided on page 146 of the Annual Report and Accounts 2019.

Climate change risk

Climate change can create physical risks such as severe weather events of increasing severity and/or frequency. Transition risk, in the context of climate change, is the possibility that a customer's ability to meet its financial obligations will deteriorate due to the global movement from a high-carbon economy to a low-carbon economy.

We are a signatory to the disclosure recommendations by the Financial Stability Board's Task Force on Climate-related Financial Disclosures.

Refer to page 22 of the Annual Report and Accounts 2019 *for our disclosure under the framework.*

Appendix I

Additional tables

Credit risk

Table 69 sets out IRB exposures by obligor grade for central governments and central banks, institutions and corporates, all of which are assessed using our 23-grade CRR master scale. We benchmark the master scale against the ratings of external rating agencies. Each CRR band is associated with an external rating grade by reference to long-run default rates for that grade, represented by the average of issuer-weighted historical default rates. The correspondence between the agency long-run default rates and the PD ranges of our master scale is obtained by matching a smoothed curve based on those default rates with our master scale reference PDs. This association between internal and external ratings is indicative and may vary over time. In these tables, the ratings of S&P are cited for illustration purposes, although we also benchmark against other agencies' ratings in an equivalent manner.

Table 69: Wholesale IRB exposure – by obligor grade

			Central governments and central banks			Institutions			Corporates[2]		
Default risk	**CRR**	**PD range**	**Average net carrying values[1]**	**Undrawn commitments**	**Mapped external rating**	**Average net carrying values[1]**	**Undrawn commitments**	**Mapped external rating**	**Average net carrying values[1]**	**Undrawn commitments**	**Mapped external rating**
		%	$bn	$bn		$bn	$bn		$bn	$bn	
Minimal	0.1	0.000 to 0.010	**214.4**	**0.9**	**AAA to AA**	**2.5**	**–**	**AAA**	**0.4**	**–**	**–**
	1.1	0.011 to 0.028	**70.1**	**1.2**	**AA- to A+**	**34.5**	**2.2**	**AA+ to AA**	**32.1**	**20.2**	**AAA to AA**
	1.2	0.029 to 0.053	**25.0**	**0.3**	**A to A-**	**13.6**	**1.5**	**AA-**	**67.4**	**44.6**	**AA-**
Low	2.1	0.054 to 0.095	**9.7**	**0.3**	**BBB+**	**11.0**	**2.7**	**A+ to A**	**91.5**	**60.8**	**A+ to A**
	2.2	0.096 to 0.169	**9.6**	**–**	**BBB**	**11.9**	**3.6**	**A-**	**109.2**	**62.7**	**A-**
Satisfactory	3.1	0.170 to 0.285	**2.4**	**0.3**	**BBB-**	**4.0**	**1.2**	**BBB+**	**123.9**	**71.4**	**BBB+**
	3.2	0.286 to 0.483	**2.1**	**–**	**BBB-**	**2.4**	**0.3**	**BBB**	**120.8**	**57.4**	**BBB**
	3.3	0.484 to 0.740	**3.0**	**0.3**	**BB+/BB**	**1.3**	**0.1**	**BBB-**	**108.3**	**46.9**	**BBB-**
Fair	4.1	0.741 to 1.022	**1.4**	**–**	**BB-**	**0.9**	**0.3**	**BB+**	**77.0**	**35.3**	**BB+**
	4.2	1.023 to 1.407	**0.5**	**0.1**	**B+**	**0.5**	**0.1**	**BB**	**60.6**	**24.7**	**BB**
	4.3	1.408 to 1.927	**3.1**	**–**	**B+**	**0.2**	**0.1**	**BB-**	**47.5**	**21.0**	**BB-**
Moderate	5.1	1.928 to 2.620	**1.5**	**–**	**B+**	**0.1**	**–**	**BB-**	**84.7**	**31.4**	**BB-**
	5.2	2.621 to 3.579	**–**	**–**	**B**	**–**	**–**	**B+**	**25.9**	**12.6**	**B+**
	5.3	3.580 to 4.914	**0.2**	**–**	**B**	**–**	**–**	**B**	**19.8**	**9.7**	**B**
Significant	6.1	4.915 to 6.718	**–**	**0.1**	**B-**	**–**	**–**	**B-**	**10.7**	**4.5**	**B-**
	6.2	6.719 to 8.860	**0.4**	**0.1**	**B-**	**–**	**–**	**B-**	**6.1**	**1.8**	**B-**
High	7.1	8.861 to 11.402	**–**	**–**	**B-**	**–**	**–**	**CCC+**	**4.1**	**1.7**	**CCC+**
	7.2	11.403 to 15.000	**–**	**–**	**CCC+**	**0.1**	**0.1**	**CCC+**	**1.9**	**0.5**	**CCC+**
Special Management	8.1	15.001 to 22.000	**0.1**	**–**	**CCC+**	**–**	**–**	**CCC**	**2.6**	**1.4**	**CCC**
	8.2	22.001 to 50.000	**0.1**	**–**	**CCC**	**–**	**–**	**CCC- to CC**	**0.7**	**0.5**	**CCC- to CC**
	8.3	50.001 to 99.999	**0.3**	**–**	**CCC- to C**	**–**	**–**	**C**	**0.2**	**0.1**	**C**
Default	9/10	100.000	**–**	**–**	**Default**	**–**	**–**	**Default**	**4.0**	**0.9**	**Default**
At 31 Dec 2019			**343.9**	**3.6**		**83.0**	**12.2**		**999.4**	**510.1**	
Minimal	0.1	0.000 to 0.010	182.6	1.0	AAA	2.4	–	AAA	–	–	
	1.1	0.011 to 0.028	77.4	0.9	AA+ to AA	32.1	2.1	AA+ to AA	28.7	12.6	AAA to AA
	1.2	0.029 to 0.053	22.5	0.4	AA- to A+	17.6	1.4	AA-	64.6	39.1	AA-
Low	2.1	0.054 to 0.095	8.1	0.3	A	13.1	2.8	A+ to A	89.9	50.3	A+ to A
	2.2	0.096 to 0.169	10.6	–	A-	11.9	3.3	A-	106.9	73.1	A-
Satisfactory	3.1	0.170 to 0.285	2.6	–	BBB+	3.1	0.7	BBB+	125.2	68.9	BBB+
	3.2	0.286 to 0.483	1.9	–	BBB	3.7	0.3	BBB	113.8	59.8	BBB
	3.3	0.484 to 0.740	2.8	0.2	BBB-	2.4	0.2	BBB-	104.4	47.5	BBB-
Fair	4.1	0.741 to 1.022	1.8	0.1	BB+	0.9	0.2	BB+	75.9	33.7	BB+
	4.2	1.023 to 1.407	0.3	0.1	BB	0.4	0.2	BB	54.2	28.8	BB
	4.3	1.408 to 1.927	1.5	0.1	BB-	0.3	0.1	BB-	49.4	19.8	BB-
Moderate	5.1	1.928 to 2.620	2.6	–	BB-	0.1	–	BB-	82.2	30.8	BB-
	5.2	2.621 to 3.579	–	–	B+	0.2	–	B+	24.0	10.1	B+
	5.3	3.580 to 4.914	0.2	–	B	–	–	B	19.6	8.5	B
Significant	6.1	4.915 to 6.718	0.1	–	B	–	–	B-	11.7	4.8	B-
	6.2	6.719 to 8.860	0.3	0.1	B-	–	–	B-	6.0	1.9	B-
High	7.1	8.861 to 11.402	0.1	–	CCC+	–	–	CCC+	3.1	1.0	CCC+
	7.2	11.403 to 15.000	–	–	CCC+	0.1	0.1	CCC+	2.0	0.6	CCC+
Special Management	8.1	15.001 to 22.000	–	–	CCC+	–	–	CCC	2.5	1.5	CCC
	8.2	22.001 to 50.000	–	–	CCC+	–	–	CCC- to CC	1.0	0.4	CCC- to CC
	8.3	50.001 to 99.999	–	–	CCC to C	–	–	C	0.4	0.2	C
Default	9/10	100.000	–	–	Default	–	–	Default	4.3	1.2	Default
At 31 Dec 2018			315.4	3.2		88.3	11.4		969.8	494.6	

1 Average net carrying value are calculated by aggregating the net carrying values of the last five quarters and dividing by five.
2 Corporates excludes specialised lending exposures subject to supervisory slotting approach.

PD, LGD, RWA and exposure by country/territory

The following tables 70. a-c analyse the exposure-weighted average PD, exposure-weighted average LGD, RWAs and exposure by location of the lending subsidiary or branch. The tables exclude specialised lending exposures subject to the supervisory slotting approach, securitisation exposures and non-credit obligations.

Table 70.a: PD, LGD, RWA and exposure by country/territory – wholesale IRB advanced approach

	Wholesale IRB advanced approach							
	All asset classes				Central governments and central banks			
	At 31 Dec 2019				At 31 Dec 2019			
	Exposure-weighted average PD	Exposure-weighted average LGD	Exposure value	RWAs	Exposure-weighted average PD	Exposure-weighted average LGD	Exposure value	RWAs
	%	%	$bn	$bn	%	%	$bn	$bn
Europe	**1.88**	**35.3**	**236.7**	**96.1**	**0.04**	**44.9**	**47.3**	**4.1**
UK	**1.87**	**35.8**	**186.9**	**76.5**	**0.03**	**44.7**	**39.6**	**2.9**
France	**2.31**	**30.2**	**39.3**	**17.5**	**0.03**	**45.0**	**0.7**	**0.1**
Asia	**0.65**	**42.9**	**573.8**	**176.4**	**0.03**	**43.7**	**208.6**	**15.9**
Hong Kong	**0.64**	**39.0**	**317.0**	**87.6**	**0.01**	**42.7**	**102.5**	**5.5**
Australia	**0.53**	**42.9**	**27.6**	**8.2**	**0.01**	**45.0**	**9.5**	**0.5**
Mainland China	**0.61**	**48.6**	**74.8**	**28.2**	**0.02**	**45.0**	**27.5**	**2.0**
Singapore	**0.41**	**41.7**	**45.5**	**10.5**	**0.01**	**44.1**	**18.6**	**1.0**
Middle East and North Africa	**0.43**	**43.9**	**24.0**	**7.6**	**0.40**	**45.0**	**18.2**	**6.0**
North America	**0.95**	**34.0**	**182.8**	**66.3**	**0.01**	**29.8**	**59.9**	**4.9**
US	**0.88**	**32.9**	**121.3**	**43.7**	**0.01**	**29.8**	**41.7**	**3.1**
Canada	**1.15**	**33.6**	**57.3**	**22.1**	**0.02**	**29.6**	**15.1**	**1.6**
Latin America	**11.10**	**44.8**	**10.2**	**5.8**	**11.84**	**45.0**	**9.5**	**5.4**

	Wholesale IRB advanced approach							
	Institutions				Corporates			
	At 31 Dec 2019				At 31 Dec 2019			
	Exposure-weighted average PD	Exposure-weighted average LGD	Exposure value	RWAs	Exposure-weighted average PD	Exposure-weighted average LGD	Exposure value	RWAs
	%	%	$bn	$bn	%	%	$bn	$bn
Europe	**0.16**	**32.5**	**17.2**	**3.4**	**2.56**	**33.0**	**172.2**	**88.6**
UK	**0.16**	**27.7**	**12.8**	**2.3**	**2.57**	**33.9**	**134.5**	**71.3**
France	**0.16**	**45.1**	**1.8**	**0.5**	**2.46**	**29.2**	**36.8**	**16.9**
Asia	**0.07**	**44.7**	**40.6**	**5.8**	**1.13**	**42.2**	**324.6**	**154.7**
Hong Kong	**0.05**	**38.5**	**27.2**	**3.3**	**1.06**	**37.0**	**187.3**	**78.8**
Australia	**0.06**	**42.5**	**2.2**	**0.4**	**0.91**	**41.7**	**15.9**	**7.3**
Mainland China	**0.10**	**46.1**	**4.3**	**0.8**	**1.03**	**51.1**	**43.0**	**25.4**
Singapore	**0.06**	**39.9**	**3.9**	**0.4**	**0.79**	**40.0**	**23.0**	**9.1**
Middle East and North Africa	**0.15**	**45.0**	**2.1**	**0.5**	**0.74**	**32.7**	**3.7**	**1.1**
North America	**0.06**	**41.4**	**5.8**	**0.8**	**1.47**	**36.4**	**117.1**	**60.6**
US	**0.13**	**44.4**	**1.5**	**0.4**	**1.37**	**34.3**	**78.1**	**40.2**
Canada	**0.03**	**21.4**	**3.4**	**0.2**	**1.69**	**36.2**	**38.8**	**20.3**
Latin America	**0.42**	**45.1**	**0.5**	**0.3**	**1.36**	**31.6**	**0.2**	**0.1**

