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SECURITIES AND EXCHANGE COMMISSION

Washington, D.C. 20549

Report of Foreign Private Issuer

Pursuant to Rule 13a - 16 or 15d - 16 of

the Securities Exchange Act of 1934

Commission File Number: 001-14930

For the month of February 2017

HSBC Holdings plc

42nd Floor, 8 Canada Square, London E14 5HQ, England

(Indicate by check mark whether the registrant files or will file annual reports under cover of Form 20-F or Form 40-F).

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Indicate by check mark if the registrant is submitting the Form 6-K in paper as permitted by Regulation S-T Rule 101(b)(1): ......

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Yes .... No X

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Certain defined terms

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.

Capital and Risk Management Pillar 3 Disclosures at 31 December 2016

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Capital and Risk Management Pillar 3 Disclosures at 31 December 2016

Regulatory framework for disclosures

HSBC is 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 a consolidated group level, we calculated capital for prudential regulatory reporting purposes throughout 2016 using the Basel III framework of the Basel Committee as implemented by the European Union ('EU') in the amended Capital Requirements Directive and Regulation ('CRD IV'), and in the PRA's Rulebook for the UK banking industry. The regulators of Group banking entities outside the EU are at varying stages of implementation of the Basel Committee's framework, so local regulation in 2016 may have been on the basis of Basel I, II or III.

The Basel Committee's 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 Committee's framework and the rules in their jurisdiction, their capital condition, risk exposures and risk management processes, and hence their capital adequacy.

Pillar 3 requires all material risks to be disclosed, enabling a comprehensive view of a bank's risk profile.

The PRA's final rules adopted national discretions in order to accelerate significantly the transition timetable to full 'end point' CRD IV compliance.

Pillar 3 disclosures

HSBC's Pillar 3 disclosures 2016 comprise all information required under Pillar 3, both quantitative and qualitative. They are made in accordance with Part 8 of the Capital Requirements Regulation within CRD IV. Additionally, we have implemented Basel Committee on Banking Supervision ('BCBS') final standards on revised Pillar 3 disclosures issued in January 2015. 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.

In our disclosures, to give insight into movements during the year, we provide comparative figures for the previous year, analytical review of variances and 'flow' tables for capital requirements. Geographical comparative data for Europe and Middle East and North Africa ('MENA') have been re-presented to reflect the management oversight provided by the MENA region following the management services agreement entered into by HSBC Bank Middle East Limited in 2016 in respect of HSBC Bank A.S. (Turkey).

Key ratios and figures are reflected throughout the Pillar 3 2016 disclosures and are also available on pages 2 to 3 of the Annual Reports and Accounts 2016. Where disclosures have been enhanced or are new we do not generally restate or provide prior year comparatives. The capital resources tables track the position from a CRD IV transitional to an end point basis.

We publish comprehensive Pillar 3 disclosures annually on the HSBC website www.hsbc.com, simultaneously with the release of our Annual Report and Accounts. A Pillar 3 document will also be disclosed at half-year following our Interim Report

disclosure. Earnings Releases will include regulatory information complementing the financial and risk information presented there and in line with the new requirements 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 or other location.

We continue to engage constructively in the work of the UK authorities and industry associations to improve the transparency and comparability of UK banks' Pillar 3 disclosures.

Regulatory developments

Throughout 2016, the BCBS and the Financial Stability Board ('FSB') continued to develop their package of reforms to the existing Basel III regulatory capital framework. In particular, the BCBS has proposed modifications to the existing risk-weighted asset ('RWA') and leverage frameworks. While many of these proposals are now finalised, certain key elements remain in draft, subject to international agreement. These include:

- changes to the framework for credit risk capital requirements under both the internal ratings based ('IRB') and standardised ('STD') approaches;
- a new single operational risk methodology, replacing those currently available;
- changes to leverage ratio exposure calculation and a new leverage buffer for global systemically important banks ('G-SIBs'); and
- the introduction of a capital floor based on the new STD approaches.

Separately, in response to the implementation of International Financial Reporting Standards 9 Financial Instruments ('IFRS 9') into the accounting framework in 2018, the BCBS has consulted on the long-term treatment of accounting provisions in the regulatory framework and potential transitional arrangements. It is the BCBS's aim that all of the above proposals will be finalised in 2017.

Meanwhile, in November, the European Commission ('EC') proposed a number of revisions to CRD IV, which reflect some of the proposals already completed or under development by the BCBS. Together, these changes are known as the 'CRR2' package.

The CRR2 package includes the following:

- a new STD approach for counterparty credit risk ('CCR') to replace the existing current exposure and STD methods;
- changes to the rules for determining the trading book boundary and the methodologies for calculating market risk capital charges;
- a binding leverage ratio and changes to the exposure measure;
- a new methodology for capital charges for equity investments in funds;
- restrictions to the capital base and changes to the exposure limits for the calculation of large exposures; and
- the final FSB Total Loss Absorbing Capacity ('TLAC') requirements in the EU in the form of Minimum Requirements for own funds and Eligible Liabilities ('MREL'). In relation to MREL implementation in the UK, the Bank of England also published its final requirements in November 2016, which introduces MREL from 2019 onwards consistent with international timelines.

The CRR2 package is expected to apply from 1 January 2021, save for the rules on TLAC, which may apply from 1 January

2019, and the transitional provisions for IFRS 9, which may apply from 1 January 2018.
All changes to the regulatory framework would need to be transposed into the relevant law before coming into effect.

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 and is reinforced by HSBC Values and our Global Standards programme.

The framework fosters continuous monitoring of the risk environment, and an integrated evaluation of risks and their interactions. 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 101 of the Annual Report and Accounts 2016. The management and mitigation of principal risks facing the Group is described in our top and emerging risks on page 89 of the Annual Report and Accounts 2016.

Commentary on hedging strategies and associated processes can be found in the Market Risk and Securitisation sections of this document. Additionally, a comprehensive overview of this topic can be found in Note 16 on page 262 of the Annual Report and Accounts 2016.

Risk culture

HSBC has long recognised the importance of a strong risk culture, the fostering of which is a key responsibility of senior executives. Our risk culture is reinforced by HSBC Values and our Global Standards programme. 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.

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

Further information on risk and remuneration is set out on page 89 of the Annual Report and Accounts 2016.

Risk governance

The Board has ultimate responsibility for the effective management of risk and approves HSBC's risk appetite. It is advised on risk-related matters by the Group Risk Committee ('GRC'), the Financial System Vulnerabilities Committee ('FSVC') and the Conduct and Values Committee ('CVC'). The activities of the GRC, FSVC and CVC are set out on pages 176 to 178 of the Annual Report and Accounts 2016.

Executive accountability for the monitoring, assessment and management of risk resides with the Group Chief Risk Officer. He is supported by the Risk Management Meeting ('RMM') of the Group Management Board ('GMB').

The management of financial crime risk resides with the Group Head of Financial Crime Risk. He is supported by the Global Standards Steering Meeting, as described on page 114 of the Annual Report and Accounts 2016.

Day-to-day responsibility for risk management is delegated to senior managers with individual accountability for decision making. These managers are supported by global functions as described under 'Three lines of defence' (see page 102 of the Annual Report and Accounts 2016).

Our executive risk governance structures ensure appropriate oversight and accountability of risk, which facilitates the

reporting and escalation to the RMM (see page 101 of the Annual Report and Accounts 2016).

Risk appetite

Risk appetite is a key component of our management of risk. It describes the aggregate level and risk types that we are willing to accept in achieving our medium to long-term business objectives. Within HSBC, risk appetite is managed through a global risk appetite framework and articulated in a risk appetite statement ('RAS'), which is biannually approved by the Board on the advice of the GRC.

The Group's 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 on our risk management tools is set out on page 101 of the Annual Report and Accounts 2016. Details on the Group's overarching risk appetite are set out on page 89 of the Annual Report and Accounts 2016.

Stress testing

HSBC operates a comprehensive 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 demonstrates 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 regulators' 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 on stress testing and details of the Group's regulatory stress test results are set out on page 103 of the Annual Report and Accounts 2016.

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, including sales and trading functions, helping to ensure balance in risk/return decisions. The Global Risk function operates in line with the 'three lines of defence' model (see page 102 of the Annual Report and Accounts 2016).

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 over other than financial reporting, including enterprise-wide stress testing.

The Directors, through the GRC and the GAC, conduct an annual review of the effectiveness of our system of risk management and internal control. The GRC and the GAC received confirmation that executive management has taken or is taking the necessary actions to remedy 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 183 of the Annual Report and Accounts

2016, where the Directors' Report 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. A number of key initiatives and projects to enhance consistent data aggregation, reporting and management, and work towards meeting our Basel Committee data obligations are in progress. Group policy promotes the deployment of preferred technology where practicable. 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 such matters as risk governance and oversight, compliance risks, approval authorities and lending guidelines, global and local scorecards, management information and reporting, and relations with third parties, including regulators, rating agencies and auditors.

Risk analytics and model governance

The Global Risk function manages a number of analytics disciplines supporting rating and scoring models for different risk types and business segments, economic capital and stress testing. It formulates 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 in progress toward our implementation targets for the IRB advanced approach.

Model governance is under the general oversight of Global Model Oversight Committee ('MOC'). Global MOC is supported by specific global functional MOCs for wholesale credit risk, market risk, Retail Banking and Wealth Management ('RBWM'), Global Private Banking ('GPB'), Finance, regulatory compliance, operational risk, fraud risk and financial intelligence, pensions risk, financial crime risk, and has functional and/or regional and entity-level counterparts with comparable terms of reference.

The Global MOC meets regularly and reports to RMM. It is chaired by the Global Risk function, and its membership is drawn from Risk, Finance and global businesses. Its primary responsibilities are to oversee the framework for the management of model risk, bring a strategic approach to model-related issues across the Group and to oversee the governance of our risk rating models, their consistency and approval, within the regulatory framework. 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 model review process led by the Independent Model Review team within Global Risk. The Independent Model Review team provides robust challenge to the modelling approaches used across the Group, and 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.

Linkage to the Annual Report and Accounts
2016

Basis of consolidation

The basis of consolidation for the purpose of financial accounting under IFRSs, described in Note 1 of the Annual Report and Accounts 2016, differs from that used for regulatory purposes as described in 'Structure of the regulatory group' on page 10.

Table 1: 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		128,009	(27)	1,197	129,179
Items in the course of collection from other banks		5,003	—	26	5,029
Hong Kong Government certificates of indebtedness		31,228	—	—	31,228
Trading assets		235,125	(198)	1	234,928
Financial assets designated at fair value		24,756	(24,481)	—	275
Derivatives		290,872	(145)	77	290,804
Loans and advances to banks		88,126	(1,845)	922	87,203
Loans and advances to customers		861,504	(3,307)	12,897	871,094
– of which:					
impairment allowances on IRB portfolios	h	(5,096)	—	—	(5,096)
impairment allowances on standardised portfolios		(2,754)	—	(235)	(2,989)
Reverse repurchase agreements – non-trading		160,974	344	1,444	162,762
Financial investments		436,797	(54,904)	3,500	385,393
Assets held for sale		4,389	(7)	—	4,382
– of which:					
goodwill and intangible assets	e	1	—	—	1
impairment allowances		(250)	—	—	(250)
– of which:					
IRB portfolios	h	(146)	—	—	(146)
standardised portfolios		(104)	—	—	(104)
Capital invested in insurance and other entities		—	2,214	—	2,214
Current tax assets		1,145	(118)	—	1,027
Prepayments, accrued income and other assets		59,520	(3,066)	306	56,760
– of which: retirement benefit assets	i	4,714	—	—	4,714
Interests in associates and joint ventures		20,029	—	(4,195)	15,834
– of which: positive goodwill on acquisition	e	488	—	(475)	13
Goodwill and intangible assets	e	21,346	(6,651)	481	15,176
Deferred tax assets	f	6,163	176	5	6,344
Total assets at 31 Dec 2016		2,374,986	(92,015)	16,661	2,299,632

Capital and Risk Management Pillar 3 Disclosures at 31 December 2016

Table 1: Reconciliation of balance sheets – financial accounting to regulatory scope of consolidation (continued)

	Ref	Accounting balance sheet $m	Deconsolidation of insurance/ other entities $m	Consolidation of banking associates $m	Regulatory balance sheet $m
Liabilities and equity					
Hong Kong currency notes in circulation		31,228	—	—	31,228
Deposits by banks		59,939	(50)	441	60,330
Customer accounts		1,272,386	(44)	14,997	1,287,339
Repurchase agreements – non-trading		88,958	—	—	88,958
Items in course of transmission to other banks		5,977	—	—	5,977
Trading liabilities		153,691	643	1	154,335
Financial liabilities designated at fair value		86,832	(6,012)	—	80,820
– of which:					
term subordinated debt included in tier 2 capital	n, q	23,172	—	—	23,172
preferred securities included in tier 1 capital	m	411	—	—	411
Derivatives		279,819	193	64	280,076
Debt securities in issue		65,915	(3,547)	662	63,030
Liabilities of disposal groups held for sale		2,790	—	—	2,790
Current tax liabilities		719	(26)	—	693
Liabilities under insurance contracts		75,273	(75,273)	—	—
Accruals, deferred income and other liabilities		41,501	1,810	495	43,806
– of which: retirement benefit liabilities		2,681	(2)	61	2,740
Provisions		4,773	(18)	—	4,755
– of which: contingent liabilities and contractual commitments		299	—	—	299
– of which:					
credit-related provisions on IRB portfolios	h	267	—	—	267
credit-related provisions on standardised portfolios		32	—	—	32
Deferred tax liabilities		1,623	(981)	1	643
Subordinated liabilities		20,984	1	—	20,985
– of which:					
preferred securities included in tier 1 capital	k, m	1,754	—	—	1,754
perpetual subordinated debt included in tier 2 capital	o	1,967	—	—	1,967
term subordinated debt included in tier 2 capital	n, q	16,685	—	—	16,685
Total liabilities at 31 Dec 2016		2,192,408	(83,304)	16,661	2,125,765
Called up share capital	a	10,096	—	—	10,096
Share premium account	a, k	12,619	—	—	12,619
Other equity instruments	j, k	17,110	—	—	17,110
Other reserves	c, g	(1,234)	1,735	—	501
Retained earnings	b, c	136,795	(9,442)	—	127,353
Total shareholders' equity		175,386	(7,707)	—	167,679
Non-controlling interests	d, l, m, p	7,192	(1,004)	—	6,188
– of which: non-cumulative preference shares issued by subsidiaries included in tier 1 capital	m	260	—	—	260
Total equity at 31 Dec 2016		182,578	(8,711)	—	173,867

Total liabilities and equity at 31 Dec 2016	2,374,986	(92,015)	16,661	2,299,632

The references (a) – (q) identify balance sheet components that are used in the calculation of regulatory capital on page 13.