Table 70.b: PD, LGD, RWA and exposure by country/territory – wholesale IRB foundation approach

	Wholesale IRB foundation approach							
	All asset classes				Central governments and central banks			
	At 31 Dec 2019				At 31 Dec 2019			
	Exposure-weighted average PD	Exposure-weighted average LGD	Exposure value	RWAs	Exposure-weighted average PD	Exposure-weighted average LGD	Exposure value	RWAs
	%	%	$bn	$bn	%	%	$bn	$bn
Europe	**2.04**	**43.7**	**38.1**	**22.7**	**0.02**	**45.0**	**–**	**–**
UK	**2.39**	**40.7**	**16.1**	**9.7**	**–**	**–**	**–**	**–**
France	**1.21**	**40.0**	**1.7**	**1.1**	**–**	**–**	**–**	**–**
Asia	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**
Hong Kong	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**
Australia	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**
Mainland China	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**
Singapore	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**
Middle East and North Africa	**3.70**	**43.2**	**16.9**	**9.6**	**0.03**	**45.0**	**0.1**	**–**
North America	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**
US	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**
Canada	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**
Latin America	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**

	Wholesale IRB foundation approach							
	Institutions				Corporates			
	At 31 Dec 2019				At 31 Dec 2019			
	Exposure-weighted average PD	Exposure-weighted average LGD	Exposure value	RWAs	Exposure-weighted average PD	Exposure-weighted average LGD	Exposure value	RWAs
	%	%	$bn	$bn	%	%	$bn	$bn
Europe	**0.14**	**45.0**	**0.1**	**–**	**2.05**	**43.7**	**38.0**	**22.7**
UK	**0.13**	**45.0**	**–**	**–**	**2.39**	**40.7**	**16.1**	**9.7**
France	**–**	**–**	**–**	**–**	**1.21**	**40.0**	**1.7**	**1.1**
Asia	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**
Hong Kong	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**
Australia	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**
Mainland China	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**
Singapore	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**
Middle East and North Africa	**0.07**	**45.0**	**0.6**	**0.2**	**3.86**	**43.1**	**16.2**	**9.4**
North America	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**
US	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**
Canada	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**
Latin America	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**

Table 70.c: PD, LGD, RWA and exposure by country/territory – retail IRB approach

	Retail IRB approach											
	All asset classes				Retail secured by mortgages on immovable property non-SME				Retail secured by mortgages on immovable property SME			
	At 31 Dec 2019				At 31 Dec 2019				At 31 Dec 2019			
	Exposure-weighted average PD	Exposure-weighted average LGD	Exposure value	RWAs	Exposure-weighted average PD	Exposure-weighted average LGD	Exposure value	RWAs	Exposure-weighted average PD	Exposure-weighted average LGD	Exposure value	RWAs
	%	%	$bn	$bn	%	%	$bn	$bn	%	%	$bn	$bn
Europe	**1.56**	**28.1**	**234.7**	**30.4**	**1.05**	**15.3**	**152.9**	**7.9**	**6.38**	**34.5**	**2.6**	**1.5**
UK	**1.35**	**31.2**	**200.3**	**26.9**	**0.95**	**15.4**	**149.6**	**7.3**	**4.25**	**36.8**	**2.0**	**1.1**
France	**3.42**	**13.1**	**26.5**	**3.3**	**6.01**	**13.9**	**3.3**	**0.6**	**13.91**	**26.4**	**0.6**	**0.4**
Asia	**0.88**	**28.9**	**192.3**	**36.1**	**0.83**	**10.7**	**123.0**	**24.1**	**0.77**	**11.4**	**0.5**	**–**
Hong Kong	**0.76**	**33.7**	**150.4**	**31.7**	**0.59**	**10.0**	**85.8**	**19.9**	**0.77**	**11.4**	**0.5**	**–**
Australia	**0.89**	**10.0**	**18.8**	**1.1**	**0.89**	**10.0**	**18.8**	**1.1**	**–**	**–**	**–**	**–**
Mainland China	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**
Singapore	**0.80**	**14.1**	**11.8**	**1.3**	**0.94**	**19.6**	**7.2**	**1.0**	**–**	**–**	**–**	**–**
Middle East and North Africa	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**
North America	**2.75**	**39.7**	**46.6**	**11.3**	**2.74**	**32.6**	**39.8**	**8.4**	**0.88**	**18.4**	**0.3**	**–**
US	**4.85**	**60.8**	**22.9**	**8.7**	**5.36**	**51.0**	**17.7**	**6.3**	**–**	**–**	**–**	**–**
Canada	**0.72**	**19.3**	**23.8**	**2.6**	**0.64**	**17.8**	**22.1**	**2.1**	**0.88**	**18.4**	**0.3**	**–**
Latin America	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**

	Retail IRB approach											
	Retail QRRE				Other SME				Other non-SME			
	At 31 Dec 2019				At 31 Dec 2019				At 31 Dec 2019			
	Exposure-weighted average PD	Exposure-weighted average LGD	Exposure value	RWAs	Exposure-weighted average PD	Exposure-weighted average LGD	Exposure value	RWAs	Exposure-weighted average PD	Exposure-weighted average LGD	Exposure value	RWAs
	%	%	$bn	$bn	%	%	$bn	$bn	%	%	$bn	$bn
Europe	**1.69**	**79.3**	**34.9**	**7.6**	**9.93**	**66.8**	**5.8**	**4.5**	**1.86**	**26.7**	**38.6**	**8.9**
UK	**1.69**	**79.3**	**34.9**	**7.6**	**8.05**	**81.4**	**4.1**	**3.9**	**2.99**	**79.5**	**9.7**	**7.0**
France	**32.83**	**77.5**	**–**	**–**	**14.53**	**31.3**	**1.7**	**0.6**	**1.83**	**11.2**	**20.9**	**1.7**
Asia	**1.02**	**96.7**	**40.7**	**9.1**	**0.28**	**26.9**	**0.1**	**–**	**0.86**	**10.6**	**27.9**	**2.9**
Hong Kong	**1.02**	**96.7**	**40.7**	**9.1**	**0.28**	**26.9**	**0.1**	**–**	**0.91**	**11.6**	**23.3**	**2.7**
Australia	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**
Mainland China	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**
Singapore	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**0.59**	**5.6**	**4.6**	**0.3**
Middle East and North Africa	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**
North America	**2.64**	**91.7**	**4.7**	**2.1**	**3.31**	**51.2**	**0.3**	**0.2**	**3.39**	**67.0**	**1.6**	**0.6**
US	**2.65**	**93.6**	**4.4**	**1.9**	**–**	**–**	**–**	**–**	**5.45**	**96.7**	**0.8**	**0.5**
Canada	**2.38**	**63.8**	**0.3**	**0.1**	**3.31**	**51.2**	**0.3**	**0.2**	**1.15**	**34.6**	**0.8**	**0.2**
Latin America	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**

Table 71: Retail IRB exposure – by internal PD band

	PD range	At 31 Dec 2019		At 31 Dec 2018	
		Average net carrying values[1]	Undrawn commitments	Average net carrying values[1]	Undrawn commitments
	%	$bn	$bn	$bn	$bn
Retail SME exposure secured by mortgages on immovable property		**3.6**	**0.3**	3.2	0.3
Band 1	0.000 to 0.483	**1.1**	**0.1**	1.0	0.1
Band 2	0.484 to 1.022	**0.7**	**0.1**	0.6	0.1
Band 3	1.023 to 4.914	**1.3**	**0.1**	1.2	0.1
Band 4	4.915 to 8.860	**0.3**	**–**	0.2	–
Band 5	8.861 to 15.000	**0.1**	**–**	0.1	–
Band 6	15.001 to 50.000	**–**	**–**	–	–
Band 7	50.001 to 100.000	**0.1**	**–**	0.1	–
Retail non-SME exposure secured by mortgages on immovable property		**298.9**	**17.4**	280.9	17.3
Band 1	0.000 to 0.483	**252.0**	**15.8**	234.9	15.5
Band 2	0.484 to 1.022	**22.2**	**0.8**	21.4	1.0
Band 3	1.023 to 4.914	**18.7**	**0.7**	17.7	0.7
Band 4	4.915 to 8.860	**1.9**	**–**	2.4	–
Band 5	8.861 to 15.000	**0.6**	**0.1**	0.5	–
Band 6	15.001 to 50.000	**1.3**	**–**	1.6	0.1
Band 7	50.001 to 100.000	**2.2**	**–**	2.4	–
Qualifying revolving retail exposure		**135.1**	**117.8**	129.1	111.6
Band 1	0.000 to 0.483	**107.1**	**101.9**	102.7	95.0
Band 2	0.484 to 1.022	**12.0**	**8.1**	11.5	8.1
Band 3	1.023 to 4.914	**13.0**	**6.7**	12.3	7.5
Band 4	4.915 to 8.860	**1.5**	**0.6**	1.4	0.6
Band 5	8.861 to 15.000	**0.6**	**0.2**	0.5	0.2
Band 6	15.001 to 50.000	**0.6**	**0.2**	0.5	0.2
Band 7	50.001 to 100.000	**0.3**	**0.1**	0.2	–
Other retail SME exposure		**7.8**	**4.3**	8.7	3.8
Band 1	0.000 to 0.483	**1.3**	**1.1**	1.2	0.9
Band 2	0.484 to 1.022	**1.2**	**0.9**	1.4	0.9
Band 3	1.023 to 4.914	**3.8**	**1.7**	4.3	1.6
Band 4	4.915 to 8.860	**0.8**	**0.3**	1.0	0.2
Band 5	8.861 to 15.000	**0.3**	**0.1**	0.3	0.1
Band 6	15.001 to 50.000	**0.3**	**0.1**	0.3	0.1
Band 7	50.001 to 100.000	**0.1**	**0.1**	0.2	–
Other retail non-SME exposure		**62.6**	**27.4**	54.8	15.9
Band 1	0.000 to 0.483	**39.4**	**22.7**	34.1	12.4
Band 2	0.484 to 1.022	**10.7**	**2.2**	9.1	1.6
Band 3	1.023 to 4.914	**10.4**	**2.4**	9.6	1.7
Band 4	4.915 to 8.860	**1.2**	**0.1**	1.1	0.1
Band 5	8.861 to 15.000	**0.4**	**–**	0.4	–
Band 6	15.001 to 50.000	**0.2**	**–**	0.2	–
Band 7	50.001 to 100.000	**0.3**	**–**	0.3	0.1
Total retail exposure		**508.0**	**167.3**	476.7	149.0
Band 1	0.000 to 0.483	**400.9**	**141.7**	373.9	124.0
Band 2	0.484 to 1.022	**46.8**	**12.1**	44.0	11.7
Band 3	1.023 to 4.914	**47.2**	**11.6**	45.1	11.6
Band 4	4.915 to 8.860	**5.7**	**1.0**	6.1	0.9
Band 5	8.861 to 15.000	**2.0**	**0.4**	1.8	0.3
Band 6	15.001 to 50.000	**2.4**	**0.3**	2.6	0.4
Band 7	50.001 to 100.000	**3.0**	**0.2**	3.2	0.1

1 Average net carrying values are calculated by aggregating the net carrying values of the last five quarters and dividing by five.

Table 72: IRB expected loss and CRAs – by exposure class

			CRA	
		Expected loss	Balances	Charge for the year
		$bn	$bn	$bn
1	**Total IRB approach**			
2	Central governments and central banks	**0.6**	**0.1**	**–**
3	Institutions	**–**	**–**	**–**
4	Corporates	**5.5**	**4.3**	**1.0**
5	Retail	**2.6**	**2.0**	**1.1**
	– secured by mortgages on immovable property SME	**0.1**	**0.1**	**–**
	– secured by mortgages on immovable property non-SME	**0.8**	**0.2**	**–**
	– qualifying revolving retail	**0.9**	**1.0**	**0.6**
	– other SME	**0.4**	**0.3**	**0.2**
	– other non-SME	**0.4**	**0.4**	**0.3**
6	**Total at 31 Dec 2019**	**8.7**	**6.4**	**2.1**
1	Total IRB approach			
2	Central governments and central banks	0.1	0.1	–
3	Institutions	–	–	–
4	Corporates	5.0	4.1	0.5
5	Retail	2.4	1.8	0.9
	– secured by mortgages on immovable property SME	0.1	0.1	0.1
	– secured by mortgages on immovable property non-SME	0.8	0.3	–
	– qualifying revolving retail	0.7	0.7	0.4
	– other SME	0.4	0.3	0.2
	– other non-SME	0.4	0.4	0.2
6	Total at 31 Dec 2018	7.5	6.0	1.4
1	Total IRB approach			
2	Central governments and central banks	0.1	–	–
3	Institutions	–	–	–
4	Corporates	5.3	4.2	0.7
5	Retail	2.5	1.0	0.3
	– secured by mortgages on immovable property non-SME	0.8	0.3	–
	– qualifying revolving retail	0.8	0.2	0.2
	– other SME	0.5	0.3	–
	– other non-SME	0.4	0.2	0.1
6	Total at 31 Dec 2017	7.9	5.2	1.0

Table 73: Credit risk RWAs – by geographical region

	RWAs					
	Europe	Asia	MENA	North America	Latin America	Total
	$bn	$bn	$bn	$bn	$bn	$bn
IRB advanced approach	**138.1**	**218.3**	**7.6**	**82.8**	**5.8**	**452.6**
– central governments and central banks	**4.1**	**15.9**	**6.0**	**4.9**	**5.4**	**36.3**
– institutions	**3.4**	**5.8**	**0.5**	**0.8**	**0.3**	**10.8**
– corporates	**100.2**	**160.5**	**1.1**	**65.8**	**0.1**	**327.7**
– total retail	**30.4**	**36.1**	**–**	**11.3**	**–**	**77.8**
IRB securitisation positions	**3.5**	**0.2**	**–**	**–**	**–**	**3.7**
IRB non-credit obligation assets	**4.6**	**4.9**	**0.9**	**2.0**	**0.9**	**13.3**
IRB foundation approach	**22.7**	**–**	**9.6**	**–**	**–**	**32.3**
– institutions	**–**	**–**	**0.2**	**–**	**–**	**0.2**
– corporates	**22.7**	**–**	**9.4**	**–**	**–**	**32.1**
Standardised approach	**39.4**	**68.5**	**29.9**	**13.7**	**23.2**	**174.7**
– central governments and central banks	**3.5**	**1.9**	**0.5**	**4.3**	**1.0**	**11.2**
– regional governments or local authorities	**–**	**–**	**0.9**	**–**	**0.7**	**1.6**
– public sector entities	**–**	**–**	**–**	**–**	**–**	**–**
– institutions	**0.1**	**0.1**	**0.6**	**–**	**0.1**	**0.9**
– corporates	**15.1**	**17.0**	**20.1**	**5.0**	**15.3**	**72.5**
– retail	**1.1**	**5.4**	**3.7**	**0.9**	**3.3**	**14.4**
– secured by mortgages on immovable property	**3.3**	**5.5**	**1.4**	**0.6**	**1.2**	**12.0**
– exposures in default	**0.8**	**0.5**	**1.9**	**0.3**	**0.6**	**4.1**
– items associated with particularly high risk	**7.2**	**–**	**0.1**	**0.5**	**0.1**	**7.9**
– securitisation positions	**2.3**	**1.3**	**–**	**0.8**	**0.2**	**4.6**
– claims in the form of CIU	**0.4**	**–**	**–**	**–**	**–**	**0.4**
– equity	**2.9**	**32.0**	**0.2**	**1.0**	**0.2**	**36.3**
– other items	**2.7**	**4.8**	**0.5**	**0.3**	**0.5**	**8.8**
Total at 31 Dec 2019	**208.3**	**291.9**	**48.0**	**98.5**	**29.9**	**676.6**
IRB advanced approach	150.3	216.2	7.3	86.5	7.9	468.2
– central governments and central banks	4.2	15.1	5.0	5.4	7.2	36.9
– institutions	4.5	7.6	0.5	1.1	0.5	14.2
– corporates	113.2	162.0	1.8	67.9	0.2	345.1
– total retail	28.4	31.5	–	12.1	–	72.0
IRB securitisation positions	5.6	0.2	–	0.5	–	6.3
IRB non-credit obligation assets	3.5	4.7	0.6	1.3	0.7	10.8
IRB foundation approach	21.0	–	9.5	–	–	30.5
– institutions	–	–	0.2	–	–	0.2
– corporates	21.0	–	9.3	–	–	30.3
Standardised approach	39.0	70.8	29.6	14.8	21.1	175.3
– central governments and central banks	3.6	1.7	0.6	5.4	1.2	12.5
– regional governments or local authorities	–	–	0.8	–	0.5	1.3
– public sector entities	–	–	–	–	–	–
– institutions	0.2	0.2	0.8	–	–	1.2
– corporates	18.4	20.3	20.4	5.9	14.2	79.2
– retail	0.9	6.3	3.7	0.9	3.0	14.8
– secured by mortgages on immovable property	2.4	6.3	1.2	0.5	0.9	11.3
– exposures in default	1.0	0.5	1.4	0.3	0.6	3.8
– items associated with particularly high risk	6.3	–	0.1	0.4	0.1	6.9
– securitisation positions	0.6	1.4	–	–	0.1	2.1
– claims in the form of CIU	0.6	–	–	–	–	0.6
– equity	2.8	30.6	0.2	1.1	0.3	35.0
– other items	2.2	3.5	0.4	0.3	0.2	6.6
Total at 31 Dec 2018	219.4	291.9	47.0	103.1	29.7	691.1

Table 74: Standardised exposure – by credit quality step

	At 31 Dec 2019			At 31 Dec 2018		
	Original exposure[1]	**Exposure value**	**RWAs^**	Original exposure[1]	Exposure value	RWAs^
	$bn	**$bn**	**$bn**	$bn	$bn	$bn
Central governments and central banks						
Credit quality step 1	**171.3**	**180.5**		158.0	166.3	
Credit quality step 2	**0.3**	**0.2**		0.3	0.2	
Credit quality step 3	**0.4**	**0.4**		0.4	0.5	
Credit quality step 4	**–**	**–**		–	–	
Credit quality step 5	**–**	**–**		–	–	
Credit quality step unrated	**4.6**	**4.4**		5.0	5.0	
	176.6	**185.5**	**11.2**	163.7	172.0	12.5
Institutions						
Credit quality step 1	**0.3**	**0.4**		0.4	0.4	
Credit quality step 2	**0.9**	**0.2**		2.5	1.5	
Credit quality step 3	**0.7**	**0.6**		–	–	
Credit quality step 4	**–**	**–**		0.1	0.1	
Credit quality step 5	**0.1**	**0.1**		–	–	
Credit quality step unrated	**0.4**	**0.3**		0.2	0.2	
	2.4	**1.6**	**0.9**	3.2	2.2	1.2
Corporates						
Credit quality step 1	**1.6**	**4.0**		1.9	3.6	
Credit quality step 2	**3.7**	**2.7**		5.2	3.4	
Credit quality step 3	**2.4**	**1.7**		5.4	3.6	
Credit quality step 4	**2.6**	**1.8**		2.2	1.6	
Credit quality step 5	**0.6**	**0.4**		1.2	0.7	
Credit quality step 6	**0.6**	**0.3**		0.2	0.1	
Credit quality step unrated	**148.9**	**65.9**		163.9	71.1	
	160.4	**76.8**	**72.5**	180.0	84.1	79.2

1 Figures presented on an 'obligor basis'.
^ Figures have been prepared on an IFRS 9 transitional basis.

Table 75: Specialised lending on slotting approach (CR10)

Regulatory categories	**Remaining maturity**	**On-balance sheet amount** **$bn**	**Off-balance sheet amount** **$bn**	**Risk weight** **%**	**Exposure amount** **$bn**	**RWAs** **$bn**	**Expected loss** **$bn**
Category 1 – Strong	Less than 2.5 years	**15.6**	**2.6**	**50**	**16.7**	**8.4**	**–**
	Equal to or more than 2.5 years	**11.5**	**2.3**	**70**	**12.5**	**8.7**	**0.1**
Category 2 – Good	Less than 2.5 years	**3.6**	**0.3**	**70**	**3.7**	**2.6**	**–**
	Equal to or more than 2.5 years	**2.0**	**0.8**	**90**	**2.3**	**2.1**	**–**
Category 3 – Satisfactory	Less than 2.5 years	**0.5**	**–**	**115**	**0.5**	**0.5**	**–**
	Equal to or more than 2.5 years	**0.1**	**–**	**115**	**0.1**	**0.1**	**–**
Category 4 – Weak	Less than 2.5 years	**0.1**	**–**	**250**	**0.1**	**0.2**	**–**
	Equal to or more than 2.5 years	**–**	**–**	**250**	**–**	**–**	**–**
Category 5 – Default	Less than 2.5 years	**0.5**	**–**	**–**	**0.8**	**–**	**0.4**
	Equal to or more than 2.5 years	**–**	**–**	**–**	**0.1**	**–**	**–**
Total at 31 Dec 2019	Less than 2.5 years	**20.3**	**2.9**		**21.8**	**11.7**	**0.4**
	Equal to or more than 2.5 years	**13.6**	**3.1**		**15.0**	**10.9**	**0.1**
Category 1 – Strong	Less than 2.5 years	14.8	2.7	50	15.9	8.0	–
	Equal to or more than 2.5 years	11.7	2.6	70	12.7	8.8	0.1
Category 2 – Good	Less than 2.5 years	2.7	0.4	70	2.9	2.0	–
	Equal to or more than 2.5 years	2.0	0.5	90	2.2	2.0	–
Category 3 – Satisfactory	Less than 2.5 years	0.4	–	115	0.4	0.5	–
	Equal to or more than 2.5 years	0.5	0.1	115	0.5	0.6	–
Category 4 – Weak	Less than 2.5 years	0.1	–	250	0.1	0.1	–
	Equal to or more than 2.5 years	–	–	250	–	0.1	–
Category 5 – Default	Less than 2.5 years	0.3	–	–	0.5	–	0.2
	Equal to or more than 2.5 years	0.1	–	–	0.1	–	0.1
Total at 31 Dec 2018	Less than 2.5 years	18.3	3.1		19.8	10.6	0.2
	Equal to or more than 2.5 years	14.3	3.2		15.5	11.5	0.2

Table 76: IRB – Credit risk exposures by portfolio and PD range (CR6)