Table 1: Reconciliation of balance sheets – financial accounting to regulatory scope of consolidation (continued)

	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		98,934	(2)	28,784	127,716
Items in the course of collection from other banks		5,768	—	22	5,790
Hong Kong Government certificates of indebtedness		28,410	—	—	28,410
Trading assets		224,837	340	4,390	229,567
Financial assets designated at fair value		23,852	(23,521)	2,034	2,365
Derivatives		288,476	(146)	495	288,825
Loans and advances to banks		90,401	(3,008)	16,413	103,806
Loans and advances to customers		924,454	(7,427)	120,016	1,037,043
– of which:					
impairment allowances on IRB portfolios	h	(6,291)	—	—	(6,291)
impairment allowances on standardised portfolios		(3,263)	—	(2,780)	(6,043)
Reverse repurchase agreements – non-trading		146,255	711	5,935	152,901
Financial investments		428,955	(51,684)	42,732	420,003
Assets held for sale		43,900	(4,107)	—	39,793
– of which:					
goodwill and intangible assets	e	1,680	(219)	—	1,461
impairment allowances		(1,454)	—	—	(1,454)
– of which:					
IRB portfolios	h	(7)	—	—	(7)
standardised portfolios		(1,447)	—	—	(1,447)
Capital invested in insurance and other entities		–	2,371	—	2,371
Current tax assets		1,221	(15)	—	1,206
Prepayments, accrued income and other assets		54,398	(2,539)	9,692	61,551
– of which: retirement benefit assets	i	5,272	—	—	5,272
Interests in associates and joint ventures		19,139	—	(18,571)	568
– of which: positive goodwill on acquisition	e	593	—	(579)	14
Goodwill and intangible assets	e	24,605	(6,068)	623	19,160
Deferred tax assets	f	6,051	195	518	6,764
Total assets at 31 Dec 2015		2,409,656	(94,900)	213,083	2,527,839

Capital and Risk Management Pillar 3 Disclosures at 31 December 2016

Table 1: Reconciliation of balance sheets – financial accounting to regulatory scope of consolidation (continued)

	Ref	Accounting balance sheet $m	Deconsolidation of insurance/ other entities $m	Consolidation of banking associates $m	Regulatory balance sheet $m
Liabilities and equity					
Hong Kong currency notes in circulation		28,410	—	—	28,410
Deposits by banks		54,371	(97	)50,005	104,279
Customer accounts		1,289,586	(119	)147,522	1,436,989
Repurchase agreements – non-trading		80,400	—	—	80,400
Items in course of transmission to other banks		5,638	—	—	5,638
Trading liabilities		141,614	(66	)59	141,607
Financial liabilities designated at fair value		66,408	(6,046	)—	60,362
– of which:					
term subordinated debt included in tier 2 capital	n, q	21,168	—	—	21,168
preferred capital securities included in tier 1 capital	m	1,342	—	—	1,342
Derivatives		281,071	87	508	281,666
Debt securities in issue		88,949	(7,885	)5,065	86,129
Liabilities of disposal groups held for sale		36,840	(3,690	)—	33,150
Current tax liabilities		783	(84	)409	1,108
Liabilities under insurance contracts		69,938	(69,938	)—	–
Accruals, deferred income and other liabilities		38,116	2,326	6,669	47,111
– of which: retirement benefit liabilities		2,809	(2	)61	2,868
Provisions		5,552	(25	)—	5,527
– of which: contingent liabilities and contractual commitments		240	—	—	240
– of which:					
credit-related provisions on IRB portfolios	h	201	—	—	201
credit-related provisions on standardised portfolios		39	—	—	39
Deferred tax liabilities		1,760	(868	)5	897
Subordinated liabilities		22,702	—	2,841	25,543
– of which:					
preferred capital securities included in tier 1 capital	k, m	1,929	—	—	1,929
perpetual subordinated debt included in tier 2 capital	o	2,368	—	—	2,368
term subordinated debt included in tier 2 capital	n, q	18,405	—	—	18,405
Total liabilities at 31 Dec 2015		2,212,138	(86,405	)213,083	2,338,816
Called up share capital	a	9,843	—	—	9,843
Share premium account	a, k	12,421	—	—	12,421
Other equity instruments	j, k	15,112	—	—	15,112
Other reserves	c, g	7,143	1,650	—	8,793
Retained earnings	b, c	143,941	(9,212	)—	134,729
Total shareholders' equity		188,460	(7,562	)—	180,898
Non-controlling interests	d, l, m, p	9,058	(933	)—	8,125
– of which: non-cumulative preference shares issued by subsidiaries included in tier 1 capital	m	2,077	—	—	2,077
Total equity at 31 Dec 2015		197,518	(8,495	)—	189,023

Total liabilities and equity at 31 Dec 2015	2,409,656	(94,900	)213,083	2,527,839

The references (a) – (q) identify balance sheet components that are used in the calculation of regulatory capital on page 13.

Capital and Risk Management Pillar 3 Disclosures at 31 December 2016

Structure of the regulatory group

HSBC's organisation is that of a financial holding company whose major subsidiaries are almost entirely wholly-owned banking entities. A simplified organisation chart showing the difference between the accounting and regulatory consolidation groups is included in Appendix II.

Following a clarification of policy by the PRA, at 30 September 2016 the regulatory treatment of our investment in Bank of Communications Co., Limited ('BoCom') changed from proportional consolidation of RWAs to a deduction from capital (subject to regulatory thresholds). The revised regulatory treatment is more consistent with our financial reporting treatment, aligning with the equity method of accounting, and better reflects our relationship with BoCom, including the nature of our obligations and financial commitments. This also results in BoCom no longer being a difference between the financial accounting and regulatory balance sheets in table 1.

Interests in other banking associates are proportionally consolidated for regulatory purposes by including our share of assets, liabilities, profit and loss, and RWAs in accordance with the PRA's application of EU legislation. As shown in table 2, the principal associate subject to proportional regulatory consolidation at 31 December 2016 is The Saudi British Bank.

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 common equity tier 1 ('CET1') (subject to thresholds). In the column 'Deconsolidation of insurance/other entities', in table 1, the amount of $2.2bn (2015: $2.4bn) shown as 'Capital invested in insurance and other entities' represents the cost of investment in our insurance business. The principal insurance entities are listed in table 2.

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. The deconsolidation of SPEs connected to securitisation activity and other entities mainly impacts the adjustments to 'Loans and advances to customers', 'Financial investments' and 'Debt securities in issue'. Table 2 lists the principal SPEs excluded from the regulatory consolidation with their total assets and total equity. Further details of the use of SPEs in the Group's securitisation activities are shown in Note 19 of the Annual Report and Accounts 2016 and on page 268.

Table 2: Principal entities with a different regulatory and accounting scope of consolidation

			At 31 Dec 2016		At 31 Dec 2015	
		Principal activities	Total assets	Total equity	Total assets	Total equity
	Footnotes		$m	$m	$m	$m
Principal associates						
Bank of Communications Co., Limited	1, 2	Banking services	1,165,535	89,364	1,110,088	80,657
The Saudi British Bank		Banking services	49,784	8,202	50,189	7,356
Principal insurance entities excluded from the regulatory consolidation						
HSBC Life (International) Ltd		Life insurance manufacturing	39,346	2,838	34,808	2,805
HSBC Assurances Vie (France)		Life insurance manufacturing	23,418	721	23,713	663
Hang Seng Insurance Company Ltd		Life insurance manufacturing	15,225	1,107	14,455	1,154
HSBC Insurance (Singapore) Pte Ltd		Life insurance manufacturing	3,589	360	3,102	315

HSBC Life (UK) Ltd		Life insurance manufacturing	1,678	158	1,941	390
HSBC Life Insurance Company Ltd		Life insurance manufacturing	864	85	764	109
HSBC Seguros S.A. (Mexico)		Life insurance manufacturing	716	118	870	182
HSBC Amanah Takaful (Malaysia) SB		Life insurance manufacturing	298	26	302	27
HSBC Vida e Previdência (Brasil) S.A.		Life insurance manufacturing	—	—	3,418	155
HSBC Seguros (Brasil) S.A.		Life insurance manufacturing	—	—	484	283
Principal SPEs excluded from the regulatory consolidation	3					
Regency Assets Ltd		Securitisation	7,380	—	15,183	—
Mazarin Funding Ltd		Securitisation	1,117	12	1,879	(9)
Turquoise Receivables Trustee Ltd		Securitisation	838	—	852	(1)
Barion Funding Ltd		Securitisation	653	56	1,132	68
Malachite Funding Ltd		Securitisation	356	34	442	26
Metrix Portfolio Distribution Plc		Securitisation	333	—	304	—

1 Since 30 September 2016, both the accounting and regulatory balance sheets use the equity method to consolidate our interest in BoCom. For further details, see ‘Structure of the regulatory group’ above.

2 Total assets and total equity for 2016 are as at 30 September 2016.

3 These SPEs issued no or de minimis share capital. The negative equity represents net unrealised losses on unimpaired assets on their balance sheets and negative retained earnings.

Table 2 also presents the total assets and total equity, on a stand-alone IFRS basis, of the entities which are included in the Group consolidation on different bases for accounting and regulatory purposes. The figures shown therefore include intra-Group balances. For associates, table 2 shows the total assets and total equity of the entity as a whole rather than HSBC’s share in the entities’ balance sheets.

For insurance entities, the present value of in-force long-term insurance business asset of $6.5bn and the related deferred tax liability are recognised at the financial reporting consolidated level only, and are therefore not included in the asset or equity positions for the stand-alone entities presented in table 2. In

addition, these figures exclude any deferred acquisition cost assets that may be recognised in the entities’ stand-alone financial reporting.

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 2016.

The Pillar 3 Disclosures 2016 are prepared in accordance with regulatory capital adequacy concepts and rules, while the Annual Report and Accounts 2016 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.
The difference between total assets on the regulatory balance sheet is shown in table 3, and the credit risk and CCR exposure values are shown in table 4.
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').
In a first step, table 3 below shows a breakdown of the accounting balances into the risk types that form the basis for regulatory capital requirements. Table 4 then shows the main differences between the accounting balances and regulatory exposures by regulatory risk type.

Table 3: Mapping of financial statement categories with regulatory risk categories

			Carrying value of items				
	Carrying values as reported in published financial statements	Carrying values under scope of regulatory consolidation[1]	Subject to credit risk framework	Subject to CCR framework[2]	Subject to securitisation framework[3]	Subject to the market risk framework	Subject to deduction from capital or not subject to regulatory capital requirements[4]
	$bn	$bn	$bn	$bn	$bn	$bn	$bn
Assets							
Cash and balances at central banks	128.0	129.2	129.2	—	—	—	—
Items in the course of collection from other banks	5.0	5.0	5.0	—	—	—	—
Hong Kong Government certificates of indebtedness	31.2	31.2	31.2	—	—	—	—
Trading assets	235.1	234.9	8.4	11.3	—	208.7	17.6
Financial assets designated at fair value	24.8	0.3	0.3	—	—	—	—
Derivatives	290.9	290.8	—	289.9	0.9	290.8	—
Loans and advances to banks	88.1	87.2	76.3	2.0	1.2	—	7.7
Loans and advances to customers	861.5	871.1	847.4	8.9	10.8	—	4.0

Reverse repurchase agreements – non-trading	161.0	162.8	—	162.4	0.4	—	—
Financial investments	436.8	385.4	375.8	—	9.5	—	0.1
Assets held for sale	4.4	4.4	4.4	—	—	—	—
Capital invested in insurance and other entities	2.2	2.2	1.4	—	—	—	0.8
Current tax assets	1.1	1.0	1.0	—	—	—	—
Prepayments, accrued income and other assets	59.5	56.8	38.0	3.9	—	8.2	6.7
Interests in associates and joint ventures	17.8	15.8	10.3	—	—	—	5.5
Goodwill and intangible assets	21.3	15.2	—	—	—	—	15.2
Deferred tax assets	6.2	6.3	5.2	—	—	—	1.1
Total assets at 31 Dec 2016	2,374.9	2,299.6	1,533.9	478.4	22.8	507.7	58.7
Cash and balances at central banks	98.9	127.7	127.7	—	—	—	—
Items in the course of collection from other banks	5.8	5.8	5.8	—	—	—	—
Hong Kong Government certificates of indebtedness	28.4	28.4	28.4	—	—	—	—
Trading assets	224.8	229.5	4.4	17.4	—	225.1	—
Financial assets designated at fair value	23.9	2.4	2.4	—	—	—	—
Derivatives	288.5	288.8	0.3	287.5	0.9	288.5	—
Loans and advances to banks	90.4	103.8	103.8	—	—	—	—
	924.4	1,037.0	1,027.5	—	9.5	—	—

Loans and advances to customers								
Reverse repurchase agreements – non-trading	146.3	152.9	5.9	147.0		—	—	
Financial investments	429.0	420.0	408.7	–	11.3	—	—	
Assets held for sale	43.9	39.8	32.8	5.3	—	—	1.7	
Capital invested in insurance and other entities	2.4	2.4	2.4	—	—	—	—	
Current tax assets	1.2	1.2	1.2	—	—	—	—	
Prepayments, accrued income and other assets	54.4	61.5	44.9	—	—	11.5	5.1	
Interests in associates and joint ventures	16.7	0.6	—	—	—	—	0.6	
Goodwill and intangible assets	24.6	19.2	—	—	—	—	19.2	
Deferred tax assets	6.1	6.8	7.8	—	–	—	(1.0	)
Total assets at 31 Dec 2015	2,409.7	2,527.8	1,804.0	457.2	21.7	525.1	25.6	

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’ and ‘Trading assets’, as some of the assets included in these items are subject to regulatory capital charges for both CCR and market risk.

2 The amounts shown in the column ‘Subject to CCR framework’ include both non-trading book and trading book.

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

4 In the comparative period, the carrying value of settlement accounts not subject to regulatory capital requirements were reported in credit risk and market risk.

Capital and Risk Management Pillar 3 Disclosures at 31 December 2016

Table 4: Main sources of differences between regulatory exposure values and carrying values in financial statements

		Items subject to:		
		Credit risk	CCR	Securitisation
	Footnotes	$bn	$bn	$bn
Asset carrying value amount under scope of regulatory consolidation		1,533.9	478.4	22.8
– differences due to reversal of IFRS netting		14.6	110.3	—
– differences due to financial collateral on standardised approach		(12.3)	—	—
– differences due to consideration of provisions on IRB approach		6.0	—	—
– differences due to modelling and standardised CCFs for credit risk and other differences	1	250.7	—	12.4
– differences due to credit risk mitigation and potential exposures for counterparty risk		—	(426.4)	—
– differences due to free deliveries and sundry balances		—	2.5	—
Exposure values considered for regulatory purposes at 31 Dec 2016		1,792.9	164.8	35.2
Asset carrying value amount under scope of regulatory consolidation		1,804.0	457.2	21.7
– differences due to reversal of IFRS netting	2	31.7	110.0	—
– differences due to financial collateral on standardised approach		(13.8)	—	—
– differences due to consideration of provisions on IRB approach		7.2	—	0.6
– differences due to modelling and standardised CCFs for credit risk and other differences	1	275.8	—	19.3
– differences due to credit risk mitigation and potential exposures for counterparty risk		—	(395.5)	—
– differences due to free deliveries and sundry balances		—	6.9	—
Exposure values considered for regulatory purposes at 31 Dec 2015		2,104.9	178.6	41.6

1 This includes the undrawn portion of committed facilities, various trade finance commitments and guarantees, by applying CCFs to these items.

2 In the comparative period, ‘differences due to reversal of IFRS netting’ have been reallocated from ‘differences due to credit risk mitigation and potential exposures for counterparty risk’.

Explanations of differences between accounting and regulatory exposure amounts

Under IFRS, netting is only permitted if legal right of set-off exists and the cash flows are intended to be settled on a net basis. Under the PRA’s regulatory rules, however, netting is applied for capital calculations if there is legal certainty and the positions are managed on a net collateralised basis. As a consequence, we recognise greater netting under the PRA’s rules, reflecting the close-out provisions that would take effect in the event of default of a counterparty rather than just those transactions that are actually settled net in the normal course of business.

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.

While bid/offer are often commensurate with market price dispersion, these adjustments essentially capture an execution cost and not market uncertainty. However, it is recognised that a variety of valuation techniques combined with the range of plausible market parameters at a given PIT 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 and that may differ 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 cost, unearned credit spread and funding fair value adjustment (‘FFVA’).
AVAs are not limited to level 3 exposures, for which a 95% uncertainty range is already computed and disclosed, but must be also calculated for any exposure for which the exit price cannot be determined without a degree of uncertainty.

Capital and Risk Management Pillar 3 Disclosures at 31 December 2016

Capital and RWAs

Capital management

Approach and policy

Our approach to capital management is designed to ensure we meet current regulatory requirements and that we respect the payment priority of our capital providers. We aim to maintain a strong capital base, to support the risks inherent in our business and to invest in accordance with our six filters framework, 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 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. 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 2016, consistent with the Group's capital plan, the Group's subsidiaries did not experience any significant restrictions on paying dividends or repaying loans and

advances. Also, there are no foreseen restrictions envisaged with regard to 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 does not have any Group Financial Support Agreements outstanding.

All capital securities included in the capital base of HSBC have been either 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 application of the CRD IV grandfathering provisions. The main features of capital securities issued by the Group, categorised as tier 1 ('T1 capital') and tier 2 capital ('T2 capital'), are set out on the HSBC website, www.hsbc.com.

The values disclosed are the IFRSs balance sheet carrying amounts, not the amounts that these securities contribute to regulatory capital. For example, the IFRSs accounting and the regulatory treatments differ in their approaches to issuance costs, regulatory amortisation and regulatory eligibility limits prescribed in the grand-fathering provisions under CRD IV.

A list of the 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 2016. 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 management, please see page 165 of the Annual Report and Accounts 2016.

Own funds

Table 5: Own funds disclosure

	At 31 Dec 2016	CRD IV prescribed residual	Final CRD IV text

Ref*		Ref	$m	amount $m	$m
	Common equity tier 1 (‘CET1’) capital: instruments and reserves				
1	Capital instruments and the related share premium accounts		21,310		21,310
	– ordinary shares	a	21,310		21,310
2	Retained earnings	b	125,442		125,442
3	Accumulated other comprehensive income (and other reserves)	c	560		560
5	Minority interests (amount allowed in consolidated CET1)	d	3,878		3,878
5a	Independently reviewed interim net profits net of any foreseeable charge or dividend	b	(1,899)		(1,899)
6	Common equity tier 1 capital before regulatory adjustments		149,291		149,291
	Common equity tier 1 capital: regulatory adjustments				
7	Additional value adjustments		(1,358)		(1,358)
8	Intangible assets (net of related deferred tax liability)	e	(15,037)		(15,037)
10	Deferred tax assets that rely on future profitability excluding those arising from temporary differences (net of related tax liability)	f	(1,696)		(1,696)
11	Fair value reserves related to gains or losses on cash flow hedges	g	(52)		(52)
12	Negative amounts resulting from the calculation of expected loss amounts	h	(4,025)		(4,025)
14	Gains or losses on liabilities valued at fair value resulting from changes in own credit standing		1,052		1,052
15	Defined-benefit pension fund assets	i	(3,680)		(3,680)
16	Direct and indirect holdings of own CET1 instruments		(1,573)		(1,573)
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)		(6,370)		(6,370)
22	Amount exceeding the 15%/17.65% threshold		—	(568)	(568)
23	– 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		—	(388)	(388)

Capital and Risk Management Pillar 3 Disclosures at 31 December 2016

Table 5: Own funds disclosure (continued)

Ref*		Ref†	At 31 Dec 2016 $m	CRD IV prescribed residual amount $m	Final CRD IV text $m
25	– deferred tax assets arising from temporary differences		—	(180)	(180)
28	Total regulatory adjustments to Common equity tier 1		(32,739)	(568)	(33,307)
29	Common equity tier 1 capital		116,552	(568)	115,984
	Additional tier 1 (‘AT1’) capital: instruments				
30	Capital instruments and the related share premium accounts		11,259		11,259
31	– classified as equity under IFRSs	j	11,259		11,259
33	Amount of qualifying items and the related share premium accounts subject to phase out from AT1	k	7,946	(7,946)	—
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	l, m	2,419	(2,267)	152
35	– of which: instruments issued by subsidiaries subject to phase out	m	1,522	(1,522)	—
36	Additional tier 1 capital before regulatory adjustments		21,624	(10,213)	11,411
	Additional tier 1 capital: regulatory adjustments				
37	Direct and indirect holdings of own AT1 instruments		(60)		(60)
41b	Residual amounts deducted from AT1 capital with regard to deduction from tier 2 (‘T2’) capital during the transitional period		(94)	94	—
	– 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		(94)	94	—
43	Total regulatory adjustments to additional tier 1 capital		(154)	94	(60)
44	Additional tier 1 capital		21,470	(10,119)	11,351
45	Tier 1 capital (T1 = CET1 + AT1)		138,022	(10,687)	127,335
	Tier 2 capital: instruments and provisions				
46	Capital instruments and the related share premium accounts	n	16,732		16,732
47	Amount of qualifying items and the related share premium accounts subject to phase out from T2	o	5,695	(5,695)	—
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	p, q	12,323	(12,258)	65
49	– of which: instruments issued by subsidiaries subject to phase out	q	12,283	(12,283)	—
51	Tier 2 capital before regulatory adjustments		34,750	(17,953)	16,797
	Tier 2 capital: regulatory adjustments				
52	Direct and indirect holdings of own T2 instruments		(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)		(374)	(94)	(468)
57	Total regulatory adjustments to tier 2 capital		(414)	(94)	(508)
58	Tier 2 capital		34,336	(18,047)	16,289

59	Total capital (TC = T1 + T2)	172,358	(28,734)	143,624
59a	Risk-weighted assets in respect of amounts subject to pre-capital requirements regulation treatment and transitional treatments subject to phase out as prescribed in Regulation (EU) No 575/2013	1,419	(1,419)	—
	– items not deducted from CET1: 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	971	(971)	—
	– items not deducted from CET1: deferred tax assets arising from temporary differences	448	(448)	—
60	Total risk-weighted assets	857,181	(1,419)	855,762
	Capital ratios and buffers			
61	Common equity tier 1	13.6 %		13.6 %
62	Tier 1	16.1 %		14.9 %
63	Total capital	20.1 %		16.8 %
64	Institution specific buffer requirement	1.348 %		
65	– capital conservation buffer requirement	0.625 %		
66	– counter cyclical buffer requirement	0.098 %		
67a	– Global Systemically Important Institution (‘G-SII’) buffer	0.625 %		
68	Common equity tier 1 available to meet buffers	7.7 %		
	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)	3,056		
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)	12,292		
75	Deferred tax assets arising from temporary differences (amount below 10% threshold, net of related tax liability)	5,675		

Capital and Risk Management Pillar 3 Disclosures at 31 December 2016

Table 5: Own funds disclosure (continued)

Ref*		Ref†	At 31 Dec 2016 $m	CRD IV prescribed residual amount $m	Final CRD IV text $m
	Applicable caps on the inclusion of provisions in tier 2				
77	Cap on inclusion of credit risk adjustments in T2 under standardised approach		2,109		
79	Cap for inclusion of credit risk adjustments in T2 under internal ratings-based approach		3,090		
	Capital instruments subject to phase-out arrangements (only applicable between 1 Jan 2013 and 1 Jan 2022)				
82	Current cap on AT1 instruments subject to phase out arrangements		10,382		
83	Amount excluded from AT1 due to cap (excess over cap after redemptions and maturities)		202		
84	Current cap on T2 instruments subject to phase out arrangements		17,978		
85	Amount excluded from T2 due to cap (excess over cap after redemptions and maturities)		3,712		

* The references identify the lines prescribed in the European Banking Authority ('EBA') template. Lines represented in this table are those lines which are applicable and where there is a value.