PD scale	Original on-balance sheet gross exposure $bn	Off-balance sheet exposures pre-CCF $bn	Average CCF %	EAD post-CRM and post-CCF $bn	Average PD %	Number of obligors	Average LGD %	Average maturity years	RWAs $bn	RWA density %	Expected loss $bn	Value adjustments and provisions^ $bn
AIRB – Central government and central banks												
0.00 to <0.15	**328.5**	**2.6**	**42.9**	**329.6**	**0.02**	**269**	**41.6**	**2.10**	**26.1**	**8**	**–**	
0.15 to <0.25	**2.0**	**0.3**	**2.6**	**2.0**	**0.22**	**11**	**45.0**	**1.40**	**0.8**	**38**	**–**	
0.25 to <0.50	**2.3**	**–**	**20.0**	**2.3**	**0.37**	**12**	**45.0**	**1.20**	**1.1**	**50**	**–**	
0.50 to <0.75	**2.4**	**0.3**	**60.6**	**2.6**	**0.63**	**15**	**45.0**	**1.10**	**1.6**	**64**	**–**	
0.75 to <2.50	**5.6**	**0.2**	**31.1**	**5.4**	**1.39**	**21**	**44.5**	**1.20**	**4.8**	**89**	**–**	
2.50 to <10.00	**0.5**	**0.2**	**0.2**	**0.1**	**7.58**	**8**	**7.8**	**3.30**	**–**	**31**	**–**	
10.00 to <100.00	**1.5**	**–**	**–**	**1.5**	**75.00**	**5**	**45.0**	**1.00**	**1.9**	**130**	**0.6**	
100.00 (Default)	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	**–**	
Sub-total	**342.8**	**3.6**	**40.1**	**343.5**	**0.37**	**341**	**41.7**	**2.10**	**36.3**	**11**	**0.6**	**0.1**
AIRB – Institutions												
0.00 to <0.15	**56.7**	**9.9**	**32.4**	**59.6**	**0.05**	**2,520**	**37.1**	**1.40**	**7.9**	**13**	**–**	
0.15 to <0.25	**2.9**	**1.2**	**27.4**	**3.3**	**0.22**	**290**	**33.7**	**1.00**	**1.0**	**30**	**–**	
0.25 to <0.50	**1.3**	**0.3**	**56.5**	**1.5**	**0.37**	**145**	**41.3**	**1.10**	**0.7**	**48**	**–**	
0.50 to <0.75	**0.8**	**0.1**	**3.8**	**0.8**	**0.63**	**102**	**45.0**	**1.40**	**0.6**	**82**	**–**	
0.75 to <2.50	**0.8**	**0.6**	**28.6**	**0.9**	**1.14**	**177**	**28.3**	**2.10**	**0.5**	**59**	**–**	
2.50 to <10.00	**–**	**–**	**36.7**	**0.1**	**3.60**	**25**	**45.3**	**0.90**	**0.1**	**125**	**–**	
10.00 to <100.00	**–**	**0.1**	**17.9**	**–**	**15.75**	**19**	**45.8**	**1.90**	**–**	**216**	**–**	
100.00 (Default)	**–**	**–**	**–**	**–**	**100.00**	**1**	**45.8**	**1.00**	**–**	**10**	**–**	
Sub-total	**62.5**	**12.2**	**32.0**	**66.2**	**0.09**	**3,279**	**37.0**	**1.40**	**10.8**	**16**	**–**	**–**
AIRB – Corporate – Specialised Lending (excluding Slotting)[1]												
0.00 to <0.15	**2.1**	**1.2**	**39.5**	**2.5**	**0.10**	**40**	**20.5**	**3.30**	**0.4**	**17**	**–**	
0.15 to <0.25	**1.8**	**0.8**	**32.0**	**2.0**	**0.22**	**44**	**29.3**	**3.80**	**0.8**	**40**	**–**	
0.25 to <0.50	**1.1**	**0.6**	**40.1**	**1.2**	**0.37**	**31**	**27.0**	**3.50**	**0.5**	**43**	**–**	
0.50 to <0.75	**1.1**	**0.2**	**52.6**	**1.0**	**0.63**	**24**	**26.1**	**3.70**	**0.6**	**53**	**–**	
0.75 to <2.50	**1.2**	**0.7**	**51.5**	**1.4**	**1.40**	**35**	**28.3**	**3.10**	**1.0**	**74**	**–**	
2.50 to <10.00	**0.6**	**–**	**69.2**	**0.5**	**4.51**	**13**	**25.3**	**3.30**	**0.4**	**85**	**–**	
10.00 to <100.00	**0.1**	**–**	**57.5**	**0.1**	**18.28**	**4**	**12.3**	**2.50**	**0.1**	**64**	**–**	
100.00 (Default)	**0.2**	**0.1**	**66.2**	**0.2**	**100.00**	**12**	**19.5**	**4.50**	**0.3**	**129**	**–**	
Sub-total	**8.2**	**3.6**	**41.8**	**8.9**	**3.45**	**203**	**25.4**	**3.50**	**4.1**	**46**	**–**	**0.1**
AIRB – Corporate – Other												
0.00 to <0.15	**107.4**	**171.5**	**36.0**	**212.1**	**0.08**	**10,842**	**40.7**	**2.10**	**45.5**	**21**	**0.1**	
0.15 to <0.25	**50.0**	**64.0**	**36.4**	**83.8**	**0.22**	**9,967**	**38.8**	**2.00**	**32.2**	**38**	**0.1**	
0.25 to <0.50	**55.4**	**51.0**	**32.9**	**75.3**	**0.37**	**11,148**	**36.6**	**2.10**	**35.3**	**47**	**0.1**	
0.50 to <0.75	**54.1**	**40.5**	**31.6**	**63.2**	**0.63**	**10,296**	**35.0**	**2.00**	**35.7**	**57**	**0.1**	
0.75 to <2.50	**142.5**	**101.3**	**30.0**	**132.2**	**1.36**	**41,384**	**37.0**	**1.90**	**103.4**	**78**	**0.7**	
2.50 to <10.00	**34.7**	**25.8**	**33.0**	**32.7**	**4.31**	**11,505**	**38.7**	**1.90**	**38.8**	**119**	**0.6**	
10.00 to <100.00	**5.0**	**3.7**	**39.1**	**4.9**	**17.34**	**1,812**	**33.1**	**1.90**	**7.6**	**156**	**0.3**	
100.00 (Default)	**4.2**	**0.6**	**35.8**	**4.4**	**100.00**	**2,246**	**46.1**	**1.80**	**2.5**	**57**	**2.4**	
Sub-total	**453.3**	**458.4**	**34.1**	**608.6**	**1.56**	**99,200**	**38.4**	**2.00**	**301.0**	**49**	**4.4**	**3.4**
Wholesale AIRB – Total at 31 Dec 2019[2]	**929.2**	**477.8**	**34.2**	**1,089.6**	**1.09**	**103,023**	**39.3**	**2.00**	**365.5**	**34**	**5.0**	**3.6**

Table 76: IRB – Credit risk exposures by portfolio and PD range (CR6) (continued)

PD scale	Original on-balance sheet gross exposure $bn	Off-balance sheet exposures pre-CCF $bn	Average CCF %	EAD post-CRM and post-CCF $bn	Average PD %	Number of obligors	Average LGD %	Average maturity years	RWAs $bn	RWA density %	Expected loss $bn	Value adjustments and provisions^ $bn
AIRB – Secured by mortgages on immovable property SME												
0.00 to <0.15	**0.4**	**–**	**46.0**	**0.3**	**0.06**	**1,196**	**11.8**	**–**	**–**	**4**	**–**	
0.15 to <0.25	**0.1**	**–**	**36.2**	**0.1**	**0.21**	**2,192**	**32.7**	**–**	**–**	**13**	**–**	
0.25 to <0.50	**0.6**	**–**	**41.6**	**0.6**	**0.35**	**6,785**	**27.0**	**–**	**0.1**	**15**	**–**	
0.50 to <0.75	**0.3**	**0.1**	**38.7**	**0.4**	**0.62**	**5,423**	**33.1**	**–**	**0.1**	**27**	**–**	
0.75 to <2.50	**1.0**	**0.2**	**37.8**	**1.0**	**1.44**	**13,167**	**33.6**	**–**	**0.5**	**48**	**–**	
2.50 to <10.00	**0.7**	**0.1**	**38.4**	**0.8**	**4.54**	**7,098**	**30.8**	**–**	**0.6**	**81**	**–**	
10.00 to <100.00	**0.1**	**–**	**37.9**	**0.1**	**17.47**	**1,117**	**31.1**	**–**	**0.1**	**135**	**–**	
100.00 (Default)	**0.1**	**–**	**66.0**	**0.1**	**100.00**	**1,042**	**33.8**	**–**	**0.1**	**85**	**0.1**	
Sub-total	**3.3**	**0.4**	**38.9**	**3.4**	**5.03**	**38,020**	**29.5**	**–**	**1.5**	**45**	**0.1**	**0.1**
AIRB – Secured by mortgages on immovable property non-SME												
0.00 to <0.15	**191.2**	**11.1**	**88.0**	**204.8**	**0.07**	**1,110,935**	**15.7**	**–**	**14.8**	**7**	**–**	
0.15 to <0.25	**33.4**	**1.7**	**88.4**	**35.1**	**0.21**	**136,145**	**16.2**	**–**	**4.6**	**13**	**–**	
0.25 to <0.50	**27.3**	**3.0**	**40.4**	**28.7**	**0.35**	**126,980**	**17.2**	**–**	**5.2**	**18**	**–**	
0.50 to <0.75	**14.1**	**0.4**	**91.6**	**14.6**	**0.59**	**56,837**	**14.9**	**–**	**2.8**	**19**	**–**	
0.75 to <2.50	**21.1**	**1.0**	**76.6**	**22.0**	**1.36**	**99,412**	**13.1**	**–**	**5.9**	**27**	**0.1**	
2.50 to <10.00	**6.1**	**0.1**	**97.0**	**6.3**	**4.42**	**27,562**	**11.3**	**–**	**2.4**	**38**	**–**	
10.00 to <100.00	**1.8**	**0.1**	**99.3**	**1.9**	**23.22**	**16,032**	**20.1**	**–**	**2.4**	**129**	**0.1**	
100.00 (Default)	**2.3**	**–**	**77.9**	**2.3**	**100.00**	**17,845**	**23.8**	**–**	**2.3**	**98**	**0.6**	
Sub-total	**297.3**	**17.4**	**79.3**	**315.7**	**1.18**	**1,591,748**	**15.7**	**–**	**40.4**	**13**	**0.8**	**0.2**
AIRB – Qualifying revolving retail exposures												
0.00 to <0.15	**5.8**	**72.5**	**49.4**	**41.4**	**0.06**	**13,492,492**	**89.4**	**–**	**1.8**	**4**	**–**	
0.15 to <0.25	**1.3**	**15.7**	**49.0**	**8.9**	**0.20**	**2,827,957**	**92.5**	**–**	**1.0**	**11**	**–**	
0.25 to <0.50	**2.5**	**14.2**	**41.9**	**8.4**	**0.36**	**2,155,649**	**90.3**	**–**	**1.5**	**18**	**–**	
0.50 to <0.75	**2.9**	**5.3**	**48.2**	**5.4**	**0.61**	**1,012,194**	**87.4**	**–**	**1.4**	**26**	**–**	
0.75 to <2.50	**6.1**	**7.8**	**47.9**	**9.8**	**1.43**	**1,894,368**	**86.0**	**–**	**4.7**	**48**	**0.1**	
2.50 to <10.00	**3.7**	**1.8**	**63.8**	**4.8**	**4.91**	**887,239**	**84.2**	**–**	**5.3**	**111**	**0.2**	
10.00 to <100.00	**1.0**	**0.4**	**65.2**	**1.2**	**30.09**	**315,052**	**84.3**	**–**	**2.6**	**209**	**0.4**	
100.00 (Default)	**0.3**	**–**	**25.3**	**0.3**	**100.00**	**151,301**	**77.9**	**–**	**0.5**	**195**	**0.2**	
Sub-total	**23.6**	**117.7**	**48.5**	**80.2**	**1.40**	**22,736,252**	**88.8**	**–**	**18.8**	**23**	**0.9**	**1.0**
AIRB – Other SME												
0.00 to <0.15	**0.1**	**0.4**	**31.5**	**0.2**	**0.09**	**99,557**	**73.9**	**–**	**–**	**14**	**–**	
0.15 to <0.25	**–**	**0.3**	**37.6**	**0.1**	**0.23**	**76,713**	**85.0**	**–**	**–**	**31**	**–**	
0.25 to <0.50	**0.2**	**0.5**	**48.4**	**0.4**	**0.38**	**135,359**	**76.5**	**–**	**0.2**	**40**	**–**	
0.50 to <0.75	**0.2**	**0.5**	**58.2**	**0.5**	**0.64**	**126,958**	**67.2**	**–**	**0.2**	**46**	**–**	
0.75 to <2.50	**1.1**	**1.2**	**54.9**	**1.7**	**1.60**	**327,051**	**68.3**	**–**	**1.2**	**69**	**–**	
2.50 to <10.00	**1.7**	**1.1**	**49.6**	**2.5**	**4.85**	**183,343**	**59.7**	**–**	**1.9**	**80**	**0.1**	
10.00 to <100.00	**0.4**	**0.1**	**61.3**	**0.5**	**20.11**	**75,895**	**76.8**	**–**	**0.7**	**141**	**0.1**	
100.00 (Default)	**0.3**	**0.1**	**77.9**	**0.3**	**100.00**	**19,210**	**44.3**	**–**	**0.5**	**138**	**0.2**	
Sub-total	**4.0**	**4.2**	**50.3**	**6.2**	**9.41**	**1,044,086**	**65.3**	**–**	**4.7**	**76**	**0.4**	**0.3**
AIRB – Other non-SME												
0.00 to <0.15	**15.1**	**14.7**	**15.8**	**17.7**	**0.07**	**675,819**	**12.5**	**–**	**0.7**	**4**	**–**	
0.15 to <0.25	**8.1**	**3.7**	**39.7**	**9.9**	**0.20**	**529,201**	**24.7**	**–**	**1.2**	**12**	**–**	
0.25 to <0.50	**12.2**	**4.4**	**24.8**	**13.5**	**0.37**	**459,987**	**19.0**	**–**	**1.6**	**13**	**–**	
0.50 to <0.75	**7.9**	**1.8**	**22.8**	**8.4**	**0.62**	**246,120**	**22.6**	**–**	**1.7**	**20**	**–**	
0.75 to <2.50	**13.2**	**1.7**	**9.7**	**13.5**	**1.31**	**490,546**	**24.9**	**–**	**4.1**	**30**	**–**	
2.50 to <10.00	**3.5**	**1.1**	**23.7**	**3.9**	**4.27**	**238,724**	**34.0**	**–**	**2.0**	**52**	**0.1**	
10.00 to <100.00	**0.8**	**–**	**16.4**	**0.9**	**23.85**	**96,236**	**42.5**	**–**	**0.7**	**86**	**0.1**	
100.00 (Default)	**0.3**	**–**	**59.5**	**0.3**	**100.00**	**36,471**	**48.4**	**–**	**0.4**	**114**	**0.2**	
Sub-total	**61.1**	**27.4**	**20.9**	**68.1**	**1.48**	**2,773,104**	**21.0**	**–**	**12.4**	**18**	**0.4**	**0.4**
Retail AIRB – Total at 31 Dec 2019	**389.3**	**167.1**	**47.3**	**473.6**	**1.40**	**28,183,210**	**29.6**	**–**	**77.8**	**16**	**2.6**	**2.0**