† The references (a) – (q) identify balance sheet components on page 6 which are used in the calculation of regulatory capital.

Leverage ratio

Our leverage ratio calculated on the Capital Requirements Regulation basis was 5.4% at 31 December 2016, up from 5.0% at 31 December 2015. This was mainly due to a reduction in the exposure measure resulting from the change in regulatory treatment of our investment in BoCom.

The Group's UK leverage ratio on a modified basis, excluding qualifying central bank balances, was 5.7%. This modification to the leverage ratio exposure measure was made following recommendations by the Bank of England's Financial Policy Committee ('FPC').

The FPC has stated that it intends to recalibrate the leverage ratio in 2017 to take account of this modification. Any uplift in HSBC's UK leverage ratio should be considered in this context.

At 31 December 2016, our UK minimum leverage ratio requirement of 3% was supplemented by an additional leverage ratio buffer of 0.2% that translates to a value of $5bn, and a countercyclical leverage ratio buffer which results in no capital impact. We comfortably exceeded these leverage requirements.

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 89 of the Annual Report and Accounts 2016.

Table 6: Summary reconciliation of accounting assets and leverage ratio exposures

		At 31 Dec 2016	2015
Ref*		$bn	$bn
1	Total assets as per published financial statements	2,375.0	2,409.7

	Adjustments for:		
2	– entities which are consolidated for accounting purposes but are outside the scope of regulatory consolidation	(75.4)	112.4
4	– derivative financial instruments	(158.6)	(140.8)
5	– securities financing transactions (‘SFT’)	10.1	13.4
6	– off-balance sheet items (i.e. conversion to credit equivalent amounts of off-balance sheet exposures)	223.1	400.9
7	– other	(19.8)	(1.2)
8	Total leverage ratio exposure	2,354.4	2,794.4

* The references identify the lines prescribed in the EBA template. Lines represented in this table are those lines which are applicable and where there is a value.

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Table 7: Leverage ratio common disclosure

Ref*		At 31 Dec 2016 $bn	2015 $bn
	On-balance sheet exposures (excluding derivatives and SFT)		
1	On-balance sheet items (excluding derivatives, SFTs and fiduciary assets, but including collateral)	1,844.4	2,103.5
2	(Asset amounts deducted in determining tier 1 capital)	(34.4)	(32.8)
3	Total on-balance sheet exposures (excluding derivatives, SFTs and fiduciary assets)	1,810.0	2,070.7
	Derivative exposures		
4	Replacement cost associated with all derivatives transactions (i.e. net of eligible cash variation margin)	43.7	31.0
5	Add-on amounts for potential future exposure ('PFE') associated with all derivatives transactions (mark-to-market method)	110.2	124.5
6	Gross-up for derivatives collateral provided where deducted from the balance sheet assets pursuant to IFRSs	5.9	4.2
7	(Deductions of receivables assets for cash variation margin provided in derivatives transactions)	(30.6)	(30.5)
8	(Exempted central counterparty ('CCP') leg of client-cleared trade exposures)	(4.1)	—
9	Adjusted effective notional amount of written credit derivatives	216.4	226.1
10	(Adjusted effective notional offsets and add-on deductions for written credit derivatives)	(209.3)	(205.9)
11	Total derivative exposures	132.2	149.4
	Securities financing transaction exposures		
12	Gross SFT assets (with no recognition of netting), after adjusting for sales accounting transactions	266.6	243.0
13	(Netted amounts of cash payables and cash receivables of gross SFT assets)	(87.9)	(77.9)
14	Counterparty credit risk exposure for SFT assets	10.4	8.3
16	Total securities financing transaction exposures	189.1	173.4
	Other off-balance sheet exposures		
17	Off-balance sheet exposures at gross notional amount	757.7	906.0
18	(Adjustments for conversion to credit equivalent amounts)	(534.6)	(505.1)
19	Total off-balance sheet exposures	223.1	400.9
	Capital and total exposures		
20	Tier 1 capital	127.3	140.2
21	Total leverage ratio exposure	2,354.4	2,794.4
22	Leverage ratio	5.4%	5.0%
EU-23	Choice on transitional arrangements for the definition of the capital measure	Fully Phased In	Fully Phased in

* The references identify the lines prescribed in the EBA template. Lines represented in this table are those lines which are applicable and where there is a value.

Table 8: Leverage ratio – Split of on-balance sheet exposures (excluding derivatives, SFTs and exempted exposures)

Ref*	At 31 Dec 2016 $bn	2015 $bn

EU-1	Total on-balance sheet exposures (excluding derivatives, SFTs, and exempted exposures)	1,844.4	2,103.5
EU-2	trading book exposures	267.5	224.5
EU-3	banking book exposures	1,576.9	1,879.0
	– of which:		
EU-4	covered bonds	1.1	1.0
EU-5	exposures treated as sovereigns	504.4	521.0
EU-6	exposures to regional governments, multilateral development banks (‘MDB’), international organisations and public sector entities (‘PSE’) not treated as sovereigns	6.0	1.0
EU-7	institutions	67.6	129.0
EU-8	secured by mortgages of immovable properties	254.6	292.0
EU-9	retail exposures	84.6	113.0
EU-10	corporate	532.4	677.0
EU-11	exposures in default	12.4	15.0
EU-12	other exposures (e.g. equity, securitisations and other non-credit obligation assets)	113.8	130.0

* The references identify the lines prescribed in the EBA template. Lines represented in this table are those lines which are applicable and where there is a value.

Capital buffers

The geographical breakdown and institution specific countercyclical capital buffer (‘CCyB’) disclosure is published annually on the HSBC website, www.hsbc.com.

Our G-SIB Indicator disclosure is published annually on the HSBC website, www.hsbc.com.

Capital and Risk Management Pillar 3 Disclosures at 31 December 2016

Pillar 1 capital requirements and RWA flow

Pillar 1 covers the capital resources requirements for credit risk, counterparty credit risk, equity, securitisation, market risk and

operational risk. These requirements are expressed in terms of RWAs.

Risk category	Scope of permissible approaches	Approach adopted by HSBC
Credit risk	The Basel Committee 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 IRB foundation 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 IRB advanced approach allows banks to use their own internal assessment in both determining PD and quantifying EAD and LGD.	For consolidated Group reporting, we have adopted the advanced IRB approach for the majority of our business. Some portfolios remain on the standardised or foundation IRB 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	Three approaches to calculating CCR and determining exposure values are defined by the Basel Committee: mark-to-market, standardised and Internal Model Method ('IMM'). These exposure values are used to determine capital requirements under one of the	We use the mark-to-market and IMM

	credit risk approaches; standardised, IRB foundation or IRB advanced.	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 non-trading book, equity exposures can be assessed under standardised or IRB approaches.	For Group reporting purposes all equity exposures are treated under the standardised approach.
Securitisation	Basel specifies two methods for calculating credit risk requirements for securitisation positions in the non-trading book: 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’).	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. Securitisation positions in the trading book are treated within the market risk framework, using the CRD IV standard rules.
Market risk	Market risk capital requirements can be determined under either the standard rules or 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. In addition to the VaR models, other internal models include Stressed VaR, Incremental Risk Charge ('IRC') and Comprehensive Risk Measure.	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 set out in Articles 104

		and 105 of the Capital Requirements Regulation.
Operational risk	The Basel Committee allows for firms to calculate their operational risk capital requirement under the basic indicator approach, the standardised approach or the advanced measurement approach.	We have historically adopted and currently use the standardised approach in determining our operational risk capital requirement. We have in place an operational risk model which is used for economic capital calculation purposes.

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Table 9: Total RWAs by risk type

	RWAs	Capital required[1]
	$bn	$bn
Credit risk	655.7	52.5
Standardised approach	166.3	13.3
IRB foundation approach	25.9	2.1
IRB advanced approach	463.5	37.1
Counterparty credit risk	62.0	5.0
Standardised approach	15.0	1.2
– CCR standardised approach	2.8	0.2
– credit valuation adjustment	10.9	0.9
– central counterparty	1.3	0.1
Advanced approach	47.0	3.8
– CCR IRB approach	43.5	3.5
– credit valuation adjustment	3.5	0.3
Market risk	41.5	3.3
Internal model based	36.5	3.0
– VaR	8.7	0.7
– stressed VaR	15.8	1.3
– incremental risk charge	9.5	0.8
– other VaR and stressed VaR	2.5	0.2
Standardised approach	5.0	0.3
– interest rate positions risk	1.5	0.1
– foreign exchange position risk	0.3	—
– equity position risk	1.7	0.1
– commodity position risk	—	—
– securitisation	1.5	0.1
– options	—	—
Operational risk	98.0	7.8
At 31 Dec 2016	857.2	68.6

1 ‘Capital required’ here and in all tables where the term is used, represents the Pillar 1 capital charge at 8% of RWAs.

Table 10: Overview of RWAs

			a	b	c
			2016	2015	2016
			RWA	RWA	Capital required
		Footnote	$bn	$bn	$bn
1	Credit risk (excluding counterparty credit risk)		589.1	818.7	47.1
2	Standardised approach (‘SA’)		120.6	303.9	9.6
3	Internal rating-based (‘IRB’) approach		468.5	514.8	37.5
4	Counterparty credit risk		61.8	69.1	5.0
5	Standardised approach for counterparty credit risk (‘SA-CCR’)	1	47.4	55.0	3.8
6	Internal model method (‘IMM’)		14.4	14.1	1.2
11	Settlement risk		0.2	0.1	—
12	Securitisation exposures in non-trading book		21.8	29.1	1.8
13	IRB ratings-based approach (‘RBA’)		20.7	28.2	1.7
14	IRB Supervisory Formula Approach (‘SFA’)		0.2	0.2	—

15	SA/simplified supervisory formula approach (‘SSFA’)	0.9	0.7	0.1
16	Market risk	41.5	42.5	3.3
17	Standardised approach (‘SA’)	5.0	7.6	0.4
18	Internal model approaches (‘IMA’)	36.5	34.9	2.9
19	Operational risk	98.0	115.4	7.8
21	Standardised Approach	98.0	115.4	7.8
23	Amounts below the thresholds for deduction (subject to 250% risk weight)	44.8	28.1	3.6
24	Floor adjustment	—	—	—
25	Total	857.2	1,103.0	68.6

1 Prior to the implementation of SA-CCR, this row represents the RWA under the mark-to-market method.

Capital and Risk Management Pillar 3 Disclosures at 31 December 2016

Credit Risk, including amounts below the thresholds for deduction

During the financial year RWAs decreased by $212.9bn, of which $38.1bn was due to foreign currency translation differences. The main drivers of these reductions were the change of regulatory treatment of our investment in BoCom, which has reduced credit risk RWAs by $136.0bn and increased our significant investments subject to 250% risk weight by $24.3bn. In addition, the sale of our operations in Brazil and continued reductions in US run-off portfolios reduced RWAs by $36.9bn and $23.2bn, respectively.

Counterparty credit risk

Overall counterparty credit risk RWAs reduced by $7.3bn, due to reductions from RWA initiatives of $17.3bn offset by increases of $10.0bn, which were predominantly due to trading activity in the first half of the year and the impact of negative interest rates and exchange rate movements. RWA initiatives comprised various trade actions including portfolio compression and trade novation to central counterparties $7.3bn, the implementation of a new internal model to reflect the current interest rate environment $3.8bn, various other process and data refinements $3.8bn, and the disposal of our operations in Brazil $2.4bn.

Securitisation in non-trading book

The $7.3bn RWA reduction arises predominantly from disposals of investments in traditional securitisations.

Market risk

Overall market risk RWAs fell by $1.0bn in the year, comprised of a $2.6bn decrease related to the standardised approach offset by a $1.6bn increase under internal models.

The reduction in RWAs related to the standardised approach was driven by a $2.1bn saving through a reduction in legacy positions held in CoCo and securitisation bonds and a $0.5bn reduction due to the disposal of our operations in Brazil. Under internal models, movements in risk levels led to an increase of $5.3bn, primarily driven by increases in the VaR and sVaR due to position changes following the modelling impact of external market risk parameters (predominantly in interest rate risk). Offsetting this increase, was a reduction of $3.7bn due to RWA initiatives, described in more detail under table 13.

Operational risk

During the year, operational risk reduced by $17.4bn mainly due to the change in regulatory treatment of BoCom $10.0bn and the three-year income averaging effect.

Table 11: RWA flow statements of credit risk exposures under IRB

		a RWA $bn
1	At 31 Dec 2015	514.8
2	Asset size	30.7
3	Asset quality	14.0
4	Model updates	(0.9)
5	Methodology and policy	0.5
6	Acquisitions and disposals	—
7	Foreign exchange movements	(28.7)
10	RWA initiatives	(61.9)
8	Other	—
9	At 31 Dec 2016	468.5

RWAs decreased in 2016 by $46.3bn, of which $28.7bn was due to foreign currency translation differences.

RWA initiatives

The main drivers of these reductions were:

- $29.8bn as a result of reduced exposures, refined calculations and process improvements;

- $23.2bn through the continued reduction in US run-off portfolios; and
- $9.0bn from the sale of our activities in Brazil.

Asset size

Asset size movements increased RWAs by $30.7bn, principally as a result of a corporate book growth in Europe and Asia.

Table 12: RWA flow statements of CCR exposures under IMM

		a
		RWA
		$bn
1	At 31 Dec 2015	14.1
2	Asset size	3.7
3	Asset quality	0.2
4	Model updates	—
5	Methodology and policy	—
	– internal updates	—
	– external regulatory updates	—
6	Acquisitions and disposals	—
7	Foreign exchange movements	—
10	RWA initiatives	(3.6)
8	Other	—
9	At 31 Dec 2016	14.4

Modelled counterparty credit risk RWAs increased by $0.3bn over the year.

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RWA initiatives

Reviews of the client portfolio and the renegotiation of Credit Support Annex ('CSA') terms led to savings of $3.6bn with an additional $1.1bn of savings due to calculation improvements.

These were broadly offset by a $1.1bn increase following the PRA approval and subsequent implementation of a new IMM model (this resulted in a net saving of $3.8bn across both the IMM and standardised approach portfolios).

Table 13: RWA flow statements of market risk exposures under an IMA

		a	b	c	e	f
		VaR	Stressed VaR	IRC	Other	Total RWA[1]
		$bn	$bn	$bn	$bn	$bn
1	At 31 Dec 2015	8.6	12.8	11.4	2.1	34.9
2	Movement in risk levels	2.4	2.9	(0.5)	0.5	5.3
3	Model updates/changes	—	—	—	—	—
4	Methodology and policy	—	—	—	—	—
5	Acquisitions and disposals	—	—	—	—	—
6	Foreign exchange movements	—	—	—	—	—
9	RWA initiatives	(2.3)	—	(1.4)	—	(3.7)
7	Other	—	—	—	—	—
8	At 31 Dec 2016	8.7	15.7	9.5	2.6	36.5

1 Internal model based RWAs as defined under CRD IV, including those undertakings which are outside the scope of line by line consolidation.

Market risk RWAs arising from internal models increased by $1.6bn over the year, mainly coming from the modelling impact of external market risk parameter changes leading to additional capital requirements as described above.

RWA Initiatives

Savings of $3.7bn of RWAs were partly due to the active risk management of the overall IRC position within Global Markets, creating savings of $1.5bn. Various changes to models comprised the remaining RWA initiatives, post the relevant PRA approvals, which included: the inclusion of the equity skew risk within VaR models and the removal of the corresponding risk not in VaR; the incorporation of the currency of collateral within risk pricing; and the refinement of risk model calculations for FX options and deal contingent swaps.

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 EEA 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 Guidance ('ICG') or minimum capital requirements for HSBC, and the PRA to define the PRA buffer, where required. Under the revised Pillar 2 PRA regime, which came into effect from 1 January 2016, 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 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 ICG and any PRA buffer that may be required.

Within Pillar 2, 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 to be 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 ICG 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 a firm's risk management and governance to be 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 regulatory and economic capital viewpoints, aiming 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 bank 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 influence 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 risksensitive 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 management of risk. 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, and to a 99.5% level of confidence for our insurance activities and pension 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 and operational risk, interest rate risk in the banking book, insurance risk, pension risk, residual 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 Chief Risk Officer 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, owning our credit policy and credit systems programmes, overseeing portfolio management and reporting on risk matters to senior executive management and to 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 102 of the Annual Report and Accounts 2016.

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.

Credit risk operates 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, global credit risk function.

Risk proposals in certain portfolios – sovereign obligors, banks, some non-bank financial institutions and intra-Group exposures – are approved centrally in Global Risk to facilitate efficient control and the reporting of regulatory large and cross-border exposures.

Credit risk management

Our exposure to credit risk arises from a wide range of customer and product types, 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 loan impairments, 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 37 .

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. For central management and reporting purposes, Group IT systems to 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 over-ridden 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 and 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 also the comments on 'Model performance' on page 48.

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 37, and throughout HSBC such models fall directly under the remit of the global functional MOCs. Additionally, the global functional MOCs are responsible for the approval of stress testing models used for regulatory stress testing exercises such as those carried out by the European Banking Authority ('EBA') and the Bank of England.

The global functional MOCs are responsible for defining which models require their approval.

Wholesale MOC requires all credit risk models for which it is responsible to be approved by delegated senior managers with notification to the committee that retains the responsibility for oversight. RBWM MOC applies materiality thresholds for approval at the committee. For models falling below these thresholds, final approval is delegated to regional committees or Regional Heads of RBWM Risk.

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 (IMR) function which is separate from our Risk Analytics functions that are responsible for the development of models.

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

Credit quality of assets

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.

Table 14: Credit quality of assets

		a	b	c	d
		Gross carrying values of			
		Defaulted exposures	Non-defaulted exposures	Allowances/ impairments	Net values (a+b-c)
		$bn	$bn	$bn	$bn
1	Loans	17.9	1,067.8	8.3	1,077.4
2	Debt Securities	—	377.4	—	377.4
3	Off-balance sheet exposures	1.5	735.0	0.3	736.2
4	Total at 31 Dec 2016	19.4	2,180.2	8.6	2,191.0

Table 15: Credit risk exposure – summary

	Footnotes	Exposure value	Average exposure value[3]	RWAs	Capital required
		$bn	$bn	$bn	$bn
IRB advanced approach		1,450.7	1,502.4	463.5	37.1
– central governments and central banks		339.4	346.6	35.4	2.8
– institutions		75.7	81.1	15.0	1.2
– corporates	1	583.1	591.2	314.0	25.1
– total retail		366.8	388.0	66.1	5.3
– of which:					
secured by mortgages on immovable property SME		1.5	2.4	0.3	–
secured by mortgages on immovable property non-SME		249.0	263.9	36.5	2.9
qualifying revolving retail		64.0	65.7	14.7	1.2
other SME		8.7	10.5	4.5	0.4
other non-SME		43.6	45.5	10.1	0.8
IRB securitisation positions		33.8	37.4	20.9	1.7
IRB non-credit obligation assets		51.9	58.1	12.1	1.0
IRB foundation approach		42.8	44.7	25.9	2.1

– central governments and central banks		0.1	0.1	–	–
– institutions		0.3	0.3	0.1	–
– corporates		42.4	44.3	25.8	2.1
Standardised approach		334.1	493.3	166.3	13.3
– central governments and central banks		167.3	192.9	14.7	1.2
– institutions		2.1	22.9	1.0	0.1
– corporates		78.4	164.4	75.0	6.0
– retail		22.0	35.5	16.3	1.3
– secured by mortgages on immovable property		25.7	35.5	9.3	0.7
– exposures in default		3.3	4.2	4.3	0.3
– regional governments or local authorities		2.9	2.8	0.9	0.1
– equity	2	15.2	10.5	33.6	2.7
– items associated with particularly high risk		3.4	4.2	5.1	0.4
– securitisation positions		0.9	0.8	0.9	0.1
– claims in the form of Collective investment undertakings (‘CIU’)		0.5	0.5	0.5	–
– international organisations		2.7	2.8	–	–
– multilateral development banks		0.2	0.2	–	–
– other items		9.5	16.1	4.7	0.4
At 31 Dec 2016		1,827.6	2,040.4	655.7	52.5

Capital and Risk Management Pillar 3 Disclosures at 31 December 2016

Table 15: Credit risk exposure – summary (continued)

	Footnotes	Exposure value $bn	Average exposure value[3] $bn	RWAs $bn	Capital required $bn
IRB advanced approach		1,510.8	1,564.0	515.8	41.3
– central governments and central banks		327.4	331.8	49.4	4.0
– institutions		90.5	114.3	18.4	1.5
– corporates	1	597.3	617.0	314.3	25.1
– total retail		404.5	412.4	93.2	7.4
– of which:					
secured by mortgages on immovable property SME		2.9	3.0	0.6	–
secured by mortgages on immovable property non-SME		275.4	283.0	60.0	4.8
qualifying revolving retail		67.8	67.0	15.3	1.2
other SME		12.1	12.9	5.8	0.5
other non-SME		46.3	46.5	11.5	0.9
IRB securitisation positions		40.9	36.6	28.4	2.3
IRB non-credit obligation assets		50.2	51.9	12.1	1.0
IRB foundation approach		43.7	36.2	27.4	2.2
– central governments and central banks		0.1	0.1	–	–
– institutions		0.3	0.2	0.2	–
– corporates		43.3	35.9	27.2	2.2
Standardised approach		592.0	592.3	332.7	26.6
– central governments and central banks		199.9	194.5	20.0	1.6
– institutions		38.9	34.2	14.7	1.2
– corporates		226.4	234.3	210.6	16.8
– retail		44.2	45.7	32.5	2.6
– secured by mortgages on immovable property		40.3	39.4	14.4	1.2
– exposures in default		4.9	4.6	6.4	0.5
– regional governments or local authorities		2.8	1.9	1.0	0.1
– equity	2	7.0	9.1	12.2	1.0
– items associated with particularly high risk		4.4	4.4	6.6	0.5
– securitisation positions		0.7	0.6	0.7	0.1
– claims in the form of CIU		0.5	0.6	0.5	–
– international organisations		2.6	2.9	–	–
– other items		19.4	20.1	13.1	1.0
At 31 Dec 2015		2,146.5	2,192.5	875.9	70.1

1 Corporates includes specialised lending exposures subject to supervisory slotting approach of $33.1bn (2015: $24.9bn) and RWAs of $22.2bn (2015: $18.2bn).

2 This includes investment in Insurance companies that are risk weighted at 250%.

3 Average exposures are calculated by aggregating exposure value of the last five quarters and dividing by five.

Capital and Risk Management Pillar 3 Disclosures at 31 December 2016

Table 16: Credit risk exposure – by geographical region

		Exposure value					
		Europe	Asia	MENA	North America	Latin America	Total
	Footnotes	$bn	$bn	$bn	$bn	$bn	$bn
IRB advanced approach		459.1	693.8	22.9	263.1	11.8	1,450.7
– central governments and central banks		37.2	205.4	14.0	73.6	9.2	339.4
– institutions		14.2	52.5	1.8	6.8	0.4	75.7
– corporates	1	183.0	264.5	6.4	128.6	0.6	583.1
– total retail		187.9	130.4	—	48.5	—	366.8
– of which:							
secured by mortgages on immovable property SME		0.6	0.6	—	0.3	—	1.5
secured by mortgages on immovable property non-SME		118.5	90.6	—	39.9	—	249.0
qualifying revolving retail		28.0	32.2	—	3.8	—	64.0
other SME		8.4	0.1	—	0.2	—	8.7
other non-SME		32.4	6.9	—	4.3	—	43.6
IRB securitisation positions		29.0	0.8	—	4.0	—	33.8
IRB non-credit obligation assets		7.8	40.2	0.7	1.6	1.6	51.9
IRB foundation approach		26.1	—	16.7	—	—	42.8
– central governments and central banks		—	—	0.1	—	—	0.1
– institutions		—	—	0.3	—	—	0.3
– corporates		26.1	—	16.3	—	—	42.4
Standardised approach		172.2	85.8	41.3	15.6	19.2	334.1
– central governments and central banks		131.7	27.5	3.0	4.3	0.8	167.3
– institutions		0.3	0.2	1.4	0.2	—	2.1
– corporates		21.9	18.2	22.2	5.5	10.6	78.4
– retail		1.9	7.9	6.5	1.4	4.3	22.0
– secured by mortgages on immovable property		5.2	14.0	3.6	1.1	1.8	25.7
– exposures in default		1.0	0.4	1.2	0.3	0.4	3.3
– regional governments or local authorities		—	—	2.4	—	0.5	2.9
– equity	2	1.4	12.1	0.2	1.1	0.4	15.2
– items associated with particularly high risk		2.8	—	0.1	0.4	0.1	3.4
– securitisation positions		—	0.8	—	—	0.1	0.9
– claims in the form of CIU		0.4	—	0.1	—	—	0.5
– international organisations		2.7	—	—	—	—	2.7
– multilateral development banks		—	—	0.2	—	—	0.2
– other items		2.9	4.7	0.4	1.3	0.2	9.5
At 31 Dec 2016		657.4	779.6	80.9	278.7	31.0	1,827.6

Capital and Risk Management Pillar 3 Disclosures at 31 December 2016

Table 16: Credit risk exposure – by geographical region (continued)