Table 76: IRB – Credit risk exposures by portfolio and PD range (CR6) (continued)

PD scale	Original on-balance sheet gross exposure $bn	Off-balance sheet exposures pre-CCF $bn	Average CCF %	EAD post-CRM and post-CCF $bn	Average PD %	Number of obligors	Average LGD %	Average maturity years	RWAs $bn	RWA density %	Expected loss $bn	Value adjustments and provisions^ $bn
FIRB – Central government and central banks												
0.00 to <0.15	–	–	**75.0**	**0.1**	**0.03**	**1**	**45.0**	**3.60**	–	**20**	–	
0.15 to <0.25	–	–	–	–	–	–	–	–	–	–	–	
0.25 to <0.50	–	–	–	–	–	–	–	–	–	–	–	
0.50 to <0.75	–	–	–	–	–	–	–	–	–	–	–	
0.75 to <2.50	–	–	–	–	–	–	–	–	–	–	–	
2.50 to <10.00	–	–	–	–	–	–	–	–	–	–	–	
10.00 to <100.00	–	–	–	–	–	–	–	–	–	–	–	
100.00 (Default)	–	–	–	–	–	–	–	–	–	–	–	
Sub-total	–	–	**75.0**	**0.1**	**0.03**	**1**	**45.0**	**3.60**	–	**20**	–	–
FIRB – Institutions												
0.00 to <0.15	**0.7**	–	**29.3**	**0.6**	**0.08**	**2**	**45.0**	**2.70**	**0.2**	**25**	–	
0.15 to <0.25	–	–	**40.9**	–	**0.22**	**1**	**45.0**	**2.40**	–	**48**	–	
0.25 to <0.50	–	–	**16.9**	–	**0.37**	**1**	**45.0**	**0.10**	–	**36**	–	
0.50 to <0.75	–	–	–	–	–	–	–	–	–	–	–	
0.75 to <2.50	–	–	–	–	–	–	–	–	–	–	–	
2.50 to <10.00	–	–	–	–	–	–	–	–	–	–	–	
10.00 to <100.00	–	–	–	–	–	–	–	–	–	–	–	
100.00 (Default)	–	–	–	–	–	–	–	–	–	–	–	
Sub-total	**0.7**	–	**31.3**	**0.6**	**0.08**	**4**	**45.0**	**2.70**	**0.2**	**26**	–	–
FIRB – Corporate – Other												
0.00 to <0.15	**10.2**	**15.5**	**38.5**	**17.0**	**0.08**	**1,357**	**44.1**	**2.10**	**4.1**	**24**	–	
0.15 to <0.25	**4.8**	**6.5**	**39.9**	**7.0**	**0.22**	**1,431**	**43.8**	**2.40**	**3.3**	**47**	–	
0.25 to <0.50	**4.6**	**5.8**	**28.4**	**6.1**	**0.37**	**1,905**	**42.8**	**1.90**	**3.5**	**56**	–	
0.50 to <0.75	**4.5**	**6.8**	**33.7**	**6.7**	**0.63**	**1,676**	**39.0**	**1.60**	**4.2**	**63**	–	
0.75 to <2.50	**10.7**	**10.0**	**21.4**	**12.1**	**1.32**	**5,329**	**43.1**	**1.60**	**10.8**	**89**	**0.1**	
2.50 to <10.00	**3.7**	**2.9**	**20.6**	**3.7**	**4.60**	**1,239**	**42.4**	**1.60**	**4.9**	**133**	**0.1**	
10.00 to <100.00	**0.6**	**0.5**	**21.4**	**0.7**	**13.62**	**186**	**43.7**	**1.40**	**1.3**	**197**	–	
100.00 (Default)	**0.8**	**0.2**	**20.7**	**0.9**	**100.00**	**435**	**43.7**	**2.10**	–	–	**0.4**	
Sub-total	**39.9**	**48.2**	**32.1**	**54.2**	**2.59**	**13,558**	**42.9**	**1.90**	**32.1**	**59**	**0.6**	**0.5**
FIRB – Total at 31 Dec 2019	**40.6**	**48.2**	**32.1**	**54.9**	**2.55**	**13,563**	**43.0**	**1.90**	**32.3**	**59**	**0.6**	**0.5**

^ *Figures have been prepared on an IFRS 9 transitional basis.*

1 *Slotting exposures are disclosed in Table 75: Specialised lending on slotting approach (CR10).*

2 *The Wholesale AIRB Total includes non-credit obligation assets amounting to $62.4 bn of original exposure and EAD, and $13.3bn of RWAs.*

Table 76: IRB – Credit risk exposures by portfolio and PD range (CR6) (continued)

PD scale	Original on-balance sheet gross exposure $bn	Off-balance sheet exposures pre-CCF $bn	Average CCF %	EAD post-CRM and post-CCF $bn	Average PD %	Number of obligors	Average LGD %	Average maturity years	RWAs $bn	RWA density %	Expected loss $bn	Value adjustments and provisions $bn
AIRB – Central government and central banks												
0.00 to <0.15	313.5	2.7	52.6	315.6	0.02	258	42.4	2.10	26.0	8	—	
0.15 to <0.25	2.5	—	18.2	2.5	0.22	10	45.0	1.80	1.1	42	—	
0.25 to <0.50	2.1	—	98.9	2.3	0.37	14	45.1	1.30	1.1	50	—	
0.50 to <0.75	3.3	0.2	78.3	3.4	0.63	16	45.0	1.10	2.2	64	—	
0.75 to <2.50	6.8	0.2	70.8	6.6	1.72	22	45.0	1.20	6.4	97	0.1	
2.50 to <10.00	0.4	0.1	41.0	—	7.49	9	45.1	4.60	0.1	210	—	
10.00 to <100.00	—	—	—	—	—	—	—	—	—	—	—	
100.00 (Default)	—	—	—	—	—	—	—	—	—	—	—	
Sub-total	328.6	3.2	55.0	330.4	0.06	329	42.5	2.10	36.9	11	0.1	0.1
AIRB – Institutions												
0.00 to <0.15	60.7	9.7	39.3	65.0	0.05	2,574	39.5	1.40	9.3	14	—	
0.15 to <0.25	3.1	0.7	22.0	3.3	0.22	323	44.7	0.90	1.2	37	—	
0.25 to <0.50	2.6	0.3	59.1	2.2	0.37	182	41.5	1.20	1.1	52	—	
0.50 to <0.75	1.4	0.2	45.8	1.4	0.63	140	41.5	1.30	1.1	74	—	
0.75 to <2.50	1.2	0.5	50.6	1.5	1.10	242	45.1	1.20	1.4	96	—	
2.50 to <10.00	0.1	—	24.7	—	6.19	22	46.4	0.80	—	169	—	
10.00 to <100.00	—	0.1	25.6	—	13.00	17	55.0	1.00	0.1	253	—	
100.00 (Default)	—	—	—	—	100.00	1	64.8	1.00	—	807	—	
Sub-total	69.1	11.5	39.2	73.4	0.11	3,501	39.9	1.40	14.2	19	—	—
AIRB – Corporate – Specialised Lending (excluding Slotting)[1]												
0.00 to <0.15	1.8	1.3	38.0	2.1	0.10	409	30.4	3.40	0.6	27	—	
0.15 to <0.25	1.9	0.4	33.4	2.0	0.22	418	28.6	3.40	0.7	37	—	
0.25 to <0.50	0.6	0.3	35.8	0.7	0.37	188	28.9	4.40	0.4	55	—	
0.50 to <0.75	1.3	0.2	34.4	1.0	0.63	261	24.5	3.50	0.5	51	—	
0.75 to <2.50	1.2	0.5	49.7	1.5	1.38	397	32.1	3.80	1.3	91	—	
2.50 to <10.00	0.6	0.1	51.1	0.5	5.34	136	27.4	3.20	0.5	101	—	
10.00 to <100.00	0.3	0.1	48.1	0.3	24.05	73	23.2	3.40	0.4	130	—	
100.00 (Default)	0.1	0.1	87.5	0.2	100.00	105	37.9	4.80	0.5	258	0.1	
Sub-total	7.8	3.0	41.3	8.3	3.68	1,987	29.1	3.60	4.9	59	0.1	0.1
AIRB – Corporate – Other												
0.00 to <0.15	109.3	160.4	38.0	212.4	0.08	10,036	41.1	2.20	48.2	23	0.1	
0.15 to <0.25	49.8	62.5	37.6	81.1	0.22	10,191	39.1	2.00	31.2	38	0.1	
0.25 to <0.50	51.1	54.7	33.9	73.3	0.37	10,304	37.3	2.10	35.4	48	0.1	
0.50 to <0.75	56.9	42.1	33.8	69.9	0.63	10,348	34.3	1.90	39.5	57	0.2	
0.75 to <2.50	146.2	102.1	32.2	137.6	1.37	42,602	37.6	2.00	111.3	81	0.7	
2.50 to <10.00	30.5	23.2	35.7	29.8	4.10	11,510	38.0	2.00	34.3	115	0.5	
10.00 to <100.00	5.1	3.3	43.0	4.5	19.20	1,967	38.6	2.00	8.3	185	0.3	
100.00 (Default)	4.2	0.9	46.6	4.5	100.00	2,473	46.0	1.90	9.9	221	1.9	
Sub-total	453.1	449.2	35.9	613.1	1.55	99,431	38.7	2.10	318.1	52	3.9	3.1
Wholesale AIRB – Total at 31 Dec 2018[2]	915.5	466.9	36.1	1,082.1	0.98	105,248	39.9	2.00	384.9	37	4.1	3.3

Table 76: IRB – Credit risk exposures by portfolio and PD range (CR6) (continued)