		Exposure value					
		Europe	Asia	MENA	North America	Latin America	Total
	Footnotes	$bn	$bn	$bn	$bn	$bn	$bn
IRB advanced approach		541.8	659.5	25.6	261.4	22.5	1,510.8
– central governments and central banks		37.4	189.3	17.2	66.1	17.4	327.4
– institutions		26.1	52.4	1.0	9.0	2.0	90.5
– corporates	1	215.2	254.4	6.3	120.8	0.6	597.3
– total retail		217.8	126.4	–	60.3	–	404.5
– of which:							
secured by mortgages on immovable property SME		2.0	0.6	–	0.3	–	2.9
secured by mortgages on immovable property non-SME		136.7	88.6	–	50.1	–	275.4
qualifying revolving retail		33.2	30.6	–	4.0	–	67.8
other SME		11.6	0.1	–	0.4	–	12.1
other non-SME		34.3	6.5	–	5.5	–	46.3
IRB securitisation positions		36.9	0.3	–	3.7	–	40.9
IRB non-credit obligation assets		8.4	36.7	1.1	1.5	2.5	50.2
IRB foundation approach		27.7	–	16.0	–	–	43.7
– central governments and central banks		–	–	0.1	–	–	0.1
– institutions		–	–	0.3	–	–	0.3
– corporates		27.7	–	15.6	–	–	43.3
Standardised approach		164.4	302.0	51.2	30.8	43.6	592.0
– central governments and central banks		121.8	65.9	4.8	5.3	2.1	199.9
– institutions		0.2	36.6	2.0	0.1	–	38.9
– corporates		22.8	132.2	28.2	18.6	24.6	226.4
– retail		2.4	21.6	8.6	1.7	9.9	44.2
– secured by mortgages on immovable property		5.1	27.3	3.6	1.0	3.3	40.3
– exposures in default		1.1	0.4	1.0	0.8	1.6	4.9
– regional governments or local authorities		–	–	2.1	–	0.7	2.8
– equity	2	2.0	2.8	0.2	1.5	0.5	7.0
– items associated with particularly high risk		2.7	–	0.1	1.0	0.6	4.4
– securitisation positions		–	0.7	–	–	–	0.7
– claims in the form of CIU		0.3	–	0.2	–	–	0.5
– international organisations		2.6	–	–	–	–	2.6
– multilateral development banks		–	–	–	–	–	–
– other items		3.4	14.5	0.4	0.8	0.3	19.4
At 31 Dec 2015		733.9	961.5	92.8	292.2	66.1	2,146.5

For footnotes, see page 23.

Capital and Risk Management Pillar 3 Disclosures at 31 December 2016

Table 17: Credit risk RWAs – by geographical region

		RWAs					
		Europe	Asia	MENA	North America	Latin America	Total
	Footnotes	$bn	$bn	$bn	$bn	$bn	$bn
IRB advanced approach		152.4	197.6	7.7	100.7	5.1	463.5
– central governments and central banks		3.9	15.9	5.3	6.4	3.9	35.4
– institutions		3.2	9.4	0.4	1.6	0.4	15.0
– corporates	1	98.4	143.4	1.7	70.3	0.2	314.0
– total retail		21.6	23.7	—	20.8	—	66.1
– of which:							
secured by mortgages on immovable property SME		0.2	—	—	0.1	—	0.3
secured by mortgages on immovable property non-SME		6.0	14.1	—	16.4	—	36.5
qualifying revolving retail		5.4	8.2	—	1.1	—	14.7
other SME		4.4	—	—	0.1	—	4.5
other non-SME		5.6	1.4	—	3.1	—	10.1
IRB securitisation positions		20.5	0.1	—	0.3	—	20.9
IRB non-credit obligation assets		4.8	5.1	0.3	1.3	0.6	12.1
IRB foundation approach		16.1	—	9.8	—	—	25.9
– central governments and central banks		—	—	—	—	—	—
– institutions		—	—	0.1	—	—	0.1
– corporates		16.1	—	9.7	—	—	25.8
Standardised approach		37.3	62.4	31.5	17.9	17.2	166.3
– central governments and central banks		3.1	1.5	0.7	8.2	1.2	14.7
– institutions		0.1	0.2	0.6	0.1	—	1.0
– corporates		21.0	17.2	21.2	5.0	10.6	75.0
– retail		1.4	5.9	4.8	1.1	3.1	16.3
– secured by mortgages on immovable property		2.0	4.9	1.3	0.5	0.6	9.3
– exposures in default		1.3	0.5	1.5	0.6	0.4	4.3
– regional governments or local authorities		—	—	0.6	—	0.3	0.9
– equity	2	2.7	29.1	0.2	1.1	0.5	33.6
– items associated with particularly high risk		4.2	—	0.2	0.6	0.1	5.1
– securitisation positions		—	0.7	—	—	0.2	0.9
– claims in the form of CIU		0.4	—	0.1	—	—	0.5
– international organisations		—	—	—	—	—	—
– other items		1.1	2.4	0.3	0.7	0.2	4.7
At 31 Dec 2016		205.8	260.0	49.0	118.6	22.3	655.7

Capital and Risk Management Pillar 3 Disclosures at 31 December 2016

Table 17: Credit risk RWAs – by geographical region (continued)

		RWAs					
		Europe	Asia	MENA	North America	Latin America	Total
	Footnotes	$bn	$bn	$bn	$bn	$bn	$bn
IRB advanced approach		173.9	195.9	10.7	122.5	12.8	515.8
– central governments and central banks		4.3	19.2	7.8	8.5	9.6	49.4
– institutions		4.7	9.0	0.3	2.5	1.9	18.4
– corporates	1	107.6	140.4	2.2	63.8	0.3	314.3
– total retail		25.2	21.8	–	46.2	–	93.2
– of which:							
secured by mortgages on immovable property SME		0.5	–	–	0.1	–	0.6
secured by mortgages on immovable property non-SME		7.5	12.5	–	40.0	–	60.0
qualifying revolving retail		6.1	8.0	–	1.2	–	15.3
other SME		5.6	–	–	0.2	–	5.8
other non-SME		5.5	1.3	–	4.7	–	11.5
IRB securitisation positions		27.9	0.1	–	0.4	–	28.4
IRB non-credit obligation assets		4.2	5.4	0.4	1.1	1.0	12.1
IRB foundation approach		17.5	–	9.9	–	–	27.4
– central governments and central banks		–	–	–	–	–	–
– institutions		–	–	0.2	–	–	0.2
– corporates		17.5	–	9.7	–	–	27.2
Standardised approach		40.2	177.7	38.6	33.9	42.3	332.7
– central governments and central banks		2.6	3.0	0.6	9.3	4.5	20.0
– institutions		0.1	13.7	0.8	0.1	–	14.7
– corporates		22.7	117.9	26.7	18.3	25.0	210.6
– retail		1.7	16.2	6.3	1.2	7.1	32.5
– secured by mortgages on immovable property		1.9	9.5	1.4	0.4	1.2	14.4
– exposures in default		1.3	0.5	1.4	1.2	2.0	6.4
– regional governments or local authorities		–	–	0.5	–	0.5	1.0
– equity	2	4.2	5.5	0.2	1.5	0.8	12.2
– items associated with particularly high risk		4.0	–	0.2	1.5	0.9	6.6
– securitisation positions		–	0.6	–	–	0.1	0.7
– claims in the form of CIU		0.3	–	0.2	–	–	0.5
– international organisations		—	—	—	—	—	—
– other items		1.4	10.8	0.3	0.4	0.2	13.1
At 31 Dec 2015		231.6	373.6	59.2	156.4	55.1	875.9

For footnotes, see page 23.

Capital and Risk Management Pillar 3 Disclosures at 31 December 2016

Table 18: Credit risk exposure – by industry sector

		Exposure value								
		Personal	Manufacturing	International trade and services	Property and other business activities	Government and public administration	Other commercial	Financial	Non-customer assets	Tota
	Footnotes	$bn	$bn	$bn	$bn	$bn	$bn	$bn	$bn	$bn
IRB advanced approach		357.4	120.1	124.5	165.3	131.4	77.7	422.4	51.9	1,45
– central governments and central banks		—	—	0.2	—	115.3	—	223.9	—	339.
– institutions		—	—	—	—	—	0.3	75.4	—	75.7
– corporates	1	0.3	119.8	123.4	157.6	15.8	77.0	89.2	—	583.
– total retail		357.1	0.3	0.9	7.7	0.3	0.4	0.1	—	366.
– of which: secured by mortgages on immovable property SME		0.5	—	0.1	0.8	0.1	—	—	—	1.5
secured by mortgages on immovable property non-SME		249.0	—	—	—	—	—	—	—	249.
qualifying revolving retail		64.0	—	—	—	—	—	—	—	64.0
other SME		—	0.3	0.8	6.9	0.2	0.4	0.1	—	8.7
other non-SME		43.6	—	—	—	—	—	—	—	43.6
IRB securitisation positions		—	—	—	—	—	—	33.8	—	33.8
IRB non-credit obligation assets		—	—	—	—	—	—	—	51.9	51.9
IRB foundation approach		0.2	13.3	10.8	5.6	0.7	8.2	4.0	—	42.8
– central governments and central		—	—	—	—	—	—	0.1	—	0.1

banks									
– institutions	—	—	0.2	—	0.1	—	—	—	0.3
– corporates	0.2	13.3	10.6	5.6	0.6	8.2	3.9	—	42.4
Standardised approach	48.9	16.2	16.9	28.3	79.9	10.6	111.5	21.8	334.
– central governments or central banks	—	0.1	0.2	—	73.1	—	88.2	5.7	167.
– institutions	—	—	—	—	—	—	2.1	—	2.1
– corporates	1.6	15.3	16.1	26.2	2.0	9.9	7.3	—	78.4
– retail	20.7	0.1	0.1	0.7	0.1	0.1	0.2	—	22.0
– secured by mortgages on immovable property	25.3	—	—	0.3	—	0.1	—	—	25.7
– exposures in default	1.3	0.5	0.4	0.5	0.1	0.4	0.1	—	3.3
– regional governments or local authorities	—	—	—	—	1.7	—	1.2	—	2.9
– equity [2]	—	—	—	0.1	0.2	—	2.6	12.3	15.2
– items associated with particularly high risk	—	—	0.1	0.3	—	0.1	2.9	—	3.4
– securitisation positions	—	—	—	—	—	—	0.9	—	0.9
– claims in the form of CIU	—	—	—	—	—	—	0.5	—	0.5
– international organisations	—	—	—	—	2.7	—	—	—	2.7
– multilateral development banks	—	—	—	—	—	—	0.2	—	0.2
– other items	—	0.2	—	0.2	—	—	5.3	3.8	9.5
At 31 Dec 2016	406.5	149.6	152.2	199.2	212.0	96.5	537.9	73.7	1,82

Capital and Risk Management Pillar 3 Disclosures at 31 December 2016

Table 18: Credit risk exposure – by industry sector (continued)

		Exposure value								
		Personal	Manufacturing	International trade and services	Property and other business activities	Government and public administration	Other commercial	Financial	Non-customer assets	Tota
	Footnotes	$bn	$bn	$bn	$bn	$bn	$bn	$bn	$bn	$bn
IRB advanced approach		390.2	125.3	136.6	158.7	137.3	87.3	425.2	50.2	1,51
– central governments and central banks		–	–	0.1	–	119.9	–	207.4	–	327.
– institutions		–	–	–	–	0.8	0.1	89.6	–	90.5
– corporates	1	0.4	124.9	135.4	146.4	16.3	86.7	87.2	–	597.
– total retail		389.8	0.4	1.1	12.3	0.3	0.5	0.1	–	404.
– of which: secured by mortgages on immovable property SME		0.5	–	0.1	2.3	–	–	–	–	2.9
secured by mortgages on immovable property non-SME		275.4	–	–	–	–	–	–	–	275.
qualifying revolving retail		67.8	–	–	–	–	–	–	–	67.8
other SME		–	0.4	1.0	10.0	0.1	0.5	0.1	–	12.1
other non-SME		46.1	–	–	–	0.2	–	–	–	46.3
IRB securitisation positions		–	–	–	–	–	–	40.9	–	40.9
IRB non-credit obligation assets		–	–	–	–	–	–	–	50.2	50.2
IRB foundation approach		–	11.9	10.6	8.3	0.7	7.9	4.3	–	43.7
– central governments and central banks		–	–	–	–	–	–	0.1	–	0.1

– institutions	–	–	–	–	–	–	0.3	–	0.3
– corporates	–	11.9	10.6	8.3	0.7	7.9	3.9	–	43.3
Standardised approach	83.5	57.9	45.4	49.8	97.2	41.8	201.9	14.5	592.
– central governments and central banks	–	0.1	–	–	70.2	–	121.9	7.7	199.
– institutions	–	–	–	–	–	–	38.9	–	38.9
– corporates	1.5	56.2	43.5	46.1	21.9	40.2	17.0	–	226.
– retail	40.8	0.6	1.0	1.2	0.1	0.3	0.2	–	44.2
– secured by mortgages on immovable property	39.7	0.1	–	0.4	–	0.1	–	–	40.3
– exposures in default	1.5	0.9	0.8	0.8	0.1	0.7	0.1	–	4.9
– regional governments or local authorities	–	–	–	–	2.3	–	0.5	–	2.8
– equity 2	–	–	–	0.1	–	–	3.4	3.5	7.0
– items associated with particularly high risk	–	–	0.1	1.1	–	0.5	2.7	–	4.4
– securitisation positions	–	–	–	–	–	–	0.7	–	0.7
– claims in the form of CIU	–	–	–	–	–	–	0.5	–	0.5
– international organisations	–	–	–	–	2.6	–	–	–	2.6
– multilateral development banks	–	–	–	–	–	–	–	–	–
– other items	–	–	–	0.1	–	–	16.0	3.3	19.4
At 31 Dec 2015	473.7	195.1	192.6	216.8	235.2	137.0	631.4	64.7	2,14

For footnotes, see page 23.

Capital and Risk Management Pillar 3 Disclosures at 31 December 2016

Table 19: Credit risk exposure – by maturity

		Exposure value				
		Less than 1 year	Between 1 and 5 years	More than 5 years	Undated	Total
	Footnotes	$bn	$bn	$bn	$bn	$bn
IRB advanced approach		625.2	378.1	395.7	51.7	1,450.7
– central governments and central banks		203.9	87.7	47.8	—	339.4
– institutions		55.0	19.8	0.9	—	75.7
– corporates	1	274.4	241.8	66.9	—	583.1
– total retail		80.8	21.8	264.2	—	366.8
– of which:						
secured by mortgages on immovable property SME		0.2	0.3	1.0	—	1.5
secured by mortgages on immovable property non-SME		1.7	4.1	243.2	—	249.0
qualifying revolving retail		64.0	—	—	—	64.0
other SME		2.0	4.8	1.9	—	8.7
other non-SME		12.9	12.6	18.1	—	43.6
IRB securitisation positions		11.0	6.9	15.9	—	33.8
IRB non-credit obligation assets		0.1	0.1	—	51.7	51.9
IRB foundation approach		19.4	19.4	4.0	—	42.8
– central governments and central banks		—	—	0.1	—	0.1
– institutions		—	0.3	—	—	0.3
– corporates		19.4	19.1	3.9	—	42.4
Standardised approach		168.1	77.7	56.0	32.3	334.1
– central governments and central banks		101.9	40.6	19.0	5.8	167.3
– institutions		1.1	0.3	0.7	—	2.1
– corporates		50.1	21.1	7.2	—	78.4
– retail		8.2	9.4	4.4	—	22.0
– secured by mortgages on immovable property		2.0	2.5	21.2	—	25.7
– exposures in default		1.7	0.7	0.9	—	3.3
– regional governments or local authorities		1.2	0.4	1.3	—	2.9
– equity	2	—	—	—	15.2	15.2
– items associated with particularly high risk		0.4	0.6	0.1	2.3	3.4
– securitisation positions		0.2	—	0.7	—	0.9
– claims in the form of CIU		0.4	—	—	0.1	0.5
– international organisations		0.4	2.0	0.3	—	2.7
– multilateral development banks		0.2	—	—	—	0.2
– other items		0.3	0.1	0.2	8.9	9.5
At 31 Dec 2016		812.7	475.2	455.7	84.0	1,827.6

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Table 19: Credit risk exposure – by maturity (continued)

		Exposure value				
		Less than 1 year	Between 1 and 5 years	More than 5 years	Undated	Total
	Footnotes	$bn	$bn	$bn	$bn	$bn
IRB advanced approach		654.2	376.1	430.4	50.1	1,510.8
– central governments and central banks		200.9	75.6	50.9	—	327.4
– institutions		66.9	20.1	3.5	—	90.5
– corporates	1	289.8	246.0	61.5	—	597.3
– total retail		86.7	23.8	294.0	—	404.5
– of which:						
secured by mortgages on immovable property SME		0.2	0.4	2.3	—	2.9
secured by mortgages on immovable property non-SME		2.4	4.2	268.8	—	275.4
qualifying revolving retail		67.8	—	—	—	67.8
other SME		2.4	6.4	3.3	—	12.1
other non-SME		13.9	12.8	19.6	—	46.3
IRB securitisation positions		9.9	10.5	20.5	—	40.9
IRB non-credit obligation assets		—	0.1	—	50.1	50.2
IRB foundation approach		20.0	19.1	4.6	—	43.7
– central governments and central banks		—	—	0.1	—	0.1
– institutions		0.1	0.2	—	—	0.3
– corporates		19.9	18.9	4.5	—	43.3
Standardised approach		230.0	207.5	120.8	33.7	592.0
– central governments and central banks		126.2	48.0	18.0	7.7	199.9
– institutions		22.4	0.5	16.0	—	38.9
– corporates		60.1	136.7	29.6	—	226.4
– retail		11.9	14.1	18.2	—	44.2
– secured by mortgages on immovable property		2.3	2.6	35.4	—	40.3
– exposures in default		2.6	1.2	1.1	—	4.9
– regional governments or local authorities		1.2	1.2	0.4	—	2.8
– equity	2	—	—	—	7.0	7.0
– items associated with particularly high risk		0.4	1.6	0.7	1.7	4.4
– securitisation positions		—	—	0.7	—	0.7
– claims in the form of CIU		0.4	—	—	0.1	0.5
– international organisations		0.4	1.6	0.6	—	2.6
– multilateral development banks		—	—	—	—	—
– other items		2.1	—	0.1	17.2	19.4
At 31 Dec 2015		904.2	602.7	555.8	83.8	2,146.5

For footnotes, see page 23.

Past due but not impaired exposures, impaired exposures, renegotiated exposures and credit risk adjustments

Tables 20 to 23 analyse past due but not impaired exposures, impaired exposures, renegotiated exposures and impairment allowances and other credit risk provisions on a regulatory consolidation basis. These tables use accounting values. The proportional consolidation of associates is the main difference between the amounts presented here and those on a financial consolidation basis.

Our approach for determining impairment allowances is explained on page 231 of the Annual Report and Accounts 2016, and the Group's definitions for accounting purposes of 'past due', 'impaired' and 'renegotiated' are set out on pages 121, 123 and 107, respectively. The accounting definition of impaired and the regulatory definition of default are generally aligned. In certain jurisdictions, for certain retail exposures, regulatory default is identified at 180 days past due, while the exposures are identified as impaired at 90 days past due. In the retail portfolio in the US, for accounting purposes, a renegotiation would normally trigger identification as 'impaired', whereas for regulatory purposes, default is identified mainly based on the 180 days past due criterion.

Under the accounting standards currently adopted by HSBC, impairment allowances, value adjustments and credit-related provisions for off-balance sheet amounts are treated as specific Credit risk adjustments ('CRAs').

Table 20: Ageing analysis of accounting past due and not impaired exposures

	Europe	Asia	MENA	North America	Latin America	Total
Up to 29 days	876	2,769	1,163	2,016	395	7,219
30-59 days	220	506	177	402	86	1,391
60-89 days	110	187	136	128	48	609
90-179 days	—	11	38	3	—	52
180 days and over	—	11	11	—	—	22
Total at Dec 2016	1,206	3,484	1,525	2,549	529	9,293

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Table 21: Breakdown of renegotiated exposures between impaired and non-impaired exposures

	First lien residential mortgages	Other personal lending	Corporate and commercial	Non-bank financial institutions	Renegotiated loans at 31 Dec 2016
	$m	$m	$m	$m	$m
Neither past due nor impaired	976	282	1,848	260	3,366
Past due but not impaired	346	78	301	—	725
Impaired	2,751	325	5,416	257	8,749
Renegotiated loans at 31 Dec 2016	4,073	685	7,565	517	12,840
Impairment allowances on renegotiated loans	267	150	1,667	130	2,214
Neither past due nor impaired	3,973	716	2,152	391	7,232
Past due but not impaired	1,753	243	123	24	2,143
Impaired	6,556	733	6,094	201	13,584
Renegotiated loans at 31 Dec 2015	12,282	1,692	8,369	616	22,959
Impairment allowances on renegotiated loans	871	251	2,097	120	3,339

Table 22: Amount of impaired exposures and related allowances, broken down by geographical region

	Europe	Asia	MENA	North America	Latin America	Total
31 Dec 2016	$m	$m	$m	$m	$m	$m
Past due but not impaired exposures	1,206	3,484	1,525	2,549	529	9,293
– personal	769	2,351	558	1,399	381	5,458
– corporate and commercial	423	1,084	861	754	146	3,268
– financial	14	49	106	396	2	567
Impaired exposures	8,137	2,561	2,449	5,891	621	19,659
– personal	1,953	579	545	4,226	261	7,564
– corporate and commercial	5,903	1,954	1,726	1,660	360	11,603
– financial	281	28	178	5	—	492
Impairment allowances and other credit risk provisions	(2,859)	(1,640)	(1,942)	(1,705)	(486)	(8,632)
– personal	(530)	(283)	(571)	(605)	(263)	(2,252)
– corporate and commercial	(2,114)	(1,348)	(1,185)	(1,080)	(223)	(5,950)
– financial	(215)	(9)	(186)	(20)	–	(430)
31 Dec 2015						
Past due but not impaired exposures	1,589	4,925	1,498	5,466	1,252	14,730
– personal	876	2,935	605	3,332	790	8,538
– corporate and commercial	699	1,948	795	1,868	460	5,770
– financial	14	42	98	266	2	422
Impaired exposures	10,385	4,095	2,801	9,135	3,151	29,567
– personal	2,121	817	642	8,130	857	12,567

– corporate and commercial	6,582	3,267	1,920	1,003	2,285	15,057
– financial	1,682	11	239	2	9	1,943
Impairment allowances and other credit risk provisions	(3,503)	(4,087)	(2,035)	(2,235)	(2,168)	(14,028)
– personal	(653)	(735)	(562)	(1,232)	(872)	(4,054)
– corporate and commercial	(2,655)	(3,339)	(1,279)	(971)	(1,296)	(9,540)
– financial	(195)	(13)	(194)	(32)	–	(434)

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Table 23: Movement in specific credit risk adjustments by industry and geographical region

	Europe	Asia	MENA	North America	Latin America	Total
	$m	$m	$m	$m	$m	$m
Specific credit risk adjustments at 1 Jan 2016	3,503	4,087	2,035	2,235	2,168	14,028
Amounts written off	(1,141)	(648)	(363)	(665)	(637)	(3,454)
– personal	(412)	(358)	(208)	(284)	(340)	(1,602)
– corporate and commercial	(728)	(285)	(137)	(381)	(297)	(1,828)
– financial	(1)	(5)	(18)	–	–	(24)
Recoveries of amounts written off in previous years	260	149	44	73	100	626
– personal	225	124	34	54	78	515
– corporate and commercial	33	24	10	18	22	107
– financial	2	1	–	1	–	4
Charge to income statement	575	675	352	796	1,164	3,562
– personal	155	274	226	219	832	1,706
– corporate and commercial	386	399	113	587	332	1,817
– financial	34	2	13	(10)	–	39
Exchange and other movements	(338)	(2,623)	(126)	(734)	(2,309)	(6,130)
Specific credit risk adjustments at 31 Dec 2016	2,859	1,640	1,942	1,705	486	8,632
Specific credit risk adjustments at 1 Jan 2015	3,946	3,883	2,117	2,764	2,621	15,331
Amounts written off	(1,123)	(595)	(508)	(662)	(1,306)	(4,194)
– personal	(467)	(416)	(273)	(554)	(997)	(2,707)
– corporate and commercial	(644)	(179)	(235)	(106)	(309)	(1,473)
– financial	(12)	–	–	(2)	–	(14)
Recoveries of amounts written off in previous years	368	165	53	76	146	808
– personal	320	135	50	57	119	681
– corporate and commercial	46	30	3	18	27	124
– financial	2	–	–	1	–	3
Charge to income statement	563	1,392	507	547	1,450	4,459
– personal	109	334	281	157	983	1,864
– corporate and commercial	440	1,058	216	397	467	2,578
– financial	14	–	10	(7)	–	17
Exchange and other movements	(251)	(758)	(134)	(490)	(743)	(2,376)
Specific credit risk adjustments at 31 Dec 2015	3,503	4,087	2,035	2,235	2,168	14,028

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. Specifically, detailed policies cover the acceptability, structuring and terms with regard to the availability of credit risk mitigation; for example 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 SMEs are commonly granted against guarantees given by their owners and/or directors.

For credit risk mitigants comprising 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 130 and 136, respectively, of the Annual Report and Accounts 2016.

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 78.

In the non-trading book, we provide customers with working capital management products. Some of these products have loans and advances to customers, and customer accounts where we have rights of offset and comply with the regulatory requirements for on-balance sheet netting. Under on-balance 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 2016, circa $35bn 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. Where collateral is subject to high volatility, valuation is frequent; where stable, less so. For market trading activities such as collateralised over-the-counter (‘OTC’) derivatives and 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. It is assumed that the guarantor’s performance materially informs the PD of the guaranteed entity. 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 the guarantor’s PD.

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, or both;
- 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; and
- for all other types of collateral, including real estate, the LGD for exposures calculated under the IRB advanced approach are 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 51 in Appendix I 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 2016.