PD scale	Original on-balance sheet gross exposure $bn	Off-balance sheet exposures pre-CCF $bn	Average CCF %	EAD post-CRM and post-CCF $bn	Average PD %	Number of obligors	Average LGD %	Average maturity years	RWAs $bn	RWA density %	Expected loss $bn	Value adjustments and provisions $bn
AIRB – Secured by mortgages on immovable property SME												
0.00 to <0.15	0.3	—	31.4	0.3	0.08	1,321	16.2	—	—	4	—	
0.15 to <0.25	0.2	—	39.8	0.2	0.21	2,557	29.5	—	—	12	—	
0.25 to <0.50	0.4	0.1	35.2	0.4	0.36	6,478	28.8	—	0.1	16	—	
0.50 to <0.75	0.3	0.1	44.5	0.3	0.61	5,000	32.2	—	0.1	27	—	
0.75 to <2.50	0.9	0.2	33.8	1.0	1.47	13,728	35.2	—	0.5	51	—	
2.50 to <10.00	0.8	0.1	40.2	0.9	4.57	7,963	31.2	—	0.7	82	—	
10.00 to <100.00	0.1	—	39.8	0.1	17.19	1,312	31.6	—	0.1	138	—	
100.00 (Default)	0.1	—	55.7	0.1	100.00	1,266	33.9	—	0.3	227	0.1	
Sub-total	3.1	0.5	37.5	3.3	5.78	39,625	30.8	—	1.8	54	0.1	0.1
AIRB – Secured by mortgages on immovable property non-SME												
0.00 to <0.15	172.1	11.4	89.8	185.9	0.06	1,066,724	15.4	—	12.4	7	—	
0.15 to <0.25	27.7	1.3	81.6	28.9	0.20	122,304	15.7	—	3.6	13	—	
0.25 to <0.50	24.5	2.9	43.8	25.8	0.35	117,856	17.4	—	4.6	18	—	
0.50 to <0.75	10.5	0.3	92.3	10.9	0.58	51,235	11.2	—	1.8	16	—	
0.75 to <2.50	23.8	1.2	79.7	24.9	1.26	105,656	18.1	—	7.5	30	0.1	
2.50 to <10.00	5.8	0.2	96.7	6.0	4.51	27,556	11.7	—	2.3	39	—	
10.00 to <100.00	2.1	0.1	97.4	2.2	25.15	18,895	21.1	—	3.0	138	0.1	
100.00 (Default)	2.3	—	76.1	2.3	100.00	18,777	24.6	—	2.0	89	0.6	
Sub-total	268.8	17.4	81.0	286.9	1.31	1,529,003	15.7	—	37.2	13	0.8	0.3
AIRB – Qualifying revolving retail exposures												
0.00 to <0.15	5.4	70.8	49.3	40.1	0.07	13,591,739	91.3	—	1.8	4	—	
0.15 to <0.25	1.4	12.5	47.9	7.3	0.21	2,415,087	93.5	—	0.8	11	—	
0.25 to <0.50	2.2	12.1	43.1	7.4	0.36	1,989,811	92.3	—	1.3	18	—	
0.50 to <0.75	2.2	5.0	48.8	4.6	0.61	987,590	92.1	—	1.2	26	—	
0.75 to <2.50	5.9	9.0	46.5	10.1	1.42	2,052,818	90.0	—	4.8	48	0.1	
2.50 to <10.00	3.2	1.8	62.0	4.3	4.74	890,646	89.0	—	4.8	112	0.2	
10.00 to <100.00	0.9	0.3	66.5	1.1	28.46	294,570	89.4	—	2.4	216	0.3	
100.00 (Default)	0.1	—	22.8	0.1	100.00	72,485	79.6	—	0.2	160	0.1	
Sub-total	21.3	111.5	48.5	75.0	1.17	22,294,746	91.3	—	17.3	23	0.7	0.7
AIRB – Other SME												
0.00 to <0.15	0.1	0.3	35.0	0.2	0.09	98,383	75.0	—	—	14	—	
0.15 to <0.25	—	0.2	38.3	0.1	0.22	72,510	80.8	—	—	29	—	
0.25 to <0.50	0.1	0.4	48.7	0.3	0.38	124,508	74.4	—	0.1	39	—	
0.50 to <0.75	0.2	0.5	63.4	0.5	0.63	155,864	68.4	—	0.2	46	—	
0.75 to <2.50	1.1	1.2	58.7	1.8	1.60	358,362	66.9	—	1.3	67	—	
2.50 to <10.00	1.8	1.0	69.1	2.6	4.87	181,027	59.5	—	2.1	80	0.1	
10.00 to <100.00	0.4	0.2	48.6	0.5	19.39	79,791	73.9	—	0.6	133	0.1	
100.00 (Default)	0.3	—	96.8	0.3	100.00	15,015	38.7	—	0.5	160	0.2	
Sub-total	4.0	3.8	57.8	6.3	9.05	1,085,460	64.1	—	4.8	76	0.4	0.3
AIRB – Other non-SME												
0.00 to <0.15	8.1	6.3	30.7	10.6	0.08	574,137	18.7	—	0.6	5	—	
0.15 to <0.25	6.5	3.5	36.4	8.1	0.21	491,674	27.8	—	1.1	13	—	
0.25 to <0.50	6.6	2.6	28.4	7.5	0.37	386,099	30.4	—	1.5	20	—	
0.50 to <0.75	4.9	1.4	24.9	5.3	0.60	196,811	28.2	—	1.2	24	—	
0.75 to <2.50	7.9	0.9	17.1	8.2	1.35	421,600	35.4	—	3.5	43	—	
2.50 to <10.00	3.8	1.1	23.0	4.1	4.39	246,174	32.8	—	2.1	51	0.1	
10.00 to <100.00	0.6	0.1	15.7	0.7	25.06	92,869	45.5	—	0.6	92	0.1	
100.00 (Default)	0.3	0.1	7.7	0.3	100.00	40,274	43.9	—	0.3	103	0.2	
Sub-total	38.7	16.0	29.6	44.8	1.91	2,449,638	28.3	—	10.9	24	0.4	0.4
Retail AIRB – Total at 31 Dec 2018	335.9	149.2	50.5	416.3	1.50	27,398,472	31.5	—	72.0	17	2.4	1.8

Table 76: IRB – Credit risk exposures by portfolio and PD range (CR6) (continued)

PD scale	Original on-balance sheet gross exposure $bn	Off-balance sheet exposures pre-CCF $bn	Average CCF %	EAD post-CRM and post-CCF $bn	Average PD %	Number of obligors	Average LGD %	Average maturity years	RWAs $bn	RWA density %	Expected loss $bn	Value adjustments and provisions $bn
FIRB – Central government and central banks												
0.00 to <0.15	—	—	—	0.1	0.03	1	45.0	4.60	—	25	—	
0.15 to <0.25	—	—	—	—	—	—	—	—	—	—	—	
0.25 to <0.50	—	—	—	—	—	—	—	—	—	—	—	
0.50 to <0.75	—	—	—	—	—	—	—	—	—	—	—	
0.75 to <2.50	—	—	—	—	—	—	—	—	—	—	—	
2.50 to <10.00	—	—	—	—	—	—	—	—	—	—	—	
10.00 to <100.00	—	—	—	—	—	—	—	—	—	—	—	
100.00 (Default)	—	—	—	—	—	—	—	—	—	—	—	
Sub-total	—	—	—	0.1	0.03	1	45.0	4.60	—	25	—	—
FIRB – Institutions												
0.00 to <0.15	0.5	—	23.5	0.6	0.10	2	45.0	2.70	0.2	33	—	
0.15 to <0.25	—	—	63.3	0.1	0.22	1	45.0	3.60	—	60	—	
0.25 to <0.50	—	—	1.1	—	0.37	1	45.0	0.10	—	36	—	
0.50 to <0.75	—	—	—	—	—	—	—	—	—	—	—	
0.75 to <2.50	—	—	—	—	—	—	—	—	—	—	—	
2.50 to <10.00	—	—	—	—	—	—	—	—	—	—	—	
10.00 to <100.00	—	—	—	—	—	—	—	—	—	—	—	
100.00 (Default)	—	—	—	—	—	—	—	—	—	—	—	
Sub-total	0.5	—	40.6	0.7	0.12	4	45.0	2.80	0.2	35	—	—
FIRB – Corporate – Other												
0.00 to <0.15	9.9	13.5	46.4	16.3	0.08	1,186	44.5	2.20	4.0	24	—	
0.15 to <0.25	3.5	5.9	33.5	5.4	0.22	1,269	44.4	2.30	2.5	47	—	
0.25 to <0.50	4.0	4.8	33.1	5.4	0.37	1,594	44.1	1.70	3.0	55	—	
0.50 to <0.75	4.8	5.6	29.9	6.0	0.63	1,573	45.5	1.80	4.4	74	—	
0.75 to <2.50	9.5	10.1	22.5	11.5	1.37	4,387	43.9	1.70	10.8	93	0.1	
2.50 to <10.00	3.0	2.1	22.8	3.2	4.59	1,050	43.4	1.80	4.4	140	0.1	
10.00 to <100.00	0.5	0.2	37.3	0.6	17.09	166	44.3	1.70	1.2	207	—	
100.00 (Default)	0.8	0.2	23.3	0.9	100.00	348	44.4	1.90	—	—	0.4	
Sub-total	36.0	42.4	33.9	49.3	2.72	11,573	44.4	1.90	30.3	61	0.6	0.5
FIRB – Total at 31 Dec 2018	36.5	42.4	33.9	50.1	2.67	11,578	44.4	1.90	30.5	61	0.6	0.5

1 Slotting exposures are disclosed in Table 75: Specialised lending on slotting approach (CR10).
2 The Wholesale AIRB Total includes non-credit obligation assets amounting to $56.9bn of original exposure and EAD, and $10.8bn of RWAs.

Counterparty credit risk

Table 77: Counterparty credit risk – RWAs by exposure class, product and geographical region

		RWAs						
		Europe	Asia	MENA	North America	Latin America	Total	Capital required
	Footnotes	$bn	$bn	$bn	$bn	$bn	$bn	$bn
By exposure class								
IRB advanced approach		**20.3**	**7.3**	**0.5**	**6.0**	**0.3**	**34.4**	**2.7**
– central governments and central banks		**0.4**	**0.1**	**0.2**	**0.1**	**0.1**	**0.9**	**0.1**
– institutions		**7.9**	**2.2**	**0.1**	**1.0**	**0.2**	**11.4**	**0.9**
– corporates		**12.0**	**5.0**	**0.2**	**4.9**	**–**	**22.1**	**1.7**
IRB foundation approach		**2.0**	**–**	**0.2**	**–**	**–**	**2.2**	**0.2**
– corporates		**2.0**	**–**	**0.2**	**–**	**–**	**2.2**	**0.2**
Standardised approach		**0.3**	**0.6**	**0.4**	**–**	**1.1**	**2.4**	**0.2**
– central governments and central banks		**–**	**–**	**–**	**–**	**–**	**–**	**–**
– institutions		**–**	**–**	**–**	**–**	**0.1**	**0.1**	**–**
– corporates		**0.3**	**0.6**	**0.4**	**–**	**1.0**	**2.3**	**0.2**
CVA advanced	1	**1.6**	**0.7**	**–**	**0.8**	**–**	**3.1**	**0.2**
CVA standardised	1	**0.2**	**–**	**0.2**	**0.2**	**0.3**	**0.9**	**0.1**
CCP standardised		**0.7**	**0.1**	**–**	**0.3**	**–**	**1.1**	**0.1**
At 31 Dec 2019		**25.1**	**8.7**	**1.3**	**7.3**	**1.7**	**44.1**	**3.5**
By product								
Derivatives (OTC and exchange traded derivatives)		**17.1**	**5.9**	**0.8**	**4.6**	**1.2**	**29.6**	**2.4**
SFTs		**5.0**	**1.0**	**0.3**	**1.5**	**0.2**	**8.0**	**0.6**
Other	2	**0.8**	**1.0**	**–**	**0.1**	**–**	**1.9**	**0.2**
CVA advanced	1	**1.6**	**0.7**	**–**	**0.8**	**–**	**3.1**	**0.2**
CVA standardised	1	**0.2**	**–**	**0.2**	**0.2**	**0.3**	**0.9**	**0.1**
CCP default funds	3	**0.4**	**0.1**	**–**	**0.1**	**–**	**0.6**	**–**
At 31 Dec 2019		**25.1**	**8.7**	**1.3**	**7.3**	**1.7**	**44.1**	**3.5**
By exposure class								
IRB advanced approach		21.7	7.2	0.4	6.7	0.4	36.4	3.0
– central governments and central banks		0.5	0.1	0.3	0.8	0.2	1.9	0.2
– institutions		8.3	2.8	–	0.9	0.2	12.2	1.0
– corporates		12.9	4.3	0.1	5.0	–	22.3	1.8
IRB foundation approach		1.7	–	0.2	–	–	1.9	0.1
– corporates		1.7	–	0.2	–	–	1.9	0.1
Standardised approach		0.4	0.5	0.3	–	0.8	2.0	0.1
– central governments and central banks		–	–	–	–	–	–	–
– institutions		–	–	–	–	0.1	0.1	–
– corporates		0.4	0.5	0.3	–	0.7	1.9	0.1
CVA advanced	1	2.8	1.1	–	1.0	–	4.9	0.4
CVA standardised	1	0.1	0.3	0.1	0.3	0.2	1.0	0.1
CCP standardised		0.6	0.2	–	0.3	–	1.1	0.1
At 31 Dec 2018		27.3	9.3	1.0	8.3	1.4	47.3	3.8
By product								
Derivatives (OTC and exchange traded derivatives)		16.5	5.9	0.6	4.5	1.0	28.5	2.3
SFTs		6.8	0.6	0.3	2.4	0.2	10.3	0.8
Other	2	0.9	1.3	–	–	–	2.2	0.2
CVA advanced	1	2.8	1.1	–	1.0	–	4.9	0.4
CVA standardised	1	0.1	0.3	0.1	0.3	0.2	1.0	0.1
CCP default funds	3	0.2	0.1	–	0.1	–	0.4	–
At 31 Dec 2018		27.3	9.3	1.0	8.3	1.4	47.3	3.8

1 *The RWA impact due to the CVA capital charge is calculated based on the exposures under the IRB and standardised approaches. No additional exposures are taken into account.*
2 *Includes free deliveries not deducted from regulatory capital.*
3 *Default fund contributions are cash balances posted to CCPs by all members. These cash balances are not included in the total reported exposure.*

Table 78: IRB – CCR exposures by portfolio and PD scale (CCR4)