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 credit derivatives, the exposure is divided into covered and uncovered portions. The covered portion, which is determined after applying an appropriate 'haircut' for currency and maturity mismatches (and for omission of restructuring clauses for credit derivatives, where appropriate) to the amount of the protection provided, attracts the risk weight of the protection provider. The uncovered portion attracts the risk weight of the obligor. For exposures fully or partially covered by eligible financial collateral, the value of the exposure is adjusted under the financial collateral comprehensive method using supervisory volatility adjustments, including those arising from currency mismatch, which are determined by the specific type of collateral (and, in the case of eligible debt securities, their credit quality) and its liquidation period. The adjusted exposure value is subject to the risk weight of the obligor.

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Table 24: Credit risk mitigation techniques – overview

		a	b	c	d	e	f	g
		Exposures unsecured: carrying amount	Exposures secured by collateral	of which: secured amount	Exposures secured by financial guarantees	of which: secured amount	Exposures secured by credit derivatives	of which: secured amount
		$bn	$bn	$bn	$bn	$bn	$bn	$bn
1	Loans	601.2	402.0	362.2	68.1	64.4	6.1	5.0
2	Debt securities	370.1	2.0	1.9	5.3	5.2	—	—
3	Total at 31 Dec 2016	971.3	404.0	364.1	73.4	69.6	6.1	5.0
4	Of which defaulted	9.5	4.3	3.1	0.1	—	—	—

Table 25: Standardised approach – credit risk exposure and Credit Risk Mitigation (CRM) effects

		a	b	c	d	e	f
		Exposures before CCF and CRM		Exposures post-CCF and CRM		RWA and RWA density	
		On-balance sheet amount	Off-balance sheet amount	On-balance sheet amount	Off-balance sheet amount	RWA	RWA density %
		$bn	$bn	$bn	$bn	$bn	$bn
	Asset classes[1]						
1	Central governments and central banks	161.9	1.5	166.2	1.1	14.7	9
2	Institutions	2.2	—	2.1	—	1.0	46
3	Corporates	80.2	79.9	66.3	12.1	75.0	96
4	Retail	22.7	44.2	21.6	0.4	16.3	74
5	Secured by mortgages on immovable property	25.5	0.8	25.5	0.2	9.3	36
6	Exposures in default	3.2	0.4	3.2	0.1	4.3	130
7	Regional governments or local authorities	2.9	0.3	2.9	—	0.9	32
8	Equity exposures	15.2	—	15.2	—	33.6	221
9	Items associated with particularly high risk	2.1	1.4	2.1	1.3	5.1	150
10	Claims in the form of CIU	0.5	—	0.5	—	0.5	100
11	Public sector entities	—	—	—	—	—	—
12	Claims on institutions and corporates with a short-term credit assessment	—	—	—	—	—	—
13	Covered bonds	—	—	—	—	—	—
14	International organisations	2.7	—	2.7	—	—	—
15	Multilateral development banks	0.2	—	0.2	—	—	5
16	Other items	9.5	—	9.5	—	4.7	50
17	Total at 31 Dec 2016	328.8	128.5	318.0	15.2	165.4	50

1 Securitisation positions are not included in this table.

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Table 26: Standardised approach – exposures by asset classes and risk weights

		a	b	e	f	g	h	i	j	k	l	p
	Risk weight	0 %	2 %	20 %	35 %	50 %	70 %	75 %	100 %	150 %	250 %	Total credit exposure amount (post-CCF and post-CRM)
		$bn	$bn	$bn	$bn	$bn	$bn	$bn	$bn	$bn	$bn	$bn
	Asset classes[1]											
1	Central governments or central banks	160.4	—	0.8	—	0.3	—	—	0.2	—	5.6	167.3
2	Institutions	—	0.1	0.8	—	0.7	—	—	0.5	—	—	2.1
3	Corporates	—	—	2.1	0.2	2.7	0.1	—	72.6	0.7	—	78.4
4	Retail	—	—	—	—	—	—	22.0	—	—	—	22.0
5	Secured by mortgages on immovable property	—	—	—	25.2	—	—	—	0.5	—	—	25.7
6	Exposures in default	—	—	—	—	—	—	—	1.3	2.0	—	3.3
7	Regional governments or local authorities	0.2	—	1.8	—	0.7	—	—	0.2	—	—	2.9
8	Equity exposures	—	—	—	—	—	—	—	2.9	—	12.3	15.2
9	Items associated with particularly high risk	—	—	—	—	—	—	—	—	3.4	—	3.4
10	Claims in the form of CIU	—	—	—	—	—	—	—	0.5	—	—	0.5
11	Public sector entities	—	—	—	—	—	—	—	—	—	—	—
12	Claims on institutions and corporates with a short-term credit assessment	—	—	—	—	—	—	—	—	—	—	—
13	Covered bonds	—	—	—	—	—	—	—	—	—	—	—
14	International organisations	2.7	—	—	—	—	—	—	—	—	—	2.7
15	Multilateral development banks	0.1	—	0.1	—	—	—	—	—	—	—	0.2
16	Other items	0.7	—	5.1	—	—	—	—	3.7	—	—	9.5
17	Total at 31 Dec 2016	164.1	0.1	10.7	25.4	4.4	0.1	22.0	82.4	6.1	17.9	333.2

1 Securitisation positions are not included in this table.

Table 27: IRB – Effect on RWA of credit derivatives used as CRM techniques

		a	b
		Pre-credit derivatives RWA	Actual RWA
		$bn	$bn
	IRB advanced approach[1]		
2	Central governments and central banks	5.9	5.9
4	Institutions	2.7	2.7
6	Total corporates	119.6	118.5
6.1	– corporates – SME	—	—
6.2	– corporates – specialised lending	14.4	14.4
6.3	– corporates – other	105.2	104.1
14	Equity	—	—

20	Total retail	31.5	31.5
10	– Secured by mortgages on immovable property SME	—	—
10.1	– Secured by mortgages on immovable property non-SME	18.4	18.4
9	– Qualifying revolving retail exposures	4.4	4.4
18	– Other SME	3.0	3.0
19	– Other non-SME	5.7	5.7
	IRB foundation approach		
1	Central governments and central banks	—	—
3	Institutions	—	—
5	Total corporates	0.3	0.3
5.1	– corporates – SME	—	—
5.2	– corporates – specialised lending	—	—
5.3	– corporates – other	0.3	0.3
13	Equity	—	—
	Total at 31 Dec 2016	160.0	158.9

1 Securitisation positions are not included in this table.

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Table 28: Credit derivatives exposures

	Footnote	a 2016 Protection bought $bn	b Protection sold $bn	a 2015 Protection bought $bn	b Protection sold $bn
Notionals					
Credit derivative products used for own credit portfolio					
– Index credit default swaps		4.6	1.9	3.5	0.7
– Total return swaps		—	—	—	—
Total notionals		4.6	1.9	3.5	0.7
Credit derivative products used for intermediation	1				
– Index credit default swaps		214.6	207.4	222.5	217.7
– Total return swaps		12.3	7.0	11.2	7.7
Total notionals		226.9	214.4	233.7	225.4
Total credit derivative notionals		231.5	216.3	237.2	226.1
Fair values					
– Positive fair value (asset)		2.3	2.9	5.1	2.2
– Negative fair value (liability)		(3.1)	(2.7)	(1.8)	(3.9)

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.

The above table 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 the resulting credit risk impact is seen in table 28 above and no counterparty credit risk capital requirement arises. For a discussion on hedging risk and monitoring the continuing effectiveness of hedges refer to page 233 of the Annual Report and Accounts 2016.

Global risk

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.

Roll-out of the IRB approach

With the PRA's permission, we have adopted the advanced approach for the majority of our business. At the end of 2016, 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 2016, 80% of the exposures were treated under advanced IRB, 2% under foundation IRB and 18% under standardised approach.

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.

This analysis includes comparison of the EL calculated in the use of IRB risk rating models, which drives part of the regulatory capital calculation, with other reported measures of credit loss within financial statements prepared under IFRSs. These measures include loan impairment allowances, value adjustments and credit-related provisions for off-balance sheet amounts, collectively referred to as CRAs. The excess of EL over CRAs is treated as a capital deduction in the composition of regulatory capital.

The disclosures below set out:

- commentary on aspects of the relationship between regulatory EL and CRAs recognised in our financial statements; and
- tables of EL and CRA balances, and charges during the period by exposure class (within retail IRB, also by sub-class) and by region.

When comparing EL with measures of credit losses under IFRSs, it is necessary to take into account differences in the definition and scope of each. Below are examples of matters that 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.

Tables 49 and 50 in Appendix I set out for IRB credit exposures the EL, CRA balances and actual loss experience reflected in the charges for CRAs.

CRA balances represent management's best estimate of losses incurred in the loan portfolios at the balance sheet date. Charges for CRAs represent a movement in the CRA balance during the year, reflecting loss events that occurred during the financial year and changes in estimates of losses arising on events that occurred prior to the current year. EL represents the one-year regulatory expected loss accumulated in the book and is calculated at a PIT.

Examples of differences in definition and scope between EL and CRA balances:

- Under IAS 39, our estimates of loss in impairment allowances are required to reflect the current circumstances and specific cash flow expectations of a customer. EL is based on modelled estimates and although the estimates may be individually assigned to specific exposures, the statistical nature of these models means that they are influenced by the behaviour of the overall portfolio;
- EL is based on exposure values that incorporate expected future drawings of committed credit lines, while CRAs are recognised in respect of financial assets recognised on the balance sheet and in respect of committed credit lines where a loss is probable;
- EL is generally based on through-the-cycle ('TTC') estimates of PD over a one-year future horizon, determined via statistical analysis of historical default experience. CRAs are recognised for losses that have been incurred at the balance sheet date;
- in the majority of cases, EL is based on economic downturn estimates of LGD, while CRAs are measured using estimated future cash flows at the balance sheet date;
- EL incorporates LGD, which may discount recoveries at a different rate from the effective interest rate employed in discounted cash flow analysis for CRAs;
- LGDs typically include all costs associated with recovery, whereas the accounting measurement considers only the costs of obtaining and selling collateral;
- In the foundation IRB approach, LGD and the conversion factors used to calculate EAD are set by regulations, and may differ significantly from the accounting assumptions about estimated cash flows;
- for EL, certain exposures are subject to regulatory minimum thresholds for one or more parameters, whereas credit losses under IFRSs are determined using management's judgement about estimated future cash flows; and
- in the case of EL, to meet regulatory prudential standards, HSBC's model philosophy favours the incorporation of conservative estimation to accommodate uncertainty; for instance where modelling portfolios with limited data. Under IFRSs, uncertainty is considered when forming management's estimates of future cash flows, using balanced and neutral judgement.

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 Institution ('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;
- institutions;
- corporates;
- securitisation positions;
- short-term claims on institutions and corporates;
- regional governments and local authorities; and

- multilateral development banks.

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'). 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 assessments	S&P's assessments	Fitch's assessments
1	Aaa to Aa3	AAA to AA–	AAA to AA–
2	A1 to A3	A+ to A–	A+ to A–
3	Baa1 to Baa3	BBB+ to BBB–	BBB+ to BBB–
4	Ba1 to Ba3	BB+ to BB–	BB+ to BB–
5	B1 to B3	B+ to B–	B+ to B–
6	Caa1 and below	CCC+ and below	CCC+ and below

Exposures to, or guaranteed by, central governments and central banks of European Economic Area ('EEA') States and denominated in local currency are risk-weighted at 0% using the standardised approach, provided they would be eligible under that approach for a 0% risk weighting.

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 estimated using a 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.

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 finally assigned CRR determines the applicable master-scale PD range from which the reference PD is 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. 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 approaches in table 51 and for the standardised approach in table 52.

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 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, PD models are differentiated 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. This includes 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 2016, we continued to apply LGD floors for our banks portfolio and some Asian corporate portfolios where there were insufficient loss observations.
In the same guidance, the PRA also indicated that it considered 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.
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 Asia models, all of which are developed using more than 10 years' worth of data. The LGD models are calibrated to a period of credit stress or downturn in economic conditions.
None of the EAD models are 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 29 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 29: Wholesale IRB credit risk models

Regulatory asset classes measured	RWAs for associated asset class $bn	Component	Number of significant models	Model description and methodology	Number of years loss data	Regulatory Floors
Central governments and central banks	35.4	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	45%
		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
Institutions	15.1	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	45%
		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]	317.6					
Global 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%
Other regional / local corporates		PD	11	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-bank financial institutions	PD	10	Predominantly statistical models that combines 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 45%
	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 56a&b).

Capital and Risk Management Pillar 3 Disclosures at 31 December 2016

Table 30: IRB models – estimated and actual values (wholesale)[1]

		PD[2]		LGD[3]		EAD[4]	
		Estimated	Actuals	Estimated[5]	Actuals[5]	Estimated	Actuals
	Footnotes	%	%	%	%	%	%
2016							
– Sovereigns model	6	3.43	—	45.00	—	—	—
– Banks model		1.63	—	—	—	—	—
– Corporates models	7	1.79	1.23	37.71	29.43	0.91	0.76