PD scale	EAD post-CRM $bn	Average PD %	Number of obligors	Average LGD %	Average maturity years	RWAs $bn	RWA density %
AIRB – Central Government and Central Banks							
0.00 to <0.15	**10.5**	**0.02**	**97**	**44.6**	**0.93**	**0.6**	**6**
0.15 to <0.25	**0.2**	**0.22**	**12**	**45.0**	**1.22**	**0.1**	**35**
0.25 to <0.50	**–**	**0.37**	**7**	**45.0**	**2.01**	**–**	**59**
0.50 to <0.75	**–**	**0.63**	**1**	**45.0**	**2.35**	**–**	**80**
0.75 to <2.50	**0.3**	**1.64**	**6**	**45.0**	**1.77**	**0.3**	**104**
2.50 to <10.00	**–**	**6.65**	**2**	**33.8**	**7.00**	**–**	**195**
10.00 to <100.00	**–**	**–**	**–**	**–**	**–**	**–**	**–**
100.00 (Default)	**–**	**–**	**–**	**–**	**–**	**–**	**–**
Sub-total	**11.0**	**0.07**	**125**	**44.7**	**0.96**	**1.0**	**9**
AIRB – Institutions							
0.00 to <0.15	**41.0**	**0.07**	**4,551**	**44.4**	**1.20**	**8.5**	**21**
0.15 to <0.25	**3.0**	**0.22**	**409**	**44.9**	**1.60**	**1.4**	**48**
0.25 to <0.50	**0.7**	**0.37**	**85**	**46.2**	**1.50**	**0.4**	**65**
0.50 to <0.75	**0.3**	**0.63**	**62**	**42.8**	**1.10**	**0.3**	**79**
0.75 to <2.50	**0.4**	**1.21**	**130**	**45.1**	**2.10**	**0.4**	**107**
2.50 to <10.00	**0.1**	**4.91**	**29**	**47.6**	**1.10**	**0.1**	**151**
10.00 to <100.00	**–**	**12.23**	**8**	**46.1**	**2.90**	**–**	**229**
100.00 (Default)	**–**	**100.00**	**1**	**45.0**	**1.00**	**–**	**365**
Sub-total	**45.5**	**0.12**	**5,275**	**44.6**	**1.20**	**11.1**	**24**
AIRB – Corporates							
0.00 to <0.15	**30.5**	**0.07**	**5,498**	**44.1**	**1.80**	**6.8**	**22**
0.15 to <0.25	**9.7**	**0.22**	**1,962**	**45.7**	**1.59**	**4.1**	**42**
0.25 to <0.50	**3.9**	**0.37**	**1,039**	**46.0**	**1.46**	**2.2**	**57**
0.50 to <0.75	**3.1**	**0.63**	**941**	**43.0**	**1.88**	**2.5**	**80**
0.75 to <2.50	**5.2**	**1.34**	**3,493**	**46.3**	**1.41**	**5.3**	**102**
2.50 to <10.00	**0.8**	**3.95**	**549**	**48.7**	**1.73**	**1.2**	**152**
10.00 to <100.00	**–**	**18.17**	**63**	**48.0**	**1.62**	**–**	**230**
100.00 (Default)	**–**	**100.00**	**13**	**39.6**	**1.96**	**–**	**–**
Sub-total	**53.2**	**0.37**	**13,558**	**44.7**	**1.70**	**22.1**	**42**
AIRB - Retail Other							
0.00 to <0.15	**–**	**0.04**	**212**	**0.9**	**–**	**–**	**–**
0.15 to <0.25	**–**	**0.23**	**10**	**1.8**	**–**	**–**	**1**
0.25 to <0.50	**–**	**0.38**	**52**	**2.2**	**–**	**–**	**2**
0.50 to <0.75	**–**	**0.62**	**22**	**1.8**	**–**	**–**	**2**
0.75 to <2.50	**–**	**1.24**	**22**	**1.5**	**–**	**–**	**3**
2.50 to <10.00	**–**	**2.82**	**2**	**3.0**	**–**	**–**	**4**
10.00 to <100.00	**–**	**96.57**	**1**	**83.6**	**–**	**–**	**29**
100.00 (Default)	**–**	**–**	**–**	**–**	**–**	**–**	**–**
Sub-total	**–**	**0.64**	**321**	**1.6**	**–**	**–**	**1**
AIRB – Total at 31 Dec 2019	**109.7**	**0.19**	**19,279**	**49.0**	**1.30**	**34.2**	**31**
FIRB – Corporates							
0.00 to <0.15	**3.7**	**0.07**	**1,188**	**45.0**	**1.98**	**0.8**	**22**
0.15 to <0.25	**0.6**	**0.22**	**156**	**45.0**	**1.59**	**0.2**	**41**
0.25 to <0.50	**0.5**	**0.37**	**166**	**45.0**	**1.29**	**0.3**	**55**
0.50 to <0.75	**0.2**	**0.63**	**119**	**45.0**	**1.21**	**0.1**	**72**
0.75 to <2.50	**0.6**	**1.41**	**516**	**45.0**	**1.80**	**0.6**	**101**
2.50 to <10.00	**0.1**	**4.86**	**129**	**45.0**	**2.59**	**0.2**	**162**
10.00 to <100.00	**–**	**10.08**	**14**	**45.0**	**1.03**	**–**	**200**
100.00 (Default)	**–**	**100.00**	**5**	**45.0**	**1.08**	**–**	**–**
FIRB – Total at 31 Dec 2019	**5.7**	**0.44**	**2,293**	**45.0**	**1.85**	**2.2**	**39**
Total (all portfolios) at 31 Dec 2019	**115.4**	**0.25**	**21,572**	**44.7**	**1.58**	**36.4**	**32**

Table 78: IRB – CCR exposures by portfolio and PD scale (CCR4) (continued)

PD scale	EAD post-CRM $bn	Average PD %	Number of obligors	Average LGD %	Average maturity years	RWAs $bn	RWA density %
AIRB – Central Government and Central Banks							
0.00 to <0.15	10.1	0.02	90	44.9	0.95	0.5	5
0.15 to <0.25	0.1	0.22	12	45.0	3.07	0.1	54
0.25 to <0.50	0.1	0.37	6	44.8	3.36	0.1	74
0.50 to <0.75	0.1	0.63	1	45.0	1.00	–	60
0.75 to <2.50	1.2	2.25	7	45.0	1.29	1.2	100
2.50 to <10.00	–	7.85	1	45.0	5.00	–	218
10.00 to <100.00	–	–	–	–	–	–	–
100.00 (Default)	–	–	–	–	–	–	–
Sub-total	11.6	0.22	117	45.0	1.02	1.9	17
AIRB – Institutions							
0.00 to <0.15	40.5	0.06	4,629	44.3	1.17	7.9	19
0.15 to <0.25	3.5	0.22	477	43.9	1.40	1.6	46
0.25 to <0.50	1.7	0.37	75	45.0	1.19	0.9	50
0.50 to <0.75	0.7	0.63	64	44.9	1.06	0.4	67
0.75 to <2.50	0.4	1.37	106	46.2	2.08	0.5	117
2.50 to <10.00	0.1	4.94	20	44.9	1.60	0.1	149
10.00 to <100.00	0.4	12.98	12	55.0	1.20	0.8	241
100.00 (Default)	–	100.00	1	45.0	1.00	–	–
Sub-total	47.3	0.21	5,384	44.7	1.18	12.2	26
AIRB – Corporates							
0.00 to <0.15	30.2	0.07	4,934	43.5	1.71	6.4	21
0.15 to <0.25	6.7	0.22	1,796	46.9	1.75	3.2	48
0.25 to <0.50	3.8	0.37	1,029	44.6	1.69	2.1	56
0.50 to <0.75	3.8	0.63	1,018	43.8	1.23	2.8	73
0.75 to <2.50	6.3	1.34	7,375	46.1	1.38	6.6	104
2.50 to <10.00	0.7	3.92	569	46.9	1.62	1.1	150
10.00 to <100.00	0.1	21.77	61	43.6	1.34	0.1	237
100.00 (Default)	–	100.00	17	41.1	2.60	–	–
Sub-total	51.6	0.42	16,799	44.4	1.64	22.3	43
AIRB – Total at 31 Dec 2018	110.5	0.28	22,300	49.2	1.38	36.4	33
FIRB – Corporates							
0.00 to <0.15	2.5	0.07	522	37.9	1.73	0.6	24
0.15 to <0.25	0.4	0.22	146	45.0	1.78	0.2	42
0.25 to <0.50	0.2	0.37	130	45.0	1.66	0.1	59
0.50 to <0.75	0.2	0.63	84	45.0	0.82	0.1	74
0.75 to <2.50	0.7	1.59	533	45.0	1.56	0.8	105
2.50 to <10.00	0.1	5.00	82	45.0	2.20	0.1	155
10.00 to <100.00	–	11.95	11	45.0	1.03	–	192
100.00 (Default)	–	100.00	7	45.0	1.02	–	–
FIRB – Total at 31 Dec 2018	4.1	0.54	1,515	45.0	1.82	1.9	45
Total (all portfolios) at 31 Dec 2018	114.6	0.32	23,815	44.6	1.40	38.3	33

Appendix II

Countercyclical capital buffer

The table below discloses the geographical distribution of credit exposures relevant to the calculation of the countercyclical buffer under Article 440 of the Regulation (EU) 575/2013. Countries or territories that have a CCyB requirement or have an own funds requirement of greater than 0.7% or that are material in nature are disclosed below.

Table 79: Geographical distribution of credit exposures relevant for the calculation of the countercyclical capital buffer

	General credit exposures		Trading book exposures		Securitisation exposures		Own funds requirements					
	SA	IRB	Sum of long/short positions for SA	Internal models	SA	IRB	*of which: General credit exposures*	*of which: Trading book exposures*	*of which: Securitisation exposures*	Total	Share of total own funds requirements	CCyB rate
Country	$m	$m	$m	$m	$m	$m	$m	$m	$m	$m	%	%
Argentina	2,076	891	–	1	–	–	234	1	–	235	0.5	
Australia	1,279	34,400	–	133	593	2,007	834	12	20	866	1.7	
Bulgaria	1	16	–	2	–	–	1	–	–	1	–	0.50%
Canada	780	63,475	–	65	185	–	1,930	4	2	1,936	3.7	
China	23,925	62,450	–	2,083	385	34	5,570	55	7	5,632	10.8	
Czech Republic	376	177	–	–	–	–	34	1	–	35	0.1	1.50%
Denmark	2	2,440	–	62	–	–	46	6	–	52	0.1	1.00%
Egypt	2,369	1,155	–	–	–	–	201	–	–	201	0.4	
France	6,446	56,575	–	324	480	1,083	1,857	19	17	1,893	3.6	0.25%
Germany	1,072	18,958	–	601	250	287	892	12	8	912	1.8	
Hong Kong	22,237	358,306	–	375	–	–	9,983	24	–	10,007	19.2	2.00%
India	3,656	14,961	–	1,295	1,251	–	939	45	80	1,064	2.0	
Iceland	–	3	–	4	–	–	–	3	–	3	–	1.75%
Indonesia	1,136	6,637	–	116	–	–	507	14	–	521	1.0	
Ireland	711	7,843	8	190	466	108	309	9	13	331	0.6	1.00%
Lithuania	2	2	–	–	–	–	–	–	–	–	–	1.00%
Luxembourg	1,389	6,110	–	121	200	–	373	6	6	385	0.7	
Malaysia	3,449	13,244	1	6	–	–	714	8	–	722	1.4	
Malta	3,591	433	–	–	–	–	166	–	–	166	0.3	
Mexico	21,964	3,041	45	132	777	–	1,536	9	17	1,562	3.0	
Netherlands	2,223	9,579	–	444	948	617	578	11	25	614	1.2	
Norway	4	1,895	–	1	–	–	79	27	–	106	0.2	2.50%
Saudi Arabia	18,001	3,934	–	45	–	–	1,329	12	–	1,341	2.6	
Singapore	2,502	31,078	–	168	–	–	935	14	–	949	1.8	
Slovakia	70	36	–	1	–	–	7	–	–	7	–	1.50%
Sweden	5	1,614	–	114	–	–	62	4	–	66	0.1	2.50%
Taiwan, Province Of China	1,498	12,834	–	168	–	–	367	3	–	370	0.7	
Turkey	4,303	1,004	–	24	–	–	329	2	–	331	0.6	
United Arab Emirates	4,858	17,883	–	60	–	–	879	14	–	893	1.7	
United Kingdom	11,151	361,417	–	2,916	5,087	13,934	9,805	96	321	10,222	19.6	1.00%
United States	9,663	129,560	–	349	4,601	1,649	5,488	76	110	5,674	10.9	
Other countries	23,779	87,237	18	1,922	1,109	491	4,766	202	40	5,008	9.7	
Total	174,518	1,309,188	72	11,722	16,332	20,210	50,750	689	666	52,105	100.00	

Table 80: Countercyclical capital buffer

	2019
Total Risk Exposure Amount ($m)	843,395
Institution specific countercyclical capital buffer rate	0.61%
Institution specific countercyclical capital buffer requirement ($m)	5,145

Appendix III

Asset encumbrance

Table 81: A – Assets[1]

		Carrying amount of encumbered assets		Fair value of encumbered assets		Carrying amount of unencumbered assets		Fair value of unencumbered assets	
		Total	*of which: notionally eligible EHQLA and HQLA*	Total	*of which: notionally eligible EHQLA and HQLA*	Total	*of which: EHQLA and HQLA*	Total	*of which: EHQLA and HQLA*
		$m	$m	$m	$m	$m	$m	$m	$m
01	Assets of the reporting institution	**184,780**	**89,788**			**2,431,667**	**508,154**		
03	Equity instruments	**21,394**	**6,225**	**–**	**–**	**53,307**	**9,555**	**–**	**–**
04	Debt securities	**92,917**	**83,563**	**92,781**	**83,441**	**434,933**	**335,877**	**429,779**	**331,896**
	– of which:								
05	*– covered bonds*	***407***	***404***	***407***	***404***	***8,651***	***8,617***	***8,651***	***8,617***
06	*– asset-backed securities*	***340***	***–***	***340***	***–***	***4,917***	***–***	***4,941***	
07	*– issued by general governments*	***72,234***	***71,317***	***72,234***	***71,317***	***257,347***	***231,365***	***257,090***	***231,134***
08	*– issued by financial corporations*	***7,948***	***1,178***	***7,948***	***1,178***	***94,890***	***15,080***	***94,845***	***15,080***
09	*– issued by non-financial corporations*	***1,880***	***214***	***1,880***	***214***	***14,481***	***4,761***	***14,168***	***4,658***
12	Other assets	**70,469**	**–**			**1,943,427**	**162,722**		

Table 81: B – Collateral received[1]

		Fair value of encumbered collateral received or own debt securities issued		Unencumbered: Fair value of collateral received or own debt securities issued available for encumbrance	
		Total	*of which: notionally eligible EHQLA and HQLA*	Total	*Of which: EHQLA and HQLA*
		$m	$m	$m	$m
130	Collateral received by the reporting institution	**269,782**	**216,763**	**244,994**	**147,920**
140	Loans on demand	**–**	**–**	**24**	**–**
150	Equity instruments	**23,675**	**8,811**	**16,624**	**6,284**
160	Debt securities	**245,440**	**207,952**	**206,899**	**141,636**
	– of which:				
170	*– covered bonds*	***6***	***–***	***25***	***–***
180	*– asset-backed securities*	***17,973***	***389***	***1,765***	
190	*– issued by general governments*	***207,476***	***196,387***	***162,884***	***129,241***
200	*– issued by financial corporations*	***12,196***	***6,012***	***23,290***	***5,800***
210	*– issued by non-financial corporations*	***7,295***	***5,164***	***16,948***	***6,595***
220	Loans and advances other than loans on demand	**–**	**–**	**14,222**	**–**
230	Other collateral received	**667**	**–**	**7,225**	**–**
240	Own debt securities issued other than own covered bonds or ABSs	**–**	**–**	**–**	**–**
241	Own covered bonds and ABSs issued and not yet pledged			**8,913**	**–**
250	Total assets, collateral received and own debt securities issued	**454,562**	**306,551**		

Table 81: C – Encumbered assets/collateral received and associated liabilities[1]

		Matching liabilities, contingent liabilities or securities lent	Assets, collateral received and own debt securities issued other than covered bonds and ABSs encumbered
		$m	$m
010	Carrying amount of selected financial liabilities	**256,771**	**375,413**

1 The values in these tables are the average of quarterly data points in the year.

Importance of encumbrance

We are a deposit-led bank and hence the majority of our funding is from customer current accounts and customer savings deposits payable on demand or at short notice. Given this structural unsecured funding position, we have little requirement to fund ourselves in secured markets, and therefore our overall low level of encumbrance reflects this position. However, we do provide collateralised financing services to clients as part of our GB&M business model, providing cash financing or specific securities, and these result in off-balance sheet encumbrance. The other sources that contribute to encumbrance are securities pledged in derivative transactions, mostly for hedging purposes, issuance of asset-backed securities, and covered bond programmes. HSBC Holdings ALCO reviews the asset encumbrance of the institution as a whole quarterly and any events changing the asset encumbrance level are examined.

For details on balance sheet encumbered and unencumbered assets, please refer to table 67.

Appendix IV

Summary of disclosures withheld

CRD IV reference	Description	Rationale
448(a)	Key assumptions (including assumptions regarding loan prepayments and behaviour of non-maturity deposits) on their exposure to interest rate risk on positions not included in the trading book.	Assumptions regarding fixed term loan repayments and term behaviouralisation of non-maturity deposits and capital drive HSBC's structural interest rates positioning and market hedging requirements. These assumptions are proprietary and their disclosure could give key business strategy information to our competitors.

Other Information

Abbreviations

The following abbreviated terms are used throughout this document.

Currencies

$	United States dollar

A

ABCP	Asset-backed commercial paper
ABS[1]	Asset-backed security
AIRB[1]	Advanced internal ratings based approach
ALCM	Asset, Liability and Capital Management
ALCO	Asset and Liability Management Committee
AT1 capital	Additional tier 1 capital
AVA	Additional value adjustment

B

BCBS	Basel Committee on Banking Supervision
BoE	Bank of England
BSM	Balance Sheet Management

C

CCF	Credit conversion factor
CCP[1]	Central counterparty
CCR[1]	Counterparty credit risk
CCyB[1]	Countercyclical capital buffer
CDS[1]	Credit default swap
CET1[1]	Common equity tier 1
CIU	Collective investment undertakings
CRA	Credit risk adjustment
CRD IV[1]	Capital Requirements Regulation and Directive
CRE[1]	Commercial real estate
CRM[1]	Credit risk mitigation/mitigant
CRR[1]	Customer risk rating
CRR II	Revised Capital Requirements Regulation, as implemented
CRO	Chief Risk Officer
CSA[1]	Credit Support Annex
CVA[1]	Credit valuation adjustment

D

D-SIB	Domestic systemically important bank

E

EAD[1]	Exposure at default
EBA	European Banking Authority
EC	European Commission
ECA	Export Credit Agency
ECAI	External Credit Assessment Institution
ECL[1]	Expected credit losses
EEA	European Economic Area
EL[1]	Expected loss
EHQLA	Extremely high-quality liquid assets
EU	European Union

F

FIRB[1]	Foundation internal ratings based approach
Fitch	Fitch Ratings
FPC[1]	Financial Policy Committee (UK)
FRTB	Fundamental Review of the Trading book
FSB	Financial Stability Board
FSVC	Financial System Vulnerabilities Committee
FVOCI[1]	Fair value through other comprehensive income

G

GAC	Group Audit Committee
GB&M	Global Banking and Markets, a global business
GMB	Group Management Board
GPB	Global Private Banking, a global business
GRC	Group Risk Committee
Group	HSBC Holdings together with its subsidiary undertakings
G-SIB[1]	Global systemically important bank
G-SII	Global systemically important institution

H

HKMA	Hong Kong Monetary Authority
Hong Kong	The Hong Kong Special Administrative Region of the People's Republic of China
HQLA	High-quality liquid assets
HSBC	HSBC Holdings together with its subsidiary undertakings

I

IAA	Internal Assessment Approach
ICAAP[1]	Internal Capital Adequacy Assessment Process
ICG	Individual capital guidance
ICR	Individual capital requirement
IFRSs	International Financial Reporting Standards
ILAA	Individual Liquidity Adequacy Assessment
IMA[1]	Internal Models Approach
IMM[1]	Internal Model Method
IRB[1]	Internal ratings based approach
IRRBB	Interest rate risk in the banking book
IRC	Incremental risk charge

L

LCR[1]	Liquidity Coverage Ratio
LFRF	Liquidity and Funding Risk Framework
LGD[1]	Loss given default
Libor	London interbank offered rate

M

MDB	Multilateral Development Bank
MENA	Middle East and North Africa
MOC	Model Oversight Committee
Moody's	Moody's Investor Service
MPE	Multiple point of entry
MREL	Minimum requirements for own funds and eligible liabilities
MRM	Model Risk Management

N

NCOA	Non-credit obligation asset
NPL	Non-performing loans
NSFR[1]	Net Stable Funding Ratio

O

ORMF	Operational risk management framework
OTC[1]	Over-the-counter

P

PD[1]	Probability of default
PFE	Potential future exposure
PIT	Point-in-time
POCI	Purchased or originated credit impaired loans
PPE	Property, plant and equipment
PRA[1]	Prudential Regulation Authority (UK)
PVA	Prudent valuation adjustment

Q

QCCP	Qualifying Central Counterparty

R

RAF	Resolvability Assessment Framework
RAS	Risk appetite statement
RBM[1]	Ratings Based Method
RBWM	Retail Bank and Wealth Management, a global business
Retail IRB[1]	Retail internal ratings based approach
RMM	Risk Management Meeting of the GMB
RNIV	Risks not in VaR
RWA[1]	Risk-weighted asset

S

SA/STD[1]	Standardised approach
SA-CCR	Standardised approach for counterparty credit risk
S&P	Standard and Poor's rating agency
SFM	Supervisory Formula Method
SFT	Securities Financing Transactions
SIC	Securities Investment Conduit
SME	Small- and medium-sized enterprise
SPE[1]	Special Purpose Entity
SRB[1]	Systemic Risk Buffer
SREP	Supervisory Review and Evaluation Process
SSFA/SFA	Simplified supervisory formula approach
SVaR	Stressed Value at risk

T

TLAC[1]	Total loss absorbing capital
TTC	Through-the-cycle
T1 capital[1]	Tier 1 capital
T2 capital[1]	Tier 2 capital

U

UK	United Kingdom
US	United States

V

VaR[1]	Value at risk

1 Full definition included in the Glossary published on HSBC website www.hsbc.com

Cautionary statement regarding forward-looking statements

The *Pillar 3 Disclosures at 31 December 2019* contain certain forward-looking statements with respect to HSBC's financial condition, results of operations, capital position and business.

Statements that are not historical facts, including statements about HSBC's beliefs and expectations, are forward-looking statements. Words such as 'expects', 'targets', 'anticipates', 'intends', 'plans', 'believes', 'seeks', 'estimates', 'potential' and 'reasonably possible', variations of these words and similar expressions are intended to identify forward-looking statements. These statements are based on current plans, estimates and projections, and therefore undue reliance should not be placed on them. Forward-looking statements speak only as of the date they are made. HSBC makes no commitment to revise or update any forward-looking statements to reflect events or circumstances occurring or existing after the date of any forward-looking statements.

Written and/or oral forward-looking statements may also be made in the periodic reports to the US Securities and Exchange Commission, summary financial statements to shareholders, proxy statements, offering circulars and prospectuses, press releases and other written materials, and in oral statements made by HSBC's Directors, officers or employees to third parties, including financial analysts.

Forward-looking statements involve inherent risks and uncertainties. Readers are cautioned that a number of factors could cause actual results to differ, in some instances materially, from those anticipated or implied in any forward-looking statement. These include, but are not limited to:

- Changes in general economic conditions in the markets in which we operate, such as continuing or deepening recessions and fluctuations in employment beyond those factored into consensus forecasts; changes in foreign exchange rates and interest rates, including the accounting impact resulting from financial reporting in respect of hyperinflationary economies; volatility in equity markets; lack of liquidity in wholesale funding markets; illiquidity and downward price pressure in national real estate markets; adverse changes in central banks' policies with respect to the provision of liquidity support to financial markets; heightened market concerns over sovereign creditworthiness in over-indebted countries; adverse changes in the funding status of public or private defined benefit pensions; and consumer perception as to the continuing availability of credit and price competition in the market segments we serve; and deviations from the market and economic assumptions that form the basis for our ECL measurements;
- Changes in government policy and regulation, including the monetary, interest rate and other policies of central banks and other regulatory authorities; initiatives to change the size, scope of activities and interconnectedness of financial institutions in connection with the implementation of stricter regulation of financial institutions in key markets worldwide; revised capital and liquidity benchmarks which could serve to deleverage bank balance sheets and lower returns available from the current business model and portfolio mix; imposition of levies or taxes designed to change business mix and risk appetite; the practices, pricing or responsibilities of financial institutions serving their consumer markets; expropriation, nationalisation, confiscation of assets and changes in legislation relating to foreign ownership; changes in bankruptcy legislation in the principal markets in which we operate and the consequences thereof; general changes in government policy that may significantly influence investor decisions; extraordinary government actions as a result of current market turmoil; other unfavourable political or diplomatic developments producing social instability or legal uncertainty which in turn may affect demand for our products and services; the costs, effects and outcomes of product regulatory reviews, actions or litigation, including any additional compliance requirements; and the effects of competition in the markets where we operate including increased competition from non-bank financial services companies, including securities firms; and
- Factors specific to HSBC, including our success in adequately identifying the risks we face, such as the incidence of loan losses or delinquency, and managing those risks (through account management, hedging and other techniques). Effective risk management depends on, among other things, our ability through stress testing and other techniques to prepare for events that cannot be captured by the statistical models it uses; and our success in addressing operational, legal and regulatory, and litigation challenges; and other risks and uncertainties we identify in 'top and emerging risks' on pages 73 to 81 of the Annual Report and Accounts 2019.

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